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THE ROLE OF BOND FINANCE IN FIRMS' SURVIVAL DURING THE ASIAN CRISIS

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The Role of Bond Finance in Firms' Survival During the Asian Crisis*

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Abstract

In this paper we assess the effects of bond financing on firms' survival during the 1997-98 Asian crisis. Using a novel database covering the period 1995 to 2007 for five Asian economies most affected by the crisis - Indonesia, Korea, Malaysia, Singapore and Thailand - we find strong evidence that the Asian crisis affected both directly and indirectly (through interactions with financial indicators) the probability of survival. More importantly, we show that bond issuers, irrespective of the currency denomination, are more likely to survive compared to non-issuers. Nevertheless, only firms issuing bonds in local currency are shielded from the adverse effects of the crisis.

Keywords: Bond Financing, Financial Crisis, Firm Survival, East Asia
JEL Classification: F32, F34, G15, L20

1.   Introduction

What is the effect of bond financing on corporate failures? Bolton and Freixas (2008) argue that bond financing, as a form of long-term finance, does not expose firms to the risks of bank runs and systemic crises. While bank-financed firms are fully exposed to the risk of bank loans, bond-financed firms are shielded from the adverse effects of a financial crisis and therefore are more likely to survive. It is generally accepted that during hard times lenders are more likely to withhold funds and interrupt lines of credit to less creditworthy firms forcing some of them to fail.

The main goal of this paper is to quantify the effects (and assess the importance) of bond financing in influencing firm survival. We do this using a novel dataset that combines several sources including Thomson Financial Primark, Bondware, Bloomberg, Zephyr and the Asian Development Bank. We then go further to examine if bond-financed firms are shielded from the adverse effects of the Asian crisis. Given that bond markets in Asia were largely underdeveloped during the crisis it is not clear whether access to financial markets dampened the effects of the crisis. We are able therefore to assess the potential offsetting role of bond finance in determining business failure. The East Asian twin crisis (currency and banking crisis) is an ideal setting to study the link between firms' survival and access to bond markets because during this period most corporations were heavily dependent on domestic and foreign bank finance to supplement internal funds for investment, with smaller and medium sized enterprises almost exclusively reliant on domestic bank loans. When the crisis erupted the funding to banks and then to corporations fell dramatically, and in the absence of local corporate bond markets to provide an alternative source of funding the effects of the crisis were amplified (Eichengreen *et al.,* 2006).

The theoretical motivation for the role of bond financing in survival is related to the 'track record' reputation that firms can establish in the bond market. Reputation, which is a concept that was made popular by Diamond (1991), is based on the history of firms' credit risk and can be used to access the bond market under favourable terms. Firms with access to bond markets are able to bear the significant fixed cost of issuing a bond, which is generally higher than the fixed cost of taking out a bank loan, and thus to give a good signal to lenders for their reputation. These reputational effects may become even more relevant during periods of economic crises where bond issuers might be able to overcome financial problems by extending external finance and re-negotiating existing bank loans. For example, banks could re-schedule the loans for issuers and trade creditors may extend their funding to support customers with long-lasting relationships. This may not be the case for bank dependent non-issuing firms that do not have established a track record in the market. Non-issuers therefore may find it more expensive to obtain external funding at times of hardship. These considerations suggest that reputational effects for bond issuers can be beneficial for their survival, especially during economic crises.

Figure 1 presents prima facie evidence suggesting that East Asian firms with access to bond markets may be better equipped to weather systemic crises. Using our data to compare issuers and non-issuers, we show that the latter category exhibits significantly more failures throughout the sample period. Importantly, this difference is even more pronounced during the crisis. For example, in the year 1997 the number of failing firms that do not have access in the bond market (non-issuers) is about 12 times higher compared to bond issuers. This startling difference between issuers and non-issuers may be explained by the fact that the former group of firms has an established 'track record' in the market and therefore is associated with the lower degree of informational asymmetry.

Our work is related to three different strands of literature. First, we build on the empirical and theoretical literature that looks at the importance of financial status and borrowing constraints on firms' survival and concludes that firms in bad financial shape are more likely to fail (see Zingales, 1998; Bunn and Redwood, 2003; Clementi and Hopenhayn, 2006; Farinha and Santos, 2006; and Bridges and Guariglia, 2008). A second relevant strand of literature has emphasised the important role of the macroeconomic environment on survival. Alvarez and Görg (2009) offer evidence from Latin America and Bhattcharjee *et al.* (2009) from the UK showing that changes in the macroeconomic environment may interact with relevant firm and industry features in amplifying exit hazards. A third related line of work is the literature on the financial development of emerging economies. According to BIS (2005) reports, the development of the financial system in general will help firms to better endure financial crises and avoid currency mismatches. However, the progress of development in Asia, especially for corporate bonds, remains painfully slow (Borensztein *et al.*, 2006; Eichengreen *et al.,* 2006).

The value added of the present paper is threefold. First, we look at the role of bond financing in firms' survival. It is well known that in the presence of information asymmetries in capital markets, firms prefer internal to external finance, but at some point as firms grow, self-funding typically becomes insufficient to finance their investment projects and so they turn to sources of external finance from the markets, in preferential order for equity, debt and banks.[1] In this paper, we focus on bond finance and investigate whether being a bond issuer is more of an advantage in attenuating failure hazards. We also consider the currency denomination of bonds, distinguishing between domestic and foreign issued bonds. Second, we examine the link between firm survival and the 1997-98 East Asian crisis controlling for a number of firm-specific, industry-specific indicators and macroeconomic factors. We explore the direct and the indirect effect (through interactions with financial indicators) of the financial crisis on firm survival, using comparable micro level panel of five economies - Indonesia, Korea, Malaysia, Singapore and Thailand - that were hit the hardest during this period. Finally, the implications of the crisis on survival are assessed for bond issuers and non-issuers as well as for domestic and foreign currency bonds.

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[1]   This sequence arises from the 'pecking-order' hypothesis by Myers and Majluf (1984) and a literature has developed to explore the composition of external finance based on this hypothesis.

The remainder of the paper is laid out as follows. Section two illustrates the empirical specifications and the econometric methodology. In Section three we present a descriptive analysis of our data. Section four presents the empirical evidence. In section five we check the robustness of our findings. Section six concludes the paper.

2.   Empirical Implementation

In this paper we focus on the link between firm survival and bond financing. Probit models are commonly used in the related empirical literature (for example Zingales, 1998; Greenaway *et al.,* 2008; and Baggs *et al.,* 2009). However, the issue of endogeneity in our empirical specifications, which are enriched with a set of firm-specific financial indicators, is likely to be of particular importance.[2] We address this issue by allowing the firm-specific variables to be endogenous and then instrumenting for them through a two-stage procedure.[3] Our approach to employ instrumental variable techniques in the estimations is formally justified by using a Wald test of exogeneity. We report p-values of the test at the foot of the tables of results. In all cases the Wald test emphatically rejects the null of exogeneity in our regressors vindicating our endogenous approach.

Our empirical modelling strategy is motivated by Clementi and Hopenhayn (2006) who develop a theory of borrowing constraints and study its implications for firm survival among other firm dynamics. Their model generates a role for capital structure in an asymmetric information setup.[4] Accordingly, we include measures of financial healthiness along with a number of controls to specify a baseline model as follows:

$$Pr(FAIL_{it} = 1) = F\big(a_0 + a_1 LEVERAGE_{it} + a_2 PROFIT_{it} + a_3 COLLATERAL_{it} + a_4 SIZE_{it} + a_5 SIZE_{it}^2$$
$$+ a_6 AGE_{it} + a_7 EXCHANGE_t + a_8 MES_j + \epsilon_{it}\big) \tag{2.1}$$

where FAIL is a dummy variable that equals 1 if firm *i* fails in year *t*, and 0 otherwise. We define a firm as failed in a given year when its company status is that of dead.[5] *F*(.) denotes the standard normal distribution function.

To incorporate a role for finance in the survival model, as suggested by Clementi and Hopenhayn (2006), we consider three dimensions of financial health from the balance sheet, namely leverage, profitability

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[2]   As it has been emphasised for linear models, endogeneity in binary choice models results in biased coefficients and, therefore, incorrect inferences (Maddala, 1983; and Rivers and Vuong, 1988).

[3]   In the absence of a formal test for the validity of instruments in the endogenous probit setup, we employ a linear instrumental variables model with the same set of instruments and the Sargan test statistic suggests that the instruments are valid.

[4]   The theoretical frameworks on survival were first introduced by Hopehayn (1992) and Jovanovic (1982) without considering a role for moral hazard.

[5]   We elaborate on the construction of the failure dummy in the next section. Note that we use the terms failure and survival interchangeably.

and collateral assets.[6] The financial condition of the firm is an important determinant of firm failure as argued by Zingales (1998), Bunn and Redwood (2003) and Bridges and Guariglia (2008). Considering the likely response of leverage (*LEVERAGE*), as measured by the firm's total debt to total assets, we remark that high levels of existing debt are associated with a worse balance sheet situation, which would increase moral hazard and adverse selection problems, and lead to the inability of firms to obtain external finance at a reasonable cost (see Levin *et al.,* 2004). Zingales (1998), Farinha and Santos (2006) and Bridges and Guariglia (2008) show that highly leveraged carriers, start-ups and domestic firms are less likely to survive. We expect therefore a positive relationship between leverage and the probability of failure.

The next financial component is a profitability ratio (*PROFITABILITY*) defined as the ratio of the firm's profits before interest and tax to its total assets. Following Bunn and Redwood (2003) and Bridges and Guariglia (2008) we use this measure to proxy for the firm's ability to generate profits. We anticipate a positive relationship between profitability and the likelihood of survival.

As an additional financial indicator we include a measure of tangible assets, which indicates the firm's ability to pledge collateral for debt finance (*COLLATERAL*). Assets that are more tangible sustain more external financing because tangibility increases the value that can be recaptured by creditors in case of borrower's default. Collateral has also been found to affect firms' chances of survival. Farinha and Santos (2006) and Bridges and Guariglia (2008) document that firms with a larger fraction of tangibles in their balance sheets are more likely to survive for a longer period of time. Thus, we expect a negative relationship between collateral and the incidence of failure.

In addition to financial characteristics that follow from the theory, our specifications include a choice of control variables guided by the existing empirical and theoretical literature on the determinants of firm survival. It is recognised that a firm's size plays an important role in determining firm failure, (Clementi and Hopenhayn, 2006), and is expected to decrease the incidence of failure. Large firms tend to face lower barriers in accessing the capital markets, while smaller firms with more severe information problems tend to face a higher risk of insolvency and illiquidity and consequently a higher risk of failure (Mata and Portugal, 1994; Audretsch and Mahmood, 1995; and Dunne *et al.,* 1998). Hence, we introduce size (*SIZE*) measured as the logarithm of the firm's real total assets.[7] We also incorporate its square (*SIZE*^{2}) to allow for non-linearities. Further, we include firms' age since firms with an established track record are less likely to fail than those that are younger because new entrants face a greater risk of failure due to the 'liability of newness' effect (Stinchcombe, 1965). A large number of empirical and theoretical papers have shown that younger firms are more likely to fail (e.g Jovanovic, 1982; Audretsch and Mahmood, 1995;

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[6]   Our results were robust to using alternative measures of indebtedness, such as the firms' total (short- and long-term) debt to assets ratio. They were also robust to considering broader measures of profitability and collateral. The results based on these different financial variables are not reported for brevity, but are available upon request.

[7]   To check the robustness of our results we use two alternative measures of size such as the number of employees and real sales. Our results, not reported here for brevity, remain largely unaffected.

and Clementi and Hopenhayn, 2006) and this would be the case both for domestic and multinational firms as noted by Görg and Strobl (2002). Thus we introduce age (*AGE*) which measures the number of years a firm has been listed on the stock exchange.

We also attempt to control for macroeconomic and industry-specific conditions in our models. To this end we control for macroeconomic effects by adding the exchange rate, which measures the exchange rate environment. Baggs *et al.* (2009) document a negative association between survival and appreciation of the Canadian dollar. We expect the exchange rate (*EXCHANGE*) to be positively associated with the firm's probability to fail. To control for economies of scale of the industry, we add the minimum efficient scale of the industry (*MES*), measured as the log of median output in sector *j*.[8] Empirical evidence concerning the influence of MES on firm survival is ambiguous. At one extreme, one might expect firms entering industries with large minimum efficient scale to have lower probabilities of survival than firms entering other industries, (Mata and Portugal, 1994). At the other extreme, industries with high MES are usually also industries showing high price cost margins, which should increase firm survival (Audretsch, 1991). We expect MES to significantly affect firm survival but its sign will be determined by the data.

In order to establish whether firms' survival prospects change during periods of adverse economic events compared to tranquil periods, we model the determinants of firm survival and check whether the occurrence of a financial crisis is a statistically significant determinant of firms' probability of failure. To do so we include a time period dummy (*CRISIS*) that takes the value of 1 in years 1997-98, and 0 otherwise.[9] The direct effect of the financial crisis on failure is shown from the sign and significance of the coefficient a_9.

$$
\begin{aligned}
Pr(FAIL_{it} = 1) = F\big(a_0 + a_1 LEVERAGE_{it} + a_2 PROFIT_{it} + a_3 COLLATERAL_{it} + a_4 SIZE_{it} + a_5 SIZE_{it}^2 \\
+ a_6 AGE_{it} + a_7 EXCHANGE_t + a_8 MES_j + a_9 CRISIS_{it} + \epsilon_{it}\big)
\end{aligned} \tag{2.2}
$$

To examine the differential impact of the Asian crisis on firm survival, we include interaction terms of the crisis dummy with the financial indicators [*Financial indicator*Crisis*, *Financial indicator*(1-*Crisis*)]. This exercise is motivated by previous evidence which suggests that firms' real activities react differently during economic downturns than tranquil periods (Gertler and Gilchrist, 1994). This specification provides us with the indirect effect of the financial crisis on business failures, since we allow for the fact that firms with varying levels of profits, debt and collateral might respond to the crisis differently.

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[8]   We also employ the MES defined as the log of median employment size in the industry, used by Görg and Strobl (2003). Results remain largely unchanged.

[9]   As an additional test we have combined the crisis dummy with the change in trend to allow for a smooth transition to a newer state post-crisis. Our results were robust to replacing the crisis dummy with the interaction between the crisis dummy and the time trend.

At the next stage we specify an empirical model including the term *BOND* which is a dummy equal to 1 if firm *i* issues a bond in year *t*, and 0 otherwise. Thus, we record the bond history in each firm. This specification is aimed at capturing the direct impact of bond finance on firm survival. The direct effect is judged from the sign and significance of the coefficient a_9. The estimated model is specified as follows:

$$Pr(FAIL_{it} = 1) = F\big(a_0 + a_1 LEVERAGE_{it} + a_2 PROFIT_{it} + a_3 COLLATERAL_{it} + a_4 SIZE_{it} + a_5 SIZE_{it}^2$$
$$+ a_6 AGE_{it} + a_7 EXCHANGE_t + a_8 MES_j + a_9 BOND_{it} + \epsilon_{it}\big) \tag{2.3}$$

Equation (2.3) is modified to include interactions between bond issuers and non-issuers with the crisis dummy to show variations in firms' survival prospects. This test is motivated by the theoretical argument by Bolton and Freixas (2008), that bond-financed firms are shielded from the direct effect of a financial crisis. We focus on the sign and significance of the coefficients a_9 and a_{10}, where we suggest that the influence of bond finance is determined in conjunction with the Asian crisis.

$$Pr(FAIL_{it} = 1) = F\big(a_0 + a_1 LEVERAGE_{it} + a_2 PROFIT_{it} + a_3 COLLATERAL_{it} + a_4 SIZE_{it} + a_5 SIZE_{it}^2$$
$$+ a_6 AGE_{it} + a_7 EXCHANGE_t + a_8 MES_j + a_9 BOND_{it} * CRISIS_{it} + a_{10}(1 - BOND_{it})$$
$$* CRISIS_{it} + \epsilon_{it}\big) \tag{2.4}$$

Finally, we model the differential impact of currency denomination of bonds on the incidence of failure during the 1997-98 crisis.

3.   Data

3.1   Data Description

The data for this paper are drawn from different sources including Thomson Financial Primark, Bondware, Bloomberg, Zephyr and the Asian Development Bank. Previous studies on bond financing in the Asian region have been hindered by the absence of bond data at the micro level, but we are able to combine the above sources in a new way to cast light on the probability of failure in East Asia. The data cover firms in emerging Asia mostly affected by the 1997-98 crisis - Indonesia, Korea, Malaysia, Singapore and Thailand. The time period is 1995 through 2007, which covers the period of the East Asian crisis and the aftermath of the crisis which has been characterised by a significant regional development in terms of size, liquidity and sophistication.

The Thomson Financial Primark database offers balance sheet and profit and loss accounts data for firms in the East Asian region. Our initial dataset includes a total of 41,641 annual observations on 4,651 companies. We provide information on financial accounts and ratios for Asian firms operating in all sectors of the economy.

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The data on bond issues are drawn from Bondware and Bloomberg. We use Bondware to identify all corporate bonds issued in international markets and we use Bloomberg to identify similar data for firms that issue bonds in the domestic Asian markets. Our coverage of bond issues therefore embraces both firms with issues in hard currencies, which are almost exclusively US dollar denominated, and firms with local currency denominated bonds. Before the crisis, issuance in local currency bonds by corporations was very limited but in the post-crisis period it went up significantly (see Fernandez and Klassen, 2004; and Burger *et al.,* 2009). In our data 55% of bonds are denominated in domestic currency and the remaining 45% in foreign currency. Data on exchange rates, which are meant to proxy for changes in the macroeconomy, are taken from the Asian Development Bank.

We use Zephyr to obtain data on mergers and acquisitions for the sampled firms. Thomson Financial Primark reports firms as 'dead' but it may be possible that some firms could be recorded as 'dead' not because they failed but because they merged with another firm instead. Employing Zephyr we are able to identify and drop those firms that are mistakenly coded as 'dead' in our data. This will ensure that our dependent variable has been accurately constructed to capture firms that failed and did not exit the sample due to mergers and acquisitions.

Following normal selection criteria used in the literature, we exclude companies that did not have complete records for all explanatory variables and firm-years with negative sales. To control for the potential influence of outliers, we exclude observations in the 0.5 percent from upper and lower tails of the distribution of the regression variables. Our combined sample contains data for 358 firms in Indonesia, 917 in Korea, 871 in Malaysia, 596 in Singapore and 530 in Thailand, a total of 3,272 firms. Finally, by allowing for both entry and exit, the panel has an unbalanced structure which helps mitigate potential selection and survivor bias.

3.2   Sample Analysis

We begin our analysis by showing the evolution of failures over time in Figure 2. This figure shows that our sample is dominated by firms that failed in 1997 which coincided with the onset of the Asian crisis. Apart from this period the distribution of failures over time is reasonably stable. Summary statistics for the variables used in our empirical analysis are provided in Table 1. Means and standard deviations of the firm-specific variables and financial indicators are presented for the total sample (column 1), for failed and surviving firms (columns 2 and 3) and for those firms that are issuers and those that are non-issuers (columns 5 and 6). Further, the p-values of a test for the equality of means are presented in columns 4 and 7. Looking at columns 2 and 3 we observe that surviving firms are larger than failed firms. This finding implies that firm size is an important determinant in business failures. The proxy for age shows that survivors are also longer listed on the stock exchange suggesting that those firms that are able to build a track record in the market are more likely to reduce the incidence of failure. Regarding the financial variables, surviving firms display higher levels of profitability, they are more collateralized and

less indebted. Further, they are more likely to be bond issuers and less likely to be affected by the crisis. These differences between sub-samples are statistically significant in all cases.

On the basis of bond financing (columns 5 and 6), we observe that the average firm's failure rate for non-issuers (0.106) is almost 1.5 times higher than the corresponding figure for bond issuers (0.066). These statistics highlight the importance of bond financing in attenuating exit hazards. We find that firms with access to bond finance are larger, confirming the information asymmetry problem that small firms face (see Calomiris *et al.,* 1995). We also observe that bond issuers are more leveraged, consistent with the notion that higher levels of leverage are often perceived as a good sign of borrowing capacity in the bond markets (see Dennis and Mihov, 2003). They also have lower levels of profitability and collateral compared to non-issuers. The former finding shows that more profitable firms may find it optimum to delay their entry to bond markets consistent with the limited liquidity assumption. The latter result implies that having more tangible assets is not necessarily an advantage for bond issuance, unlike for bank finance where tangible assets can be pledged as collateral. In addition, bond issuers are less likely to fail during the financial crisis (0.079) in contrast with non-issuers (0.143).

In summary, these preliminary statistics suggest that firms' failure rates are largely related to bond finance, financial healthiness and the crisis. It remains to be seen, however, whether these findings continue to hold when we control for a number of factors which are known to play a role in survival models. In the sections that follow we provide formal econometric analysis of the determinants of firm failures, the effect of financial crisis, and the role of bond financing.

4.   Main Results

4.1   The Direct and Indirect Effect of the Asian Crisis on Failure

We begin our enquiry with a baseline model of business failure as shown in Equation (2.1). Table 2, column 1 summarises the results of the IV Probit where the probability of failure is modelled as a function of the firm-specific control variables, financial indicators, industry characteristics and macroeconomic conditions. This model is aimed at evaluating the impact of financial health on survival probabilities. The predicted probability of exit, evaluated at the mean of the independent variables is 7.3%, which is close to the actual exit rates reported in the summary statistics. To provide some interpretation of the estimated coefficients in column 1, we also report the marginal changes, evaluated at the sample means for each variable.

Financial indicators have the expected impact on firms' failure. In particular, firms with high levels of *LEVERAGE* face higher probabilities of failure compared to those with low leverage confirming previous reported empirical evidence (Zingales, 1998; Farinha and Santos, 2006; and Bridges and Guariglia, 2008).

High levels of debt would increase moral hazard and asymmetric information problems, and would lead to a higher probability of failure. The effect is economically important since a one percent increase in leverage would raise the probability of failure by 2.7%. This implies an increase in the predicted exit probability by 37% (2.7/7.3).

Next, *PROFITABILITY* measures the extent to which high-profitable firms face a lower risk of failure. It enters with the expected negative sign implying that an increase in the profitability ratio lowers the hazard of failure. Marginal changes suggest that a one percent increase in firms' profits would decrease failure rates by 0.07%. This result is consistent with previous findings that more profitable firms are less likely to fail (Bunn and Redwood, 2003; and Bridges and Guariglia, 2008).

The coefficient on *COLLATERAL*, the proxy for the degree of firms' collateralization, attracts the expected negative sign and it has a highly significant impact on firms' failure prospects. Firms with high levels of tangible assets are able to pledge collateral and to obtain more external funding but also to pursue risk-shifting strategies (Bridges and Guariglia, 2008; and Farinha and Santos, 2006). This effect is economically important since increasing collateral by one percent would reduce the incidence of failure by 4.86%.

With respect to our firm-specific controls, the results on *SIZE* and *SIZE*^{2} indicate that there is a non-linear relationship between firm size and the likelihood of survival. A significant coefficient of the squared logarithm of real total assets shows that the advantages of a bigger size decrease with increasing size, with the turning point being 12. The coefficient on firm *AGE* exerts a negative and significant impact on failure. This finding is in line with previous theoretical and empirical evidence which shows that younger firms that lack reputation in the market are more likely to fail (e.g Jovanovic, 1982; Audretsch and Mahmood, 1995; and Clementi and Hopenhayn, 2006).

The results on the *MES* and the exchange rate (*EXCHANGE*) behave as conjectured. Firms operating in industries with high MES are more likely to survive, which is consistent with Audretsch (1991), whereas the proxy for the macroeconomic condition attains a positive effect on failure which supports the theory that a stronger local currency raises the probability that firms will fail (Baggs *et al.,* 2009).

To assess the role of the East Asian financial crisis on firms' likelihood of failure, we first focus on the direct impact of the crisis on the probability of survival using the time-period *CRISIS* to indicate that firms faced the Asian crisis by estimating Equation (2.2). The third column of Table 2 shows that the coefficients on the control variables size, size squared, age, MES and EXCHANGE retain their signs and their significant impact on survival. As before, financial indicators also affect significantly firms' probability of failure. Focusing on the impact of the financial crisis dummy on the likelihood of failure we observe that during 1997 and 1998, East Asian firms were more likely to fail. More precisely, the coefficient on the dummy shows the positive and highly significant effect on the hazard of failure. Looking at column 4, the

marginal change is 7.71% supporting the view that during downturns economic activity faces a general slowdown which is likely to affect bank credit, business profitability and survival among other firms' real decisions.

To further scrutinise the impact of the financial crisis on the hazard of failure, we look into the indirect effect (through interactions with financial characteristics) of the crisis dummy on failure. We interact our financial indicators, leverage, profitability and collateral, with the *Crisis* and (1-*Crisis*) dummy to capture the sensitivity of survival to financial indicators in and out of the financial crisis. Imperfect capital markets generate a transmission mechanism through which an economic shock can generate large and persistent domestic balance sheet effects.[10] Previous evidence suggests that there is a significant difference in the response of firms' real activities in periods of recession versus non-recession (Gertler and Gilchrist, 1994). Thus, our objective is to check whether the impact of the financial crisis on failure can be amplified by firms with weak financial health.

The results in Table 3 reveal that all financial indicators (with the exception of profitability) present higher coefficients during the crisis compared to their coefficients out of the crisis and these are statistically different from each other.[11] The findings are economically important since a percentage increase in leverage would raise the probability of failure by 8.3% during the recession period and by only 1.07% during tranquil periods. The importance of good financial health in periods of economic slowdown is also observed on the coefficient for collateral. High levels of tangible assets boost the survival prospects of East Asian firms especially during the crisis. Marginal changes suggest that a percentage increase in collateral would reduce the incidence of failure by 22.43% during the crisis and by 15.45% out of the crisis. To summarise, we find that financial indicators are more important in explaining business failures during the financial crisis compared to tranquil periods, revealing that firms in good financial shape face higher probabilities of survival.

4.2   Bond Finance, Survival and the Asian Crisis

The East Asian financial system suffered severe damages during the crisis primarily due to the underdeveloped bond market and the weak banking sector. One basic premise of this paper is that access to bond finance is associated with the establishment of reputation in the market (Diamond, 1991). If reputational effects are in play we should expect to find bond issuers to be less likely to fail, everything else equal. In addition, we anticipate reputation to be of particular importance during the crisis where non-issuers, which are more informational opaque and lack track record, will have a higher probability of failure.

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[10]   According to the financial accelerator theory (Bernanke *et al.,* 1999), procyclical movements in the firm's balance sheets and net worth, and credit constraints can amplify and propagate the real or monetary policy shock.

[11]   The p-values for the test of equality for the coefficients on leverage and collateral are as follows: 0.007; 0.018.

In Table 4, columns 1 and 2, we show the direct impact of bond finance on failure as shown in Equation (2.3). In columns 3 and 4 we present the sensitivity of firms' survival probabilities to bond finance during the Asian crisis as shown in Equation (2.4). All the control and financial variables are correctly signed and retain their significance. Turning to the results of our main interest, we observe that the coefficient on the bond issuance dummy (column 1) exerts a negative impact on the likelihood of failure. Marginal effects suggest that the change in the likelihood of failure associated with a change in the dummy from 0 to 1 (non-issuer to issuer) is 5%. This implies a reduction in the predicted exit probability by 71% (5/7). Firms that are able to borrow through the issuance of bond debt are those that can bear the significant fixed cost of accessing the bond market, which is higher than the fixed cost of taking out a bank loan, and signal their lenders for their good reputation. Bond-financed firms might be able to overcome any credit burden and thus they are less likely to fail. This empirical result supports the argument of good reputation established through bond issuance. Further, we find that bond issuers remain unaffected during the crisis (column 3). The importance of reputation may become even more relevant during periods of economic crises where bond issuers might be able to overcome financial problems by extending external finance and re-negotiating existing bank loans. This finding confirms the argument of Bolton and Freixas (2008) that 'bond issuers are shielded from the direct effect of a financial crisis' (p. 37).[12] The opposite is true for non-issuers (column 4). Switching a firm's status from bond issuer to non-issuer would raise the incidence of failure by 8%.

Having presented the beneficial effects of bond issuance, we now check whether there is a differential impact of currency denomination of bonds on firms' failure probabilities during the crisis. In Table 4 we presented evidence that bond issuers are shielded from the crisis due to reputational effects. However, one plausible question is whether this argument holds if we consider the fact that some firms were relying on bonds denominated in foreign currency when the crisis burst in 1997. The World Bank (1999) reports that 58% of the long-term loans in the East Asia and Pacific were denominated in US dollars and over 20% in Japanese yen, whilst others were denominated in multiple currencies. The denomination of debt in foreign currencies was also extended in bond markets. After the devaluation of domestic currencies, indebted firms found it expensive to repay their foreign currency denominated debt.

In columns 1 and 2 of Table 5 we consider further the direct impact of bond issuance on survival but we make the distinction between firms that issue bond debt in foreign currency and those that issue bond debt in domestic currency. Therefore we construct the dummy *Domestic* which takes the value 1 if firm *i* issues a domestic bond in year *t*, and 0 otherwise and the dummy *Foreign* which is equal to 1 if firm *i* issues a foreign bond in year *t*, and 0 otherwise. We also introduce the dummy *Non-issuer* which takes the value 1 if firm *i* never issues a bond throughout the sample period, and 0 otherwise. The latter dummy is the omitted category in our specification. Looking at column 1 we observe that issuing in either local or

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[12]   It should be noted, however, that access to bond finance may not always be a panacea for all economies. During the 1997-98 crisis, corporate bond markets were largely underdeveloped and quickly evaporated when they needed the most. Eichengreen *et al.* (2006) report that bond markets in Asia were unable to provide a "spare tyre" during the crisis and bond yields on new issues skyrocketed.

foreign currency bonds would increase survival prospects.[13] Marginal effects in column 2 reveal that changing a firm's status from non-issuer to domestic (foreign) bond issuer implies an increase in the likelihood of survival by 6.34% (3.17%). This finding corroborates the reputational effect that was identified in Table 4. Next, columns 3 and 4 focus on the impact of the crisis on the hazard of failure for domestic issuers, foreign issuers and non-issuers. To interpret the indirect effect of the crisis we interact the three dummies with the crisis time period. The results show that domestic bond issuers are shielded from the impact of the crisis, whilst foreign bond issuers are fully exposed to the Asian crisis. Marginal changes reveal that the latter group of issuers faces a 3.46% higher probability of failure during the crisis. This reflects the fact that firms with foreign denominated lending had a particular problem since debts became much more burdensome on the firms when the exchange rate collapsed. Lastly, non-issuers face the highest probability of failure which is close to 8%.[14]

5.   Robustness Tests

Overall, our results suggest that bond financing plays an important offsetting role in firm survival. In this section we subject this finding to a number of checks in order to ensure robustness. These additional checks involve estimation of our main empirical specifications controlling for bank finance and trade credit, using proportional hazard models as well as propensity score matching techniques. The section offers a test of robustness of the results in Table 4 (where we look at the direct impact of bond finance on failure and its offsetting role during the crisis) and all the reported findings are compared to Table 4.

5.1   Controlling for Additional Sources of External Finance

Given that bond finance is not the only available option for firms' external finance, one concern is that other sources such as equity finance, bank finance and trade credit may have a central place in determining business failures. Our model controls for stock market reputation since we include the number of years a firm has been listed on the stock exchange, but it does not explicitly account for other options of external finance. Following Mateut *et al.* (2006) we consider trade credit, measured as the ratio of the firm's trade credit to its total liabilities, to account for firms that use trade credit as an additional source of external finance because they cannot get credit from banks. In addition, in the absence of data on the relationship between banks and firms we construct a bank finance variable, which is defined as the ratio of the firm's short-term debt to its total debt and it was first introduced by Kashyap *et al.* (1993), to control for the fact that Asian firms rely heavily on bank loans. We estimate therefore Equations (2.3) and (2.4) augmented with trade credit and bank finance.

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[13]   The p-value for the test of equality for the coefficients on foreign issuers and domestic issuers is 0.000.

[14]   The p-value for the test of equality for the coefficients on foreign issuers and non-issuers is 0.044.

We present these results in Table 6 and compare them with results in Table 4. The coefficient on the bank finance is insignificant and quantitatively unimportant and this is most likely due to the fact that we have already adequately controlled for bank loans in our leverage variable. Trade credit is positive and significant indicating that higher levels of debt from trade creditors would increase the probability of failure. Again, our financial indicators appear to be important determinants of firm failures and have the expected signs. In addition, our previous results on bond finance are re-confirmed in that bond issuers are more likely to survive and remain largely unaffected during the crisis. On the contrary, non-issuers are more likely to fail during the Asian crisis. In sum, we can conclude that our core findings are not materially affected by other sources of external finance.

5.2   Proportional Hazard Model

While our empirical models explicitly control for endogeneity in our regressors using IV techniques, firm failure studies often employ Cox proportional hazard models (e.g. Audretsch and Mahmood, 1995). This complements probit specifications as it models both the event of failure and the time it takes a firm to fail. To ensure that our results are robust to hazard models we estimate Equations (2.3) and (2.4) using the complementary log-log model (cloglog) which is equivalent to the discrete time version of the proportional hazard model.[15] Estimating the models with the complementary log-log model will allow us to capture the exact time of failure and the potential right censoring bias.

The results reported in columns 1 and 2 of Table 7 are quantitatively and qualitatively similar with those reported in Table 4. In particular, our financial indicators remain highly significant and carry the expected signs. With respect to the impact of bond finance on firm survival, we find that issuers are more likely to survive compared to non-issuers. In order to interpret the magnitude of the estimates we calculate the exponentiated coefficient of the bond dummy. This finding is economically important since the probability of failure is decreasing by 60%, which is consistent with the reduction in the predicted exit probability in Table 4 based on the bond dummy. In addition, we continue to find that bond issuers remain largely unaffected during the crisis, while non-issuers are more likely to fail during the same period. We therefore conclude that the offsetting role of bond finance is robust to an alternative estimation technique.

5.3   Accounting for Bond Endogeneity

It is possible that the offsetting role of bond financing in firm survival may be due to the endogenous nature of bond issuance decision. To address this concern we use sampled matching techniques described by Heckman *et al.* (1998) and recently employed in the bond IPO literature by Hale and Santos (2009). Specifically, the propensity score matching method estimates the probability of being a bond

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[15]   Given that our data are collected on a yearly basis, the cloglog model is more appropriate compared to the Cox model. In addition, the cloglog model has the same assumptions on the coefficient vector a as the continuous-time version of the proportional hazard model (Prentice and Gloeckler, 1978).

issuer conditional on observed pre-issuance characteristics using a probit model. Once the propensity scores are calculated, we use the 'caliper' matching method to select the nearest control firms in which the propensity score falls within a pre-specified radius as a match for a bond issuer.[16] Therefore, we carefully construct a sample of bond issuers and matched non-issuers, and estimate Equations (2.3) and (2.4) on this matched sample using the propensity hazard model described above.[17]

Results reported in Table 8 are consistent with those presented in Table 4. The dummy on bond finance is negative and highly significant indicating that switching from non-issuers to issuers would directly reduce the incidence of failure. In addition, we find once again that bond-financed firms are directly shielded from the adverse effects of the crisis, while non-issuers are more likely to fail during this period.

6.   Conclusion

Using a novel financial dataset for five Asian economies - Indonesia, Korea, Malaysia, Singapore and Thailand - that were hit the hardest during the 1997-98 crisis, we find that their survival prospects dramatically deteriorated during this period. We find strong evidence that the crisis affected both directly and indirectly (through interactions with financial indicators) the probability of survival. Above all, we find that reputation affects positively the likelihood of survival of firms issuing bonds in either foreign or domestic currency, whereas only domestic issuers are shielded from the adverse effects of the crisis.

Our results have important policy implications. If access to bond finance is one factor that could ameliorate emerging markets crises and protect firms against failures, then the promotion of regional and well-functioning bond markets should be at the top of the policymakers' agenda. But our results are also highly relevant for western economies which now face the deepest recession since the second world war. They highlight the importance of facilitating access to liquid and resilient bond markets especially when banks decide to interrupt lines of credit during crises.

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[16]   In order to match issuers and non-issuers we use the PSMATCH2 routine in Stata 10.1 described in Leuven and Sianesi (2003). In our analysis, the pre-specified radius is set to 0.01.

[17]   Since we aim to match a group of issuers and non-issuers with similar characteristics we report in the Appendix mean variable differences between the two groups of firms that were successfully matched together. It is worth noting that the matching procedure has substantially reduced the firm-level differences between issuers and non-issuers.

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Table 1. Summary Statistics

	Total Sample (1)	Fail$_{it}$=1 (2)	Fail$_{it}$=0 (3)	Diff. (4)	Bond$_{it}$=1 (5)	Bond$_{it}$=0 (6)	Diff. (7)
Fail$_{it}$	0.103 (0.304)	1.00 (0.00)	0.000 (0.00)	-	0.066 (0.249)	0.106 (0.308)	0.000
Age$_{it}$	14.146 (4.992)	12.671 (5.152)	14.318 (4.945)	0.000	13.572 (4.791)	14.199 (5.004)	0.000
Size$_{it}$	14.662 (3.685)	14.625 (3.690)	14.982 (3.627)	0.000	17.846 (3.272)	14.382 (3.587)	0.000
Leverage$_{it}$	0.683 (0.915)	0.974 (1.259)	0.650 (0.861)	0.000	0.785 (0.783)	0.674 (0.925)	0.000
Profitability$_{it}$	6.873 (53.300)	-11.614 (73.505)	9.011 (50.008)	0.000	1.828 (37.749)	7.317 (54.433)	0.000
Collateral$_{it}$	0.712 (0.307)	0.583 (0.386)	0.727 (0.293)	0.000	0.643 (0.310)	0.718 (0.306)	0.000
Bond$_{it}$	0.079 (0.270)	0.051 (0.220)	0.082 (0.275)	0.000	1.00 (0.00)	0.00 (0.00)	-
Crisis$_{it}$	0.138 (0.345)	0.250 (0.433)	0.125 (0.331)	0.000	0.079 (0.271)	0.143 (0.351)	0.000
Observations	31134	3226	27908		2467	28667	

Notes: The table presents sample means. Standard deviations are reported in parentheses. *Fail$_{it}$* is a dummy that equals 1 if firm *i* fails in year *t*, and 0 otherwise. *Age$_{it}$* measures the number of years a firm has been listed on the stock exchange. *Size$_{it}$* is denoted by the log of real assets. *Leverage$_{it}$* is measured as the firm's total debt to assets ratio. *Profitability$_{it}$* is the ratio of the firm's profits before interest and tax to its total assets. *Collateral$_{it}$* is defined as the ratio of the firm's tangible assets over its total assets. *Bond$_{it}$* is a dummy which takes the value 1 if firm *i* issues a bond in year *t*, and 0 otherwise. The *Crisis$_{it}$* is a dummy representing the Asian crisis and takes the value 1 in years 1997-98, and 0 otherwise. The subscript *i* indexes firms, and the subscript *t*, time, where *t* = 1995-2007. Variables are measured in thousands of US dollars.

Table 2. The Direct Impact of the Asian Crisis on Survival

	Baseline Model Endog. Probit (1)	Baseline Model Marginal Changes (2)	Asian Crisis Endog. Probit (3)	Asian Crisis Marginal Changes (4)
$Leverage_{it}$	0.193*** (11.5)	2.690	0.180*** (10.6)	2.445
$Profitability_{it}$	-0.005*** (-10.3)	-0.076	-0.006*** (-11.0)	-0.081
$Collateral_{it}$	-0.349*** (-7.21)	-4.867	-0.332*** (-6.76)	-4.501
$Size_{it}$	-0.072** (-2.02)	-1.001	-0.071** (-1.977)	-0.960
$Size_{it}^2$	0.003*** (2.74)	0.045	0.003** (2.57)	0.040
Age_{it}	-0.040*** (-14.8)	-0.553	-0.039*** (-14.5)	-0.531
$Exchange_t$	0.001*** (5.37)	0.012	0.001*** (3.94)	0.010
MES_j	-0.348*** (-7.19)	-4.852	-0.352*** (-7.18)	-4.772
$Crisis_{it}$			0.452*** (14.9)	7.710
$Log-likelihood$	-6579		-6435	
$Exogeneity\ Test(p-values)$	0.000		0.000	
$Observations$	23558		23558	

Notes: Endogenous Probit regression results and their marginal effects are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. Leverage, profitability, collateral, size and size squared are instrumented using their lagged levels in t-1. The exogeneity test is a Wald test distributed as chi-squared under the null of exogeneity of the regressors. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

Table 3. The Indirect Impact of the Asian Crisis on Survival

	Endog. Probit (1)	Marginal Changes (2)
$Leverage_{it} * Crisis_{it}$	0.718***	8.346
	(3.50)	
$Leverage_{it} * (1 - Crisis_{it})$	0.093**	1.076
	(2.24)	
$Profitability_{it} * Crisis_{it}$	0.002	0.025
	(0.47)	
$Profitability_{it} * (1 - Crisis_{it})$	-0.005**	-0.055
	(-2.11)	
$Collateral_{it} * Crisis_{it}$	-1.929***	-22.431
	(-7.62)	
$Collateral_{it} * (1 - Crisis_{it})$	-1.329***	-15.458
	(-11.8)	
$Size_{it}$	-0.054	-0.624
	(-1.23)	
$Size_{it}^2$	0.002	0.023
	(1.34)	
Age_{it}	-0.037***	-0.428
	(-11.1)	
$Exchange_t$	0.002***	0.025
	(10.4)	
MES_j	-0.165***	-1.914
	(-2.74)	
$Log - likelihood$	-5286	
$Exogeneity\ Test(p - value)$	0.000	
$Observations$	20477	

Notes: Endogenous Probit regression results and their marginal effects are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. Leverage, profitability, collateral, size and size squared are instrumented using their lagged levels in t-1. The exogeneity test is a Wald test distributed as chi-squared under the null of exogeneity of the regressors. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

Table 4. Bond Finance, Survival and the Asian Crisis

	Bond Finance Endog. Probit (1)	Bond Finance Marginal Changes (2)	Bond Finance*Crisis Endog. Probit (3)	Bond Finance*Crisis Marginal Changes (4)
$Leverage_{it}$	0.200*** (11.9)	2.758	0.181*** (10.6)	2.452
$Profitability_{it}$	-0.005*** (-10.3)	-0.075	-0.006*** (-11.0)	-0.079
$Collateral_{it}$	-0.345*** (-7.10)	-4.750	-0.334*** (-6.79)	-4.516
$Size_{it}$	-0.119*** (-3.28)	-1.631	-0.075** (-2.07)	-1.015
$Size_{it}^2$	0.006*** (4.61)	0.077	0.003*** (2.71)	0.044
Age_{it}	-0.040*** (-14.7)	-0.547	-0.040*** (-14.5)	-0.535
$Exchange_t$	0.001*** (5.37)	0.011	0.001*** (3.99)	0.008
MES_j	-0.331*** (-6.78)	-4.552	-0.348*** (-7.09)	-4.711
$Bond_{it}$	-0.493*** (-9.40)	-5.031		
$Bond_{it} * Crisis_{it}$			0.193 (0.76)	3.000
$(1\text{-}Bond_{it}) * Crisis_{it}$			0.466*** (15.0)	8.026
$Log - likelihood$	-6532		-6437	
$Exogeneity\ Test(p - values)$	0.000		0.000	
$Observations$	23558		23558	

Notes: Endogenous Probit regression results and their marginal effects are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. Leverage, profitability, collateral, size and size squared are instrumented using their lagged levels in t-1. The exogeneity test is a Wald test distributed as chi-squared under the null of exogeneity of the regressors. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

Table 5. Currency Denomination of Bonds, Survival and the Asian Crisis

	Bond Finance Endog. Probit (1)	Bond Finance Marginal Changes (2)	Bond Finance*Crisis Endog. Probit (3)	Bond Finance*Crisis Marginal Changes (4)
$Leverage_{it}$	0.201*** (11.9)	2.737	0.181*** (10.6)	2.453
$Profitability_{it}$	-0.005*** (-10.2)	-0.074	-0.006*** (-11.0)	-0.079
$Collateral_{it}$	-0.339*** (-6.95)	-4.617	-0.333*** (-6.78)	-4.509
$Size_{it}$	-0.107*** (-2.96)	-1.465	-0.075** (-2.07)	-1.011
$Size_{it}^2$	0.005*** (4.18)	0.070	0.003*** (2.72)	0.044
Age_{it}	-0.040*** (-14.7)	-0.543	-0.039*** (-14.5)	-0.535
$Exchange_t$	0.001*** (5.33)	0.011	0.001*** (4.02)	0.008
MES_j	-0.342*** (-6.97)	-4.658	-0.348*** (-7.10)	-4.710
$Domestic_{it}$	-0.792*** (-9.29)	-6.345		
$Foreign_{it}$	-0.282*** (-4.34)	-3.170		
$Domestic_{it} * Crisis_{it}$			-0.009 (-0.019)	-0.128
$Foreign_{it} * Crisis_{it}$			0.219* (1.82)	3.462
$Non\text{-}issuer_{it} * Crisis_{it}$			0.466*** (15.1)	8.027
$Log-likelihood$	-6518		-6433	
$Exogeneity\ Test(p-values)$	0.000		0.000	
$Observations$	23558		23558	

Notes: Endogenous Probit regression results and their marginal effects are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. *Domestic_{it}* is a dummy which takes the value 1 if firm *i* issues a domestic bond in year *t*, and 0 otherwise. *Foreign_{it}* is a dummy which takes the value 1 if firm *i* issues a foreign bond in year *t*, and 0 otherwise. *Non-issuer_{it}* is a dummy equal to 1 if firm *i* never issues a bond throughout the sample period, and 0 otherwise. Leverage, profitability, collateral, size and size squared are instrumented using their lagged levels in *t*-1. The exogeneity test is a Wald test distributed as chi-squared under the null of exogeneity of the regressors. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

Table 6. Robustness: Additional Sources of External Finance

	Bond Finance Endog. Probit (1)	Bond Finance*Crisis Endog. Probit (2)
$Leverage_{it}$	0.226***	0.207***
	(12.4)	(11.2)
$Profitability_{it}$	-0.006***	-0.006***
	(-8.87)	(-9.66)
$Collateral_{it}$	-0.197***	-0.180***
	(-3.43)	(-3.12)
$Size_{it}$	-0.038	0.007
	(-0.89)	(0.17)
$Size_{it}^2$	0.004***	0.001
	(2.75)	(1.07)
Age_{it}	-0.029***	-0.029***
	(-9.64)	(-9.66)
$Exchange_t$	0.001***	0.001***
	(5.15)	(3.87)
MES_j	-0.293***	-0.306***
	(-5.54)	(-5.78)
$Trade_{it}$	0.399**	0.428***
	(2.48)	(2.63)
$Bank_{it}$	0.026	0.026
	(0.34)	(0.34)
$Bond_{it}$	-0.460***	
	(-8.42)	
$Bond_{it} * Crisis_{it}$		0.273
		(1.05)
$(1\text{-}Bond_{it}) * Crisis_{it}$		0.428***
		(12.6)
$Log - likelihood$	-5467	-5404
$Exogeneity\ Test(p - values)$	0.000	0.000
$Observations$	19888	19888

Notes: Endogenous Probit regression results and their marginal effects are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. *Trade* is the ratio of the firm's trade credit over its total liabilities. *Bank* is defined as the ratio of the firm's short term debt over its total debt. Leverage, profitability, collateral, bank, trade, size and size squared are instrumented using their lagged levels in *t*-1. The exogeneity test is a Wald test distributed as chi-squared under the null of exogeneity of the regressors. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

Table 7. Robustness: Proportional Hazard Model

	Bond Finance (1)	Bond Finance*Crisis (2)
$Leverage_{it}$	0.230***	0.217***
	(14.1)	(13.2)
$Profitability_{it}$	-0.004***	-0.004***
	(-11.5)	(-10.8)
$Collateral_{it}$	-0.661***	-0.673***
	(-9.84)	(-9.94)
$Size_{it}$	-0.115**	-0.066
	(-2.02)	(-1.17)
$Size_{it}^2$	0.006***	0.003*
	(3.41)	(1.84)
Age_{it}	-0.082***	-0.083***
	(-18.4)	(-18.3)
$Exchange_t$	0.000	-0.000
	(0.84)	(-0.34)
MES_j	-0.533***	-0.549***
	(-6.49)	(-6.69)
$Bond_{it}$	-0.870***	
	(-9.42)	
$Bond_{it} * Crisis_{it}$		0.277
		(1.44)
$(1\text{-}Bond_{it}) * Crisis_{it}$		0.684***
		(14.8)
$Log-pseudolikelihood$	-7841	-7799
$Observations$	26852	26852

Notes: Complementary log-log regression results are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

**Table 8. Robustness: Accounting for Bond Endogeneity in a Matched Sample**

	Bond Finance (1)	Bond Finance*Crisis (2)
$Leverage_{it}$	0.384***	0.346***
	(8.11)	(7.17)
$Profitability_{it}$	-0.004***	-0.003***
	(-3.61)	(-2.77)
$Collateral_{it}$	-0.421*	-0.278
	(-1.71)	(-1.18)
$Size_{it}$	0.414*	0.290
	(1.89)	(1.27)
$Size_{it}^2$	-0.009	-0.006
	(-1.44)	(-0.92)
Age_{it}	-0.079***	-0.080***
	(-6.21)	(-5.99)
$Exchange_t$	0.000	-0.000
	(0.34)	(-0.71)
MES_j	-0.433**	-0.531***
	(-2.50)	(-3.12)
$Bond_{it}$	-0.891***	
	(-8.07)	
$Bond_{it} * Crisis_{it}$		0.265
		(1.23)
$(1-Bond_{it}) * Crisis_{it}$		1.196***
		(8.82)
$Log - pseudolikelihood$	-1148	-1148
$Observations$	4160	4160

Notes: Complementary log-log regression results on the matched sample are reported. The dependent variable is a dummy equal to 1 if the firm fails, and 0 otherwise. Robust z-statistics are presented in the parentheses. The following countries are included in the regressions: Indonesia, Korea, Malaysia, Singapore and Thailand. * significant at 10%; ** significant at 5%; *** significant at 1%. Country dummies and industry dummies are included in the model. Also see notes to Table 1.

Table A-1. Mean Variable Differences between Bond Issuers and Non-issuers in the Pre-issuance Period, Matched Sample

	Mean Treated	Mean Control	% Bias	%Bias Reduction	t-test	t-test (p-value)
$Leverage_{it}$	0.739	0.718	2.8	80.4	0.87	0.384
$Collateral_{it}$	0.636	0.634	0.8	97.0	0.26	0.795
$Profitability_{it}$	1.447	1.837	0.9	91.1	0.33	0.743
$Size_{it}$	17.668	17.71	1.3	98.9	0.41	0.680
$Size_{it}^2$	322.88	325.18	2.2	98.1	0.66	0.511
Age_{it}	13.643	13.47	3.6	73.1	1.13	0.260
MES_j	13.484	13.467	2.6	85.2	0.80	0.426
$Exchange_t$	576.41	612.68	7.0	88.0	2.10	0.035

Notes: See notes to Table 1 for definition of the variables including in the matching.

Figure 1. Failures for Bond-Issuers and Non-Issuers
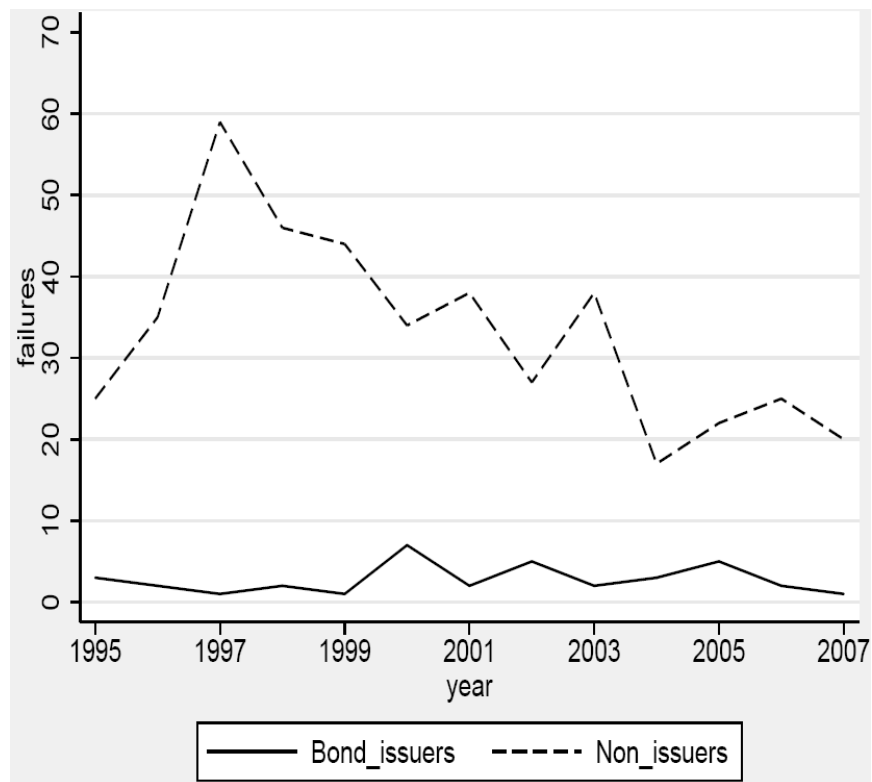
Figure 2. Number of Failing Firms by Year