Debt Structure When Bankruptcy Law Offers Incentives to Restructure

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Abstract: Bankruptcy laws play a dual role in multiple lender models (von Thadden, Berglof and Roland, 2010; Zhong, 2021): they affect the strength of borrowers' commitment to repay, and the incentives offered to multiple lenders to re-negotiate distressed debt. We capture this dual role of bankruptcy law by supplementing the La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV) (1997,1998) creditor rights index with two restructuring indexes that capture incentives for creditors to restructure. Using a difference-in-difference approach, we show the traditional trade-off model helps explain an *increase* of 5.9% in total long-term debt following bankruptcy laws that permit out-of-court restructuring. In comparison, the multiple lender model helps explain a *decrease* of 3.9% in total long-term debt following bankruptcy laws that encourage strategic default. The increase in long-term debt in the case of the former comes through diversification of lenders to banks, debentures for large profitable firms, and bank and non-bank private debt for weak, unprofitable firms.

Keywords: bankruptcy law, debt structure, restructuring, bank debt, and creditors' rights.

JEL Code: G32, G33, G38.

The La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV) (1997, 1998) creditor rights index has been the standard bearer in studies that relate debt policy to bankruptcy law.[1] Increasingly, bankruptcy laws worldwide are being rewritten to include an out-of-court restructuring procedure. This paper examines the impact of these laws on both the level and distribution of long-term debt across bank, public, and non-bank private debt categories.

Theoretical models have been developed for the response of firm-level debt policy to restructuring incentives when the firm has a single lender (Mella-Barral and Perraudin, 1997; Anderson and Sundaresan, 1996; Broadie, Chernov and Sundaresan, 2007). Recent extensions examine how firms with multiple creditors respond to restructuring incentives. For example, Hackbarth, Hennessy, and Leland (HHL) (2007) model the effect of renegotiations on the distribution between bank and public debt, while Zhong (2021) and von Thadden, Berglof and Roland (2010) generalize the results of the mix of creditors, without drawing an explicit distinction between bank and public debt. Within this framework of mixed debt models, bankruptcy laws influence both the strength of the borrower's commitment to repay and the incentives offered to creditors to re-negotiate distressed debt. It follows from these models that firms should consider both the negotiability of a debt category and the incentives provided by bankruptcy law to re-negotiate debt in choosing their lenders.

In this paper, we trace bankruptcy reforms adopted by countries, many in Europe, between 2002 and 2018, to study their impact on the level and structure of firms' long-term debt. The

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[1] The literature was pioneered by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) (LLSV). La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997,1998), Qian and Strahan (2007), Djankov, McLeish, and Shleifer (2007) (DMS), and Haselman, Pistor and Vig (2010) rely on the LLSV creditor rights index to conclude that the supply of debt increases when laws strengthen creditor rights. Vig (2013) finds in contrast, that greater creditor rights led to a reduction in both secured debt and total debt.

impetus for bankruptcy reforms in Europe came from a resolution about restructuring and bankruptcy that was adopted by the EU in 2000.[2] Since the EU resolution did not seek the adoption of a uniform bankruptcy code, there is considerable heterogeneity in the types of bankruptcy reforms adopted subsequently by countries in the EU. In addition, in our empirical analysis, we also include three non-EU countries, Chile, Brazil, and Russia, which undertook bankruptcy reforms coincidentally with countries in the EU.

We supplement the LLSV (1997,1998) creditor rights index with two additional indexes that measure the strength of restructuring incentives to reflect the dual role played by bankruptcy law in the framework of a mixed debt model of a firm's debt policy. Next, using data from Orbis, a subset of the Bureau Van Dijk suite of databases, which provides a breakdown of long-term interest-bearing debt into bank, public, and non-bank private debt, we confirm prior evidence on pro-creditor reforms, while providing novel evidence on pro-restructuring reforms.

We document that long-term debt increases by almost 6% when bankruptcy reforms permit out-of-court restructuring. Out-of-court restructuring increases firms' debt capacity by reducing expected bankruptcy costs (Jostarndt and Sautner, 2010). The increase in total debt comes about from a 5% increase in bank debt, and a 13% increase in private debt. Not surprisingly, 12 out of the 18 countries in the sample decided to enable out-of-court restructuring of distressed debt. Pro-creditor reforms encourage concentration into bank debt, while reducing public debt issuance by 11%. Finally, bankruptcy reforms encouraging strategic default by borrowers result in a nearly 4%

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[2] Countries in the European Union were encouraged to reform their bankruptcy laws to conform to a set of core principles articulated in COUNCIL REGULATION (EC) No 1346/2000 of 29 May 2000 on Insolvency Proceedings, available on eur-lex-europa.eu.

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reduction in total long-term debt. In countries that adopted such reforms, even profitable firms are forced to substitute bank debt with non-bank private debt.

Since collateral and covenants can act as substitutes for bankruptcy law (Davydenko and Franks, 2008; Haselman, Pistor and Vig, 2010; Qi, Roth and Wald, 2009; Adler and Capkun, 2019), we ensure that there were no related legal changes around the time of the bankruptcy law amendments. In addition, Djankov, McLeish, and Shleifer (2007) show that the existence of public and private credit registries is strongly associated with private credit development. However, none of the countries in our sample established credit registries coincidentally with undertaking bankruptcy reforms. We are, therefore, reasonably assured that any changes in the level and structure of debt financing between the pre-and post-event periods are attributable to changes in bankruptcy law. In addition, we also take into account that several studies demonstrate that the effect of bankruptcy laws on firm-level debt policy is dependent on the strength of enforcement of bankruptcy laws (Alencar and Ponticelli, 2016; Djankov, Hart, McLiesh and Shleifer, 2008; Favara, Schroth and Valta, 2012; Gine and Love, 2010). Although we do not explicitly control for the strength of enforcement in this study, we believe that, since the treatment sample is predominantly composed of EU countries—where law enforcement is presumably more substantial than in non-EU countries—enforcement may not be a significant factor influencing our results.

2. Hypotheses

The tradeoff theory predicts that firms will borrow to the point where the marginal cost of bankruptcy exceeds the marginal benefit of the debt tax shield. Direct and agency bankruptcy costs are shown in Mella-Barral and Perraudin (1997) to decrease when a firm with a single lender can re-negotiate debt service. Subsequent studies show that the relative bargaining power of the

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borrower and lender affects debt levels: Mella-Barral (1999) shows that total debt decreases when debtors have relatively stronger bargaining power, while Broadie, Chernov, and Sundaresan (2007) show that re-organization of debt within a Chapter 11 filing leads to higher firm value and higher debt capacity when creditors have control over the reorganization process.

HHL extend the single lender model to a firm financed with both bank and public debt. They predict that firms should rely exclusively on bank debt because it can be efficiently renegotiated, which is consistent with empirical evidence in Gilson, John, and Lang (1990) and Carey, Post, and Sharpe (1998). Thus, when bankruptcy laws strengthen creditor rights, the HHL model predicts a shift from public debt to bank debt. When bankruptcy laws permit debt restructuring, HHL predict that firms with strong bargaining power over banks replace bank debt with public debt. Substitution away from bank debt is predicted because the bank is only willing to lend up to its reservation value, which is the value it expects to redeem in a liquidation. Strong firms who wish to take advantage of the tax shield provided by debt financing make up the shortfall by issuing public debt.

In the HHL model, cash flows to equity in weak firms is zero in the renegotiation states when banks receive all cash flows. Shareholders who want to preserve the convexity of payoffs may choose to borrow from non-bank private lenders. This category of debt can be renegotiated like bank debt while letting the issuer avoid the day-to-day scrutiny of bank debt. Empirical literature (Rauh and Sufi , 2010; Denis and Mihov, 2003) confirms that firms with the lowest quality issue non-bank private debt. Such firms can be recast within the HHL framework as weak firms relative to banks but with bargaining power over non-bank private lenders. When bankruptcy laws favor debt restructuring, weak firms should shift away from bank debt and into non-bank private debt.

Debt restructuring can be conducted through an out-of-court workout, or within formal bankruptcy. Jostarndt and Sautner (2010) show that both administrative expenses and agency costs are significantly higher in a formal bankruptcy than in a private workout. The trade-off model predicts that a decrease in expected bankruptcy costs leads to a higher optimal level of debt. Thus, bankruptcy reforms that encourage out-of-court restructuring should be associated with an increase in the level of long-term debt.

The following testable hypotheses emerge from the discussion above:

i)   Stronger creditor rights encourage firms to issue bank debt

ii)   Stronger creditor rights discourage firms from issuing public debt.

iii)   Bankruptcy laws that encourage restructuring lead strong firms to issue public debt, and weak firms to issue non-bank private debt.

iv)   Bankruptcy laws that encourage out-of-court restructuring encourage the issuance of total long-term debt.

More recent models of multiple lenders (von Thadden, Berglof and Roland, 2010; Zhong, 2021) argue that firms voluntarily choose to borrow from multiple lenders in order to increase their debt capacity. Borrowing from multiple lenders commits the firm to a higher payout of cash flow. The commitment is credible because it is harder to opportunistically hold up any single creditor. The disadvantage of multiple lenders is the difficulty of contract negotiations when individual collection rights of one category of creditors conflict with collective debt collection imposed by a resolution of a bankruptcy filing. The firm arrives at the optimal number of creditors by trading off its commitment to pay back its debt, against inefficient liquidation that results from coordination problems amongst multiple creditors.

The emphasis in Zhong's (2021) dynamic mixed-debt model is rollover risk, which is the inability of the firm to replace maturing debt with new debt. Rollover risk is higher when bankruptcy law gives one group of creditors the right to seize collateral. Thus, both models of mixed debt predict consolidation into bank debt when bankruptcy laws strengthen creditor rights. Related to the He and Xiong (2012a) study of runs on corporate debt, a strong creditor's decision not to roll over maturing debt affects junior lenders, who will respond by withholding supply. On the other hand, rollover risk is lower when bankruptcy laws encourage efficient restructuring through a private workout. The mixed-debt models predict that the resultant reduction in rollover risk leads firms to diversify their creditor base. Finally, bankruptcy laws that encourage restructuring are those that encourage strategic default by the borrower. Mixed-debt models predict a shrinkage in total debt in response to such laws. A firm's commitment to a higher payout of cash flows with multiple lenders is no longer credible as the firm is incented by bankruptcy law to opportunistically hold up creditors.

Further predictions on the types of debt that firms can access come from combining the characteristics of each debt category with the type of bankruptcy law adopted. Within the context of the Zhong (2021) model, both bank and non-bank private debt have lower rollover risk, as they are both easier to negotiate. Public debt, being harder to negotiate, has a higher rollover risk. Firms will seek to increase their debt capacity by taking into consideration the type of bankruptcy law, and the rollover risk associated with a particular debt category. When rollover risk is *magnified* by bankruptcy laws that strengthen creditor rights, firms will mitigate rollover risk by choosing to borrow from bank and non-bank private debt, the two sources of debt with the least rollover risk. When rollover risk is *minimized* by bankruptcy laws that encourage efficient restructuring, strong

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firms will strengthen their commitment to a higher payout of their cash flows by borrowing from hard-to-negotiate public debt.

The testable hypotheses from the mixed debt models are:

v)   Stronger creditor rights encourage firms to focus debt issuance on a single class of lenders.

vi)   Laws that encourage efficient restructuring lead to the diversification of lenders. Strong firms will diversify into bank and public debt, and weak firms will borrow from banks, and non-bank private lenders.

vii) Laws that encourage strategic default lead to a reduction in debt capacity. These types of laws weaken the firm's commitment to repay lenders, so the firm is unable to borrow from multiple sources. Debt capacity shrinks as a result.

3. Data

3.1. Bankruptcy law changes

We identify twenty-six countries worldwide that changed their bankruptcy laws between 2002 and 2018. The sample period is determined by the availability of financial data on Orbis, which covers the period from 2000 to 2020.   Bankruptcy law changes that occurred before 2002 and after 2018 are excluded, considering the requirement of at least two years of financial data before and after the law change. Several additional countries, including Italy, Great Britain, Ireland, Russia, and Germany, undertook multiple bankruptcy law changes during the sample period. We only include those changes that affected the values of the bankruptcy law indexes created in this study.[3]   For instance, Sweden changed its bankruptcy law in 2010, with the most significant change being an increase in the percentage of a company's personal property that could

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[3] We discuss the creation of these indexes in more detail in the next sub-section.

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be used as collateral security for credits from 55% per the old law to 100%. Since this change to the law leaves the bankruptcy indexes unchanged, we do not include Sweden in our study. Similarly, Mexico changed its bankruptcy law in 2014 to eliminate the cram-down of restructuring agreements on dissenting creditors while permitting DIP financing to have super-priority. Since the two changes offset each other, the bankruptcy indexes constructed in this paper remained unchanged after the law, and for this reason, Mexico is not included. However, Italy, which undertook bankruptcy law changes in both 2006 and 2012, is included twice in the sample because the changes had a material impact on the bankruptcy law indexes.

The sample is dominated by countries in the EU who were responding to the 2000 EU directive.[4] These include the United Kingdom[5], Greece, France, Italy, Spain, Netherlands, Portugal, Finland, Ireland, Belgium, Denmark, Turkey, and Germany. In addition to the EU countries, the sample includes Russia, Brazil and Chile in Latin America. Although four countries in Asia, namely, China, India, Thailand, and Vietnam changed their bankruptcy laws during the sample period, we excluded them from the final sample since their public debt markets have specialized characteristics: Amstad and He (2020) show that public debt markets in China are systematically different from public debt markets in the U.S. Slovakia, Vietnam and New Zealand also undertook bankruptcy reforms during this period, but are not included in the sample because there are too few publicly listed firms in these countries with data on Orbis. Our final sample consists of 18 countries, with 15 countries from the Eurozone, Russia, Brazil, and Chile. We used a variety of sources to understand the changes to bankruptcy law including: i) a now-defunct

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[4] See footnote 2.

[5] The UK Insolvency law applies across the United Kingdom, as opposed to separate local regimes that apply to individual bankruptcies.

website http://www.eStandardsforum.org, ii) the website of the International Bar Association: http://www.ibanet.org., iii) a publication titled "Bankruptcy Laws around Europe (1850-2015): Institutional Change and Institutional Features", and iv) country-specific publications. Details regarding changes to the law in each country in our sample are in an online appendix.

3.2 Bankruptcy Law Indexes

Ten countries in our sample created new procedures in their bankruptcy law for debt restructuring. We create two indexes to capture such changes: the first index, OUT, equals 1(0) if the bankruptcy law creates (does not create) a separate procedure to handle out-of-court restructuring. Some countries permit in-court, or court-supervised reorganization that is similar to the Chapter 11 code in the U.S. We create a second index called REORG, which is a six-condition index that measures the incentives given by bankruptcy law to creditors to grant concessions within a court-supervised procedure. Each of the following conditions, if present (absent), receives a 1(0) in the index: i) a separate procedure in the bankruptcy code for in-court restructuring; ii) automatic stay when the company is admitted to in-court restructuring; iii) restructuring negotiations are not public; iv) cramdown of agreements reached by creditors during restructuring negotiations; v) payments made before bankruptcy filing are not subject to clawback; and vi) debtor-in-possession (DIP) financing gets super-priority status over secured creditors.

Higher values of REORG indicate larger incentives given by the law to facilitate in-court debt restructuring. For instance, a separate procedure in the bankruptcy code for restructuring allows firms and creditors to speed up the resolution of financial distress (Tashjian, Lease, and McConnell, 1996). The automatic-stay condition is meant to prevent a run on assets by secured creditors when the firm is in the pre-insolvency phase. The third condition regarding privacy for restructuring negotiations prevents suppliers and other trade creditors from withholding services

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to the company at the prospect of financial distress raised by debt restructuring (Hertzel, Officer, Li, and Cornaggia, 2009). The fourth condition in dealing with cramdowns is to discourage the holdout problem described in Gilson, John, and Lang (1990), and Asquith, Gertner, and Scharfstein (1994). The likelihood that restructuring succeeds is higher when bankruptcy law does not permit clawback; agreements that firms reach with their creditors in pre-insolvency negotiations cannot be overturned if the firm ends up filing for bankruptcy. DIP financing is coded as one and is included in the REORG index even though it applies only when a firm declares bankruptcy. Granting super-priority to DIP financing effectively impairs the claims of senior lenders, by weakening the collateral rights of secured creditors (Dahiya, John, Puri, and Ramirez, 2003). By threatening to alter lenders' liquidation rights in formal bankruptcy, firms can ex-ante encourage banks and public debtors to enter into restructuring negotiations (James, 1995).[6]

We create a creditor rights index, CRED, as a modified DMS index. It is constructed by assigning a value of 1(0) to each of the following six conditions: i) only creditors can file for formal bankruptcy; ii) the law allows for collateral seizure when the loan is in the form of a pledge or a mortgage; iii) the court or a court-appointed administrator is left in control of the bankrupt firm; iv) secured creditors are elevated in absolute priority over all other claimants, including pre-insolvency lenders and estate, tax, and labor claimants; v) there is no automatic stay after the firm is admitted to bankruptcy; and vi) secured creditors are permitted to opt out of restructuring negotiations inside the bankruptcy. The two additional conditions in our CRED index that are

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[6] Dispersed public debt holders are drawn into bargaining talks by the prospect of participation by banks (James, 1995, 1996). Hege and Mella-Barral (2005) model the process by which laws governing proceedings in formal bankruptcy translate to ex-ante decisions made by debtors and creditors. Through a process of backward induction, they show that even dispersed creditors can be persuaded to make coupon concessions in private workouts in exchange for guaranteed liquidation rights.

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absent in the DMS index are conditions (v) and (vi). After the approval of a formal bankruptcy filing, courts may impose an automatic stay on all contractual payments, particularly on interest and principal repayments on outstanding debt. An automatic stay may not extend to collateralized debt, which may be seized by pledgors even when an automatic stay is in effect. Hence automatic stay is included as a condition separate from the seizure of collateral. Imposing an automatic stay hurts secured creditors as they have to wait to recover their debts. Finally, condition (vi) permits secured creditors to pursue recovery of their debt independent of ongoing debt restructuring negotiations among unsecured creditors and the firm. Secured creditors recover less of their outstanding debt if they can be coerced to participate in such negotiations.[7]

It may be argued that there is no distinction between the CRED and REORG indexes if conditions in the REORG index, such as automatic stay, cram-downs, and DIP financing indicate weak creditors' rights rather than the ease of reorganization. We believe that the mixed-debt models described in the earlier section warrant the creation of two separate indexes to distinguish between individual versus collective creditor rights. The CRED index represents the rights of individual creditors, while the REORG index captures collective creditor rights. For instance, imposing an automatic stay, and granting permission to debtors to file for bankruptcy may weaken creditors' rights, but as argued by von Thadden, Berglof, and Roland (2010), these are also mechanisms to enforce collective creditor rights by preventing a run on assets by one group of creditors who can recover their full claim if they are the first to foreclose on collateral.

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[7] At the suggestion of an anonymous referee, we created an index with only the four conditions in the DMS index. The results from the empirical analysis are qualitatively similar to those reported in the paper and are available from the authors upon request.

Following Spamann (2010) who criticizes indexes that are inconsistent in their classification of rules that have ambiguous interpretations, we exclude conditions that have an ambiguous effect on CRED or REORG. For this reason, we ignore exchange offers, pre-packs, reforms that increase the speed and efficiency of bankruptcy proceedings (including specialized courts to deal with complex bankruptcy issues), and detailed specifications of the method of sale and the disposal of assets in a liquidation. Certain types of mechanisms to dispose of assets in a piecemeal liquidation can give secured creditors the upper hand in a restructuring even though the intent is an equitable distribution of liquidation proceeds. Eckbo and Thorburn (2008) present evidence that suggests there's ambiguity in classifying such reforms into the CRED or REORG indexes.

Details on the construction of the CRED and REORG indexes for each country in the sample are in Appendix 1. In Table 1, we report the values of the three indexes under the current law, and under the old law. Based on a combination of the index OUT, the change in the CRED index, and the change in the REORG index, we identify three regimes of bankruptcy law changes: 1) pro-creditor countries including Spain, Netherlands, Portugal, and Finland, for who OUT=0, and the change in CRED is positive, 2) pro-restructuring countries including Italy_1, Denmark, France, Brazil, Greece, Switzerland and Ireland, for who OUT =1, and, the change in REORG is positive, and 3) pro-debtor countries including Russia, United Kingdom, Italy_2, Turkey, Belgium, Chile and Germany for who OUT=1 and change in CRED is negative. [8] Italy_1 is in the pro-

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[8] While Brazil is classified under the pro-restructuring category in this paper, Alencar and Ponticelli (2016) classify Brazil's 2005 bankruptcy reforms as strengthening secured creditors. In footnote 8, they note that the 'law introduced a new reorganization procedure based on Chapter 11 of the US Bankruptcy Code', and list the new measures included in this reorganization procedure, all of which are included in our restructuring index.

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restructuring group for its 2006 reforms and is in the pro-debtor group for its 2012 reforms (Italy_2).

3.3. Country characteristics

We examine country characteristics to investigate whether there are systematic differences in the macroeconomic environment among countries in the three regimes. Country characteristics include macro-economic conditions and legal factors such as the rule of law (Demirguc-Kunt and Detragiache, 1998). We obtain the rule-of-law indicator, annual real GDP growth rate, the rate of inflation, the unemployment rate, the market capitalization of listed domestic companies as a percent of GDP, and the domestic credit to the private sector as a percent of GDP, from the World Development Indicators database maintained by the World Bank.[9]

We rely on macroeconomic variables to construct a control sample of countries. The control sample is required to control for biases in results that arise from endogeneity in the selection of a particular set of bankruptcy laws, or in a firm's choice of the level and structure of long-term debt. To identify the control sample, we first estimate a logistic regression for the likelihood that a country would undertake changes to its bankruptcy law in any given year. The change in the CRED index from one year to the next serves as the proxy for the change in bankruptcy laws. Annual macroeconomic data from the World Bank database are obtained for all countries in Latin America and Europe that have financial data on Orbis.[10] Macroeconomic data for these potential

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[9] A previous version included the ratio of bank nonperforming loans to total gross loans. It is excluded in this version due to unavailability of data on the current World Bank database for the pre-2006 period. The previous version also included cultural factors such as religion and language (Stulz and Williamson, 2003) and legal origins (LLSV). Since our current sample is dominated by European countries which have identical values for many of these variables, cultural factors and legal origins are dropped from this version.

[10] Appendix 2 has macro-economic characteristics of the treatment and control samples of countries in the year in which the new bankruptcy law is enacted for the treatment country.

control countries is pooled with macro-economic data for the sample of test countries in Table 1, every year. The logistic regression below is estimated with pooled annual data from 2002 to 2020:

$$\text{Pr(an increase in creditor rights)}_t = \gamma\, \mathbf{Z}_t + \eta_t \tag{1}$$

Variables included in $\mathbf{Z_t}$ are the market capitalization of equity to GDP, growth in GDP, the inflation rate, the unemployment rate, credit available to the private sector to GDP, and the rule of law index. For the treatment sample of countries, the binary dependent variable is set to 1(0) if the change in the creditor rights index is positive (0 or negative). For the countries in the potential control sample of countries, the binary dependent variable is set equal to zero. Results from the estimation of the logit model in equation (1) are reported in Panel A of Table 2. The coefficients on the rule of law index, GDP growth, unemployment rate, and equity market capitalization are positive, and those on the inflation rate and the percent credit to the private sector are negative. All goodness-of-fit measures range between 1.04% and 6.5%.

The probability that a country will increase its creditor rights in any given year is obtained from equation (1). The treatment sample of countries that undertook bankruptcy law changes is matched with all countries that i) did not undertake a bankruptcy law change within four years of the event year for the treatment country, ii) have a predicted probability that is within ± 1% of the predicted probability for the treatment country, and iii) were in the same geographic region as the treatment country. The last condition is implemented by matching countries in Western Europe with other Western European countries, eastern European countries with other Eastern European countries, and Latin American countries with other Latin American countries.

The list of treatment countries and their matching countries is in Panel B of Table 2. Norway and Sweden are standard matches for most countries in the Eurozone, while European treatment countries like Greece, Turkey, and Russia are matched with Hungary and Poland. The

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two Latin American countries in the sample, namely Brazil and Chile, are matched to Latin American countries that did not change their bankruptcy law from 2002 to 2020.

3.4. Firm-level data

We obtained data on companies from 2000 to 2020 from Orbis, a subset of the Bureau Van Dijk suite of databases available through WRDS. Data on identifying and accounting variables are obtained for these firms and are listed in Appendix 4. We include only those firms with a standardized legal form as a 'Public Limited Company.' Table 3 details the sample of firms within each country, including industry affiliation and size calculated in terms of log (total assets). The largest number of firms is 2272 in Great Britain, followed by 801 in France. The smallest number of firms in the sample is 74 in Portugal. With a few exceptions, the manufacturing sector accounts for a larger proportion of firms in most countries. The exceptions are Chile, where the agriculture sector dominates, and Great Britain, where the services sector dominates. The mean and median log(assets) indicate that Spanish firms are the largest, and firms in Belgium are the smallest.

We determined debt ratios from the list of variables listed in Appendix 4. By running random checks with observations on a few firms, we ascertained that the total long-term interest-bearing debt reported by Orbis is the sum of bank loans, debentures, and other long-term interest-bearing debt. A second category of long-term debt is classified as non-interest-bearing debt. Orbis reports the sum of the two categories of long-term interest and non-interest-bearing debt under a variable called non-current liabilities (NCL).[11] All debt-related variables are scaled using the log(assets). We rely on Orbis data to calculate five different long-term leverage ratios, each with log (total assets) in the denominator: 1) total debt, 2) bank loans, 3) debentures and convertible

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[11] In earlier versions, we exclude non-interest bearing liabilities, and instead relied on Worldscope data for total long-term debt. In this version, we retain the variable 'non-current liabilities' as the measure of total long-term debt

debt; 4) non-bank private debt, and 5) non-interest-bearing long-term debt. Non-bank private debt is identified using the Orbis variable labeled 'other long-term interest-bearing debt'. A consideration in calculating leverage ratios is the treatment of missing variables. Of the different treatments reviewed by Goyal and Frank (2007), we chose the simplest approach of omitting missing variables from the analysis. We plot scaled total debt, bank debt, and debentures over the entire time period available on Orbis in Figure 1.[12]

Figure 1 shows that among the pro-creditor countries of the Netherlands and Spain, there is a rising trend in long-term debt and bank debt. In Finland and Portugal, there is a short-term upward trend in long-term debt, and bank debt in in the years immediately following the change in law. There appears to be no change in debentures throughout the period. In the pro-restructuring sample, there is a rising trend in total debt in France and Ireland, a slight rise in total debt in Brazil and Greece and a decrease in total debt in Switzerland. However, bank debt appears to be range bound in all of the countries. It is instead, the proportion of debentures that increases among four of the six countries, Brazil, France, Greece and Denmark. Among the pro-debtor countries, four of the six countries, Great Britain, Russia, Turkey and Germany experienced a downward trend in total debt. Only Belgium, and to a lesser extent, Chile experienced an increase in total debt, which appears to be driven by an upward trend in the proportion of debentures

The difference-in-difference approach requires that the treatment and control samples experience a similar trend in the outcome of interest, the parallel trends assumption. We examine the validity of the parallel-trends assumption by plotting the difference in scaled values of total

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[12] We report the number of observations with data for the change in total debt, bank debt, debentures , private debt, and non-interest-bearing long-term debt in Appendix 4. The change in each debt category is calculated as the difference between the scaled value of the debt category in the post-event and pre-event periods, where the event year is the year when the new bankruptcy law was enacted.

long-term debt and bank debt for treatment and control countries centered around the change in CRED, REORG, and OUT indexes. Panel A in Figure 2 has the difference in scaled total long-term debt around the change in the CRED index. The graph shows that the difference in debt levels is insignificantly different from zero in periods -2, -1, and 0, but is significantly positive thereafter. The insignificant difference in the pre-treatment period confirms the parallel trends assumption. Panel B of Figure 2 has the difference in scaled total long-term debt around the change in the REORG index. The graph shows that the difference in debt levels is insignificantly different from zero in periods -2 through +2. There is an upward trend in scaled long-term debt starting in year +2. Panel C of Figure 2 has the difference in scaled long-term debt around the change in OUT. The graph shows an insignificant difference between the treatment and control samples up to year 0, after which long-term debt increases significantly for the treatment sample. Panels D-F of Figure 2 have the differences in scaled bank debt around the change in the CRED, REORG, and OUT indexes. The strongest evidence in favor of parallel trends is in Panel E. Levels of bank debt in the period before the change in REORG are insignificantly different for the treatment and control samples, but decline significantly for the treatment sample immediately following the change in the REORG index.

4. Empirical Analysis

We estimate pooled OLS regressions with the change in a debt category as the dependent variable to test hypotheses relating to the response of various categories of debt to bankruptcy reforms.

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4.1. Panel Regressions

Firm- and year-level observations from all eighteen countries that undertook bankruptcy law changes are combined into a panel. The following regression is used to test whether a debt category changed due to changes to bankruptcy laws:

$$D_{it} = \boldsymbol{\alpha} + \beta \mathbf{X}_{ikt} + \theta_C *CRED_{it} + \theta_O *OUT_{it} + \theta_R * REORG_{it} + \varepsilon_{it} \qquad (2)$$

where D_{it} is the level of a scaled debt category for firm i in year t. $\boldsymbol{\alpha}$ is a vector of firm and year fixed effects. For each firm, i, in the treatment country k, $CRED_{kt}$ is the creditor rights index, $REORG_{kt}$ is the restructuring index, and OUT_{kt} is the binary index for whether bankruptcy law permits out-of-court restructuring, in year t. We include a maximum of five years around the event year for each firm in the treatment sample. The vector X in equation (2) is a set of macroeconomic variables and firm-specific characteristics. The macroeconomic variables are the GDP growth rate, the inflation rate, the rule of law index, and the market capitalization of equity as a percent of GDP. Based on Fama and French (2002); Hennessy and Whited (2005); Benmelech, Garmaise, and Moskowitz (2005); Acharya, John, and Sundaram (2011); and Stulz (1990), we include firm size, profitability, and the ratio of tangible assets to total assets. Firm size is the natural log of total assets, profitability is the ratio of net income to total assets, and asset tangibility is the ratio of fixed assets to total assets. These variables are as of the fiscal year end in each year.[13]

Correlations between the explanatory variables for the countries that undertook bankruptcy reforms are presented in Table 4. Correlations reported in bold indicate statistical **insignificance** at the 5% level: it is mostly profitability that is uncorrelated with the other variables. The

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[13] Ownership of the largest blockholder was included as an explanatory variable in an earlier version; it was dropped from this version because it is reported only in the last year of coverage in the Orbis database, which can be as long as 18 years for Russia that undertook bankruptcy law changes in 2002, and the last year of coverage is 2020.

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macroeconomic variables are all highly correlated with other macroeconomic variables. These variables are also highly correlated with the bankruptcy indexes. In particular, the creditor rights index is correlated over 60% with the inflation rate and with the rule of law index.

There is an endogeneity bias in the estimation of θs in equation (2) if there are unobservable factors that contribute to the decision to undertake a particular bankruptcy reform (Roberts and Whited (2012)). For instance, the ability of debtors to pursue out-of-court restructuring is shown in Bris, Welch, and Zhu (2006)) to depend on political implications and the cost of restructuring. Therefore, the estimates of θs suffer from an omitted variable bias if the change in the level of debt is due to variables that affect the three bankruptcy variables, CRED, OUT, and REORG, but are not included as explanatory variables in equation (2). Our identification methodology relies on a diff-in-diff methodology with a control sample (Bertrand and Mullainathan, 2003). The bankruptcy indexes for the control sample do not change over the period surrounding the event year of the treatment sample. Hence the estimates of θ in equation (2) for the control sample capture the effect of missing variables on the firm's debt policy. In an estimation of equation (2) with the countries that changed their bankruptcy laws and the control sample of countries that did not change their bankruptcy laws, the estimates of θ capture the incremental effect of changes in bankruptcy laws on debt policy, net of the effect of missing variables. The construction of the control sample has been described earlier in Section 3.3.

Table 5 has resulted from the diff-in-diff OLS regressions for the change in the four debt categories, namely, total long-term debt, bank debt, debentures, and private non-bank debt. The first three specifications include each individual bankruptcy index. The coefficients on REORG and OUT are positive and significant in specifications (ii) and (iii) indicating that total long-term debt increases when bankruptcy law encourages in- or out-of-court restructuring. All three

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bankruptcy indexes are included as explanatory variables in the specification (iv). The results from this specification show that the coefficient on REORG has turned negative, while the coefficient on OUT continues to be positive and significant. The positive coefficient on OUT is consistent with the hypothesis (iv) from the trade-off model that total debt **increases** when the possibility of out-of-court restructuring reduces both the direct and indirect costs of bankruptcy (Jostarndt and Sautner, 2010). The negative coefficient on REORG is consistent with the hypothesis (vii) from the mixed debt models that total debt **decreases** when the possibility of strategic default reduce borrower commitment to repay.

Table 5 shows that for bank debt, the coefficient on ΔCRED is consistently positive and statistically significant in all specifications, which is consistent with hypotheses (i) and (v). The reservation value of banks increases in the trade-off model when bankruptcy law protects secured creditor rights. The supply of bank debt increases as a result. The mixed debt model predicts that when one group of lenders is protected at the cost of other types of lenders, firms will reduce the diversity of their debt structure, and rely on a single source. That single source is most likely to be bank debt because of the ease of re-negotiation of bank debt (Coase (1960)). The coefficient on OUT is also positive and significant in specifications (iii) and (iv) indicating support for hypotheses (vi) from the mixed-debt models. The holdout problem is weaker when bankruptcy law encourages out-of-court restructuring. The resulting decrease in rollover risk encourages firm demand for bank debt.

Results in Table 5 for debentures show that the coefficient on ΔCRED is consistently negative and statistically significant indicating support for hypothesis (ii) from the trade-off model. Strong creditor rights discourage the supply of debentures since secured creditors can seize collateral and force an inefficient liquidation of the distressed firm. Finally, regression results for

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private non-bank debt in Table 5 show that the coefficients on CRED and OUT are positive and significant. The positive and significant coefficient on OUT indicates support for hypothesis (iii) from the trade-off model. The model predicts a lower supply of bank debt as a result of a decrease in the bank's reservation value when bankruptcy law gives restructuring incentives. Weak firms make up the shortfall in bank debt by substituting with non-bank private debt. The positive relation between CRED and private debt is indirectly predicted by hypothesis (ii). Stronger creditor rights discourage the issuance of debentures because of the threat of inefficient liquidation by empowered creditors. Strong firms might substitute bank debt with non-bank private debt. Non-bank private lenders do not enjoy the strong rights of secured lenders like banks.

We determine the economic significance of the results in Table 5 by calculating, as in Mitton (2024):

$$E_y^S = \frac{bS_x}{\overline{y}} \qquad (3)$$

where b is the estimated regression coefficient on the explanatory variable, S_x is the sample standard deviation of the explanatory variable, and $\overline{y}$ is the sample mean of the dependent variable. Out-of-court restructuring enables firms to increase their total debt by 5.9% as indicated by the estimate of $E_{total\ debt}^{OUT}$. The increase in total debt comes from a 5% increase in bank debt, and by a 13% increase in private debt following such bankruptcy law changes. Not surprisingly, therefore, 12 out of the 18 countries in the sample decided to enable out-of-court restructuring of distressed debt. The results in Table 5 also sound a cautionary note about bankruptcy laws that promote debt restructuring while simultaneously weaking creditor rights: total debt decreases by 3.9% following

such laws that effectively incentivize lenders to strategically default. Finally, bankruptcy law changes that strengthen creditor rights led to an 11% decrease in public debt issuance.[14]

4.2: Cross-sectional Regressions

We estimate the difference in difference regressions with the change in scaled debt levels. Firm-level observations from all eighteen countries that undertook bankruptcy law changes, and the sample of control countries that did not change their bankruptcy laws contemporaneously as the treatment sample, are combined into a panel. The following regression is used to test whether a debt category changed due to changes to bankruptcy laws:

$$\Delta D_{ik} = \alpha_l + \theta_C * \Delta CRED_k + \theta_O * \Delta OUT_k + \theta_R * \Delta REORG_k + \beta \Delta \mathbf{X}_{ik} + \varepsilon_{ik} \qquad (4)$$

where ΔD_{ik} is the change in the average level of a debt category from the pre-event to the post-event period for firm i in country k. α_l is a vector of event year fixed effects. $\Delta CRED_k$ is the change in the creditor rights index between the post- and pre-event periods, $\Delta REORG$ is the change in the $REORG$ index between the post- and pre-event periods, ΔOUT is the change in the binary index for whether bankruptcy law permits out-of-court restructuring, and ε is a random component assumed to be homoscedastic, mean zero. The changes in the bankruptcy indexes are zero, by construction, for the control sample.

When a country implements changes to its bankruptcy law over several phases, we select the year in which the last phase goes into effect as the event year. The pre-event period for most countries in the sample is the three years before the new bankruptcy law is enacted. For Russia, which enacted its new law in 2002, the pre-event period is 2001. For UK and Netherlands, which

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[14] These estimates are qualitatively similar when E_y^s is calculated with the standard deviation of the dependent variable in the denominator.

enacted their laws in 2003, the pre-event period covers 2001 and 2002. The post-event period is the year of, and the two years following implementation of the new law.

Results are in Table 6. They are consistent with those in Table 5, but weaker. When the changes in the three bankruptcy indexes are included in the specification (iii), the change in total long-term debt is positively related to ΔOUT, the change in bank debt is positively related to $\Delta CRED$, the change in debentures is negatively related to $\Delta CRED$, and the change in private debt is not significantly related to changes in any of the three bankruptcy indexes. In Specification (iv), none of the bankruptcy indexes are significant, being subsumed by firm-specific and macroeconomic variables.

Our evidence in Tables 5 and 6 demonstrates the importance of rollover risk, a previously unidentified risk in bankruptcy law. Mixed-debt models imply that strengthening secured creditor rights over the right to repayment for other categories of lenders increases rollover risk. Evidence in Table 8 confirms that firms mitigate rollover risk by reducing their demand for hard-to-negotiate public debt following pro-creditor reforms and substituting instead with non-bank private debt. Rollover risk reduction when bankruptcy law changes encourage out-of-court restructuring also helps explain why non-bank private debt increases following such changes to the law. Demand for diversity in their debt structure encourages firms to borrow from different types of lenders.

5. Economic impact of bankruptcy reforms

In this section, we address whether the change in the structure of debt financing impacted the real economy. Our approach is to examine whether the characteristics of issuers of various types of debt changed in the post-reform period. Haselmann, Pistor and Vig (2010) find that

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bankruptcy reforms in Eastern European countries impacted the real economy by increasing lending to households, which tend to be weaker credits than firms.

Traditional issuers of each category of long-term debt have been identified by Denis and Mihov (2003): the largest firms with the highest proportion of tangible assets issued public debt, and smaller firms with high ex-ante probabilities of default issued non-bank private debt, with bank debt issuers in the middle of the size and quality spectrum. In this section, we examine whether bankruptcy reforms altered the characteristics of issuers by drawing in non-traditional issuers who are substituting other forms of debt.

Denis and Mihov (2003) used data on the actual issuance of each category of debt to identify the characteristics of issuers. In our study, we don't have data on new debt issuance for global firms. Instead, we calculate the average addition of new debt in each of the three post-reform years using Orbis data:

$$\Delta\_D_{ki,t} = [D_{ki,t} - (LTD_{i,t}/LTD_{i,t-1})*D_{kit-1}]/A_{it} \tag{5}$$

where Δ_D_{kit} is the amount of new debt for the ith firm in the kth debt category in year t of the three-year post-reform period, D_{kit} is the *level* of debt for the ith firm in the kth debt category in year t of the post-reform period (in \$), $LTD_{,it}$ is the level of total debt for the ith firm in year t of the three-year post-reform period and $LTD_{,it-1}$ is the level of total debt in year t-1 of the post-reform period, and A_{it} is the log of total assets in year t of the post-event period. The second part in the numerator of equation (5) is the amount of debt in a category that would have been acquired (or shed) had the firm continued to borrow in the same proportion of total long-term debt as in the previous year. Thus, equation (5) measures newly issued (or shed) debt in any category over and

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above what would be predicted if only total assets had increased. The post-event average of the amount of new debt issued by the ith firm in the kth debt category is calculated as:

$$\text{New\_debt}_{ik} = (\Delta\_D_{ki,t} + \Delta\_D_{ki,t+1} + \Delta\_D_{ki,t+2})/3 \qquad (6)$$

We estimate a difference-in-difference OLS regression with event year fixed effects to test whether the characteristics of post-reform issuers differ from those of issuers in the pre-reform period for *new* issuers of each type of debt:

$$\Delta\text{CHAR}_i = \alpha + \beta * \text{New\_debt}_{ik} + \delta * \text{New\_debt}_{ik} * \Delta\text{CRED}_j + \theta * \text{New\_debt}_{ik} * \Delta\text{REORG}_j +$$
$$\sigma * \text{New\_debt}_{ik} * \Delta\text{OUT}_j + \pi\Delta\mathbf{X}_j + \varepsilon_i \qquad (7)$$

where i denotes an issuer, j denotes a country, k denotes a debt category, and the vector **X** is the set of the changes in various macroeconomic variables around the event year. Equation (7) is estimated with firms from treatment and control countries. Standard errors of the coefficient estimates are clustered by event year. $\Delta\text{CHAR}i$ is the average characteristic, size, profitability, or tangibility, over the year of, and in the two years following the bankruptcy reform.

Results are in Table 7, Panels A-C. Panel A has results for new bank debt issuers. Pro-creditor reforms encourage larger firms with more tangible assets to issue bank debt, as indicated by the positive coefficients on ΔCRED in the size and tangibility regressions. In Denis and Mihov (2003), these would have been debenture issuers, who appear to be switching to bank debt following bankruptcy laws that strengthen creditor rights. Consistent with hypothesis (vi), Panel A shows that out-of-court restructuring encourages smaller firms to issue bank debt; the coefficient on ΔOUT in the size regressions is negative and statistically significant.

Panel B of Table 7 shows that smaller firms with fewer tangible assets issue debentures following pro-creditor reforms. Alternatively, the negative coefficients on ΔCRED in the size and

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tangibility regressions could be interpreted as larger firms with more tangible assets reducing their outstanding debentures following pro-creditor bankruptcy laws. Large firms issue debentures only when bankruptcy law favors out-of-court restructuring, which is consistent with hypotheses (iii) and (vi) that efficient restructuring encourages strong firms to issue debentures. The regressions did not show evidence of an increase in the issuance of debentures following laws that enable out-of-court restructuring because only large firms are able to do so.

Panel C of Table 7 confirms that even profitable firms can only access non-bank private debt following bankruptcy laws that encourage strategic default; the coefficient on ΔREORG is positive in the profitability regression. This result is consistent with hypothesis (vii). Finally, confirming hypotheses (iii) and (vi), we find that weak firms are more likely to issue non-bank private debt, as indicated by the negative coefficient on ΔOUT in the profitability regressions.

Overall, results in Table 7 confirm that efficient out-of-court restructuring leads to diversification of lenders for small, unprofitable firms, who are able to borrow from bank, and non-bank private debt. On the other hand, laws that encourage borrowers to strategically default force profitable firms to borrow from non-bank private debt. Finally, laws that strengthen creditor rights encourage large firms with plenty of tangible assets to concentrate their borrowing on banks.

6. Identification of specific clauses

The results demonstrate that the restructuring and creditor rights indexes have significant explanatory power for debt structure. It may be argued that the CRED and REORG indexes are not distinct from each other if some of the conditions in the latter undermine creditor rights, rather than ease debt restructuring. For instance, automatic stay, cram-downs, and DIP financing may be

indications of weak creditors' rights rather than be indicative of the ease of reorganization. We examine whether a deconstructed REORG index has independent explanatory power for debt structure in the presence of the CRED index. We create a dummy variable for each of the six clauses that constitute the REORG index. These are 1) STAY=1 if reforms impose an automatic stay on payments to all creditors and suppliers in the pre-insolvency phase, 2) SEPARATE =1 if there is a separate procedure for pre-insolvency restructuring, 3) CRAM =1 if the court or a creditor group can force unsecured creditors to accept a plan to re-structure debt, 4) CLAW =1 if the court can annul and reclaim payments made to creditors and suppliers during a period retroactive to the filing of bankruptcy, 5) SECRET =1 if pre-insolvency restructuring is kept private, 6) DIP=1 if reforms encourage debtor in possession financing by giving it a higher ranking in the APR. Of these, only CRAM, CLAW, and DIP are correlated less than 30% with each other.

We examine the response of the four debt categories to the deconstructed REORG index. We re-estimate equation (2) as a difference in difference regression with the deconstructed REORG index, ΔCRED, and ΔOUT. To isolate the effect of the bankruptcy law changes, we omit the firm-specific and macroeconomic variables used in section 4.1 Results are reported in Table 8. The results for total long-term debt show that the coefficients on ΔCRED and ΔOUT are no longer significant. Of the restructuring clauses, the coefficient on ΔCRAM is positive and marginally significant. The coefficient on ΔCRED remains positive and statistically significant in the regressions for the change in bank debt. The coefficient on ΔCRAM is also positive and significant. Mixed debt models would predict that the cramdown of a restructuring agreement reduces rollover risk.

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The coefficient on ∆CRED remains negative but is not significant at the 5% level in the regression for the change in the level of public debt. None of the other coefficients are statistically significant. Finally, in the regression for private debt, the coefficient on ∆CRED has turned negative and significant, while the coefficients on ∆OUT, ∆CLAW, and ∆CRAM are positive and statistically significant.

7. Conclusions

The historical trade-off model implies that firms set their optimal debt level by trading off the debt tax shield against expected bankruptcy costs. Recent theoretical models of mixed debt demonstrate that diversification of a firm's creditor base allows the firm to maximize this trade-off. Within the framework, bankruptcy law not only affects the strength of the commitment of the borrower to repay debt, but it also affects the risk of rolling over a particular category of debt. In our paper, we show that the dual role played by bankruptcy laws in mixed debt models requires that the traditional creditor rights index of LLSV should be supplemented by a second index that measures rollover risk.

With the help of metrics that measure creditor rights and the strength of out-of-court and in-court restructuring, we demonstrate that the design of bankruptcy law affects a firm's debt capacity through its influence on the ability of a firm to diversify its lender base to bank, public and private debt sources. As also argued by De Fiore and Uhlig (2015), this is important because the composition of credit markets impacts a country's ability to sustain economic growth. The more important policy implication from our evidence is that bankruptcy laws can affect growth in the broader economy by expanding firms' debt capacity.

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Table 1

Panel A provides the summary of creditor rights index (*CRED*), the restructuring index (*REORG*), under the current law and under the old law. Values of the *CRED*,and *REORG* indexes are based on descriptions in Table 1. *OUT* equals 1(0) if the new law creates (does not create) a separate procedure for out-of-court restructuring. *Event Year* is the year when the new bankruptcy law takes effect. In panel B, countries are classified into three regimes based on OUT and the changes in CRED and REORG.

Panel A: CRED and REORG under the current law and the old law

Country	Event Year	CRED based on old law	CRED based on the new law	REORG based on the new law	REORG based on the old law	OUT
Belgium	2009	2	2	3	0	1
Brazil	2005	1	3	4	0	1
Chile	2014	5	3	3	1	0
Denmark	2010	3	4	3	1	0
Finland	2004	1	5	1	0	0
France	2006	0	1	6	3	1
Germany	2012	5	4	3	2	0
Greece	2007	1	2	4	0	1
Ireland	2015	1	2	2	0	1
Italy_1	2006	2	3	3	0	1
Italy_2	2012	3	2	4	3	1
Netherlands	2003	3	4	1	0	0
Portugal	2005	1	5	1	0	0
Russia	2002	2	0	3	0	1
Spain	2004	2	3	0	0	0
Switzerland	2014	4	3	6	0	1
Turkey	2018	2	2	3	1	1
United Kingdom	2003	4	1	2	0	1
Median		2	3	2	0	1

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Panel B: Pro-creditor, Pro-restructuring and Pro-debtor regimes

Regime	Criteria for inclusion in regime	List of countries
Pro-creditor	Change in CRED > 0, and OUT=0	Spain, Netherlands, Portugal and Finland
Pro-restructuring	change in REORG > 0, and OUT=1	Italy_1[15], France, Brazil, Greece, Denmark Switzerland, and Ireland
Pro-debtor	change in CRED < 0 and OUT=1	Russia, United Kingdom, Italy_2, Turkey, Belgium, Chile and Germany

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[15] Italy_1 refers to the 2006 reforms and Italy_2 refers to the 2012 reforms

Table 2
Construction of the Control Sample

This table provides macro-economic characteristic of countries adopting new bankruptcy laws. All variables are measured in the year of enactment of the new laws. Panel A has the characteristics of countries undertaking each category of bankruptcy reform. Data on macro-economic variables are from World Bank. Rule-of-Law index is one of six governance indicators compiled by World Bank for each country. The control countries are identified by estimating the following logistic regression:

$$\Pr(\text{an increase in creditor rights})_t = \gamma \, \mathbf{Z}_t + \eta_t \tag{1}$$

The regression is estimated by pooling countries and years from 2000 to 2020. The dependent variable takes a value 1(0) if the country's creditor rights index changed (did not change) in that year. Variables in $\mathbf{Z}_t$ include the market capitalization of equity to GDP, growth in GDP, the inflation rate, the unemployment rate, credit available to private sector to GDP, and the rule of law index. For each country in the treatment sample that changed its bankruptcy law, control countries are identified as those from the same geographical area that did not change their bankruptcy law in the four years pre- and post- the event year for the test country, and with a propensity score obtained from estimating equation (1) that is within 1% of the propensity score for the test country.

Panel A shows the results from an estimation of the logistic regression. Panel B has the values of macro-economic variables for countries in each of the three bankruptcy groups. The panel also has the mean values of macro-economic variables for the control countries, p-values from an F-test of the difference of means of the test countries and the control countries, and p-values for an F-test of the difference of means between test countries in the three bankruptcy groups.

Table 2 (continued)
Panel A: Logistic regression for the probability of a change in CRED in any given year.

The countries included in the regression include the test countries, and the following potential control countries which had data on at least 10 publicly traded corporations: Argentina, Ecuador, Colombia, Peru, Norway, Sweden, Hungary and Poland. The sample period is from 2000 to 2020.

Observations	357	
Independent variable	**coefficient**	**p-value**
Intercept	4.934	0.00
GDP growth	0.132	0.09
Market cap of equity as % of GDP	0.001	0.91
Inflation rate	-0.047	0.62
Rule of law index	0.017	0.35
Re-scaled R^2	4.61%	
Goodness-of-fit measures		
Aldrich-Nelson	1.04%	
Cragg-Uhler 1	1.05%	
Cragg-Uhler 2	4.12%	
McFadden's LRI	3.59%	
McKelvey-Zavoina	6.47%	

Table 2(continued)

Panel B: Treatment and corresponding control countries

Treatment country	Treatment year	Control countries
Belgium	2009	Norway
Brazil	2005	Peru, Argentina, Ecuador
Switzerland	2014	Norway
Chile	2014	Argentina, Colombia, Ecuador, Peru
Germany	2012	Norway
Denmark	2010	Sweden, Norway
Spain	2004	Norway
Finland	2004	Norway
France	2006	Norway
Great Britain	2003	Norway, Sweden
Greece	2007	Hungary, Poland
Ireland	2015	Norway
Italy_1 and Italy_2	2006 and 2012	Norway
Netherlands	2003	Norway, Sweden
Portugal	2005	Belgium, Norway
Turkey	2018	Hungary, Poland
Russia	2002	Hungary, Poland

Table 3
Characteristics of treatment countries

This table provides characteristics of the firms in each test country in the event year. We report the total number of public limited firms, log-transformed total assets, the number of firms in the utilities and financial, agricultural and mining, manufacturing, retail and services sectors. The sample period spans from 2002 to 2018. All variables are denominated in U.S. Dollars and are obtained from Orbis dataset.

Country	Number of public limited companies	# of Utilities and financial institutions	# of agriculture and mining firms	# of manu-facturing firms	# of retail firms	# of services firms	Average log(total Assets)	Median log(total Assets)
Belgium	173	7	5	37	8	33	18.52	18.20
Brazil	428	38	24	72	35	50	18.61	18.40
Chile	335	30	119	28	24	15	20.10	20.15
Denmark	202	5	3	41	14	56	18.59	18.30
Finland	197	8	1	54	20	54	18.51	18.33
France	801	19	18	185	84	201	18.48	18.11
Germany	537	25	49	148	34	99	19.20	19.04
Greece	236	11	11	45	35	34	18.98	19.21
Ireland	123	2	3	17	9	18	19.98	20.25
Italy	371	22	9	105	31	74	20.32	20.11
Netherlands	316	7	12	60	26	46	19.28	18.88
Portugal	74	5	2	10	7	9	19.91	19.33
Russia	761	97	19	255	56	28	19.22	19.11
Spain	261	20	3	33	9	37	20.68	20.33
Switzerland	301	12	6	81	18	33	20.11	19.91
Turkey	400	22	9	100	42	25	18.58	18.50
United Kingdom	2272	90	51	284	208	565	18.18	18.05

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Figure 1
Debt structure in countries adopting bankruptcy reforms

This figure plots data on the mean proportion of each of the five categories of debt by each country. The ratio of all long-term debt (non-current liabilities), interest-bearing long-term debt, bank, debenture, and private debt to total assets is calculated using data from Orbis for all firms in each country. Panel A shows debt structure in countries adopting pro-creditor reforms. Panel B shows debt structure in countries adopting pro-restructuring reforms. The sample period spans from 2001 to 2009.

Panel A: Pro-creditor countries
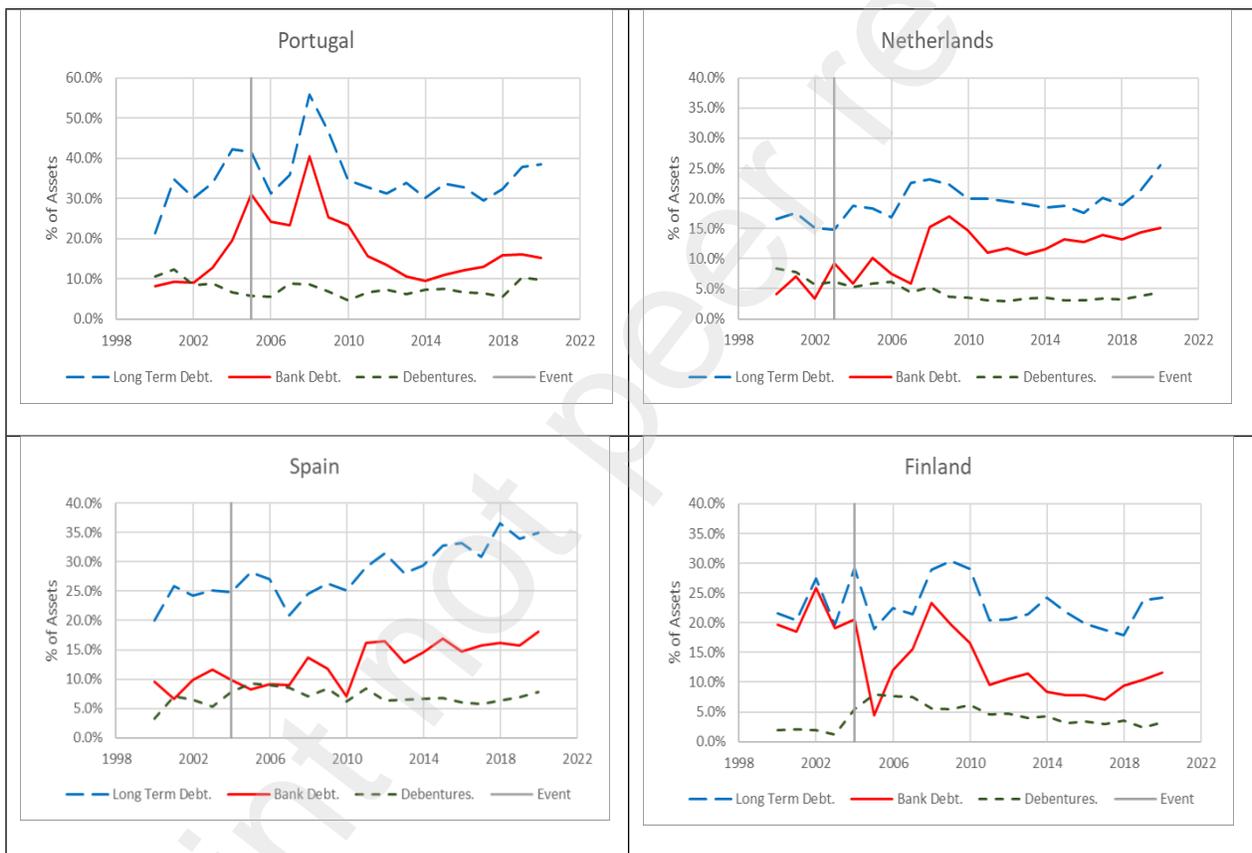
Figure 1 (continued)

Panel B: Pro-restructuring countries

Figure 1 (continued)

Panel C: Pro-debtor countries
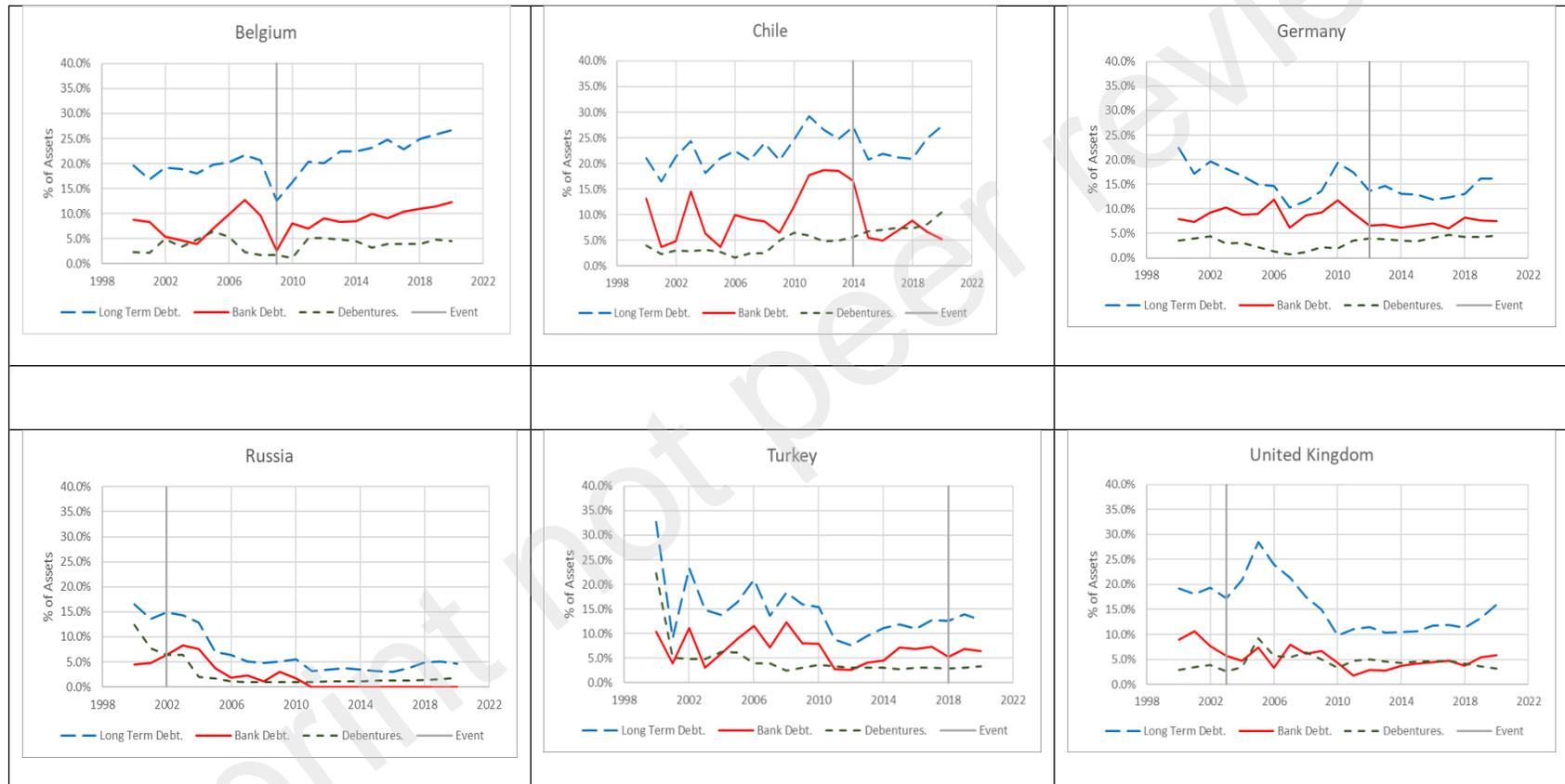
Figure 2
Graphs of scaled debt for treatment and control samples
Panel A: Long-term debt surrounding changes in the CRED index

DID, from last period before treatment changes (t=0) to t

Relative time to last period before treatment changes (t=0)
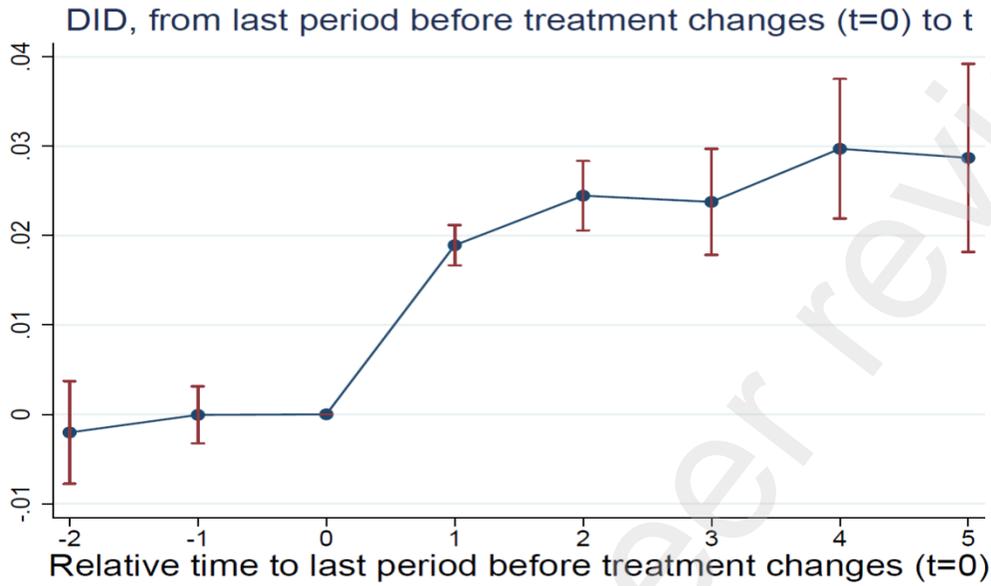
Panel B: Long-term debt surrounding changes in the REORG index

DID, from last period before treatment changes (t=0) to t

Relative time to last period before treatment changes (t=0)
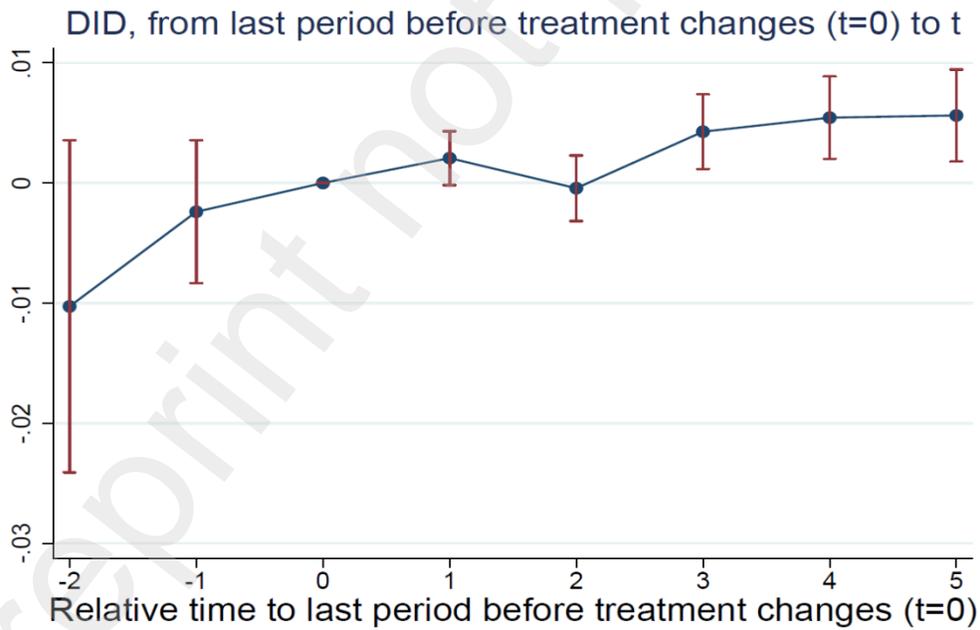
Figure 2 (continued)
Panel C: Long-term debt surrounding changes in the OUT index
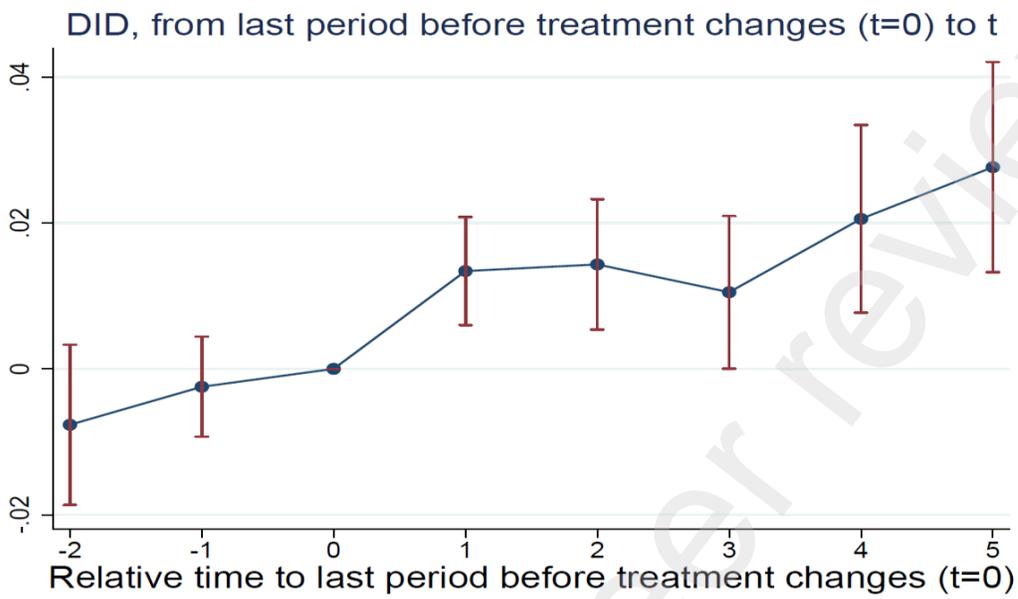
Panel D: Bank debt surrounding changes in the CRED index

DID, from last period before treatment changes (t=0) to t
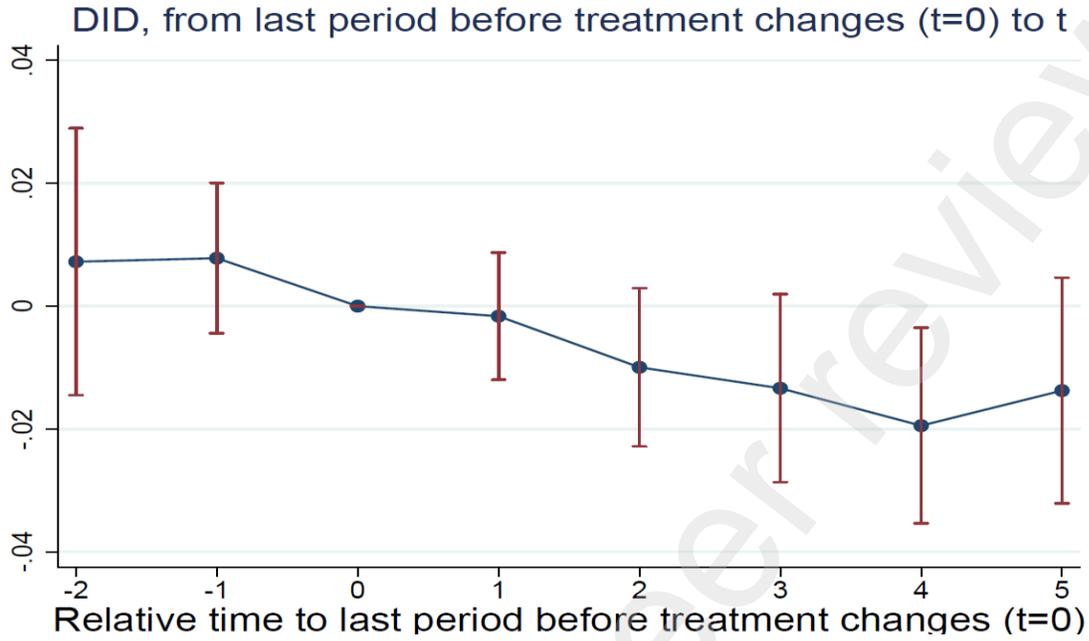
Panel F: Bank debt surrounding changes in the OUT index

DID, from last period before treatment changes (t=0) to t
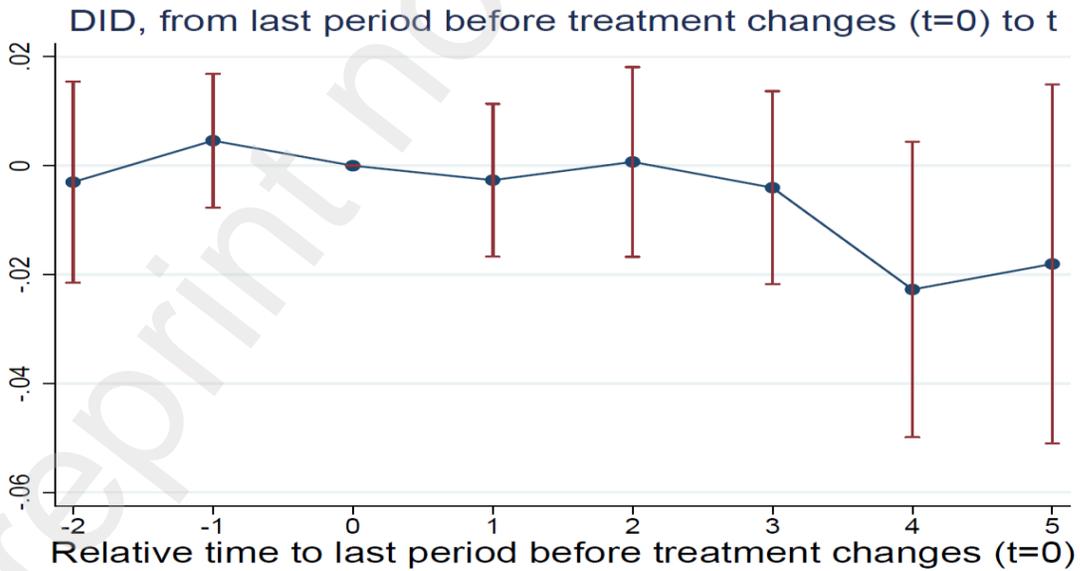
Table 4
Correlations between the explanatory variables

This table provides correlation matrix of explanatory variables for treatment (countries with bankruptcy law changes) and control samples of countries. Numbers in bold indicate statistical **insignificance** at the 5% level. CRED is the creditor rights index, *REORG* is the restructuring index and OUT is the binary index for an out-of-court procedure in bankruptcy law. Data on *PCT-MCAP,* the percentage of GDP accounted for by the market capitalization of equity market, GDP- growth rate, inflation rate, and rule of law index are from the World Bank database. Data on *Size,* measured as log(total assets), *Profitability,* measured as net income scaled by total assets, and *Tangible,* measured as fixed assets scaled by total assets is from Orbis. Data period from 2002 to 2020.

	CRED	REORG	OUT	Size	Profits	Tangible	GDP-GRO	PCT-MCAP	Inflation	Rule of Law
CRED	1	-0.16	-0.58	0.33	**0.01**	0.12	-0.42	0.12	-0.60	0.67
REORG		1	0.51	0.07	**0.00**	0.16	-0.36	0.38	-0.13	0.22
OUT			1	-0.16	0.00	-0.02	0.09	0.18	0.46	-0.49
Size				1	0.02	0.31	-0.26	0.20	-0.35	0.37
Profit					1	**0.00**	**0.00**	0.01	**0.00**	**0.01**
Tangible						1	-0.14	0.26	-0.17	0.21
GDP-growth							1	-0.23	0.47	-0.60
PCT-MCAP								1	-0.45	0.57
Inflation									1	-0.89
Rule of Law										1

Table 5

Diff-in-diff OLS regressions for scaled debt

This table shows the regression results based on a diff-in-diff regression:

$$D_{it} = \alpha_1 + \theta_C * CRED_k + \theta_O * OUT_k + \theta_R * REORG_k + \beta_1 X_{ik} + \varepsilon_{ik} \qquad (2)$$

where D_{it} is the level of a scaled debt category for firm i in year t. The debt categories are TOTDEBT, total long-term debt, BANK, bank debt, DEBENT, debentures, and PVT, non-bank private debt. Firms in both treatment and control countries are included in the panel. Values of each of these debt categories each year are scaled by total assets in that year. CRED, REORG and OUT are the creditor rights index, the restructuring index, and the out-of-court restructuring index in year t for both treatment and control firms. The vector X_{ik} of independent variables for the ith firm in the kth test country include the changes in macro-economic variables from the event year to the previous year, and firm characteristics in the event year. The macro-economic variables are change in the GDP growth rate (GDP), inflation rate, the rule of law index (RULE), and the market capitalization of the equity markets as a percent of GDP (MCAP). The firm-specific variables are size calculated as the log of total assets, profitability calculated as the ratio of net income over total assets, and asset tangibility calculated as the ratio of tangible assets to total assets. Equation (2) is estimated with fixed effects for firm and year, and standard errors of the coefficient estimates are clustered by firm and year. Data on country characteristics are from World Bank, on total, bank, public and private debt, and accounting variables are from Orbis. The sample period covers 2002 to 2020.

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Table 5 (continued)

		TOTAL DEBT		**BANK**		**DEBENTURE**		**PRIVATE**	
		Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
(i)	observations	92532		90449		90582		5226	
	CRED	-0.0015	-1.44	0.0050	5.10	-0.0063	-9.82	0.0098	3.10
	Adj R-square (%)	74.68		68.74		70.04		73.93	
(ii)	observations	92532		90449		90582		5226	
	REORG	0.0025	6.99	0.0014	4.11	0.0017	7.40	0.0027	2.17
	Adj R-square (%)	74.7		68.74		70.02		73.89	
(iii)	observations	92532		90449		90582		5226	
	OUT	0.0102	8.56	0.0064	5.63	0.0048	6.44	0.0218	3.49
	Adj R-square (%)	74.71		68.75		70.01		73.95	
(iv)	observations	92532		90449		90582		5226	
	CRED	-0.0009	-0.78	0.0061	5.58	-0.0055	-7.56	0.0111	2.88
	REORG	-0.0038	-3.26	-0.0013	-1.14	0.0004	0.56	-0.0005	-0.14
	OUT	0.0219	5.85	0.0122	3.32	0.0020	0.82	0.0270	1.67
	Adj R-square (%)	74.71		68.77		70.05		74.04	
(v)	observations	81085		80317		80427		4456	
	CRED	0.0011	1.00	0.0061	5.50	-0.0041	-5.59	0.0158	3.96
	REORG	-0.0043	-3.57	-0.0010	-0.90	-0.0002	-0.30	-0.0059	-1.71
	OUT	0.0217	5.64	0.0089	2.41	0.0047	1.90	0.0492	3.05
	Size	0.0184	28.42	0.0156	25.10	0.0005	1.31	-0.0067	-1.42
	profit	0.0000	-1.18	0.0000	-1.07	0.0000	-0.02	-0.0306	-1.24
	tangible	0.1239	36.86	0.1058	32.59	0.0147	6.73	0.1107	5.65
	Adj R-square (%)	77.73		71.23		73.15		77.09	

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Table 5 (continued)

		TOTAL DEBT		BANK		DEBENTURE		PRIVATE	
		Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
(vi)	observations	179664		61401		61442		3565	
	CRED	0.0082	5.38	0.0159	8.69	-0.0060	-4.69	0.0151	3.65
	REORG	-0.0016	-1.21	0.0040	2.88	0.0012	1.24	-0.0044	-1.21
	OUT	0.0005	0.11	-0.0133	-2.63	-0.0070	-1.96	0.0386	2.26
	Size	0.0282	41.94	0.0273	26.94	-0.0011	-1.59	0.0106	1.99
	profit	-0.0055	-7.57	-0.0013	-3.04	-0.0011	-1.45	-0.1047	-3.80
	tangible	0.1663	59.59	0.1396	34.43	0.0092	3.23	0.0932	4.47
	GDP growth	0.0000	-0.08	0.0002	0.81	-0.0005	-3.12	0.0006	0.98
	PCT-MCAP	-0.0001	-5.79	0.0000	-0.36	-0.0001	-3.20	0.0000	0.46
	Inflation	0.0012	6.31	0.0003	1.20	0.0009	5.53	0.0001	0.15
	Rule of law	-0.0011	-12.52	-0.0005	-4.29	-0.0004	-4.71	0.0007	0.85
	Adj R-square (%)	83.62		72.97		74.99		80.20	

Table 6

Diff-in-diff OLS regressions for the difference in scaled debt from pre- to post-event periods

This table shows the regression results based on a diff-in-diff regression:

$$\Delta D_{ik} = \alpha_I + \theta_C *\Delta CRED_k + \theta_O *\Delta OUT_k + \theta_R *\Delta REORG_k + \beta_1 \Delta X_{ik} + \varepsilon_{ik} \qquad (3)$$

where ΔD_{ik} is the difference between the post- and pre-event levels of scaled debt categories of firm i in country k. The debt categories are TOTDEBT, total long-term debt, BANK, bank debt, DEBENT, debentures, and PVT, non-bank private debt. Firms in both treatment and control countries are included in the panel. Values of each of these debt categories each year are scaled by total assets in that year. $\Delta CRED$, $\Delta REORG$ and ΔOUT are the change in the creditor rights index, the restructuring index, and the out-of-court index between the pre- and post-event periods for treatment and control firms. The vector ΔX_{ik} of independent variables for the ith firm in the kth test country include pre- to post-event changes in macro-economic variables and firm fundamentals . The macro-economic variables are the GDP growth rate (GDP), inflation rate, the rule of law index (RULE), and the market capitalization of the equity markets as a percent of GDP (MCAP). The firm-specific variables are size calculated as the log of total assets, profitability calculated as the ratio of net income over total assets, and asset tangibility calculated as the ratio of tangible assets to total assets. Equation (3) is estimated with fixed effects for event year, and standard errors of the coefficient estimates are clustered by event year. Data on country characteristics are from World Bank, on total, bank, public and private debt, and accounting variables are from Orbis. The sample period covers 2000 to 2020.

		TOTAL DEBT		BANK		DEBENTURE		PRIVATE	
		Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
(i)	observations	6929		6578		6418		2074	
	Intercept	0.0013	0.97	-0.0040	-3.18	0.0042	4.56	-0.0033	-1.40
	$\Delta CRED$	-0.0003	-0.13	0.0085	3.77	-0.0059	-3.62	0.0032	0.78
	Adj R^2(%)	0		0.22		0.2		0.03	
(ii)	observations	6929		6578		6418		2074	
	Intercept	0.0008	0.53	-0.0050	-3.63	0.0036	3.64	-0.0058	-2.35
	$\Delta REORG$	0.0009	0.96	0.0021	2.41	0.0006	0.87	0.0045	3.02
	Adj R^2(%)	0.01		0.09		0.01		0.44	
(iii)	observations	6929		6578		6418		2074	
	Intercept	0.0003	0.20	-0.0055	-3.98	0.0041	4.06	-0.0058	-2.31
	ΔOUT	0.0068	1.79	0.0114	3.27	-0.0006	-0.25	0.0184	2.85
	Adj R^2(%)	0.05		0.16		0		0.39	

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Table 6 (continued)

		TOTAL DEBT		BANK		DEBENTURE		PRIVATE	
		Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
(iv)	observations	6929		6578		6418		2074	
	Intercept	0.0003	0.21	-0.0050	-3.64	0.00	3.49	-0.0063	-2.48
	ΔCRED	-0.0027	-0.98	0.0066	2.66	-0.01	-3.69	-0.0041	-0.83
	ΔREORG	-0.0019	-1.04	-0.0006	-0.38	0.00	1.65	0.0030	1.11
	ΔOUT	0.0145	1.99	0.0095	1.43	0.00	-0.62	0.0114	0.91
	Adj R^2(%)	0.07		0.27		0.27		0.49	
	observations	4812		4747		4592		1441	
	Intercept	0.0025	1.24	-0.0037	-1.96	0.0075	5.75	-0.0013	-0.37
	ΔCRED	-0.0004	-0.11	0.0045	1.48	-0.0011	-0.53	0.0003	0.06
	ΔREORG	-0.0017	-0.84	0.0011	0.61	0.0012	0.94	0.0021	0.69
	ΔOUT	0.0037	0.45	-0.0007	-0.09	-0.0101	-1.98	0.0031	0.25
(v)	Δsize	0.0165	5.44	0.0119	4.15	-0.0035	-1.73	-0.0008	-0.14
	Δprofit	-0.0026	-1.77	0.0025	1.80	-0.0047	-5.13	-0.0532	-1.58
	Δtangible	0.2142	14.53	0.1825	13.16	0.0306	3.18	0.0650	2.40
	Δgdp-gro	-0.0006	-1.01	0.0005	0.87	-0.0010	-2.52	0.0017	1.95
	Δpct-mcap	-0.0005	-3.21	-0.0003	-1.66	-0.0002	-1.68	0.0001	0.43
	Δinflation	-0.0003	-0.53	-0.0008	-1.68	0.0006	1.73	-0.0006	-0.37
	Δrule of law	-0.0001	-0.12	-0.0025	-3.16	0.0013	2.27	-0.0019	-1.30
	Adj R^2(%)	5.92		5.11		1.26		1.22	

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Table 7
Difference in Difference Regressions for changes in issuer characteristics

This table shows the regression results on how changes in the structure of debt financing have an impact on the real economy. First, we calculate the average addition of new debt in each of the three post-reform years using Orbis data as:

$$\Delta\_D_{ki,t} = [D_{ki,t} - (LTD_{i,t}/LTD_{i,t-1})^*D_{kit-1}]/A_{it} \tag{4}$$

where Δ_D_{kit} is the amount of new debt for the ith firm in the kth category in year t of the three-year post-reform period, D_{kit} is the *level* of debt for the ith firm in the kth category in year t of the post-reform period (in \$), $LTD_{,it}$ is the level of total debt for the ith firm in year t of the three-year post-reform period and $LTD_{,it-1}$ is the level of total debt in year t-1 of the post-reform period, and A_{it} is the log of total assets in year t of the post-event period. The average of the amount of new debt issued by the ith firm in the kth category is calculated as:

$$New\_debt_{ik} = (\Delta\_D_{ki,t} + \Delta\_D_{ki,t+1} + \Delta\_D_{ki,t+2})/3 \tag{5}$$

We estimate an OLS regression with event year fixed effects to test whether the characteristics of post-reform issuers differ from those of issuers in the pre-reform period for the entire sample of firms from control and matched countries:

$$\Delta CHAR_i = \alpha + \beta^*New\_debt_{ik} + \delta^*New\_debt_{ik}^*\Delta CRED_k + \theta^*New\_debt_{ik}^*\Delta REORG_k + \sigma^*New\_debt_{ik}^*\Delta OUT_k + \pi\Delta X_k + \varepsilon_i \tag{6}$$

where i denotes an issuer, k denotes a country, the vector **X** is the set of the change in various macro-economic variables around the event year, namely the change in the GDP growth rate (GDP), inflation rate, the rule of law index (RULE), and the market capitalization of the equity markets as a percent of GDP (MCAP). Equation (5) is estimated with fixed effects for country and year, and standard errors of the coefficient estimates are clustered by country and event year. $\Delta CHAR_i$ is the average characteristic, size, profitability, or tangibility, over the year of, and the two years following the bankruptcy reform. Characteristics of issuers of new bank debt, and public debt is examined in panel A, of private debt and non-interest-bearing debt in panel B. α_1 are event year fixed effects. T-statistics (in the second column) are calculated using standard errors clustered by country and event year. The sample period spans from 2001 to 2020.

Table 7 (continued)

Panel A: Mean characteristics of issuers of new bank debt

	Size		profitability		tangibility	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
observations	4342		3983		4342	
Intercept	19.450	547.16	0.026	1.27	0.527	145.26
New_bankdebt	0.000	0.76	0.000	-0.05	0.000	-0.39
ΔCRED*New_bankdebt	89.401	2.73	1.790	0.09	10.583	3.17
ΔREORG New_bankdebt	4.027	0.19	-0.689	-0.06	-1.834	-0.85
ΔOUT* New_bankdebt	-166.018	-1.90	1.240	0.02	-9.813	-1.10
ΔGDP	0.052	4.60	-0.002	-0.26	0.005	4.26
ΔRULE	0.011	3.68	0.003	1.62	0.000	-0.19
ΔINFLATION	-0.019	-1.79	0.010	1.61	-0.003	-2.52
ΔMCAP	0.010	0.60	0.008	0.84	-0.002	-1.18
Adj R2 (%)	1.29		0.14		0.95	

Panel B: Mean characteristics of issuers of new public debt

	Size		profitability		tangibility	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
observations	4339		3980		4339	
Intercept	19.454	548.05	0.025	1.25	0.527	145.22
New_debenture	0.000	1.16	0.000	0.00	0.000	0.93
ΔCRED *New_debenture	-101.819	-3.06	-3.730	-0.19	-12.352	-3.63
ΔREORG New_debenture	-2.697	-0.11	0.333	0.02	0.754	0.30
ΔOUT* New_debenture	200.566	2.29	4.613	0.09	7.093	0.79
ΔGDP	0.051	4.51	-0.002	-0.27	0.005	4.18
ΔRULE	0.010	0.60	0.009	0.84	-0.002	-1.16
ΔINFLATION	-0.018	-1.69	0.010	1.63	-0.003	-2.50
ΔMCAP	0.011	3.67	0.003	1.65	0.000	-0.25
Adj R2 (%)	1.50		0.14		0.93	

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Table 7 (continued)

Panel C: Mean characteristics of issuers of new private debt

	Size		profitability		tangibility	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
observations	1161		1066		1161	
Intercept	20.485	254.86	0.099	31.81	0.553	76.49
New_pvtdebt	-20.412	-1.39	-0.151	-0.27	-0.269	-0.20
ΔCRED *New_pvtdebt	-39.769	-0.54	1.275	0.35	-2.612	-0.40
ΔREORG New_pvtdebt	7.617	0.16	3.714	2.00	2.926	0.70
ΔOUT* New_pvtdebt	34.331	0.23	-27.755	-3.98	-4.459	-0.34
ΔGDP	0.024	1.06	0.001	0.87	0.002	1.11
ΔRULE	-0.035	-0.90	-0.001	-0.98	-0.003	-0.97
ΔINFLATION	0.076	1.91	0.001	0.32	0.008	2.28
ΔMCAP	-0.016	-2.57	0.000	0.69	0.000	0.20
Adj R2 (%)	2.38		2.62		1.38	

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Table 8
Change in scaled debt and clauses in the restructuring index

This table reports regression results based on diff-in-diff OLS regressions, which are estimated for the change in the proportion of various categories of debt from the pre- to the post-reform period by pooling sample and control firms into a panel.

$$\Delta D_{ik} = \alpha_I + \theta_C *\Delta CRED_k + \theta_O *\Delta OUT_k + \theta_L*\Delta CLAW_k + \theta_D*\Delta DIP_k + \theta_R*\Delta CRAM_k + \varepsilon_{ik} \qquad (7)$$

where ΔD_{ik} is the difference between the post- and pre-event levels of scaled debt categories of firm i in country k. The debt categories are TOTDEBT, total long-term debt, BANK, bank debt, DEBENT, debentures, and PVT, non-bank private debt, all scaled by total assets in that year. Firms in both treatment and control countries are included in the panel. $\Delta CRED$ and ΔOUT are the change in the creditor rights index and the out-of-court index between the pre- and post-event periods for treatment and control firms. $\Delta CLAW = 1$ if the court can annul and reclaim payments made to creditors and suppliers during a period retro-active to the filing of bankruptcy, $\Delta DIP=1$ if reforms encourage debtor in possession financing by giving it a higher ranking in the APR, and $\Delta CRAM = 1$ if the court or a creditor group can force unsecured creditors to accept a plan to re-structure debt. Equation (3) is estimated with fixed effects for event year, and standard errors of the coefficient estimates are clustered by event year. Data on country characteristics are from World Bank, on total, bank, public and private debt, and accounting variables are from Orbis. The sample period covers 2000 to 2020.

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Table 8 (continued)

	Δ(total LT debt)		Δ(bank debt)		Δ(debentures)		Δ(private debt)	
observations	6343		6007		5852		1797	
Intercept	-0.002	-0.93	-0.008	-4.18	0.003	1.95	-0.021	-5.26
ΔCRED	-0.001	-0.20	0.007	2.17	-0.004	-1.76	-0.019	-2.74
ΔCLAW	0.001	0.21	0.001	0.17	0.000	0.01	0.017	2.22
ΔDIP	0.001	0.15	0.003	0.54	0.003	0.69	-0.011	-1.22
ΔCRAM	0.007	1.81	0.007	2.25	0.002	0.78	0.022	3.64
ΔOUT	0.004	0.67	0.002	0.40	-0.001	-0.22	0.026	2.38
Fixed effects for event year	yes		yes		yes		yes	
Adj R2	0.14%		0.39%		0.12%		1.99%	

Appendix 1

This table provides details on the construction of a creditor rights index (*CRED*) and a restructuring index (*REORG*) for each country. Panel A presents the construction of *CRED*, the creditor rights index. We assign a value of 1(0) to each of the following six conditions: i) only creditors can file for bankruptcy; ii) the law allows for collateral seizure when the loan is in the form of a pledge or a mortgage; iii) the court or a court-appointed administrator is left in control of the bankrupt firm; iv) secured creditors are elevated in absolute priority over all other claimants, including pre-insolvency lenders and estate, tax, and labor claimants; v) there is no automatic stay after the firm is admitted to bankruptcy; and vi) secured creditors are permitted to opt out of restructuring negotiations inside bankruptcy. Panel B presents the construction of the *REORG*, the restructuring index. We assign a value of 1(0) to each of the following six conditions: i) a separate procedure in the bankruptcy code for pre-bankruptcy restructuring; ii) automatic stay when the company is admitted to prebankruptcy restructuring; iii) cramdown restructuring agreements can occur in pre-insolvency; iv) pre-bankruptcy restructuring negotiations are not public; v) debtor-in-possession (DIP) financing in a formal bankruptcy gets super-priority status over secured creditors; and vi) payments made prior to bankruptcy filings are not subject to clawbacks. Panel C has the pre-reform CRED index, which is the CRED index constructed using condition under the old bankruptcy law.

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Panel A: Construction of post-reforms *CRED*, the creditor rights index

Country	Can debtors file for bankruptcy? (0/1:Yes/No)	Seizure of pledged collateral (1/0:Yes/No)	Administrator or court in control? (1/0:Yes/No)	Priority ranking of secured creditors (1:Higher, 0:Lower)	Automatic stay? (0/1:Yes/No)	Secured creditors opt out of restructuring inside bankruptcy(1:Yes, 0:No)	Total
Belgium	0	0	1	1	0	0	2
Brazil	0	0	1	1	0	1	3
Chile	0	0	1	1	1	0	3
Denmark	0	1	1	1	0	1	4
Finland	1	1	1	1	0	1	5
France	0	0	1	0	0	0	1
Germany	0	1	0	1	1	1	4
Greece	0	1	1	0	0	0	2
Ireland	0	1	0	1	0	0	2
Italy_1	0	0	1	1	0	1	3
Italy_2	0	0	1	1	0	0	2
Netherlands	0	1	1	1	0	1	4
Portugal	0	1	1	1	1	1	5
Russia	0	0	0	0	0	0	0
Spain	0	0	1	1	0	1	3
Switzerland	0	0	1	1	0	1	3
Turkey	0	0	1	1	0	0	2
United Kingdom	0	0	1	0	0	0	1

Panel B: Construction of *REORG*, the restructuring index

Country	Separate procedure dealing with pre-insolvency restructuring? (Yes:1, 0:No)	Is there an automatic stay imposed on preinsolvency restructuring? (1:Yes, 0:No)	Cramdown of restructuring agreement reached in preinsolvency? (1:Yes, 0:No)	Is preinsolvency restructuring private? (1:Yes, 0:No)	DIP financing gets superpriority (1:Yes, 0:No)	Clawback of payments prior to bankruptcy filing? (0:Yes, 1: No)	Total
Belgium	1	1	1	0	0	0	3
Brazil	1	0	1	0	1	1	4
Chile	1	1	1	0	0	0	3
Denmark	1	1	0	0	0	1	3
Finland	1	0	0	0	0	0	1
France	1	1	1	1	1	1	6
Germany	1	1	1	0	0	0	3
Greece	1	1	1	0	0	1	4
Italy_1	1	0	1	0	0	1	3
Italy_2	1	1	1	0	1	0	4
Ireland	1	0	1	0	0	0	2
Netherlands	0	0	0	0	0	1	1
Portugal	1	0	0	0	0	0	1
Russia	1	0	0	1	0	1	3
Spain	0	0	0	0	0	0	0
Switzerland	1	1	1	1	1	1	6
Turkey	1	1	1	0	0	0	3
United Kingdom	1	1	0	0	0	0	2

Appendix 1 (continued)

Panel C: Construction of the pre-reforms creditor rights index

Country	Restrictions for going into re-organization[16]	Automatic Stay on Assets[17]	Secured Creditors paid first [18]	Management stays in reorganization[19]	Seizure of collateral when it is a pledge /mortgage[20]	secured creditors can opt out of restructuring inside bankruptcy[21]	Total
Belgium	0	0	1	1	0	0	2
Brazil	0	0	0	1	0	0	1
Chile	1	1	1	1	0	1	5
Denmark	0	1	1	0	1	0	3
Finland	0	0	1	0	0	0	1
France	0	0	0	0	0	0	0
Germany	1	1	1	1	0	1	5
Greece	0	1	0	0	0	0	1
Ireland	0	0	1	0	0	0	1
Italy_1	0	0	1	1	0	1	3
Italy _2	0	1	0	1	0	0	2
Netherland	1	1	1	0	0	0	3
Portugal	0	1	0	0	0	0	1
Russia	1	1	0	0	0	0	2
Spain	0	0	1	1	0	0	2
Switzerland	0	1	1	1	1	0	4
Turkey	0	0	0	1	1	0	2
United Kingdom	1	1	1	1	0	0	4

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[16] Takes a value of one if creditor consent required to file for reorganization;

[17] Takes a value of one if no automatic stay is imposed after a reorganization petition is filed.

[18] Takes a value of one if secured creditors rank first in absolute priority

[19] Takes a value of one if management does not stay in control of the firm.

[20] Takes a value of one if pledgees or mortgage holders can seize collateral

[21] Takes a value of one if secured creditors can opt out of restructuring negotiations

Appendix 2
Country characteristics for treatment and control countries in the event year

Regime	Countries	GDP growth %	Rule of law index	Private credit /GDP (%)	Unemp-loyment rate (%)	Market cap of equity as % of GDP	Inflation rate %
Pro-creditor laws	Spain	3.12	85.10	116.01	11.09	87.99	3.88
	Finland	3.99	99.52	63.73	10.36	10.30	0.60
	Netherlands	0.16	95.02	108.81	3.59	84.24	2.17
	Portugal	0.78	87.56	124.77	7.58	33.95	3.33
	Treatment countries, mean	2.01	91.80	103.33	8.16	54.12	2.50
	Control countries, mean	2.03	89.18	99.37	6.82	66.48	2.84
	Treatment-control(p-val)	0.73	0.27	0.47	0.12	0.16	0.45
Pro-restructu-ring laws	Brazil	3.20	38.76	31.84	10.55	53.23	7.43
	Switzerland	2.35	98.08	165.12	4.83	205.81	-0.65
	Denmark	1.87	99.05	193.04	7.75	N/A	3.22
	France	2.45	90.43	84.26	8.83	104.64	2.16
	Greece	3.27	76.56	84.54	8.35	83.09	3.42
	Ireland	24.37	92.79	53.08	9.91	43.87	8.39
	Italy_1	0.82	64.59	70.85	7.73	42.95	2.01
	Treatment countries, mean	5.48	80.04	97.53	8.28	88.93	3.71
	Control countries, mean	3.09	85.66	101.36	6.72	77.59	2.90
	Treatment-control(p-val)	0.38	0.12	0.11	0.06	0.81	0.93
Pro-debtor laws	Belgium	-2.02	88.63	58.68	7.91	53.75	0.53
	Chile	1.79	86.54	109.05	6.65	89.92	5.85
	Germany	0.42	92.02	83.81	5.38	42.14	1.50
	Great Britain	3.12	94.03	129.51	4.81	117.95	2.52
	Italy_2	-2.98	64.32	93.76	10.65	23.09	1.55
	Russia	4.70	22.89	17.97	7.88	N/A	15.66
	Turkey	2.98	38.94	67.54	10.89	19.17	16.48
	Treatment countries, mean	1.14	69.62	80.05	7.74	57.67	6.30
	Control countries, mean	0.83	73.71	89.78	8.91	56.66	3.35
	Treatment-control(p-val)	0.84	0.83	0.88	0.92	0.56	0.99
F-Tests (p-values) for differences between pro-creditor, pro-restructuring and pro-debtor treatment countries		17.35 (0.00)	6.49 (0.00)	1.23 (0.29)	0.27 (0.76)	9.49 (0.00)	0.52 (0.59)

B

Appendix 3
Non-missing observations on leverage ratios by country

This table provides the number of observations for each of the five debt categories with data on both pre- and post-event proportions of debt for the treatment sample of countries that changed their bankruptcy laws. The five different debt categories are total long-term debt (TOTDEBT); bank loans (BANK); debentures and convertible debt (DEBENT); non-bank private debt (PVT); and non-interest-bearing long-term debt (ZERO). The pre-event period for most countries in the sample is the three years before the new bankruptcy law is enacted. The post-event period is the year of, and the two years following implementation of the new law.

Country	Total observations	Total long-term debt	Bank debt	Debentures	Non-bank private debt	Non-interest bearing debt
Belgium	173	97	57	5	32	18
Brazil	428	236	171	40	53	14
Chile	335	137	137	137	41	86
Denmark	202	34	34	29	8	14
Finland	197	100	81	26	60	14
France	801	552	304	81	263	94
Germany	537	467	220	36	57	55
Greece	236	185	80	0	32	21
Ireland	123	38	16	3	10	45
Italy	371	130	99	0	48	88
Netherlands	316	113	46	25	58	43
Portugal	74	36	30	1	15	3
Russia	761	43	23	3	24	0
Spain	261	79	69	0	30	7
Switzerland	301	187	186	180	104	166
Turkey	400	336	336	319	0	0
United Kingdom	2272	957	368	73	185	60
Total	7788	3727	2257	958	1020	728

c

Appendix 4

This table reports the name and the descriptions of accounting and ownership variables to determine the debt ratios. The sample period spans from 2001 to 2009. All accounting variables are denominated in U.S. Dollars and are obtained from the Orbis dataset in the Bureau Van Dyck suite.

Serial #	Orbis data variable	Description	Serial #	Orbis data variable	Description
_40025	TYPE OF ENTITY	FLDR	LT DEBT REDN.	OFAS	OTHER FA
ACCPRACTICE	ACCOUNTING PRACTICE	FPRD	Net debt ISSUANCE	ONCL	OTHER NON-CURR LIAB
BVDID	Bvdid #	FLDN	LT DEBT, NET	ONET	NET INCOME
Bank_loans		FSDI	ST DEBT ISSUED	OOLB	OTHER LIAB
CAPI	CAPITAL	FSDN	ST DEBT, NET	OOPE	OTHER OP EXP
CASH	CASH & EQUIVALENT	FTDI	TOT DEBT ISSUED	Other_LT_ interest_bearing debt	
CATEGORY	COMPANY CATEGORY	FTDR	TOT DEBT REDN	Other_LT_ noninterest_debt	
CLOSDATE	CLOSING DATE	GRMA	GROSS MARG (%)	OPRE	OP REVENUE
COST	COGS	GROS	GROSS PROFIT	ORIG_CURRENCY	ORIGINAL CURRENCY
CONSCODE	CONSOLIDATION CODE	IC	INTEREST COVER	OTXP	TAXES PAYABLE
COUNTRY	COUNTRY	IFAS	INTANGIBLES	PLAT	P/L AFTER TAX
CRED	CREDITORS	INTE	INTEREST PAID	PPE	PROFIT PER EMPLOYEE (TH)
CUAS	CURR ASSETS	IPO_DATE	IPO DATE	PRMA	PROFIT MARGIN (%)
CULI	CURR LIAB	LEGALFRM	NATIONAL LEGAL FORM	RD	R&D EXP
DATEINC	INCORP. DATE	LOAN	LOANS	SCEX	CAPEX
CURR	CURRENT RATIO	Lease		SD_ISIN	ISIN NUMBER
DEBT	DEBTORS	LTDB	LT DEBT	SD_TICKER	TICKER SYMBOL
Debentures		NAT	TURNOVER		
DEPR	DEPR. & AMORT	NCAS	NET CURR ASSETS	SHLQ	LIQ RATIO
EBMA	EBIT MARG (%)	NCLI	NON-CURR LIAB	SOLR	SOLV RATIO
EMPL	# EMPLOYEES	OACR	ACC RECEIVABLE	STOK	STOCK
ETMA	EBITDA MARGIN	OAEX	ACCR EXP	TFAS	TANGIBLE FA
EXCHRATE	EXCHANGE RATE	OAPB	ACC PAYABLE	TOAS	TOT ASSETS
FIAS	FIXED ASSETS	OBDT	DEF TAXES	TSHF	TOT SH. FUNDS & LIAB.
FILING	FILING TYPE	OCLI	OTHER CURR LIAB	TURN	SALES
FLDI	LT DEBT ISSUED				

D