

# THE FINANCIAL CRISIS AND CORPORATE DEBT MATURITY: THE ROLE OF BANKING

## STRUCTURE

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This paper analyses the influence of the financial crisis on corporate debt maturity for 39 countries during the period 1995-2012. The results reveal the importance of the dependence of firms on external finance and the banking structure of the countries on debt maturity during the financial crisis. Corporate debt maturity was found to decline during the financial crisis. However, only those firms that were more dependent on external finance before the onset of the financial crisis suffered this reduction. The reduction in corporate debt maturity is the result of a higher average increase in short-term debt than in long-term debt. The financial crisis had a stronger negative effect on corporate debt maturity in countries with less bank concentration, while the debt maturity of larger firms decreased less as a result of the financial crisis than the debt maturity of smaller firms in countries where banks play an important role in the financing of the private sector.

JEL classification: G18, G32.

## 1. INTRODUCTION

The Global Financial Crisis is considered by many economists the worst financial crisis since the Great Depression of the 1930s. The current crisis has opened up an interesting debate regarding its consequences for the real economy. Financial institutions facing losses may reduce the availability of credit and increase the cost of accessing credit. During the financial crisis, this resulted in a credit crunch that played a crucial role in the failure of businesses, a decline in consumer wealth and a downturn in economic activity leading to the 2008-2012 global recession and contributing to the European sovereign-debt crisis. An important strand of papers analysing the consequences of the financial crisis has focused on its influence on the lending channel. Most papers have shown that firm leverage and investment decreased as a consequence of the financial crisis.

In this context, the aim of this paper is to study the impact of the current crisis on one aspect of capital structure, namely corporate debt maturity, analysing whether corporate debt maturity decreased as a result of the financial crisis in line with the imposition of more stringent credit conditions for borrowers. The paper also considers how dependence on external finance and country-level determinants influence the effect of the financial crisis on debt maturity.

In contrast to the majority of previous papers analysing the impact of the financial crisis on the real economy, we consider the influence of the financial crisis within an international context<sup>1</sup>. Figure 1 shows the differences in the average ratio of long-term debt to total debt before and during the crisis for each country. The average ratio of long-term debt to total debt is calculated for the periods 1995-2007 and 2008-2012 for each country. Differences in debt maturity can be seen to vary widely across countries. For example, the average percentage of

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<sup>1</sup> Most of this literature has focused on the influence of the financial crisis within the US context (Almeida *et al.*, 2011; Duchin *et al.*, 2010; Ivashina and Scharfstein, 2010; and Santos, 2011, among others). The exception are the papers by Campello *et al.* (2010), Carvalho *et al.* (2015) and Lins *et al.* (2013), which analyse the impact of the crisis on real decisions made by corporations in an international context.

long-term debt for firms in South Korea, the USA and India decreased 7 per cent during the crisis compared to average values prior to 2008. However, the average percentage of long-term debt increased sharply as a result of the financial crisis in countries such as Austria, Portugal and Brazil. In fact, the debt maturity of firms increased in more than half of the countries included in the sample. This evidence thus reveals that the variation in corporate debt maturity during the financial crisis may be affected by differences in country characteristics.

INSERT FIGURE 1 ABOUT HERE

The contribution of the paper comprises the analysis of the influence of the financial crisis on debt maturity in a large cross-country panel of data for the period 1995-2012. We also study whether the effect of the financial crisis on corporate debt maturity is affected by firm- and country-level determinants of debt maturity. In particular, we investigate whether this effect exists depending on the dependence of firms on external finance and on the banking structure of the country. First, Dell’Ariccia *et al.* (2008) and Duchin *et al.* (2010) provide evidence consistent with the bank lending supply shock being the origin of the reduction in performance or investment following banking crises. However, Kahle and Stulz (2013) show a decrease in borrowing and capital expenditures for US industrial firms that is not a consequence of a bank lending or credit supply shock. Within this context, we use the changes in corporate debt maturity during the crisis to investigate whether these changes are in line with a credit supply or a demand effect. Second, as the financial crisis had an important impact on the solvency of banks, the weight of bank credit in the financing of the private sector and bank concentration might influence the credit standards set by banks. We are not aware of any other study that has investigated the impact of the Global Financial Crisis on corporate debt maturity within an

international context<sup>2</sup>. Almeida *et al.* (2011) test whether US firms with large fractions of their long-term debt maturing at the time of the crisis present more pronounced negative outcomes than otherwise similar firms. Firms whose long-term debt was maturing right after the onset of the crisis cut their investment rates more than other firms did. However, these authors do not analyse the effect of financial crisis on corporate debt maturity or how firm and country characteristics influence the effect of the financial crisis on debt maturity.

The findings of the present paper are consistent with a small reduction in corporate debt maturity as a result of the financial crisis. However, this result conceals differences according to firm dependence on external finance and institutional features of the countries. Our findings show that the financial crisis had a negative effect on corporate debt maturity for those firms with a greater dependence on external finance and in countries with lower levels of efficiency of the legal system and bank concentration. We thus show that the variation in corporate debt maturity during the financial crisis is consistent with a credit supply shock, as only firms that have more dependence on external finance suffered reductions in debt maturity following the onset of the crisis. Furthermore, our results reveal that bank concentration helped to reduce the negative impact of the financial crisis on corporate debt maturity. This result is consistent with the idea that firms in less concentrated credit markets are subject to greater financial constraints (Petersen and Rajan, 1995; Berlin and Mester, 1999) and in keeping with the benefits of relationship banking. However, the negative effect of the financial crisis on corporate debt maturity was greater in countries where the weight of banks in the economy is significant, affecting mainly smaller firms. Finally, our results are robust to the use of alternative measures of the financial crisis and reveal that the effect of the crisis on corporate debt maturity was greater during the period 2010-2011. We also provide evidence

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<sup>2</sup> Deesomsak *et al.* (2009) investigate the effects of firm-specific and country-specific characteristics and the 1997 Asian financial crisis on the debt maturity structure of firms in the Asia Pacific region (Thailand, Malaysia, Singapore and Australia), comparing the consequences of the crisis for these four countries. Their paper reveals that the crisis had several significant effects on both firm-specific and market-wide determinants of debt maturity, especially in Thailand and Malaysia, where the crisis originated.

that the effect of the financial crisis on corporate debt maturity depends on the intensity of the financial crisis. In fact, firms in those countries where the decline in economic activity or the percentage of nonperforming loans are higher present a greater reduction in debt maturity.

The rest of the paper presents a review of the literature and discusses the implications tested in Section 2, while Section 3 describes the database and methodology employed. Section 4 discusses the empirical results and Section 5 provides robustness tests. Finally, Section 6 concludes the paper.

## **2. LITERATURE REVIEW**

The Global Financial Crisis has opened up a debate regarding its consequences for the real economy. In this context, several papers have analysed the impact of the financial crisis on the lending channel. Chari *et al.* (2008) call into question the way in which the financial crisis has affected the economy, showing that the crisis is not associated with a decline in bank lending. However, Ivashina and Scharfstein (2010) show that syndicated lending started to decline in mid-2007 and fell sharply during the bank panic that began in September 2008 for US firms<sup>3</sup>. They also highlight that there was a simultaneous run by borrowers who drew down their lines of credit, leading to an increase in loans reported on bank balance sheets. Their paper also shows that some banks were more adversely affected than others were. In fact, banks with more deposit financing cut their syndicated lending less than banks without access to this more stable source of funding.

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<sup>3</sup> The bank lending survey by the European Central Bank (ECB) shows that the financial crisis also reduced the credit issued by banks in European countries. This survey is addressed to senior loan officers of a representative sample of euro area banks and is conducted four times a year. The sample group participating in the survey comprises around 90 banks from all euro area countries and takes into account the characteristics of their respective national banking structures. Detailed information on the survey and results are available at <https://www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html>.

Evidence has not only revealed that lending has reduced as a consequence of the crisis, but that it has also led to an increase in borrowing costs and changes in investment decisions. Santos (2011) shows that firms paid higher loan spreads during the subprime crisis and that the increase in loan spreads was higher for firms which borrowed from banks that incurred greater losses. In a survey of 1,050 CFOs, Campello *et al.* (2010) find that more than half the respondents cancelled or postponed their planned investments because of financial constraints during the crisis. Furthermore, their evidence indicates that constrained firms report significantly larger planned percentage cuts compared to their peers in technology and capital spending and employment. Carvalho *et al.* (2015) show that the 2007-2009 financial crisis is associated with equity valuation losses and investment cuts to borrower firms with the strongest lending relationships with banks. Almeida *et al.* (2011) reveal that US firms whose long-term debt was largely maturing immediately after the third quarter of 2007 cut their investment-to-capital ratio more than other similar firms whose debt was due well after the crisis. Duchin *et al.* (2010) also reveal that corporate investment by US firms declined significantly following the onset of the financial crisis and this decline was greater for firms dependent on external finance. In line with this evidence, Vermoesen *et al.* (2013) report that Belgium firms which, at the start of the crisis, had a larger part of their long-term debt maturing within the next year experienced a significantly larger drop in investments in 2009. Moreover, this effect was mainly driven by firms which are more likely to be financially constrained. Lins *et al.* (2013) show that family-controlled firms underperformed significantly compared to other firms during the global financial crisis using a sample of 8,584 firms from 35 countries. All the above evidence thus reveals the important effects of the financial crisis on the lending channel, providing support for the existence of significant supply constraints in terms of both quantity and the price of the credit leading to reductions in investment rates.

In this context, the present paper analyses the influence of the recent financial crisis on corporate debt maturity. Ivashina and Scharfstein (2010) and Campello *et al.* (2012) reveal that

credit lines became particularly important during the first quarters of the financial crisis, as they replaced bank loans, providing the liquidity needed to invest during the crisis and ameliorating the negative impact of scarce credit on real activities. As most credit lines have a shorter maturity than bank loans (Jimenez *et al.*, 2007)<sup>4</sup>, we expect the financial crisis to be associated with a shortening of corporate debt maturity. Moreover, the imposition of more stringent credit standards by banks, substituting long-term loans by shorter loans due to the solvency problems suffered by banks, may also lead to a reduction in debt maturity. Consequently, our first hypothesis is:

*H1. The financial crisis has reduced corporate debt maturity as a result of the use of shorter debt.*

However, we expect the influence of the financial crisis on corporate debt maturity not to have an equally detrimental effect on all firms and that the observed differences in debt maturities will depend on the dependence on external finance and on the structure of the banking system in each economy.

The influence of financial crises on corporate borrowing and investment may be explained from two alternative theories. On the one hand, credit supply shock theory poses that the credit system does not renew loans as a response to a shock in the financial system<sup>5</sup> (Brunnermeier, 2009; Shleifer and Vishny, 2010). According to this view, debt issuance and corporate investment should fall more for credit-dependent firms. On the other hand, the effect of the financial crises on the real economy could be the result of a demand shock (Kahle and Stulz, 2013). According to this theory, increases in uncertainty and decreases in the demand for products following financial crises lead to a decrease in investment and hence in demand for credit to finance investment. Dell’Ariccia *et al.* (2008) offer evidence that there is a

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<sup>4</sup> Campello *et al.* (2012) find that the maturity of credit lines in their sample for European and US firms is about 30 months before the crisis, while it is about 27 months during the crisis (2008-2009).

<sup>5</sup> A more specific theory is the bank supply shock theory, in which banks are the ones that reduce the supply of loans as a result of a shock in the financial system.

real cost to banking crises, as sectors that are more dependent on external finance perform relatively worse during banking crises. Duchin *et al.* (2010) also provide evidence in line with a credit supply shock, as the decline in corporate investment following the recent financial crisis is higher for firms that have low cash reserves or high net short-term debt, are financially constrained or operate in industries dependent on external finance. However, Kahle and Stulz (2013) show evidence that is not in line with the view that a bank lending supply shock or a credit supply shock constitute predominant casual factors to explain the financial and investment policies of firms during the recent crisis. In this context, our second hypothesis is the following:

*H2. The reduction in debt maturity would be higher for firms with a greater dependence on external finance before the crisis if credit supply shock is the dominant effect.*

Access to external financing will partly depend on the banking structure of each economy. Banks are central to business activity, as they are the main providers of debt financing in most economies. Financial intermediaries directly influence corporate financial structure. They have advantages in collecting information (Diamond, 1984) and incentives to use this information to discipline borrowers due to the fact that they benefit from economies of scale in obtaining information and do not suffer from free-rider problems.

Specifically, we consider that the banking structure of the country might influence the effect of the financial crisis on corporate debt maturity. Fan *et al.* (2012) report a negative effect of the weight of banks in the economy on debt maturity as a result of bank preferences for short-term debt. Demirgüç-Kunt and Maksimovic (1999) also stress that short-term debt allows banks to use their advantages in monitoring borrowers. Short-term debt forces lenders to monitor corporate performance more frequently and enables the bank to change the terms of contract or not to renew the loan (Diamond, 1991; Rajan, 1992). Large firms have better access to domestic and international markets and are therefore usually less dependent on domestic



bank credit. However, as they are subject to more financing constraints, smaller firms will be affected to a greater extent by bank preferences. Consequently, we expect a negative relationship between the weight of banks in the economy and corporate debt maturity, particularly in the case of smaller firms. We forecast that this negative relationship will be stronger during the financial crisis, as bank difficulties lead banks to lend on a shorter-term basis, replacing long-term by short-term debt. In line with the above arguments, our third hypothesis is:

*H3. The weight of bank credit in the financing of the private sector had a more negative effect on corporate debt maturity during the financial crisis, especially in the case of smaller firms.*

The banking literature suggests that bank concentration has two potential effects on firm leverage. In a market without asymmetric information, there will be a negative relationship between bank concentration and firm leverage given that higher bank market power results in a higher price for debt and less credit availability. However, in markets with asymmetric information, higher bank market concentration may increase the incentives of banks to invest in the acquisition of soft information by establishing close relationships with borrowers over time. This will lead to greater availability of credit, thus reducing corporate financial constraints (Boot, 2000; Dell'Ariccia and Marquez, 2004).

The importance of bank concentration has been argued by Petersen and Rajan (1995) and Berlin and Mester (1999). These authors show that US firms in less concentrated credit markets are subject to greater financial constraints. They offer evidence from small business data indicating that creditors are more likely to finance credit-constrained firms when credit markets are concentrated because it is easier for these creditors to internalize the benefits of assisting firms. More recently, Bharath *et al.* (2011) show the benefits of borrowing from relationship lenders even for large firms with a much wider choice of financing options available. The existence of a positive relationship between bank concentration and credit

availability is in line with the fact that relationship banking serves to mitigate information asymmetries between creditors and debtors. Given that long-term debt is subject to greater information asymmetries than short-term debt, the positive effect of bank concentration on leverage could be concentrated in long-term debt. Thus, a positive relationship might be assumed between bank concentration and debt maturity. From this point of view, the financial crisis could have a weaker effect on corporate debt maturity because of the benefits of relationship banking in those countries where bank concentration is higher, seeing as increased competition is likely to erode the benefits of relationship lending. However, given that the financial crisis has affected the solvency of banks, it could also result in the rupture of bank-firm relationships. As both types of relation are theoretically possible, we make no a priori forecast as to whether relationship banking has increased or decreased as a result of the financial crisis, treating it as an empirical issue.

### 3. DATABASES, METHODOLOGY AND VARIABLES

Our source for firm data is the Worldscope database, which contains financial statement data and stock prices from many countries in comparable form. Financial firms (SIC codes 6000 - 6999) were excluded. Finally, our sample comprises 30,727 firms and 171,892 firm-year observations for 39 countries over the period 1995-2012. The sample includes countries with different institutional environments.

We use the following benchmark model to investigate the aggregate effect of the recent financial crisis on the debt maturity structure of firms:

$$\begin{aligned}
 DEBT\_MAT_{it} = & a_0 + a_1 ASSET\_MAT_{it-1} + a_2 GROWTH_{it-1} + a_3 SIZE_{it-1} + \\
 & a_4 FIRM\_QUALITY_{it-1} + a_5 VOL\_EBIT_{it-1} + a_6 LEV_{it-1} + b_1 RULE\_OF\_LAW_{kt} \\
 & + b_2 C\_RIGHTS_{kt} + b_3 S\_RIGHTS_{kt} + b_4 BANK\_CREDIT_{kt} + b_5 BANK\_CONC_{kt} + [1] \\
 & + b_6 BOND_{kt} + c_1 DCRISIS + \sum_{kt} \lambda_{kt} + \sum_{jt} \mu_{jt} + v_i + \varepsilon_{it}
 \end{aligned}$$

The dependent variable is debt maturity (DEBT\_MAT); defined as the percentage of the firm's total debt that has a maturity of more than one year. DCRISIS is a dummy variable that takes the value of 1 for the years 2008, 2009, 2010, 2011 and 2012, and zero otherwise. Our interest is focused on the coefficient of the DCRISIS variable and on the interaction of this variable with the firm's dependence on external finance and the country's banking structure. We therefore introduce interaction terms of the crisis dummy with the dependence of external finance and with the country variables considered in our benchmark model.

To analyse the influence of the financial crisis on corporate debt maturity, we control for the differences in the sample in terms of firm and country characteristics. We first control for the differences in the sample in firm characteristics. To do so, we introduce firm-level variables suggested by theory which have been used in previous studies analysing firm debt maturity (Myers, 1977; Barnea *et al.*, 1980; Barclay and Smith, 1995; Stohs and Mauer, 1996; Guedes and Opler, 1996; Ozkan, 2000; Scherr and Hulburt, 2001; and Antoniou *et al.*, 2006). These variables include asset maturity (ASSET\_MAT), growth opportunities (GROWTH), firm size (SIZE), firm quality (FIRM\_QUALITY), earnings volatility (VOL\_EBIT) and leverage (LEV). Our proxy measures of these determinants are constructed in line with the empirical literature on corporate debt maturity. Appendix A presents the definitions of the variables used in the empirical analysis and their sources.

Second, identifying the impact of the financial crisis on corporate debt maturity requires controlling for changes in country characteristics. The papers by Demirgüç-Kunt and Maksimovic (1999) and Fan *et al.* (2012) reveal that the institutional context influences corporate debt maturity. Our estimations accordingly include proxies for country determinants of debt maturity. Following the aforementioned papers, these variables are rule of law (RULE\_OF\_LAW), protection of investors' rights (C\_RIGHTS and S\_RIGHTS) and the weight of banks in the economy (BANK\_CREDIT). In line with the potential effect of relationship banking

on corporate debt maturity, we also include bank concentration (BANK\_CONC). As corporate debt maturity might also depend on the issuance of corporate bonds, we include a proxy of the firms' dependence on bond issues (BOND). This variable controls for potential substitution effects between bank debt and corporate bonds<sup>6</sup>. In countries where the corporate bond market is sufficiently developed and firms are less dependent on bank loans, the effect of the financial crisis on corporate debt maturity might depend on the evolution of bond markets during the crisis.

We have used the rule of law component from the Worldwide Governance Indicators (WGI) compiled by Kaufmann *et al.* (2009) to proxy the efficiency of a country's legal system. Rule of law is one of the six dimensions of the WGI and captures perceptions of the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence (RULE\_OF\_LAW). The index ranges from -2.5 to 2.5, low levels denoting a less efficient legal system.

We use the index developed in Djankov *et al.* (2007) to measure the legal rights of creditors against defaulting debtors (C\_RIGHTS). This index is a development of the creditors' rights index proposed by La Porta *et al.* (1998), although the creditors' rights index is constructed in January each year in the former paper. It measures four powers of secured lenders in bankruptcy: (1) whether there are restrictions, such as creditor consent, when a debtor files for reorganization; (2) whether secured creditors are able to seize their collateral after the petition for reorganization is approved, i.e. whether there is no automatic stay or asset freeze imposed by the court; (3) whether secured creditors are paid first out of the proceeds of liquidating a bankrupt firm; and (4) whether an administrator, and not management, is responsible for running the business during the reorganization. A value of one is added to the

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<sup>6</sup> De Fiore and Uhlig (2014) show that non-financial corporations started shifting the composition of their debt from bank loans towards debt securities early in 2008.

index when a country's laws and regulations provide each one of these powers to secured lenders. It consequently ranges between 0 and 4, with higher values indicating stronger creditors' rights or stronger protection against borrower expropriation.

We measure the protection of property rights by means of the index of private property rights (S\_RIGHTS) published by the Heritage Foundation. This is an annual index of the degree to which private property rights are protected and the degree to which government enforces laws that protect private property. It also accounts for the possibility that private property may be expropriated, as well as analysing the independence of the judiciary, corruption within the judiciary and the ability of individuals and businesses to enforce contracts. This index ranges between 0 and 100, a high score indicating greater legal protection of property rights.

We use two variables to proxy the country's banking structure. First, the weight of banks in the economy, measured as the annual ratio of private credit by deposit money banks to GDP (BANK\_CREDIT). The data are obtained from the Financial Structure and Economic Database (Beck *et al.*, 2006). Second, we also use a measure of bank concentration in a country. Following Demirgüç-Kunt *et al.* (2004) and Beck *et al.* (2006), we measure bank concentration as the annual fraction of bank assets held by the three largest commercial banks in the country (BANK\_CONC). Figures are obtained from the World Bank Database, whose main source is Fitch IBCA's Bankscope Database. We control for the development of the bond market, measured annually as the sum of the private bond market capitalization to GDP plus the international debt issues to GDP (BOND).

A potential problem when considering banking structure and the development of private bond market proxies is that these variables can themselves be affected by the development of other institutions or by corporate financing decisions. We resolve this question regarding the potential endogeneity of these variables using instrumental variables estimation. We consider several variables as instruments of the weight of banks and bonds in the economy and bank

concentration. The proxies for the role of banks and bonds in the financing of firms in each economy are: rule of law, the protection of creditor rights, the legal origin of the country, per capita GDP, the sum of short-term and long-term capital flows plus foreign direct investment into the country divided by GDP and the average firm size in each country (Demirgüç-Kunt and Maksimovic, 1999). Similarly, we regress the observed value of bank concentration on the institutional quality of the country measured by the protection of property rights, on the legal origin of the country and on the market size proxied by the country's total population and total GDP (Cetorelli and Gambera, 2001). Subsequently, we perform a Durbin-Wu-Hausman (DWH) test of overidentifying restrictions for each of the regressions. This test verifies the null hypothesis that the introduction of instrumental variables has no influence on the coefficients of the estimations. We hence perform a DWH F test for each of the estimations in our paper, the results of which are reported in the bottom row of each table. When the p value of the F test falls below 10 percent, the null hypothesis is rejected and the instrumental variables estimations are reported. Otherwise, the estimations with the observed values of the banking structure variables are provided.

We include three specific effects: country-year ( $\sum_{kt} \lambda_{kt}$ ), industry-year ( $\sum_{jt} \mu_{jt}$ ) and firm-specific ( $\nu_i$ ) effects. These specific effects aim to control for most of the shocks affecting debt maturity. This approach has the advantage of being less likely to suffer from omitted variable bias or model specification than traditional regressions (Dell'Ariccia *et al.*, 2008).

Table 1 provides descriptive statistics on the firm- and country-level variables used in this paper, dividing the sample into the periods “before the crisis” and “during the crisis”. Panel A describes the entire 1995-2012 period, while Panels B and C show the descriptive statistics before (1995-2007) and during (2008-2012) the crisis. Debt maturity can be seen to decrease during the crisis from a mean value of 49.09 per cent to a mean value of 44.58 per cent. This

result is thus consistent with the financial crisis shortening corporate debt maturity as per our prediction. However, this analysis does not take into account potentially significant differences in firm- and country- level characteristics resulting from the financial crisis. As for firm control variables, asset maturity, growth opportunities, size and firm quality are seen to decrease during the crisis, while only volatility of earnings and leverage show an increase as a consequence of the crisis. Bank concentration and the role of banks and bond markets in the financing of the private sector increased during the crisis.

INSERT TABLE 1 ABOUT HERE

Table 2 reports the number of observations for each country and the mean values of country-level variables for each country. Debt maturity varies widely among countries: Thailand has the lowest level of long-term debt (32.84 per cent), while the US has the highest percentage of long-term debt (73.10 per cent). There are also important differences in terms of the efficiency of the legal system, protection of investors' rights, bank concentration, the weight of banks in the economy or the issuance of corporate bonds in each country.

INSERT TABLE 2 ABOUT HERE

Table 3 presents the correlation matrix. DEBT\_MAT shows a positive correlation with asset maturity, growth opportunities, size, leverage, rule of law, protection of property rights and development of the private bond market, but correlates negatively with firm quality, volatility of earnings, protection of creditor rights, bank concentration and the weight of banks in the economy. As noted previously, corporate debt maturity also correlates negatively with DCRISIS. In general, the correlations among firm-level variables are low.

INSERT TABLE 3 ABOUT HERE

#### **4. EMPIRICAL ANALYSIS**

The estimations are carried out using panel data. Prior to testing, we used the Breusch-Pagan test (Breusch and Pagan, 1980) to identify the existence of individual effects. The null hypothesis of no unobserved heterogeneity is rejected. In this context, a model that captures individual heterogeneity, as the panel data methodology does, is appropriate. The panel data methodology corrects for unobserved firm-specific and time-specific effects. The panel data estimation was calculated using fixed effects, as the Hausman test (1978) rejects the null hypothesis of the lack of correlation between individual effects and observable variables in all regressions. All independent firm-level variables are lagged by one year to control for potential problems of endogeneity.

Table 4 presents the results from the panel data estimation. Column (1) shows the results when considering firm-level determinants of debt maturity and the DCRISIS variable. First, the coefficient of DCRISIS is negative and significant, revealing that the debt maturity of firms decreased during the period of financial crisis. In fact, the coefficient of DCRISIS in column (1) shows that firms reduced their debt maturity by 1 per cent on average during the financial crisis after considering firm-level determinants of debt maturity. This effect is lower when we also include country-level determinants. According to the results obtained in column (2), this reduction is just 0.42 per cent and is not significant, suggesting that the financial crisis had a detrimental, but non-significant effect on corporate debt maturity.

INSERT TABLE 4 ABOUT HERE

Analysis of the results for the firm control variables shows that debt maturity is positively related to asset maturity. This is consistent with the matching hypothesis, according to which firms match assets and liabilities in order to reduce risk. The GROWTH variable shows a positive and significant coefficient, a result that is inconsistent with the agency cost hypothesis. Although the underinvestment problem identified by Myers (1977) suggests that debt maturity should decrease with growth opportunities, the empirical findings of Stohs and



Mauer (1996) are also in line with a positive relationship between growth opportunities and debt maturity. This positive relationship between growth opportunities and corporate debt maturity could be supported by the liquidity risk argument, according to which firms with long-term investment opportunities prefer to hedge against liquidity risk by issuing long-term debt (Antoniou *et al.*, 2006; Diamond, 1991; Guedes and Opler, 1996). The effect of size on debt maturity is positive, indicating that larger firms have longer debt maturities. This relationship is consistent with the idea that firms with greater agency problems, i.e. small firms, may use shorter-term debt to reduce underinvestment and risk-shifting problems. FIRM\_QUALITY has a negative influence on debt maturity, indicating that high-quality firms tend to issue short-term debt as the incentives to lengthen the maturity of debt increases with the risk of not being able to refund debt. The coefficient of VOL\_EBIT is negative, though not statistically significant at standard levels; hence, we do not obtain evidence in line with the tax hypothesis. According to this hypothesis, the maturity of debt should rise when the volatility of firm value decreases. This is because firms with high volatility in their value have to change their capital structure frequently to reduce bankruptcy costs and will hence use more short-term debt (Kane *et al.*, 1985). Leverage shows a positive relationship with debt maturity in a way that is consistent with the arguments put forward by Diamond (1991), as liquidity risk increases with leverage and hence highly leveraged firms can be expected to use more long-term debt. Moreover, this effect dominates the use of leverage and debt maturity as substitutes in mitigating under- and overinvestment problems.

To sum up, we find strong evidence that the firm characteristics that have been found to affect debt maturity in the existing literature are also relevant for the firms in our sample. As regards the firm-level control variables, our results thus provide strong evidence in line with the matching maturity and liquidity risk explanations.

Column (2) shows the results when the country-specific determinants are considered. All the results for firm-specific variables discussed previously are maintained when the country-level determinants of debt maturity are included in the estimations. The RULE\_OF\_LAW variable has a positive coefficient, indicating that firms in countries with strong legal enforcement have longer debt maturity. However, this coefficient is not found to be statistically significant. This lack of significance of the RULE\_OF\_LAW variable could be explained by its high correlation with S\_RIGHTS<sup>7</sup>. Consequently, we exclude the S\_RIGHTS variable in column (3). In spite of the results being similar for RULE\_OF\_LAW when the S\_RIGHTS variable is excluded, the proxy for the protection of property rights is excluded from the estimations in the rest of the paper and RULE\_OF\_LAW is considered as a proxy of the enforcement of law and the protection of property rights.

The level of protection of creditor rights (C\_RIGHTS) is seen to positively influence corporate debt maturity. Firms in countries with strong protection of creditors' rights tend to issue debt with a longer maturity. Stronger creditor protection gives lenders more power during bankruptcy. Besides, a greater ability to force repayment will exert an ex ante influence on the terms of the credit. This increases the recovery rate of loans and reduces the risk to lenders. Moreover, stronger protection of creditors' rights reduces the likelihood of firms engaging in excessive risk taking and asset substitution. The positive relationship between the protection of creditors' rights and corporate debt maturity suggests that creditors lend on more favourable terms when their rights are strongly protected and is consistent with the evidence provided by Qian and Strahan (2007) for bank loans.

As far as the banking structure variables are concerned, the maturity of debt is seen to increase in countries in which bank concentration (BANK\_CONC) is high. This result suggests

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<sup>7</sup> In fact, the measure of the efficiency of the legal system (RULE\_OF\_LAW) considers not only the quality of contract enforcement, but also the protection of property rights, while the measure of protection of property rights (S\_RIGHTS) also takes into account the degree to which government enforces laws.

that higher bank concentration increases bank incentives to establish close relationships with borrowers over time, thus reducing the financial constraints on firms. It is consistent with the findings of Hernández-Cánovas and Koëter-Kant (2008), who show that stronger firm-bank relationships lengthen the maturity of bank loans for a sample of small and medium-sized European enterprises.

The weight of banks in the economy (BANK\_CREDIT) is seen to have a negative influence on debt maturity. This result is in line with the evidence provided by Fan *et al.* (2012). These authors obtained a negative relationship between the weight of banks in the economy and debt maturity, which is consistent with the preferences of suppliers of capital having an influence on debt maturity structures. As for the development of the private bond markets, we show that it has a positive effect on corporate debt maturity, in line with the longer maturity of bonds than bank loans.

Following Dell’Ariccia *et al.* (2008) and Duchin *et al.* (2010), we assume that the debt maturity of firms which were more dependent on external finance before the onset of the crisis is more likely to be affected by the supply effect of the crisis. Columns (4) to (6) of Table 4 report the analysis of the changes in debt maturity in more financially dependent firms. We define a new variable, DCRISIS\*FD, which is the interaction term between the DCRISIS variable and the ratio of debt and total assets at December 2006 (FD). The coefficient of this interaction term (DCRISIS\*FD) will be the differential effect of the financial crisis on corporate debt maturity for those firms with a greater dependence on external finance before the onset of the crisis. A negative coefficient of DCRISIS\*FD would suggest that corporate debt maturity decreased more in more financially-dependent firms as a consequence of the recent financial crisis and would be the expected result if the reduction in corporate debt maturity were caused by a credit supply shock.

The coefficients of the interaction terms between the variable identifying the crisis years (DCRISIS) and the firms' external dependence (FD) are negative and statistically significant at conventional levels regardless of whether we control for firm-level characteristics or whether we also control for country-level determinants of corporate debt maturity. Thus, evidence consistent with the existence of a credit supply effect on corporate debt maturity following the recent financial crisis is provided.

The results for the DCRISIS variable in columns (4) to (6) in fact reveal the existence of a positive effect of the financial crisis on corporate debt maturity for those firms that depended less on external finance before the onset of the crisis, as the coefficient is positive and statistically significant at standard levels. The coefficients in columns (5) and (6) show that firms that were less dependent on external finance increased their debt maturity by 1.25-1.29 per cent on average during the financial crisis. The coefficients and their significance for the remaining explanatory variables, i.e. firm- and country-level variables, are similar to those we found previously. Thus, the results are maintained when we consider whether a credit supply effect exists or not in corporate debt maturity.

Table 5 shows the results when we investigate the way in which the financial crisis influenced corporate debt maturity. We consider three different dependent variables, the ratios between total debt (columns (1) and (2)), long-term debt (columns (3) and (4)), and short-term debt (columns (5) and (6)) and the market value of assets<sup>8</sup>. The market value of assets is defined as total assets minus the book value of equity plus the market value of equity. By using these three measures of leverage as dependent variables, we aim to better understand the effect of the recent financial crisis on corporate debt maturity. As firm-level control variables, we use the traditional determinants of firms' capital structure indicated by Rajan and Zingales (1995): profitability, growth opportunities, asset tangibility and firm size. We measure profitability

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<sup>8</sup> Welch (2004) argues that we should use market leverage ratios given that theories of target ratios are implicitly about market leverage ratios.

(PROFITABILITY) as earnings before interest and taxes plus depreciation expenses and provisions (non-cash deductions from earnings) divided by total assets. We use the market-to-book ratio, as in Rajan and Zingales (1995) and Flannery and Rangan (2006), as a measure of growth opportunities (GROWTH). Following Titman and Wessels (1988), we proxy the tangibility of assets by the percentage of property, plant and equipment in total assets (TANGIBILITY). We use the natural logarithm of total sales (SIZE) as the measure of firm size. We also control for the protection of creditors' rights (C\_RIGHTS) using the index developed in Djankov *et al.* (2007), as the papers by Demirgüç-Kunt and Maksimovic (1999), Giannetti (2003) and González and González (2008) show that institutions that favour creditors' rights and ensure stricter enforcement are associated with higher leverage. Additionally, we include DCRISIS to determine how the crisis affected leverage and DCRISIS\*FD to investigate whether the credit supply effect may explain the observed variation in corporate debt structure or not during the financial crisis.

The coefficients of the firm-level control variables are as expected. The coefficient of PROFITABILITY is negative for total and short-term leverage. This finding is in line with the pecking order theory, as higher profitability increases the possibility of retaining earnings, thus reducing the use of debt. The negative coefficients for growth opportunities reflect higher agency costs between shareholders and debtholders and higher costs of financial distress. The positive coefficients of TANGIBILITY in all the estimations are consistent with the greater value of these assets as collateral. Firm size has a positive impact on the total and long-term debt of firms, which is consistent with size being an inverse proxy for the probability of bankruptcy. The positive coefficients for C\_RIGHTS confirm that legal protection of creditor rights can reduce the agency cost of debt, as reported by Demirgüç-Kunt and Maksimovic (1999), Giannetti (2003) and González and González (2008).

INSERT TABLE 5 ABOUT HERE

The significant and positive coefficients of DCRISIS in column (1) reveal that leverage increased during the financial crisis. Columns (3) and (5) respectively show the variation in long-term and short-term debt leverage ratios during the recent crisis. The results also reveal an increase in long- and short-term debt as a result of the crisis, the increase being higher for short-term debt. The coefficients of DCRISIS in columns (3) and (5) show that firms respectively increased the ratios of long- and short-term debt and the market value of assets by 1.86 and 2.55 per cent on average during the financial crisis.

The coefficients of the interaction terms between the DCRISIS variable and the firms' external dependence (FD) are negative and statistically significant at conventional levels regardless of whether the dependent variable is total, long- or short-term leverage. These negative coefficients of DCRISIS\*FD reveal that there is a negative differential effect of the financial crisis on corporate leverage for those firms that depended more on external finance before the onset of the recent crisis, providing evidence of a credit supply effect in corporate leverage. Furthermore, short-term leverage is seen to increase more for less financially-dependent firms and to decrease less for more financially-dependent firms compared to long-term leverage in these groups of firms. These results suggest that the effect of the recent crisis on corporate maturity shown in Table 4 is caused by higher average increases in short-term debt than long-term debt.

The debt maturity regressions in Table 6 show that the effect of the financial crisis on debt maturity is related to institutional and banking structure characteristics. Columns (1) to (5) present the results when the interactions between DCRISIS and the country-level characteristics considered in this paper are included sequentially in the specification. The coefficients of RULE\_OF\_LAW, C\_RIGHTS, BANK\_CONC, BANK\_CREDIT and BOND show the effect of these variables before the financial crisis, while the interaction terms of these variables with the DCRISIS variable show the differential influence of country variables during

the crisis. The influences of firm- and country-level characteristics are similar to those shown in Table 4.

The coefficient of DCRISIS in column (6) shows that firms reduced their debt maturity by almost 3 per cent on average during the financial crisis in countries with low levels of the country characteristics. As for the interaction terms, the positive coefficients of DCRISIS\*RULE\_OF\_LAW and DCRISIS\*BANK\_CONC reveal that higher levels of rule of law and bank concentration can be seen to lead to a reduction in the negative impact of the financial crisis on corporate debt maturity. Higher levels of legal enforcement and greater banking concentration thus helped firms to avoid the reduction in debt maturity resulting from the financial crisis. These results provide evidence in line with the role of relationship banking, as bank concentration is found to ameliorate the reduction in corporate debt maturity during the financial crisis. This means that firms in countries with a higher level of bank concentration suffered less stringent restrictions on debt maturity. This result is consistent with evidence provided by Petersen and Rajan (1995) that firms in less concentrated credit markets are subject to greater financial constraints.

INSERT TABLE 6 ABOUT HERE

We test our third hypothesis in columns (7) and (8), analysing the effect of the weight of banks on corporate debt maturity during the financial crisis and whether this influence varies according to firm size. BANK\_CREDIT measures the effect of this variable during the period before the financial crisis for small firms. The DCRISIS\*BANK\_CREDIT interaction term identifies the differential effect of BANK\_CREDIT on corporate debt maturity during the financial crisis. The DCRISIS\*SIZE variable measures the differential effect of the financial crisis on corporate debt maturity in larger firms. Finally, the coefficient of the DCRISIS\*SIZE\*BANK\_CREDIT variable shows the differential impact of the financial crisis for larger firms in countries with a

large weight of banks in the economy<sup>9</sup>. The results in column (7) reveal that both the `BANK_CREDIT` and `DCRISIS*BANK_CREDIT` variables have a negative influence on corporate debt maturity, in line with the banking preference for short-term debt in both periods. These effects are economically significant, given that a one-standard deviation increase in the fitted value of `BANK_CREDIT` and `DCRISIS*BANK_CREDIT` would cause a reduction in debt maturity of -11.25 and -5.68 per cent, respectively. However, the positive coefficient of `DCRISIS*SIZE*BANK_CREDIT` shows that larger firms suffered a lower reduction in debt maturity compared to smaller firms during the financial crisis in countries where banks play an important role in the financing of the private sector. A one-standard deviation increase in the value of `DCRISIS*SIZE*BANK_CREDIT` would cause an increase of 2.88 per cent in the average value of the dependent variable. This positive differential effect of `BANK_CREDIT` on corporate debt maturity during the financial crisis for large firms is also maintained when we control for a potential size effect of bank concentration (column (8)).

## 5. ROBUSTNESS

In this section, we present additional robustness tests for our measure of the financial crisis. An important concern is that our measure of the financial crisis does not consider the fact that the crisis did not affect all the countries with the same intensity simultaneously. We address these issues taking into account proxies of the financial crisis that vary during the period 2008-2012 as well as measures of the intensity of the financial crisis.

First, we separately consider dummy variables identifying different sub-periods of the period 2008-2012 instead of one dummy variable for the overall period. `DCRISIS1`, `DCRISIS2` and `DCRISIS3` are three dummy variables that take the value of 1 for the periods 2008-2009, 2010-2011 and 2012, respectively, and 0 otherwise. The results using this definition of the financial

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<sup>9</sup> We also control for the influence of bank concentration on corporate debt maturity depending on firm size.



crisis are shown in Table 7. The coefficients of DCRISIS1, DCRISIS2 and DCRISIS3 are negative and significant in column (1) when only firm-level determinants of corporate debt maturity are considered, revealing a reduction in debt maturity during the different sub-periods of the financial crisis. In columns (2) to (4), when the firm- and country-level determinants of corporate debt maturity and the interaction effects of the crisis dummies and country-level variables are considered, at least one of the dummies measuring the financial crisis is negative and significant. In general, the results reveal that the negative effect of the crisis on corporate debt maturity was higher during the years 2010 and 2011.

INSERT TABLE 7 ABOUT HERE

The results for the firm- and country-level variables and the interaction terms between the variables measuring the financial crisis and country-level variables are similar to those obtained when using DCRISIS as the measure of the financial crisis. Specifically, we obtain results that are consistent with an increase in corporate debt maturity in countries with higher bank concentration, as the coefficients of BANK\_CONC and the interaction terms of this variable with the different periods of the financial crisis are always positive and significant. Similar to the results shown in Table 6, the coefficients for the interaction terms of BANK\_CREDIT and DCRISIS1, DCRISIS2 and DCRISIS3 are negative and significant. Furthermore, the results in column (4) reveal that a large weight of banks in the financing of the private sector led to a higher reduction in corporate debt maturity during the period of the financial crisis, and this reduction affected smaller firms to a greater extent.

Columns (5) to (8) confirm our evidence in line with the view that a credit supply shock is the predominant casual factor to explain corporate debt maturity during the recent crisis. The coefficients of the interaction terms between DCRISIS1, DCRISIS2 and DCRISIS3 identifying the crisis years and the firms' external dependence (FD) are negative and statistically significant at

conventional levels regardless of whether we control for firm-level characteristics or whether we also control for country-level determinants of corporate debt maturity.

Second, as the crisis has not had the same intensity in all economies, its consequences may have had a different influence on corporate debt maturity in different countries. We therefore check the robustness of our results by considering two measures of the intensity of the crisis in each country. On the one hand, we measure the intensity of the financial crisis as the difference between the average GDP growth rate for the period 2003-2007 minus the average GDP growth rate during the period 2008-2012 for each country. Thus, the greater the intensity of the crisis, the higher the value of this variable. On the other, we consider the percentage of non-performing loans for each country during the period 2008-2012 as a proxy for the intensity of the financial crisis. In both definitions, the variable (CRISIS\_INTENSITY) only shows a measure of the intensity during the years 2008-2012, being zero in the remaining years. These results are reported in Table 8, in columns (1) to (4) for the former measure of the intensity of the financial crisis and in columns (5) to (8) for the latter measure.

INSERT TABLE 8 ABOUT HERE

For both measures of the intensity of the financial crisis (CRISIS\_INTENSITY), the results show a negative relationship between this variable and corporate debt maturity (except for the coefficient in column (8)), suggesting that firms in those countries that suffered a stronger financial crisis present a greater reduction in their debt maturity. Firm- and country-level determinants of corporate debt maturity maintain the sign and significance reported in previous tables. Columns (3), (4), (7), and (8) present the results for the interactions between CRISIS\_INTENSITY and institutional characteristics and banking structure variables on corporate debt maturity during the financial crisis. As for the influence of country-level determinants during the financial crisis, higher levels of rule of law (except in column (8)),

protection of creditor rights and bank concentration are seen to reduce the negative impact of the financial crisis on corporate debt maturity.

The results also show that there is a negative effect of the weight of banks in the economy in the period before the financial crisis as well as during the financial crisis. However, the positive coefficient of  $CRISIS\_INTENSITY*SIZE*BANK\_CREDIT$  suggests that smaller firms suffered more restrictions in terms of debt maturity during the financial crisis in countries where banks play an important role in the financing of the private sector.

The results also show that the coefficient of  $DCRISIS*SIZE$  is negative and significant in column (8), while that of  $CRISIS\_INTENSITY$  is not significant. This reveals that the negative effect of the crisis on corporate debt maturity seems to be concentrated in large firms. This seemingly surprising result is consistent with the data provided by the ECB bank lending survey, which indicates that the crisis had a greater impact on large firms than on small firms. The ECB survey shows an increase in the tightening of credit standards for loans or credit lines to enterprises as a result of the financial crisis, although this tightening is not equally distributed across firms according to size. For the first quarter of 2008, a net percentage of 53% of banks reported a tightening of the credit standards they applied to large firms, while this percentage was only 34% for small and medium-sized enterprises. Furthermore, non-price terms and conditions also contributed more strongly to the net tightening for large firms than for SMEs, especially as regards the size of loans and credit lines, but also in terms of collateral, loan covenants and loan maturity.

Summing up, when we consider the different intensity of the financial crisis on corporate debt maturity, we confirm our main results: (1) the financial crisis reduced corporate debt maturity; (2) the effect of bank concentration on corporate debt maturity was more positive during the financial crisis, revealing the value of relationship banking as a way of improving the credit conditions of borrowers during periods of uncertainty; and (3) the debt maturity of larger firms

decreased less as a result of the financial crisis than the debt maturity of smaller firms in countries where banks play an important role in the financing of the private sector.

## **6. CONCLUSIONS**

This paper analyses the effect of the Global Financial Crisis on corporate debt maturity for a sample of 39 countries. Although corporate debt maturity was found to decline during the financial crisis, the effect is weak for the average firm. Total, long- and short-term leverage increased during the financial crisis compared to the average leverage in the period before the crisis. The results highlight that the increase in short-term debt is higher than in long-term debt, leading to a reduction in corporate debt maturity. Furthermore, the negative effect of the crisis on corporate debt maturity was stronger in those firms that are more dependent on external finance before the onset of the crisis. This result is addressed by a higher negative effect of the crisis on long-term debt than in short-term debt for firms with a greater dependence on external finance. These results provide evidence in line with the crisis having a credit supply effect that reduced the availability of corporate debt, especially long-term debt, shortening the corporate debt maturity of firms that were more dependent of external finance before the onset of the financial crisis.

We also analyze how the banking structure of the country affects the impact of the financial crisis on corporate debt maturity. The impact of the financial crisis on corporate debt maturity varied depending on banking concentration and the role played by banks in the financing of the private sector. Higher levels of bank concentration are seen to reduce the negative impact of the financial crisis on corporate debt maturity, suggesting that higher bank concentration increases bank incentives to establish close relations with borrowers over time. This last result is consistent with the importance of bank concentration (Petersen and Rajan, 1995; Berlin and Mester, 1999), as firms in less concentrated credit markets are subject to greater financial constraints.

We likewise show that the reduction in debt maturity was greater in countries where banks play an important role in the financing of the private sector, in keeping with the preferences of banks having an even greater influence on debt maturity structures during the financial crisis. Moreover, the reduction in debt maturity was lower for larger firms compared to smaller firms during the financial crisis in countries where banks play an important role in the financing of the private sector, suggesting that smaller firms were affected to a greater extent by bank preferences as they also are more dependent on domestic bank credit.

The evidence provided in the paper is robust to alternative measures of the financial crisis which consider that the recent crisis did not affect all countries with the same intensity simultaneously. Specifically, our results reveal that the effect of the crisis on corporate debt maturity was stronger during the years 2010 and 2011 and in those countries where the intensity of the crisis was greater.

Our results have potential policy implications, as they suggest that the financial crisis systematically affected corporate debt structure, but did so in an unequal way across firms and across countries, confirming the relevance of banking structure in corporate financing both in normal times and during economic and financial downturns. Bank concentration and the weight of banks in the financing of the private sector are revealed to affect the bank incentives to extend debt maturity during the crisis. Thus, regulators should consider the externalities for the real economy of the financial system when designing policies to develop or support the financial system.

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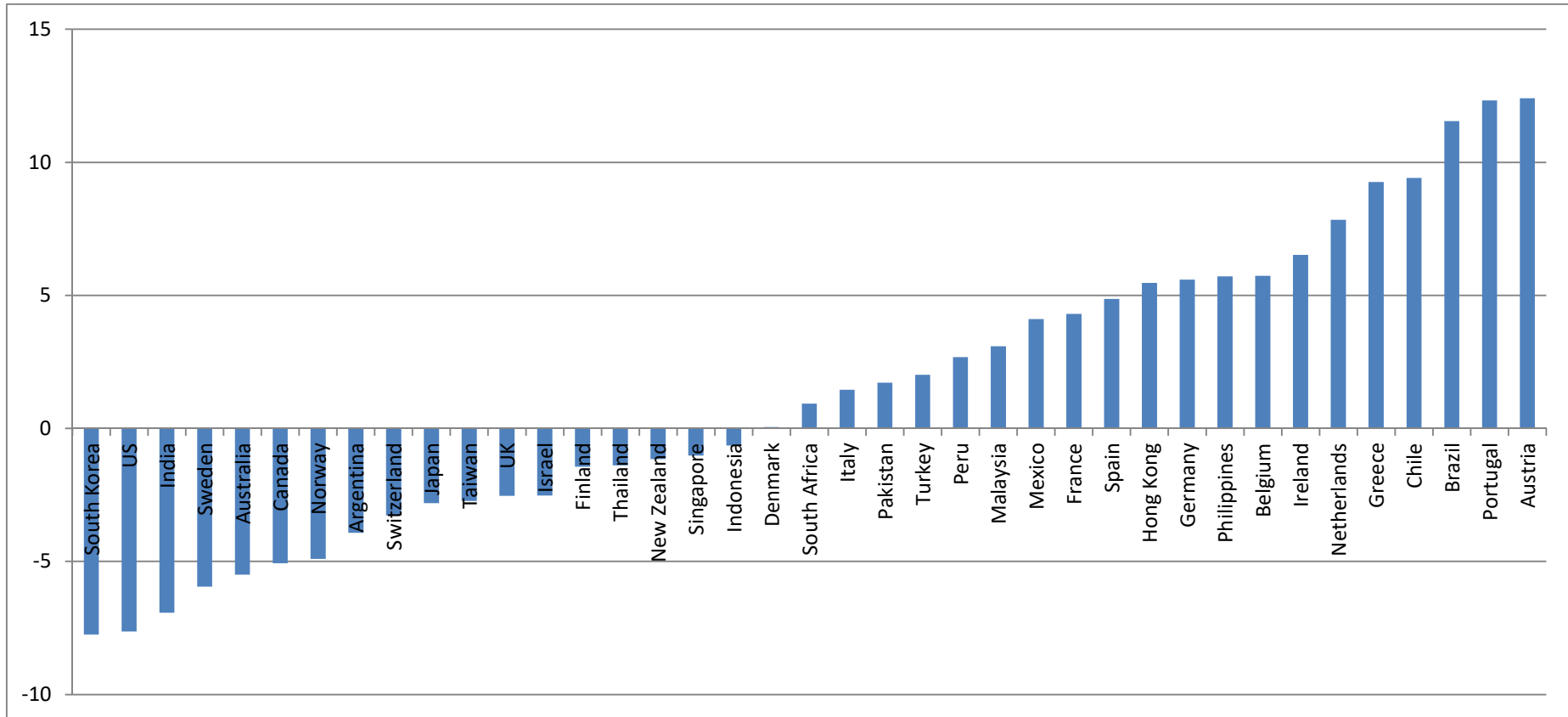
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**Figure 1. Differences in debt maturity across countries during the financial crisis**

This figure represents the difference between the average long-term debt to total debt ratio before (1995-2007) and during (2008-2012) the crisis for the countries included in our sample. Long-term debt is debt with a maturity of more than one year. Data from the Worldscope database.



**Table 1. Descriptive statistics**

Panels A, B and C report the descriptive statistics of firm-level and country-level variables for the overall sample, before and during the crisis. DEBT\_MAT is the percentage of the firm's total debt that has a maturity of more than one year. ASSET\_MAT is the ratio between net fixed assets and total assets. GROWTH is the market-to-book ratio. SIZE is the natural logarithm of sales. FIRM\_QUALITY is the ratio of net income plus depreciation to net debt. VOL\_EBIT is the absolute value of change in earnings before interest and taxes. LEV is the ratio between total debt and the firm's market value. RULE OF LAW is one of the six dimensions of the Worldwide Governance Indicators compiled by Kaufmann *et al.* (2009) and is a measure of the efficiency of the legal system. S\_RIGHTS measures the protection of property rights. C\_RIGHTS measures creditor rights. BANK\_CONC is the fraction of assets held by the three largest commercial banks in each country. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. BOND is the sum of the private bond market capitalization to GDP plus the international debt issues to GDP.

	Number of observations	Mean	Median	Standard Deviation	First quartile	Third quartile
<i>Panel A: Total Sample</i>						
DEBT_MAT (%)	171,892	47.19	48.19	34.01	14.23	77.35
ASSET_MAT (%)	171,892	33.22	30.36	22.19	15.58	47.49
GROWTH	171,892	1.79	1.21	2.02	0.69	2.15
SIZE	171,892	5.19	5.15	2.09	3.88	6.50
FIRM_QUALITY	171,892	2.22	0.38	10.56	0.16	0.96
VOL_EBIT	171,892	1.28	0.48	2.77	0.20	1.14
LEV (%)	171,892	33.00	28.31	25.03	11.45	50.88
RULE_OF_LAW	171,892	1.09	1.32	0.70	0.75	1.66
S_RIGHTS	171,892	74.28	70.00	16.89	70.00	90.00
C_RIGHTS	171,892	2.00	2.00	1.09	1.00	3.00
BANK_CONC (%)	164,507	52.30	46.75	19.44	36.12	64.50
BANK_CREDIT (%)	154,381	91.59	98.43	40.01	54.98	109.71
BOND (%)	136,701	72.82	61.80	40.49	46.30	97.12
<i>Panel B: Before the crisis</i>						
DEBT_MAT (%)	99,150	49.09	50.69	33.92	17.51	79.55
ASSET_MAT (%)	99,150	33.77	31.00	21.60	16.86	47.47
GROWTH	99,150	2.02	1.40	2.14	0.81	2.43
SIZE	99,150	5.28	5.24	2.01	4.00	6.55
FIRM_QUALITY	99,150	2.31	0.42	10.67	0.18	1.01
VOL_EBIT	99,150	1.22	0.45	2.67	0.19	1.08
LEV (%)	99,150	31.05	25.97	24.22	10.49	47.60
RULE_OF_LAW	99,150	1.15	1.36	0.67	0.79	1.69
S_RIGHTS	99,150	76.57	90.00	16.37	70.00	90.00
C_RIGHTS	99,150	1.99	2.00	1.11	1.00	3.00
BANK_CONC (%)	97,807	50.97	45.03	20.09	35.26	63.68
BANK_CREDIT (%)	91,648	86.55	93.14	36.45	53.04	110.93
BOND (%)	82,023	69.19	60.42	34.21	47.22	90.58
<i>Panel C: During the crisis</i>						
DEBT_MAT (%)	72,742	44.58	44.44	33.96	10.20	74.10
ASSET_MAT (%)	72,742	32.47	29.46	22.94	13.59	47.50
GROWTH	72,742	1.48	0.99	1.80	0.57	1.75
SIZE	72,742	5.06	5.01	2.20	3.74	6.42
FIRM_QUALITY	72,742	2.10	0.34	10.41	0.13	0.88
VOL_EBIT	72,742	1.37	0.52	2.89	0.21	1.23
LEV (%)	72,742	35.64	31.80	25.85	13.03	55.25
RULE_OF_LAW	72,742	1.00	1.27	0.72	0.52	1.60
S_RIGHTS	72,742	71.16	70.00	17.09	50.00	90.00
C_RIGHTS	72,742	2.02	2.00	1.05	1.00	3.00
BANK_CONC (%)	66,700	54.24	50.58	18.28	44.16	67.03
BANK_CREDIT (%)	62,733	98.96	103.41	43.67	62.99	107.13
BOND (%)	54,678	78.26	67.32	47.89	45.05	109.77

**Table 2. Descriptive statistics by country**

Table 2 reports the mean values of the dependent variables and country-level variables for each country. DEBT\_MAT is the percentage of the firm's total debt that has a maturity of more than one year. RULE OF LAW is one of the six dimensions of the Worldwide Governance Indicators compiled by Kaufmann *et al.* (2009) and is a measure of the efficiency of the legal system and the protection of property rights. C\_RIGHTS measures the protection of creditor rights. BANK\_CONC is the fraction of assets held by the three largest commercial banks in each country. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. BOND is the sum of the private bond market capitalization to GDP plus the international debt issues to GDP.

COUNTRY	Number of observations	DEBT_MAT (%)	RULE OF LAW	S_RIGHTS	C_RIGHTS	BANK_CONC (%)	BANK_CREDIT (%)	BOND (%)
Argentina	503	45.16	-0.56	33.18	1	40.41	13.95	32.94
Australia	5,186	49.76	1.76	90.00	3	65.45	108.99	95.84
Austria	649	50.71	1.85	90.00	3	64.64	110.46	109.74
Belgium	1,040	50.51	1.39	85.91	2	87.13	82.86	115.01
Brazil	2,385	51.38	-0.26	50.00	1	51.48	36.80	26.18
Canada	6,958	59.88	1.77	90.00	1	60.20	95.61	61.99
Chile	1,278	57.30	1.24	89.17	2	54.93	60.10	23.04
Denmark	1,265	52.29	1.90	90.34	3	79.77	124.06	170.31
Finland	1,175	58.72	1.93	90.43	1	96.35	74.81	68.21
France	5,275	50.72	1.42	72.15	0	60.26	98.73	96.91
Germany	5,754	51.37	1.68	90.00	3	69.56	110.50	107.36
Greece	2,513	36.07	0.72	55.09	1	67.97	78.76	77.29
Hong Kong	7,009	37.65	1.43	90.00	4	70.17	152.38	48.95
India	12,733	53.87	0.02	50.00	2	31.43	41.95	-
Indonesia	2,499	42.20	-0.73	33.29	2.07	49.60	25.67	6.73
Ireland	400	63.48	1.68	90.00	1	66.63	152.15	177.28
Israel	1,639	50.72	0.89	70.00	3	78.15	90.92	-
Italy	2,119	45.76	0.53	59.12	2	46.88	93.44	77.79
Japan	29,635	40.03	1.33	76.26	1.20	41.46	104.79	48.20
Malaysia	7,344	33.28	0.49	53.00	3	49.75	99.83	67.72
Mexico	968	63.71	-0.48	50.00	0	60.93	16.88	23.87
Netherlands	1,249	56.71	1.78	90.00	3	78.94	164.79	166.93
New Zealand	769	65.90	1.87	91.97	4	78.60	126.41	-
Norway	1,177	66.98	1.91	90.00	2	93.28	70.84	41.56
Pakistan	1,621	34.71	-0.85	33.06	1	46.58	23.34	-
Peru	652	41.66	-0.67	39.28	0	74.39	21.62	13.17
Philippines	1,033	41.34	-0.49	39.66	1	47.10	30.22	22.66
Portugal	559	51.35	1.11	70.00	1	85.00	142.23	102.71
Singapore	4,635	34.14	1.65	90.00	3	92.28	96.77	46.96
South Africa	2,049	44.69	0.10	50.00	3	77.79	70.90	27.30
South Korea	11,480	32.92	0.90	73.26	3	58.69	92.23	69.33
Spain	1,220	53.13	1.20	70.00	2	66.48	146.62	109.67
Sweden	2,416	58.89	1.88	87.08	1	95.40	88.22	107.83
Switzerland	1,836	60.02	1.88	89.30	1	84.63	160.68	96.81
Taiwan	11,901	33.06	0.89	72.02	2	28.92	-	-
Thailand	3,927	32.84	0.02	56.27	2.10	48.42	93.49	17.43
Turkey	1,917	33.10	0.03	53.15	2	55.46	26.85	7.29
UK	8,938	58.27	1.72	89.27	4	52.13	159.64	88.90
US	16,186	73.10	1.61	89.54	1	30.33	51.78	120.63

### Table 3. Correlations

The table presents the correlation matrix. DEBT\_MAT is the percentage of the firm's total debt that has a maturity of more than one year. ASSET\_MAT is the ratio between net fixed assets and total assets. GROWTH is the market-to-book ratio. SIZE is the natural logarithm of sales. VOL\_EBIT is the absolute value of change in earnings before interest and taxes. FIRM\_QUALITY is the ratio of net income plus depreciation to net debt. LEV is the ratio between total debt and the firm's market value. RULE OF LAW is one of the six dimensions of the Worldwide Governance Indicators compiled by Kaufmann *et al.* (2009) and is a measure of the efficiency of the legal system. S\_RIGHTS measures the protection of property rights. C\_RIGHTS measures creditor rights. BANK\_CONC is the fraction of assets held by the three largest commercial banks in each country. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. DCRISIS is a dummy variable that takes the value of 1 for the years 2008, 2009, 2010, 2011 and 2012, and zero otherwise. FD is the ratio of debt and total assets one year before the onset of the crisis, at December 2006. DCRISIS1 is a dummy variable that takes the value of 1 for the years 2008 and 2009, and zero otherwise. DCRISIS2 is a dummy variables that takes the value of 1 for the years 2010 and 2011, and zero otherwise. DCRISIS3 is a dummy variables that takes the value of 1 for the year 2012, and zero otherwise. CRISIS\_INTENSITY1 is the difference between the mean GDP growth for the period 2008-2012 minus the mean GDP growth for the period 2003-2007. CRISIS\_INTENSITY2 is the non-performing loans for each country during the period 2008-2012. \*\*\*, \*\*, and \* represent significance at the 1%, 5% and 10% level, respectively.

	DEBT_MAT	ASSET_MAT	GROWTH	SIZE	FIRM_QUALITY	VOL_EBIT	LEV	RULE_OF_LAW	S_RIGHTS	C_RIGHTS	BANK_CONC	BANK_CREDIT	BOND	DCRISIS	DCRISIS*FD	DCRISIS1	DCRISIS2	DCRISIS3	CRISIS_INTENSITY1
ASSET_MAT	0.178***																		
GROWTH	0.099***	-0.103***																	
SIZE	0.222***	-0.011***	0.067***																
FIRM_QUALITY	-0.115***	-0.067***	0.069***	0.018***															
VOL_EBIT	-0.028***	-0.004	-0.022***	-0.101***	-0.037***														
LEV	0.071***	0.219***	-0.363***	0.041***	-0.240***	0.067***													
RULE_OF_LAW	0.137***	-0.148***	0.099***	0.164***	-0.018***	0.024***	-0.170***												
S_RIGHTS	0.141***	-0.117***	0.094***	0.152***	-0.019***	0.025***	-0.142***	0.908***											
C_RIGHTS	-0.092***	-0.016***	-0.021***	-0.132***	0.006**	0.011***	-0.020***	0.068***	0.167***										
BANK_CONC	-0.033***	-0.056***	0.016***	-0.075***	-0.006**	0.021***	-0.062***	0.282***	0.243***	0.464***									
BANK_CREDIT	-0.078***	-0.131***	-0.037***	0.059***	-0.015***	0.028***	-0.059***	0.563***	0.495***	0.283***	0.385***								
BOND	0.206***	-0.128***	0.113***	0.048***	-0.018***	0.012***	-0.078***	0.518***	0.466***	0.030***	0.075***	0.285***							
DCRISIS	-0.066***	-0.029***	-0.133***	-0.052***	-0.010***	0.028***	0.091***	-0.104***	-0.158***	0.014***	0.082***	0.152***	0.110***						
DCRISIS*FD	-0.030***	0.061***	-0.153***	0.063***	-0.069***	0.026***	0.308***	-0.060***	-0.104***	-0.003	0.064***	0.109***	0.001	0.556***					
DCRISIS1	-0.031***	-0.010***	-0.094***	-0.056***	-0.015***	0.010***	0.086***	-0.063***	-0.115***	0.007***	0.033***	0.084***	0.046***	0.533***	0.328***				
DCRISIS2	-0.039***	-0.022***	-0.053***	-0.032***	0.001	0.028***	0.019***	-0.052***	-0.070***	0.010***	0.070***	0.084***	0.088***	0.548***	0.293***	-0.214***			
DCRISIS3	-0.022***	-0.008***	-0.038***	0.029***	0.001	-0.005*	0.019***	-0.032***	-0.031***	0.002	0.007***	0.047***	0.014***	0.321***	0.148***	-0.125**	-0.129***		
CRISIS_INTENSITY1	-0.038***	-0.040***	-0.109***	-0.038***	-0.010***	0.022***	0.099***	-0.044***	-0.095***	0.064***	0.150***	0.269***	0.205***	0.784***	0.441***	0.422***	0.429***	0.246***	
CRISIS_INTENSITY2	-0.029***	0.000	-0.094***	-0.028***	-0.009***	0.007**	0.120***	-0.248***	-0.288***	-0.080***	-0.002	0.043***	0.252***	0.673***	0.402***	0.331***	0.388***	0.220***	0.711***

**Table 4. Debt maturity and the financial crisis**

Regressions are estimated using panel data. The dependent variable (DEBT\_MAT) is the percentage of the firm's total debt with a maturity of more than one year. ASSET\_MAT is the ratio between net fixed assets and total assets. GROWTH is the firm's growth rate. SIZE is the natural logarithm of sales. FIRM\_QUALITY is the ratio of net income plus depreciation to book value. VOL\_EBIT is the absolute value of change in earnings before interest and taxes. LEV is the ratio between total debt and market value. DCRISIS is a dummy variable that takes the value of 1 for the years 2008, 2009, 2010, 2011 and 2012, and 0 otherwise. FD is the ratio of debt and total assets one year before the onset of the crisis, at December 2006. RULE\_OF\_LAW is one of the six dimensions of the WGI and is a measure of the efficiency of the legal system. S\_RIGHTS measures the protection of property rights. C\_RIGHTS measures creditor rights. BANK\_CONC is the fraction of assets held by the three largest banks in each country. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. BOND is the sum of government bond market capitalization to GDP plus the international debt issues to GDP. The Durbin-Wu-Hausman statistic tests the hypothesis that the introduction of instrumental variables has no influence on the coefficients of the estimations. We report instrumental variables estimations if the test is significant at the 10 percent level. Country-year, industry-year and firm fixed effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. \*\*\*, \*\*, and \* represent significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.4404*** (50.35)	0.4084*** (14.96)	0.4049*** (14.93)	0.4423*** (50.56)	0.4154*** (15.21)	0.4124*** (15.19)
ASSET_MAT	0.0553*** (6.34)	0.0353*** (3.42)	0.0354*** (3.43)	0.0536*** (6.14)	0.0333*** (3.22)	0.0333*** (3.23)
GROWTH	0.0035*** (6.76)	0.0034*** (5.75)	0.0034*** (5.74)	0.0037*** (7.15)	0.0036*** (6.12)	0.0036*** (6.11)
SIZE	0.0039*** (2.54)	0.0081*** (4.46)	0.0082*** (4.50)	0.0032** (2.08)	0.0074*** (4.05)	0.0074*** (4.08)
FIRM_QUALITY	-0.0009*** (-9.77)	-0.0008*** (-8.03)	-0.0008*** (-8.02)	-0.0009*** (-9.64)	-0.0008*** (-7.92)	-0.0008*** (-7.92)
VOL_EBIT	-0.0002 (-0.85)	-0.0000 (-0.05)	-0.0000 (-0.07)	-0.0002 (-0.80)	-0.0000 (-0.01)	-0.0000 (-0.02)
LEV	0.0497*** (9.59)	0.0628*** (10.19)	0.0623*** (10.13)	0.0472*** (9.09)	0.0602*** (9.74)	0.0597*** (9.69)
DCRISIS	-0.0100*** (-4.94)	-0.0042 (-1.40)	-0.0038 (-1.29)	0.0061** (2.04)	0.0125*** (3.18)	0.0129*** (3.29)
DCRISIS*FD	-	-	-	-0.0566*** (-7.20)	-0.0583*** (-6.51)	-0.0586*** (-6.54)
RULE_OF_LAW	-	0.0109 (0.83)	0.0090 (0.69)	-	0.0099 (0.75)	0.0083 (0.63)
C_RIGHTS	-	0.0186*** (4.44)	0.0181*** (4.35)	-	0.0183*** (4.37)	0.0179*** (4.29)
S_RIGHTS	-	-0.0002 (-1.15)	-	-	-0.0002 (-0.98)	-
BANK_CONC	-	0.0849*** (5.96)	0.0832*** (5.87)	-	0.0790*** (5.54)	0.0776*** (5.47)
BANK_CREDIT	-	-0.1258*** (-3.76)	-0.1383*** (-4.38)	-	-0.1290*** (-3.86)	-0.1397*** (-4.42)
BOND	-	0.0007*** (3.75)	0.0008*** (4.27)	-	0.0007*** (3.93)	0.0008*** (4.41)
Hausman test	1,418.97***	1,211.82***	1,117.94***	1,538.29***	1,251.58***	1,179.62***
F test	45.59***	23.88***	25.49***	46.23***	25.05***	26.65***
# observations	135,621	101,460	101,460	135,621	101,460	101,460
# firms	27,881	21,595	21,595	27,881	21,595	21,595
Durbin-Wu-Hausman test	-	4.00***	5.36***	-	4.72***	5.99***

**Table 5. Debt and the financial crisis**

Regressions are estimated using panel data. The dependent variables are the ratios between total debt (columns (1) and (2)), long-term debt (columns (3) and (4)), and short-term debt (columns (5) and (6)) and the market value of assets. The market value of assets is defined as total assets minus the book value of equity plus the market value of equity. PROFITABILITY is measured as EBIT plus depreciation expenses and provisions (non-cash deductions from earnings) divided by total assets. GROWTH is the market-to-book ratio. TANGIBILITY is the ratio between property, plant and equipment and total assets. SIZE is the natural logarithm of sales. C\_RIGHTS measures creditor rights. DCRISIS is a dummy variable that takes the value of 1 for the years 2008, 2009, 2010, 2011 and 2012, and zero otherwise. FD is the ratio of debt and total assets one year before the onset of the crisis, at December 2006. Country-year, industry-year and firm-specific effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. \*\*\*, \*\*, and \* represent significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.2104*** (30.80)	0.2126*** (31.17)	0.0773*** (15.87)	0.0786*** (16.15)	0.1331*** (27.72)	0.1340*** (27.93)
PROFITABILITY	-0.0002* (-1.68)	-0.0002* (-1.68)	0.0000 (0.16)	0.0000 (0.16)	-0.0002** (-2.55)	-0.0002** (-2.55)
GROWTH	-0.0209*** (-66.58)	-0.0204*** (-64.72)	-0.0107*** (-47.74)	-0.0104*** (-46.25)	-0.0102*** (-46.26)	-0.0100*** (-45.06)
TANGIBILITY	0.1706*** (32.09)	0.1682*** (31.67)	0.1265*** (33.34)	0.1251*** (32.99)	0.0441*** (11.81)	0.0431*** (11.53)
SIZE	0.0017* (1.82)	0.0007 (0.78)	0.0042*** (6.30)	0.0037*** (5.47)	-0.0025*** (-3.82)	-0.0029*** (-4.45)
C_RIGHTS	0.0077*** (4.53)	0.0076*** (4.46)	0.0044*** (3.64)	0.0043*** (3.58)	0.0033*** (2.75)	0.0032*** (2.70)
DCRISIS	0.0441*** (35.64)	0.0677*** (36.88)	0.0186*** (21.11)	0.0321*** (24.47)	0.0255*** (29.28)	0.0357*** (27.61)
DCRISIS*FD		-0.0824*** (-17.38)		-0.0469*** (-13.85)		-0.0356*** (-10.66)
Hausman test	204.34***	3,521.43***	300.00***	1,137.41***	525.47***	3,149.89***
F test	1049.04***	968.68***	575.10***	533.43***	513.54***	469.58***
# observations	135,421	135,421	135,421	135,421	135,421	135,421
# firms	27,862	27,862	27,862	27,862	27,862	27,862

**Table 6. Country-level determinants of firm debt maturity and financial crisis**

Regressions are estimated using panel data. The dependent variable (DEBT\_MAT) is the percentage of the firm's total debt that has a maturity of more than one year. ASSET\_MAT is the ratio between net fixed assets and total assets. GROWTH is the growth rate of the GDP. SIZE is the natural logarithm of sales. VOL\_EBIT is the absolute value of change in earnings before interest and taxes. FIRM\_QUALITY is the ratio of net income plus depreciation to net debt. LEV is the ratio between total debt and the firm's market value. DCRISIS is a dummy variables that takes the value of 1 for the years 2008, 2009, 2010, 2011 and 2012, and zero otherwise. RULE\_OF\_LAW is one of the six dimensions of the WGI and is a measure of the efficiency of the legal system. C\_RIGHTS measures creditor rights. BANK\_CONC is the fraction of assets held by the three largest commercial banks in each country. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. BOND is the sum of the private bond market capitalization to GDP plus the international debt issues to GDP. The Durbin-Wu-Hausman statistic tests the null hypothesis that the introduction of instrumental variables has no influence on the coefficients of the estimations. We report instrumental variables estimations if the test is significant at the 10 percent level. Country-year, industry-year and firm-specific effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. \*\*\*, \*\*, and \* represent significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.4092*** (15.02)	0.3981*** (14.51)	0.4140*** (15.22)	0.4050*** (14.93)	0.4038*** (14.88)	0.4152*** (14.83)	0.4286*** (15.21)	0.4284*** (15.20)
ASSET_MAT	0.0352*** (3.41)	0.0367*** (3.54)	0.0381*** (3.68)	0.0352*** (3.41)	0.0355*** (3.43)	0.0377*** (3.64)	0.0369*** (3.56)	0.0370*** (3.57)
GROWTH	0.0034*** (5.80)	0.0033*** (5.70)	0.0033*** (5.65)	0.0034*** (5.71)	0.0034*** (5.79)	0.0033*** (5.57)	0.0033*** (5.56)	0.0033*** (5.55)
SIZE	0.0083*** (4.54)	0.0080*** (4.41)	0.0078*** (4.28)	0.0082*** (4.49)	0.0082*** (4.49)	0.0077*** (4.23)	0.0059*** (3.16)	0.0059*** (3.17)
FIRM_QUALITY	-0.0008*** (-8.04)	-0.0008*** (-8.01)	-0.0008*** (-7.95)	-0.0008*** (-8.02)	-0.0008*** (-8.03)	-0.0008*** (-7.92)	-0.0008*** (-7.93)	-0.0008*** (-7.93)
VOL_EBIT	-0.0000 (-0.06)	-0.0000 (-0.07)	-0.0000 (-0.05)	-0.0000 (-0.07)	-0.0000 (-0.06)	-0.0000 (-0.07)	-0.0000 (-0.09)	-0.0000 (-0.09)
LEV	0.0621*** (10.11)	0.0625*** (10.16)	0.0626*** (10.19)	0.0624*** (10.15)	0.0618*** (10.04)	0.0637*** (10.33)	0.0638*** (10.35)	0.0639*** (10.35)
DCRISIS	-0.0089** (-2.09)	-0.0095** (-2.08)	-0.0364*** (-4.69)	-0.0009 (-0.15)	-0.0078* (-1.80)	-0.0296*** (-3.62)	-0.0262 (-1.61)	-0.0396* (-1.73)
RULE_OF_LAW	0.0084 (0.64)	0.0098 (0.75)	0.0059 (0.45)	0.0087 (0.66)	0.0075 (0.57)	0.0020 (0.15)	0.0001 (0.01)	0.0005 (0.04)
C_RIGHTS	0.0189*** (4.50)	0.0173*** (4.12)	0.0195*** (4.66)	0.0183*** (4.38)	0.0177*** (4.24)	0.0211*** (4.88)	0.0209*** (4.83)	0.0209*** (4.84)
BANK_CONC	0.0822*** (5.79)	0.0858*** (6.02)	0.0724*** (5.04)	0.0836*** (5.90)	0.0831*** (5.87)	0.0762*** (5.18)	0.0777*** (5.28)	0.0772*** (5.24)
BANK_CREDIT	-0.1448*** (-4.55)	-0.1294*** (-4.04)	-0.1363*** (-4.32)	-0.1384*** (-4.38)	-0.1324*** (-4.15)	-0.1360*** (-4.08)	-0.1396*** (-4.18)	-0.1397*** (-4.19)
BOND	0.0008*** (4.32)	0.0008*** (4.13)	0.0007*** (3.85)	0.0008*** (4.24)	0.0008*** (4.15)	0.0006*** (3.39)	0.0007*** (3.60)	0.0007*** (3.59)
DCRISIS*RULE_OF_LAW	0.0048* (1.66)					0.0086** (2.21)	0.0083** (2.11)	0.0078** (1.98)
DCRISIS*C_RIGHTS		0.0027 (1.64)				0.0029 (1.42)	0.0044** (2.15)	0.0043** (2.11)
DCRISIS*BANK_CONC			0.0565*** (4.54)			0.0598*** (4.20)	0.0600*** (4.22)	0.0901** (2.31)
DCRISIS*BANK_CREDIT				-0.0027 (-0.60)		-0.0243*** (-3.56)	-0.0478*** (-3.57)	-0.0512*** (-3.65)
DCRISIS*BOND					0.0000 (1.25)	0.0000 (0.62)	0.0000 (0.38)	0.0000 (0.42)
DCRISIS*SIZE							-0.0005 (-0.20)	0.0018 (0.48)
DCRISIS*SIZE*BANK_CREDIT							0.0039* (1.96)	0.0045** (2.12)
DCRISIS*SIZE*BANK_CONC								-0.0052 (-0.83)
Hausman test	1,149.83***	1,154.81***	1,234.22***	1,180.83***	1,112.42***	1,379.09***	1,409.41***	1,401.73***
F test	23.98***	23.97***	25.17***	23.82***	23.90***	20.56***	19.61***	18.75***
# observations	101,460	101,460	101,460	101,460	101,460	101,460	101,460	101,460
# firms	21,595	21,595	21,595	21,595	21,595	21,595	21,595	21,595
Durbin-Wu-Hausman test	6.24***	3.75**	4.77***	5.98***	5.86***	3.86***	4.21***	4.27***



### Table 7. Debt maturity and evolution of the financial crisis

Regressions are estimated using panel data. The dependent variable (DEBT\_MAT) is the percentage of the firm's total debt that has a maturity of more than one year. ASSET\_MAT is the ratio between net fixed assets and total assets. GROWTH is the growth rate of the GDP. SIZE is the natural logarithm of sales. VOL\_EBIT is the absolute value of change in earnings before interest and taxes. FIRM\_QUALITY is the ratio of net income plus depreciation to net debt. LEV is the ratio between total debt and the firm's market value. DCRISIS1 is a dummy variables that takes the value of 1 for the years 2008 and 2009, and zero otherwise. DCRISIS2 is a dummy variables that takes the value of 1 for the years 2010 and 2011, and zero otherwise. DCRISIS3 is a dummy variables that takes the value of 1 for the year 2012, and zero otherwise. FD is the ratio of debt and total assets one year before the onset of the crisis, at December 2006. RULE\_OF\_LAW is one of the six dimensions of the WGI and is a measure of the efficiency of the legal system. C\_RIGHTS measures creditor rights. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. BANK\_CONC is the fraction of assets held by the three largest commercial banks in each country. BOND is the sum of the private bond market capitalization to GDP plus the international debt issues to GDP. The Durbin-Wu-Hausman statistic tests the null hypothesis that the introduction of instrumental variables has no influence on the coefficients of the estimations. We report instrumental variables estimations if the test is significant at the 10 percent level. Country-year, industry-year and firm-specific effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. \*\*\*, \*\*, and \* represent significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.4200*** (46.37)	0.3845*** (13.23)	0.4087*** (13.47)	0.4223*** (13.85)	0.4198*** (46.30)	0.3939*** (13.54)	0.4141*** (13.64)	0.4283*** (14.04)
ASSET_MAT	0.0557*** (6.38)	0.0374*** (3.62)	0.0393*** (3.79)	0.0383*** (3.69)	0.0545*** (6.25)	0.0353*** (3.42)	0.0374*** (3.60)	0.0362*** (3.49)
GROWTH	0.0035*** (6.79)	0.0033*** (5.71)	0.0032*** (5.49)	0.0032*** (5.51)	0.0037*** (7.12)	0.0036*** (6.09)	0.0034*** (5.81)	0.0034*** (5.84)
SIZE	0.0045*** (2.95)	0.0078*** (4.28)	0.0075*** (4.10)	0.0054*** (2.85)	0.0042*** (2.76)	0.0071*** (3.53)	0.0068*** (3.68)	0.0046*** (3.87)
FIRM_QUALITY	-0.0009*** (-9.82)	-0.0008*** (-8.03)	-0.0008*** (-7.90)	-0.0008*** (-7.84)	-0.0009*** (-9.72)	-0.0008*** (-7.91)	-0.0008*** (-7.78)	-0.0008*** (-7.71)
VOL_EBIT	-0.0002 (-0.92)	0.0000 (0.07)	0.0000 (0.05)	-0.0000 (-0.11)	-0.0002 (-0.77)	0.0000 (0.12)	0.0000 (0.10)	-0.0000 (-0.06)
LEV	0.0495*** (9.55)	0.0638*** (10.35)	0.0647*** (10.44)	0.0661*** (10.67)	0.0481*** (9.25)	0.0611*** (9.89)	0.0623*** (10.02)	0.0637*** (10.24)
DCRISIS1	-0.0091*** (-4.38)	-0.0007 (-0.22)	-0.0288*** (-3.12)	-0.0043 (-0.26)	0.0089** (2.80)	0.0148*** (3.53)	-0.0099 (-1.00)	0.0179 (1.05)
DCRISIS2	-0.0159*** (-6.39)	-0.0120*** (-3.29)	-0.0375*** (-3.72)	-0.0294* (-1.75)	0.0015 (0.43)	0.0067 (1.43)	-0.0145 (-1.35)	-0.0035 (-0.20)
DCRISIS3	-0.0337*** (-10.15)	-0.0084 (-1.55)	-0.0292** (-2.01)	-0.0135 (-0.55)	-0.0285*** (-6.50)	0.0067 (1.03)	-0.0112 (-0.73)	0.0083 (0.33)
DCRISIS1*FD					-0.0655*** (-7.42)	-0.0536*** (-5.22)	-0.0509*** (-4.89)	-0.0509*** (-4.88)
DCRISIS2*FD					-0.0636*** (-7.07)	-0.0652*** (-6.23)	-0.0629*** (-5.93)	-0.0652*** (-6.13)
DCRISIS3*FD					-0.0023 (-0.20)	-0.0482*** (-3.40)	-0.0440*** (-3.30)	-0.0478*** (-3.40)
RULE_OF_LAW		0.0212 (1.58)	0.0151 (1.09)	0.0218 (1.56)		0.0199 (1.48)	0.0144 (1.04)	0.0216 (1.54)
C_RIGHTS		0.0216*** (4.91)	0.0277*** (5.90)	0.0296*** (6.26)		0.0211*** (4.81)	0.0265*** (5.65)	0.0286*** (6.04)
BANK_CONC		0.0831*** (5.86)	0.0707*** (4.75)	0.0753*** (5.05)		0.0771*** (5.43)	0.0665*** (4.45)	0.0708*** (4.74)
BANK_CREDIT		-0.1455*** (-4.44)	-0.1679*** (-4.54)	-0.1943*** (-5.13)		-0.1479*** (-4.51)	-0.1654*** (-4.47)	-0.1935*** (-5.11)
BOND		0.0007*** (3.12)	0.0006** (2.42)	0.0006*** (2.75)		0.0007*** (3.31)	0.0006*** (2.59)	0.0007*** (2.95)
DCRISIS1*RULE_OF_LAW			0.0065 (1.46)	0.0031 (0.69)			0.0039 (0.88)	0.0003 (0.07)
DCRISIS2*RULE_OF_LAW			0.0102** (2.13)	0.0022 (0.45)			0.0067 (1.40)	-0.0017 (-0.33)
DCRISIS3*RULE_OF_LAW			0.0176** (2.42)	0.0054 (0.70)			0.0147** (2.01)	0.0021 (0.28)
DCRISIS1*C_RIGHTS			0.0050** (2.15)	0.0039* (1.65)			0.0053** (2.30)	0.0042* (1.75)
DCRISIS2*C_RIGHTS			-0.0009 (-0.39)	0.0006 (0.24)			-0.0007 (-0.30)	0.0007 (0.30)
DCRISIS3*C_RIGHTS			0.0051 (1.55)	0.0079* (2.34)			0.0053 (1.63)	0.0080** (2.38)
DCRISIS1*BANK_CONC			0.0490*** (3.08)	0.0490*** (3.07)			0.0454*** (2.86)	0.0450*** (2.83)
DCRISIS2*BANK_CONC			0.0815*** (4.39)	0.0817*** (4.40)			0.0767*** (4.13)	0.0768*** (4.13)
DCRISIS3*BANK_CONC			0.0564** (2.13)	0.0520* (1.95)			0.0525** (1.98)	0.0480* (1.80)
DCRISIS1*BANK_CREDIT			-0.0193** (-2.39)	-0.0394*** (-3.26)			-0.0191** (-2.38)	-0.0415*** (-3.42)
DCRISIS2*BANK_CREDIT			-0.0261*** (-3.08)	-0.0589*** (-4.69)			-0.0249*** (-2.94)	-0.0595*** (-4.74)
DCRISIS3*BANK_CREDIT			-0.0368*** (-3.20)	-0.0867*** (-4.80)			-0.0364*** (-3.15)	-0.0874*** (-4.83)
DCRISIS1*BOND			0.0001 (1.23)	0.0001 (1.49)			0.0001 (1.16)	0.0001 (1.45)
DCRISIS2*BOND			-0.0000 (-0.15)	0.0000 (0.24)			-0.0000 (-0.21)	0.0000 (0.19)
DCRISIS3*BOND			-0.0000 (-0.26)	-0.0000 (-0.15)			-0.0000 (-0.21)	-0.0000 (-0.11)
DCRISIS1*SIZE				-0.0057** (-1.99)				-0.0064** (-2.24)
DCRISIS2*SIZE				-0.0036 (-1.24)				-0.0041 (-1.41)
DCRISIS3*SIZE				-0.0051 (-1.25)				-0.0056 (-1.38)
DCRISIS1*SIZE*BANK_CREDIT				0.0057** (2.44)				0.0063*** (2.69)
DCRISIS2*SIZE*BANK_CREDIT				0.0086** (3.60)				0.0091** (3.81)
DCRISIS3*SIZE*BANK_CREDIT				0.0123*** (3.73)				0.0127*** (3.84)
Hausman test	1,386.19***	1,104.82***	1,625.50***	1,722.48***	1,509.64***	1,422.26***	1,602.97***	1,665.29***
F test	44.71***	23.59***	13.80***	13.63***	41.47***	22.18***	13.74***	13.64***
# observations	135,621	101,460	101,460	101,460	135,621	101,460	101,460	101,460
# firms	27,881	21,595	21,595	21,595	27,881	21,595	21,595	21,595
Durbin-Wu-Hausman test	-	5.32***	5.24***	6.86***	-	5.94***	5.10***	6.89***

**Table 8. Debt maturity and intensity of the financial crisis**

Regressions are estimated using panel data. The dependent variable (DEBT\_MAT) is the percentage of the firm's total debt that has a maturity of more than one year. ASSET\_MAT is the ratio between net fixed assets and total assets. GROWTH is the growth rate of the GDP. SIZE is the natural logarithm of sales. VOL\_EBIT is the absolute value of change in earnings before interest and taxes. FIRM\_QUALITY is the ratio of net income plus depreciation to net debt. LEV is the ratio between total debt and the firm's market value. CRISIS\_INTENSITY in columns (1) to (4) is CRISIS\_INTENSITY1 and is defined as the difference between the mean GDP growth rates for the periods 2003-2007 and 2008-2012 for each country, and zero otherwise. CRISIS\_INTENSITY in columns (5) to (8) is CRISIS\_INTENSITY2 and is the non-performing loans for each country during the period 2008-2012. RULE\_OF\_LAW is one of the six dimensions of the WGI and is a measure of the efficiency of the legal system. C\_RIGHTS measures creditor rights. BANK\_CREDIT is the ratio of private credit by deposit money banks to GDP. BANK\_CONC is the fraction of assets held by the three largest commercial banks in each country. BOND is the sum of the private bond market capitalization to GDP plus the international debt issues to GDP. The Durbin-Wu-Hausman statistic tests the null hypothesis that the introduction of instrumental variables has no influence on the coefficients of the estimations. We report instrumental variables estimations if the test is significant at the 10 percent level. Country-year, industry-year and firm-specific effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. \*\*\*, \*\*, and \* represent significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.4447*** (51.33)	0.4040*** (16.16)	0.4168*** (16.05)	0.4291*** (16.38)	0.4578*** (51.20)	0.3934*** (15.73)	0.4136*** (15.04)	0.4221*** (15.27)
ASSET_MAT	0.0556*** (6.36)	0.0346*** (3.35)	0.0370*** (3.57)	0.0356*** (3.44)	0.0474*** (5.24)	0.0362*** (3.48)	0.0391*** (3.76)	0.0384*** (3.69)
GROWTH	0.0035*** (6.79)	0.0034*** (5.73)	0.0033*** (5.55)	0.0033*** (5.57)	0.0031*** (5.93)	0.0033*** (5.64)	0.0033*** (5.54)	0.0033*** (5.54)
SIZE	0.0035** (2.32)	0.0082*** (4.49)	0.0079*** (4.33)	0.0066*** (3.53)	0.0035** (2.24)	0.0077*** (4.24)	0.0073*** (3.97)	0.0067*** (3.64)
FIRM_QUALITY	-0.0009*** (-9.76)	-0.0008*** (-8.02)	-0.0008*** (-7.94)	-0.0008*** (-7.95)	-0.0009*** (-9.65)	-0.0008*** (-7.79)	-0.0008*** (-7.68)	-0.0008*** (-7.64)
VOL_EBIT	-0.0002 (-0.86)	-0.0000 (-0.08)	-0.0000 (-0.09)	-0.0000 (-0.11)	-0.0001 (-0.56)	-0.0000 (-0.09)	-0.0000 (-0.08)	-0.0000 (-0.13)
LEV	0.0496*** (9.55)	0.0630*** (10.23)	0.0657*** (10.63)	0.0659*** (10.66)	0.0568*** (10.46)	0.0653*** (10.48)	0.0666*** (10.68)	0.0680*** (10.89)
CRISIS_INTENSITY	-0.2635*** (-3.43)	-0.2095** (-2.29)	-0.9858*** (-2.83)	-0.8820* (-1.69)	-0.0033*** (-6.62)	-0.0024** (-4.07)	-0.0072*** (-2.82)	0.0035 (0.94)
RULE_OF_LAW	- (0.54)	0.0070 (0.54)	-0.0018 (-0.13)	-0.0001 (-0.01)		0.0090 (0.69)	0.0069 (0.52)	0.0133 (0.99)
C_RIGHTS	- (4.56)	0.0186*** (4.56)	0.0221*** (5.23)	0.0229*** (5.38)		0.0188*** (4.63)	0.0218*** (5.13)	0.0240*** (5.61)
BANK_CONC	- (6.02)	0.0855*** (6.02)	0.0842*** (5.84)	0.0833*** (5.78)		0.0936*** (6.45)	0.0868*** (5.85)	0.0869*** (5.84)
BANK_CREDIT	- (-4.89)	-0.1354*** (-4.89)	-0.1423*** (-4.72)	-0.1549*** (-5.08)		-0.1271*** (-4.87)	-0.1484*** (-4.90)	-0.1753*** (-5.71)
BOND	- (4.29)	0.0007*** (4.29)	0.0006*** (3.58)	0.0007*** (3.84)		0.0007*** (4.06)	0.0007*** (3.83)	0.0007*** (4.24)
CRISIS_INTENSITY*RULE_OF_LAW	- (3.72)		0.5501*** (3.72)	0.3866** (2.49)			0.0031*** (2.80)	0.0005 (0.41)
CRISIS_INTENSITY*C_RIGHTS	- (2.42)		0.2027** (2.42)	0.1876** (2.17)			0.0025*** (4.03)	0.0019*** (2.91)
CRISIS_INTENSITY*BANK_CONC	- (2.88)		1.4830*** (2.88)	1.7214*** (3.32)			0.0132*** (2.90)	0.0161*** (3.54)
CRISIS_INTENSITY*BANK_CREDIT	- (-3.78)		-0.9786*** (-3.78)	-1.4949*** (-4.54)			-0.0079*** (-3.98)	-0.0194*** (-6.86)
CRISIS_INTENSITY*BOND	- (-0.0001)		-0.0001 (-0.04)	0.0003 (0.17)			-0.0000 (-0.29)	0.0000 (0.73)
CRISIS_INTENSITY*SIZE	- (-0.75)			-0.0663 (-0.75)				-0.0026*** (-4.21)
CRISIS_INTENSITY*SIZE*BANK_CREDIT	- (2.30)			0.1523** (2.30)				0.0029*** (5.55)
Hausman test	1,426.92***	1,045.96***	1,452.05***	1,352.55***	1,321.08***	1,028.45***	1,214.44***	1,264.99***
F test	44.18***	25.75***	21.27***	20.06***	46.28***	26.06***	21.17***	20.89***
# observations	135,621	101,460	101,460	101,460	124,877	100,393	100,393	100,393
# firms	27,881	21,595	21,595	21,595	25,483	21,344	21,344	21,344
Durbin-Wu-Hausman test	-	5.70***	3.19**	3.83***	-	2.48*	2.26*	4.15***

## Appendix A. Variables

The table shows the definition of variables used in the paper and their sources.

Name	Definition	Source
<b>CRISIS VARIABLES</b>		
DCRISIS	A dummy variable that takes the value of 1 for the years 2008, 2009, 2010, 2011 and 2012, and 0 otherwise.	
DCRISIS1	A dummy variable that takes the value of 1 for the years 2008 and 2009, and 0 otherwise.	
DCRISIS2	A dummy variable that takes the value of 1 for the years 2010 and 2012, and 0 otherwise.	
DCRISIS3	A dummy variable that takes the value of 1 for the year 2012, and 0 otherwise.	
CRISIS_INTENSITY1	The difference between the mean GDP growth for the period 2003-2007 minus the mean GDP growth for the period 2008-2012 and zero for the remaining years.	World Bank
CRISIS_INTENSITY2	The percentage of non-performing loans for each country during the period 2008-2012. Bank non-performing loans to total gross loans are the value of non-performing loans divided by the total value of the loan portfolio (including non-performing loans before the deduction of specific loan-loss provisions). The loan amount recorded as non-performing should be the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.	World Bank
<b>FIRM-LEVEL VARIABLES</b>		
DEBT_MAT	The percentage of the firm's total debt (long-term debt plus debt in current liabilities) that has a maturity of more than one year.	Worldscope
ASSET_MAT	The ratio between net fixed assets and total assets.	Worldscope
GROWTH	The market-to-book ratio.	Worldscope
SIZE	The natural logarithm of sales.	Worldscope
FIRM_QUALITY	The ratio of net income plus depreciation to net debt	Worldscope
VOL_EBIT	The absolute value of change in earnings before interest and taxes.	Worldscope
LEV	The ratio between total debt and the firm's market value. The market value of assets is defined as total assets minus the book value of equity plus the market value of equity.	Worldscope
<b>COUNTRY-LEVEL VARIABLES</b>		
RULE_OF_LAW	Rule of law is one of the six dimensions of the Worldwide Governance Indicators. Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society and, in particular, the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.	Kaufmann <i>et al.</i> (2009)
S_RIGHTS	An indicator of the degree to which private property rights are protected and the degree to which government enforces laws that protect private property. It also accounts for the possibility that private property may be expropriated and analyses the independence of the judiciary, corruption within the judiciary and the ability of individuals and businesses to enforce contracts. It ranges between 0 and 100, a high score indicating greater legal protection of property rights.	Heritage Foundation
C_RIGHTS	This index measures four powers of secured lenders in bankruptcy: (1) whether there are restrictions, such as creditor consent, when a debtor files for reorganization; (2) whether secured creditors are able to seize their collateral after the petition for reorganization is approved, i.e. whether there is no automatic stay or asset freeze imposed by the court; (3) whether secured creditors are paid first out of the proceeds of liquidating a bankrupt firm; and (4) whether an administrator, and not management, is responsible for running the business during the reorganization. A value of one is added to the index when a country's laws and regulations provide each one of these powers to secured lenders; it thus varies between 0 (poor creditor rights) and 4 (strong creditor rights).	Djankov <i>et al.</i> (2007)
BANK_CONC	The fraction of bank assets held by the three largest commercial banks in the country.	Financial Development and Structure Dataset (World Bank). Beck <i>et al.</i> (2006)
BANK_CREDIT	The ratio of the private credit by deposit money banks to GDP.	Financial Development and Structure Dataset (World Bank). Beck <i>et al.</i> (2006)
BOND	The sum of the private bond market capitalization to GDP plus the international debt issues to GDP.	Financial Development and Structure Dataset (World Bank). Beck <i>et al.</i> (2006)