Debt Enforcement and Bank Loans: Evidence from Insolvency Practices Worldwide[*]

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Abstract: Using a novel debt enforcement index reflecting legal and economic characteristics directly relating to resolving insolvency across the world, we document that bank loan terms are more stringent (larger interest rate spread, higher collateral requirement, more covenants) in countries with weaker debt enforcement. The effect is more prominent when creditor rights are better protected and debtors are exposed to higher fundamental and informational risks. Improved enforcement has real effects of reducing borrowers' covenant violation and enhancing their preference for bank funding. Lenders' syndicates become more concentrated as loan contract enforceability deteriorates. A difference-in-differences analysis of insolvency resolution reforms worldwide confirms the cross-country evidence.

1. Introduction

Debt enforcement has been of considerable interest in finance and economics literatures. This interest is underscored by Djankov, Hart, McLiesh, and Shleifer (henceforth DHMS) (2008) who state in their groundbreaking paper that '(d)ebt needs to be enforced.' According to Moody's (2001), 'contracts are worth little more than the paper on which they are written if the … legal and political system cannot guarantee that they will be consistently enforced.' In this study, we examine how contract enforceability embedded in insolvency resolution practices influences the design of bank loan terms. We focus on bank loans for three reasons. First, bank lending is the predominant source of funding for a firm's business activities. Second, bank loan contracting involves multiple facets that help in developing a deeper understanding of the pricing of debt (loans), as well as of other non-price terms pertinent to lenders' concerns about borrowers' creditability and the enforcement of creditor rights in case of insolvency. Third, banks, as private debt holders, have superior ability to comprehend the enforcement procedures and potential frictions because they have more access to information than do creditors in the public debt market. Banks' responses to debt enforcement frictions as reflected in loan terms better indicate the performance of insolvency institutions. Existing literature also emphasizes the importance of examining the 'micro-level effects on borrowers' cost of loan finance' (Bae and Goyal 2009) and the '*intensive* margin' from loan terms relative to the '*extensive* margin' from the total supply of credit (Qian and Strahan 2007).

Despite the importance of debt enforcement, how it affects bank loan terms is still theoretically undetermined. On the one hand, better enforcement of loan contracts protects creditors' interest in case of default (e.g., by securing a higher recovery rate and hastening the payment collection process), thereby inducing a de facto lower level of credit risk for banks.

Improved enforceability also mitigates the moral hazard problem of borrowers by deterring strategic default, which further reduces credit risk faced by lenders. These effects allow banks to adopt more lenient loan contracting terms. On the other hand, a better enforcement environment could make banks relax their lending standards and grant credits to risker borrowers, and accordingly charge a higher interest rate and impose other non-price requirements. The prospect of a strict debt enforcement arrangement could also inflate shareholder-debtholder conflicts and exaggerate potential underinvestment and risk-shifting distortions in borrowing firms. These mechanisms increase lenders' risk exposure and induce more stringent loan terms. It is, therefore, important to provide empirical evidence regarding the actual impacts of debt enforcement on bank loan contracting.

An empirical examination of debt enforcement requires an appropriate enforcement measure. A bank loan enforcement measure is appropriate if it *directly* captures concrete, detailed features of the procedure for resolving insolvency. However, most empirical studies on debt enforcement use measures derived from the study by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (henceforth LLSV) (1998) that focuses on the legal rules of a jurisdiction and constructs aggregate law enforcement proxies, including the efficiency and integrity of the legal environment, agents' confidence in the rules of society, corruption, expropriation, and contract repudiation by the government, that are relevant for potential foreign investors (rather than creditors). Although these measures may be suitable for aggregate-level analyses of a country's financial development, corporate financing, and economic growth (LLSV 1997; Demirguc-Kunt and Maksimovic 1998; Levine 1998; Beck and Levine 2005), they may not be the best choice for studies that examine how individual financial contracts are influenced by their enforceability; they are, at best, an *indirect* measure of enforceability at the loan level.

In this study, we employ a novel measure of contract enforceability that directly focuses on actual debt enforcement practices. The measure is based on the metric of insolvency resolution practices developed by DHMS (2008) who collect detailed data on legal and economic characteristics of the debt enforcement procedures of an insolvent firm, both with and without court involvement and with and without formal bankruptcy, from a large number of countries. Specifically, we construct a debt enforcement index for 32 countries and regions using the structural characteristics from DHMS (2008) that can be clearly identified as pro-debtor (i.e., more enforcement friction) or pro-creditor (i.e., less enforcement friction), with a higher index value indicating better enforcement quality. This procedure-focused enforcement proxy reflects the actual activities taken by insolvency practitioners, and better matches the nature of the issue to be explained in our study, i.e., bank loan terms. In other words, we use a more *direct* enforcement assessment based on contract insolvency practices to explain loan contracting behavior.

We link the enforcement index with bank lending terms relating to the cost (all-in spread drawn), collateral, and covenants for over 43,000 loans. Our empirical evaluation shows that for a one standard deviation decrease (roughly equaling the difference between the first and third quantiles) of the enforcement index, which corresponds to a higher level of friction in enforcement and a deterioration of its quality, lending banks increase loan spread by about 13%, require 1.63 more covenants (about 46% more than the mean value), and are 477% more likely to attach collateral provisions in loan contracts. These are the effects after we control for numerous loan-, firm-, and country-level factors, including the *indirect* debt enforcement proxy of LLSV (1998).

To strengthen the interpretation of the results, we also implement a difference-in-

differences (DiD) analysis around the reforms of insolvency resolution worldwide that targeted debt enforcement. These reforms are tracked by the World Bank which, based on the DHMS (2008) methodology, classifies them as changes that improve the efficiency and quality of insolvency resolution practices and changes that impair them. We find that after a reform that strengthens enforcement in a country, the loan terms (cost, collateral, covenants) become less stringent than in other countries that do not have such reforms. In contrast, after a reform that weakens enforcement, the loan terms become more stringent in the reform country than in non-reform countries. This evidence is consistent with and reinforces the baseline result on the relation between enforcement and loan contracting, and more importantly, reduces the concern that our results may be driven by potential effects of unobserved legal or political characteristics other than debt enforcement.

To obtain a deeper understanding of the conditions under which debt enforcement plays a more important role, we examine whether the relation between enforcement and loan contracting varies systematically with the fundamental risk (proxied by financial distress) and the informational risk (proxied by earnings management) of borrowing firms, and with creditor rights granted to lending banks. We find that higher risk exposures from either debtors' deeper financial distress or greater earnings management strengthen the importance of enforcement for loan contracting. The existence of stronger creditor rights also makes enforcement more important for loan contracting.

We further document that debt enforcement can have real effects on borrower behavior. When there is less enforcement friction, we find fewer incidents of covenant violation and stronger preference for bank loan funding, suggesting that better contract enforceability deters borrowing firms' activities that are detrimental to lenders and changes their corporate financing

structure. Lastly, we confirm that an improvement in debt enforcement leads to less concentrated loan syndicates, consistent with better monitoring and easier re-contracting when insolvency issues can be more efficiently resolved.

Our study adds new evidence to the literature on the influence of contract enforceability on the credit market, particularly the loan market. Our evidence is pertinent given that the law-and-finance research has evolved from the seminal work of LLSV (1998) and related studies (e.g., LLSV 1997) that mainly examine macro-finance problems to the strand of literature that studies the effects of legal institutions on individual financial contracts. Whereas macro-focused law enforcement measures from LLSV (1997, 1998) may be appropriate for the former area of research, they may not be appropriate for contract-level investigations. By drawing on the work of DHMS (2008), who compile a direct, procedure-focused debt enforcement measure, our study is the first to document the impact of the measure on individual contracting.

With regard to the debt enforcement effect on bank loans, our work supplements existing studies that use relatively *indirect* enforcement proxies, such as Qian and Strahan (2007) who use legal formalism from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2003) and Bae and Goyal (2009) who utilize a property rights measure based on the corruption, expropriation, and repudiation components of LLSV (1998). Although we do not conduct a horse race among various debt enforcement proxies, we conceptually differentiate our measure, which is based on *direct*, actual contract insolvency resolution practices, from existing indirect measures that are more relevant to the overall legal system but less so to individual debt contracts. Moreover, we show that the direct DHMS (2008) measure and the indirect LLSV (1998) measure complement rather than substitute one another; each measure is significant after controlling for the other. These findings show that specific insolvency resolution is important to structuring debt contracts

in addition to the overall quality and efficiency of the legal environment and highlight the importance of examining the DHMS (2008) measure even when bank contracting studies have employed other LLSV-based enforcement proxies.

Our study also provides richer information about the enforcement-loan relation than existing studies. By using the DHMS (2008) metric, we are able to conduct a DiD analysis using data provided by the World Bank because its identification of exogenous debt enforcement shocks is based on the DHMS (2008) methodology. Such a setting is unique to our study, which is the first to adopt a DiD approach to explore changes in loan contract terms resulting from changes in insolvency resolution practices.

Lastly, our study documents initial evidence on the potential real effects of debt enforcement on borrower behavior, as well as the direct relation between enforcement and lender syndicate structure. Prior research either does not provide such evidence or only does so indirectly (e.g., Bae and Goyal 2009).

The rest of this article is organized as follows: Section 2 develops conceptual framework. Sections 3 and 4 present our baseline empirical model and it empirical results, respectively. Section 5 conducts the DiD analysis of insolvency resolution reforms. Section 6 examines cross-sectional differences in the loan term impacts of debt enforcement, the real effects of debt enforcement, and the impact of contract enforceability on syndicate structure. Section 7 reports the results of robustness tests and Section 8 provides our conclusions.

2. Conceptual framework

2.1. Theoretical background

Prior research has emphasized the critical role of enforcement in business contracting.

Ball, Robin, and Wu (2003) and Christensen, Hail, and Leuz (2013) show that enforcement of the laws is as important as the existence of the laws, and Bhattacharya and Daouk (2002, 2009) even argue that it is the enforcement, not the existence, of laws that matters. When enforcement is costly, it is an important decision variable for creditors. Krasa and Viliamil (2000) contend that, when lenders cannot commit ex ante to request enforcement at a later time, they take this into account at the outset of contract writing. Thus, theoretically, debt enforcement holds the potential to influence debt contracting, including bank loan contracting.

Poor enforcement is generally considered unfavorable to lenders, because it lowers recovery rates, increases the time spent in insolvency resolution, and weakens creditor bargaining power following default (Aghion and Bolton 1992; Hart and Moore 1994, 1998; Bae and Goyal 2009). Costly or ineffective enforcement of contracts could also foster opportunistic behaviors such as strategic default in which borrowers are unwilling to repay although potentially solvent (Jappelli, Pagano, and Bianco 2005; Davydenko and Strebulaev 2007). These prospects constitute substantial threat to lenders' payoffs from lending, and thus increase their exposure to credit risk. Consequently, the contractual payment, ex ante, must rise for the lenders to break even, i.e., lenders charge a higher interest rate over benchmark in an environment of poorer debt enforcement, ceteris paribus. Regarding a bank loan contract, lending banks could also seek additional protection by demanding more collateral when envisioning that the dilution of their claims by poor enforcement is likely to decrease the value of collateral (Davydenko and Franks 2008). When enforcement is costly, the prospect of weak bargaining power in resolving insolvency motivates banks to more closely monitor borrower behaviors to prevent moral hazard incidence (e.g., excessive risk-taking and strategic default) by adding more constraining covenants in the loan contracts. Overall, we expect that poor enforcement of loan contracts

makes banks rationally increase the stringency of their lending terms by increasing interest rate spread, collateral requirements, and covenants.

However, the above mechanisms do not work without countervailing effects. As risks increase for creditors operating in an institutional environment with poor enforcement, instead of increasing interest rates, banks could ration some borrowers (Stiglitz and Weiss 1981; Jappelli et al. 2005; Bae and Goyal 2009) by applying a stricter screening process through which only less risky borrowers are accepted. The new cohort of bank loan customers is offered more favorable lending terms that may offset the greater stringency of loan contracting for existing borrowers. Moreover, strict debt enforcement may not always work to increase firms' expected recovery in default. Favara, Morellec, Schroth, and Valta (2017) show that enforcement of debt contracts in default affects the underinvestment and risk-shifting distortions caused by risky debt and the conflicts between borrowers and lenders; imperfect enforcement *attenuates* the borrower-lender conflicts and thus induces leveraged firms to invest more efficiently and take on less risk as they approach financial distress, which helps reduce default probability eventually and serves to decrease lenders' credit risk. This rationale suggests that a *weakening* of the enforceability of loan contracts could be beneficial to banks and allow them to offer more lenient loan terms.

In sum, given the divergent theoretical predictions of how debt enforcement affects bank loan contracting, it is important to empirically examine the enforcement-loan relation in a comprehensive way. A critical step in this endeavor is identifying an appropriate measurement scheme for the enforcement of bank loan contracts. Existing literature, however, pays much less attention to this issue and there is a mosaic of enforcement measures used in what appears to be an arbitrary way.

2.2. Debt enforcement proxies used in the banking literature

Although there is a long history of recognizing the importance of debt enforcement (e.g., Keynes 1924), empirical studies assessing its impact on finance have proliferated since LLSV's 1997 and 1998 studies in which they develop quantifiable measures of enforcement based on the tradition for law and order, i.e., rule of law (LLSV 1997) and its expansion (LLSV 1998). LLSV's (1997, 1998) metrics heavily depend on the rating variables from certain risk forecasting and advisory firms such as the International Country Risk Guide (ICRG) and the Business International Corporation (BIC). Not only do these measures come from different sources and are collected and evaluated by different groups, they are also based on different references, which raises the concern that 'we are comparing apples to oranges' (DHMS 2008) when the enforcement score of one country is juxtaposed with that of another.

More importantly, these enforcement measures are broadly defined and involve a diverse set of considerations on different aspects of a country's legal environment, many of which are not relevant (at least not in a direct way) to contract insolvency solution. For example, the ICRG assesses 'the strength and impartiality of the legal system' and the 'popular observance of the law.'[1] The World Bank incorporates this concept, together with many others, into its rule of law measure that 'captures perceptions of the extent to which agents have confidence in and abide by the rules of society,' including 'the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.'[2] LLSV (1998) supplement rule of law with efficiency of the judicial system from the BIC, and corruption, expropriation risk, and risk of repudiation from the ICRG to measure law enforcement. Like rule of law, all these additional factors are macro-oriented. Efficiency of judicial system assesses the 'integrity of the legal environment as it affects business, particularly foreign firms.' Corruption is considered

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[1] https://epub.prsgroup.com/list-of-all-variable-definitions.
[2] http://info.worldbank.org/governance/wgi/pdf/rl.pdf.

severe if 'high government officials are likely to demand special payments' and 'illegal payments are generally expected throughout lower levels of government' in the form of 'bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans.' Expropriation refers to 'outright confiscation' or 'forced nationalization.' Repudiation by government includes 'a modification in a contract taking the form of a repudiation, postponement, or scaling down' due to 'budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities.'

Despite the macro scope of the LLSV enforcement measures, a number of papers in the banking literature utilize these measures with or without modifications, although they address banking-related issues that are micro in scope, i.e., at the firm or contract level. For example, Laeven and Majnoni (2005) use rule of law as part of a judicial efficiency measure (the other part refers to creditor rights, which are not about debt enforcement) and examine its effect on average bank interest rates across countries. Bae and Goyal (2009) consider the impacts on bank loans from corruption, risk of repudiation, and risk of expropriation. Ge, Kim, and Song (2012) examine how the enforcement components of LLSV (1998) influence the relation between internal governance and loan contracting. Esty and Megginson (2003) modify LLSV's (1998) measure by extracting a principal component and check its relationship with debt ownership concentration among banks.

DHMS (2008) adopt an entirely different approach to provide references that are more *directly* related to debt enforcement. Their measurement scheme incorporates both objective and subjective factors and integrates legal rules and actual practices, because it builds on the detailed narratives provided by attorneys and judges about actual debt enforcement procedures used. Because these law practitioners' descriptions are based on an identical case of debt default, they

can be more directly compared across different countries and suffer less from the 'apples and oranges' problem. A unique feature of the DHMS (2008) survey is that it collects rich information about the structural characteristics of the debt enforcement procedures with both legal and economic implications. These characteristics include the rights of creditors to seize and sell their collateral without court approval, to enforce their security in or out of court upon commencement of the insolvency proceedings or in lawsuits, to approve the appointment of or dismiss the insolvency administrator, and to vote directly on the reorganization plan. They also indicate whether the insolvent firm can enter liquidation without attempting reorganization, must cease operations upon commencement of the insolvency proceedings, and must submit proof of reorganization prospects before reorganization. In addition, the survey provides information about management control during insolvency proceedings, appeal of the insolvency or liquidation order, suspension of the insolvency order until the resolution of the appeal, and the triggering mechanisms of insolvency initiation. As shown in Favara et al. (2017), these legal and economic characteristics of debt enforcement practices have clear indications for the levels of friction that could be encountered during the insolvency solution processes. These indicators span the three basic procedures of debt enforcement: foreclosure, liquidation, and reorganization. Because foreclosure is a solution with no or minimal court involvement, DHMS' (2008) measure goes beyond the bankruptcy codes and their enforcement and pertains to debt enforcing behaviors that are actually taken.

As creditors, banks should consider potential difficulties in enforcement that are determined not only by the macro legal system efficiency but also by the actual insolvency practices. For the strategic decisions about aggregate credit granting to a certain country, the overall legal efficiency is pertinent; for individual loans per se, the operation of actual

enforcement procedures may be more relevant. The existing literature has examined the former, whereas we address the latter in this study.

3. Empirical method

Our baseline empirical model is a standard pooled cross-sectional and time-series regression, as shown below:

$$
\begin{aligned}
Loan\ Term = {} & \beta_0 + \beta_1(Debt\ Enforcement\ Index) + \beta_2 Ln(Loan\ Size) + \beta_3 Ln(Loan\ Maturity) \\
& + \beta_4(Performance\ Pricing) + \beta_5(Firm\ Size) + \beta_6 PPE + \beta_7 LEV + \beta_8 ROA + \beta_9 Z\text{-}score \\
& + \beta_{10}(Cash\ Flow\ Volatility) + \beta_{11}(GDP\ Growth) + \beta_{12} Inflation + \beta_{13} GDP \\
& + \beta_{14}(Common\ Law) + \beta_{15}(Rule\ of\ Law) + \beta_{16}(Bank\ Environment) + \beta_{17}(Creditor\ Rights) \\
& + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon
\end{aligned} \tag{1}.
$$

The dependent variable *Loan Term* is one of the following three contracting terms: interest rate, collateral, and covenants. We use *Ln(Spread)*, the natural logarithm of the all-in spread drawn, i.e., the amount paid by the borrower in basis points (bps) in excess of LIBOR for each dollar drawn down, as our measure for interest rate, *Secured*, an indicator variable that equals 1 if the loan includes a collateral provision and 0 otherwise, as our measure for collateral, and *Covenants*, the number of covenants, including general and financial covenants, as our measure for covenants.

The key independent variable is *Debt Enforcement Index*. We follow Favara et al. (2017) by computing this index as the average of 16 binary indicators for the structural characteristics compiled in the DHMS (2008) survey (as detailed in the Appendix). These indicators have clear-cut pro-debtor or pro-creditor implications. Following Favara, Schroth, and Valta (2012) and Favara et al. (2017), we impute the DHMS survey results from 2005 to all our sample years. We construct the measure such that a higher index value corresponds to more efficient debt enforcement practices. If better debt enforcement alleviates borrowers' funding cost and non-

price constraints, we expect a negative β_1.

We control for loan-, firm-, and country-level variables. At the loan level, we control for loan size (*Ln(Loan Size)*), the natural logarithm of the face value of the loan in millions of dollars; loan maturity (*Ln(Loan Maturity)*), the natural logarithm of loan maturity in months; and an indicator variable for the existence of performance pricing provisions (*Performance Pricing*). At the firm level, we control for the borrower's firm size (*Firm Size*), the natural logarithm of total assets in millions of dollars; the proportion of tangible assets (*PPE*), gross property, plant and equipment divided by total assets; leverage ratio (*LEV*), current and long-term debt divided by total assets; profitability (*ROA*), pre-tax income divided by total assets; volatility of cash flows (*Cash Flow Volatility*), the standard deviation of operating cash flows over the past five years; and Altman's (1968, 2013) modified Z-score (*Z-score*).

The country-level controls include variables that reflect general economic conditions and the legal environment. We use GDP level (*GDP*), GDP growth rate (*GDP Growth*), and inflation rate (*Inflation*) to control for economic conditions. We also include a variable that assesses the efficiency and market structure of commercial banks in an economy (*Bank Environment*), using the financial development and structure data compiled by Beck, Demirguc-Kunt, and Levine (2000). To control for the legal-environment, we include the measures from LLSV (1998) for legal origin (*Common Law*), which equals 1 if the legal origin is common law and 0 otherwise, the powers granted by laws (*Creditor Rights*), and the efficiency of the legal system (*Rule of Law*), which reflects macro-level debt enforcement. We provide detailed definitions and constructions of all the dependent and independent variables in the Appendix. We also control for industry fixed effects using the Fama-French 48 industry classification and for year fixed effects.

We estimate a Logit model when the dependent variable is binary (i.e., *Secured*), a

14

Poisson model when it is ordinal (i.e., *Covenants*), and an Ordinary Least Squares (OLS) model when it is continuous (i.e., *Ln(Spread)*). We use *t*-statistics or *z*-statistics computed based on standard errors adjusted for heteroscedasticity to assess the statistical significance levels of the estimated coefficients. Since the number of loans is not evenly distributed across countries, with the U.S. having the largest portion (see Table 1, Panel A for relevant statistics), we follow Edwards (1992) and Chen, Huang, Lobo, and Wang (2016) and weight observations by the inverse of the proportion of country-loan observations.[3]

4. Main empirical results

4.1. Summary statistics

Our debt enforcement data are from the authors' website of DHMS (2008). We compile the 16 individual structural characteristics following Favara et al. (2017). We obtain accounting data from Compustat Global, country-level economic data from the World Bank, and legal data from the authors' website of LLSV (1998). We retrieve loan-level data from Deal Scan for the years 1994 to 2009.[4] Our final dataset includes a total of 43,239 loans borrowed by 8,439 firms in 32 countries.[5] Table 1 provides a statistical summary of all the main variables.

Panel A reports cross-sectional statistics of the country-level variables. The index of debt enforcement varies significantly across countries, with Australia, Hong Kong, New Zealand, Singapore, and the U.K. having the highest possible score of 1 and Chile having the lowest possible score of 0. As shown in Panel D, the average index score is 0.556 with a standard

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[3] We present evidence in the robustness tests that our results are not driven by this weighted regression estimation technique or by the dominating number of observations from the U.S.

[4] Our sample period ends in 2009, similar to Favara et al. (2017) who also adopt a DHMS-based enforcement measure. The main reason is that we follow the common practice in the literature and use the 2011 version of Chava and Roberts' (2008) link table for matching bank loan data from Deal Scan with accounting data from Compustat Global. The latest year that is fully covered by this link table is 2009.

[5] For the convenience of exposition, we use countries to refer to the jurisdictions used in this paper.

deviation of 0.248. Notably, the LLSV-based enforcement measure – *Rule of Law* – does not move in tandem with our DHMS-based enforcement measure. For many cases, e.g., Canada, Finland, the Netherlands, Norway, Sweden, Switzerland, and the U.S., *Rule of Law* diverges substantially from *Debt Enforcement Index* because these countries have a full score of 10 for the LLSV (1998) measure but relatively lower scores for the DHMS (2008) measure. *Rule of Law* does not exhibit as much variation as *Debt Enforcement Index*; its standard deviation is less than one-third of its mean, whereas the standard deviation of *Debt Enforcement Index* is about half of its mean. The (unreported) correlation between *Rule of Law* and *Debt Enforcement Index* is only 0.220. This evidence suggests that the LLSV-based proxy does not deliver the same information about the ease of debt enforcement as does the DHMS-based proxy, thus highlighting the importance of examining the impact of one while controlling for the other.

4.2. Baseline results

Table 2 reports baseline results from Model (1) using various loan contracting terms as the dependent variable. For the price term, i.e., the all-in spread drawn, column 1 shows that a lower debt enforcement index, meaning more enforcement friction and less efficient insolvency solution, leads to a significantly larger loan spread. Specifically, when *Ln(Spread)* is regressed on *Debt Enforcement Index* and other controls, *Debt Enforcement Index* has a statistically significant coefficient of -0.518 with a *t*-value of -2.95. Economically, if the debt enforcement measure is decreased by one standard deviation of 0.248 (as shown in Panel D of Table 1), loan spread will increase by 12.85% because the coefficient estimate represents the percentage change effect of the independent variable on the dependent variable if it is in logarithmic form. Based on the average spread of 175.600 bps (Panel B of Table 1), the average change in loan spread is 22.565 bps. If the debt enforcement index drops from the highest possible value of 1 (as in Australia,

Hong Kong, etc.) to the lowest possible value of 0 (as in Chile), average loan spread will increase by 90.961 bps, a 51.80% jump from the mean.

We note that this highly significant, both statistically and economically, effect of debt enforcement index on loan spread is after we control for several loan, firm, and country characteristics that may also influence the price of bank loans. These control variables have coefficient signs consistent with existing literature. In general, at the loan level, smaller, longer maturity loans with lower likelihood of containing performance pricing provisions are associated with higher loan spread. At the firm level, borrowers with smaller size, less tangible assets (*PPE*), higher leverage, lower profitability (*ROA*), lower Z-score, and higher cash flow volatility exhibit higher loan spread. At the country level, firms in countries with higher GDP level and GDP growth rate have higher loan spread, suggesting that bank funding is more expensive in stronger and faster growing economies. Inflation rate also drives up loan spread, but the effect is not statistically significant. In common law countries, loan spread is significantly larger than in countries with other law origins. Bank environment exhibits a positive although insignificant association with loan spread. For the creditor protection-related variables, a higher score of *Creditor Rights* significantly reduces loan spread, which is consistent with the evidence in Laeven and Majnoni (2005), Qian and Strahan (2007), and Bae and Goyal (2009). More relevantly, *Rule of Law*, the debt enforcement measure used in prior research, also has a significantly negative coefficient, suggesting that a better legal environment helps lower borrowing costs. The economic significance of the *Rule of Law* effect is no less than that of the *Debt Enforcement Index* effect. The importance of each of these two effects in conjunction with one another implies that banks consider both the overall condition of law obedience and the specific insolvency resolution practices when pricing loans. The concrete insolvency institutional

efficiency supplements the general legal enforcement assessment as a potential determinant of bank lending decisions.

Debt enforcement also has a significant impact on other non-price loan terms. Column 2 of Table 2 shows that the likelihood of collateral requirement is larger when enforcement efficiency is lower, as evidenced by the significantly negative coefficient on *Debt Enforcement Index* of -7.068. This coefficient estimate implies that a one standard deviation decrease in *Debt Enforcement Index* increases the odds of collateral requirement by 477%, suggesting a sizable influence of enforceability on the collateral provision in bank loans. The coefficient on *Rule of Law* indicates a magnitude of impact on collateral requirement only slightly weaker than that of *Debt Enforcement Index*, which is in line with the evidence in column 1.

Column 3 examines the impact of debt enforcement on the number of covenants. The coefficient on *Debt Enforcement Index* is significantly negative at -6.589, implying that a one standard deviation decrease in *Debt Enforcement Index* (i.e., increase in insolvency friction) is accompanied by an increase of 1.63 in the number of covenants, which is about 46% of the mean value (Panel B of Table 1). We also note from column 3 that, in contrast to the DHMS-based *Debt Enforcement Index*, *Rule of Law* has the opposite impact on the covenant-related loan term. The literature normally considers covenants as a useful tool to protect creditors in a weakly enforced insolvency environment (Smith 1979; Nash, Netter, and Poulsen 2003; Miller and Reisel 2011). Relevant studies, however, do not differentiate the debt enforcement environments in overall rule of law and in specific default resolution practices. Our evidence suggests that these two types of enforcements have distinct implications for banks' use of loan covenant constraints.

Finally, comparing across the three columns of Table 2 reveals differences in levels of

impact from debt enforcement on price and non-price terms in loan contracting. In particular, the effects on collateral and covenants are much larger than that on loan spread. Banks appear to resort more to adjusting non-price terms than to changing the cost of funds as a response to changes in debt enforcement friction.

5. Reforms in insolvency resolution practices: A DiD analysis

A notable deficiency of existing studies relating debt enforcement to bank loans is the lack of sufficient control for potential endogenous issues. For example, given the vast scope of bank loan determinants, omitted variables are likely to bias estimations of the link between enforcement and loan terms. To alleviate this concern, we employ a DiD design that compares changes in loan terms of firms that experience reforms in insolvency resolution practices to firms that do not experience such reforms. Such an analysis is feasible because the *Doing Business* project of the World Bank tracks changes related to the efficiency and quality of the insolvency framework in different jurisdictions. Importantly, the World Bank identifies the changes based on the DHMS (2008) methodology, which are of direct relevance to the debt enforcement measure used in our study. Moreover, the reforms are clearly divided into two types: those that make it easier to do business by strengthening the insolvency enforcement framework and those that make it more difficult to do business by weakening it. This dataset, therefore, facilitates a detailed investigation of how the change in debt enforcement affects the change in loan contracting.

Specifically, we conduct the analysis using the following DiD models:

$$
\begin{aligned}
Loan\ Term = {} & \gamma_0 + \gamma_1 Reform\_Improvement \times Post + \gamma_2 Ln(Loan\ Size) + \gamma_3 Ln(Loan\ Maturity) \\
& + \gamma_4(Performance\ Pricing) + \gamma_5(Firm\ Size) + \gamma_6 PPE + \gamma_7 LEV + \gamma_8 ROA + \gamma_9 Z\text{-}score \\
& + \gamma_{10}(Cash\ Flow\ Volatility) + \gamma_{11}(GDP\ Growth) + \gamma_{12} Inflation + \gamma_{13} GDP \\
& + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon
\end{aligned}
\tag{2a};
$$

$$Loan\ Term = \gamma_0 + \gamma_1 Reform\_Deterioration \times Post + \gamma_2 Ln(Loan\ Size) + \gamma_3 Ln(Loan\ Maturity)$$
$$+ \gamma_4(Performance\ Pricing) + \gamma_5(Firm\ Size) + \gamma_6 PPE + \gamma_7 LEV + \gamma_8 ROA + \gamma_9 Z\text{-}score$$
$$+ \gamma_{10}(Cash\ Flow\ Volatility) + \gamma_{11}(GDP\ Growth) + \gamma_{12} Inflation + \gamma_{13} GDP$$
$$+ Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon \qquad\qquad (2b).$$

In Model (2a), the variable of interest is *Reform_Improvement×Post*, where *Reform_Improvement* is an indicator that equals 1 for borrowers of the treatment group, i.e., those in a country adopting a reform that improves the efficiency and quality of the insolvency process and 0 otherwise (i.e., the control group includes borrowers in countries without improvement reforms), and *Post* is an indicator that equals 1 for the post-reform period and 0 otherwise. The model uses firm fixed effects to differentiate treatment and control groups, which also control for static, firm-level differences. We also include year fixed effects to identify the pre- and post-reform periods, which also capture flexible time trends that are common to both firms that do and do not experience enforcement reforms. Stated another way, firm and year fixed effects identify the treatment/control and pre/post in a more precise way, and specifying these fixed effects renders it unnecessary to separately include the standalone *Reform_Improvement* and *Post* dummy variables in the regression. Such DiD design with fixed effects has been widely adopted in prior studies (Bertrand and Mullainathan 1999, 2003; Low 2009; Christensen, Floyd, Liu and Maffett 2017). In this specification, γ_1, the coefficient on *Reform_Improvement×Post*, estimates the difference in loan term changes between borrowers in countries that experience insolvency process improving reforms and borrowers in countries that do not experience insolvency process reforms. A negative γ_1 would indicate that an improvement in debt enforcement makes lenders apply less stringent loan terms to borrowers. We exclude from the model country-level controls that are invariant over time and across firms.

In Model (2b), the variable of interest is the interaction of *Reform_Deterioration*, an

indicator that equals 1 for borrowers in a country after it adopts a reform that reduces the efficiency and quality of the insolvency process and 0 otherwise, and *Post*, an indicator for the post-reform period. A positive coefficient on *Reform_Deterioration×Post* would indicate that deterioration in debt enforcement makes lenders apply more stringent loan terms to borrowers.

We report the empirical results of the DiD analysis in Table 3. Panel A considers the shocks of debt enforcement improving reforms. The key independent variable *Reform_Improvement×Post* has significantly negative coefficients in the specifications with loan spread (-0.251 in column 1) and collateral requirement (-0.075 in column 2) as the dependent variable, while its effect is insignificant on the covenant variable (column 3). The estimated coefficients in columns 1 and 2 imply an average reduction in loan cost and in collateral likelihood of 25% and 7.79%, respectively, after a reform is implemented that aims at improving the efficiency and quality of insolvency institutions in a country, relative to other countries without such a reform.

In Panel B, where negative debt enforcement shocks that deteriorate the insolvency practices are used as the DiD setting, the coefficients on *Reform_Deterioration×Post* are significantly positive with values of 0.533 (in column 1) and 0.903 (in column 3) where loan spread and covenants are the dependent variable, respectively. The evidence suggests that after the enforcement friction becomes more severe in a country, borrowers pay 53.3% more in loan spread and are subject to 0.903 more covenants on average, relative to borrowers in other countries without insolvency deteriorating changes. The findings in Panel B corroborate the conclusion in Bae and Goyal (2009) that enforceability mattered more during the time of the Asian Financial Crisis. Our setting, however, is different from that of Bae and Goyal (2009) because there were no material changes of property rights – Bae and Goyal's (2009) measure of

21

enforcement – in any of the affected countries during the crisis period, while we are able to specifically identify the changes in insolvency practices that are closely related to our enforcement measure. Because such changes are largely exogenous to any single borrowing firm, our results alleviate potential concerns about endogeneity that are critical to studying the relation between enforcement and loan terms but have not been addressed in prior research. Overall, the results from the DiD analysis in Table 3 are consistent with and confirm our baseline results.

6. Further evidence

In this section, we provide additional evidence on the relation between contract enforceability and bank loan terms by examining factors that are likely to influence the enforcement-loan relation, the potential real effects of better enforceability on borrower behavior, and the direct effect of insolvency practices on loan syndicate structure.

6.1. Factors that influence the enforcement-loan relation

We examine the following two sets of factors that are likely to influence the impacts of debt enforcement for loan contracting: firm (borrower)-level risk profiles and country-level creditor rights. At the firm level, we use financial distress and borrowers' earnings management to capture fundamental credit risk and information-related agency risk, respectively, both of which potentially affect the likelihood and the severity of the insolvency problem. At the country level, we examine the strength of creditor rights because enforceability is only meaningful when creditors' rights are recognized by the law.

We use the following empirical framework to assess the influence of each of these factors on the enforcement-loan relation:

$Loan\ Term = \delta_0 + \delta_1(Debt\ Enforcement\ Index) + \delta_2 Condition$
$\qquad + \delta_3(Debt\ Enforcement\ Index) \times Condition + Controls$

$$+ \textit{Industry Fixed Effects} + \textit{Year Fixed Effects} + \varepsilon \hspace{3cm} (3),$$

where *Condition* refers to one of the firm-risk or creditor rights variables. Other control variables are the same as in Model (1). Our interest is in the coefficient on the interaction term, δ_3, which indicates how the conditioning variable influences the impact of debt enforcement on bank loan terms.

We report the results in Table 4. Panel A shows how a firm's fundamental distress risk affects the relation between debt enforcement and loan contracting. More distressed borrowers have a higher likelihood of insolvency and hence higher reliance on the enforcement system to resolve the problem, which implies that debt enforcement efficiency is more important. The results are generally consistent with this conjecture. Using the probability of bankruptcy estimated via a hazard model based on Shumway (2001) to measure *Financial Distress*, we find that its interaction with *Debt Enforcement Index* has significantly negative coefficients for all three loan contracting terms, indicating a stronger impact of enforcement on bank loan pricing (i.e., better enforcement lowers loan spread), collateral requirement (i.e., better enforcement reduces collateral likelihood), and covenant provision (i.e., better enforcement decreases the number of covenants) when borrower financial distress is more severe.

Panel B reports how a firm's informational agency risk as proxied by earnings management (measured by abnormal accruals estimated using a modified Jones (1991) model) affects the relation between debt enforcement and loan contracting. The interaction term between *Debt Enforcement Index* and *Earnings Management* has negative and statistically significant coefficients in column 1 and column 2, suggesting that firms' engagement in more earnings management, which reflects less informational transparency and more agency problems, leads to debt enforcement friction being accompanied by larger increases in loan spread and collateral

requirement. Overall, this evidence, together with that in Panel A, reveals that firm-specific risk factors moderate the relation between debt enforcement and bank loan terms.

In Panel C, we examine how the strength of creditor rights influences the debt enforcement-bank loan contracting relationship. Creditor rights and their enforceability are integrated parts of the overall framework of societal order, but they are also conceptually distinctive. In fact, some countries (e.g., Indonesia) score high on creditor rights but low on enforcement (refer to Bae and Goyal (2009) for a more thorough discussion); in our sample, the correlation between *Creditor Rights* and *Debt Enforcement Index* is merely 0.376. In a nutshell, the insolvency infrastructure actually enforces the rights of creditors codified in law. Without well-established creditor rights, enforcement of these rights is meaningless. We thus expect the observed negative relations between debt enforcement and spread-, collateral-, and covenant-related loan terms to be more negative for borrowers in countries with stronger creditor rights. In other words, we expect a negative coefficient on the interaction between debt enforcement index and strength of creditor rights. To better differentiate between strong and weak creditor rights, we construct an indictor variable *Strong Creditor Rights* that equals 1 for countries with creditor rights scored higher than the sample median and 0 otherwise. Using *Strong Creditor Rights* as the *Condition* variable in Model (3), we document results that support our prediction: the estimates of δ_3 in all the three columns are negative and highly significant, both statistically and economically.[6] These findings imply that stronger debt enforcement further lowers the loan funding burden in an economy with stronger creditor rights protection. This evidence echoes Bae and Goyal (2009) who find that creditor rights and property rights reinforce each other.

6.2. The real effects of debt enforcement on debtor behavior

The findings of a negative relation between debt enforcement and loan terms imply that

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[6] We find consistent results when we use *Creditor Rights* as the conditioning variable.

(i) at the individual level, if debt is strictly enforced, it is costly for a borrower to violate its credit obligations, and (ii) at the aggregate level, if stronger bank loan enforcement leads to cheaper funding with less stringent non-price constraints, then debt enforcement may influence borrowers' selection of funding sources in favor of bank loans. These two implications relate to the real effects of debt enforcement on the behavior of borrowing firms. We use Models (4a) and (4b) below to test these conjectures:

$$\textit{Covenant Violation} = \lambda_0 + \lambda_1(\textit{Debt Enforcement Index}) + \textit{Controls} + \textit{Industry Fixed Effects}$$
$$+ \textit{Year Fixed Effects} + \varepsilon \qquad (4a),$$

$$\textit{Debt Choice} = \lambda_0 + \lambda_1(\textit{Debt Enforcement Index}) + \textit{Controls} + \textit{Industry Fixed Effects}$$
$$+ \textit{Year Fixed Effects} + \varepsilon \qquad (4b).$$

In Model (4a), we examine whether debt enforcement is negatively related to the likelihood that borrowers violate their obligations, i.e., whether it reduces borrowers' covenant violation. The dependent variable *Covenant Violation* is an indicator for the ex post occurrence of covenant violation that equals 1 if the borrower violates a covenant and 0 otherwise.

Table 5, Panel A reports the estimation results of Model (4a), which show that debt enforcement is negatively associated with the likelihood of covenant violation (coefficient on *Debt Enforcement Index* = -6.138, *z*-statistic = -5.99). These results imply that if *Debt Enforcement Index* is reduced by one standard deviation, the odds of covenant violation will increase by 358%, an effect that is economically significant. Therefore, effective debt enforcement does appear to change borrowers' behavior. Specifically, it helps constrain borrowers' negative actions and increase the likelihood that they observe debt covenants. This is good news for creditors because the actual incidence of potential conflicts due to covenant violation can be largely reduced, which greatly attenuates banks' concern about the relevant risk therein.

In Model (4b), we assess whether the effect of debt enforcement on individual loans influences the debt choice of borrowers by leading to a larger expansion of the bank loan market than of other private and public debt markets. Following the literature (Diamond 1991; Lin, Ma, Malatesta, and Xuan 2013; Li, Ng, and Saffar 2019), we construct the following two variables using data from Capital IQ: *Bank Debt Ratio*, the ratio of bank loans to total public and private debt, and *Public Debt Ratio*, the ratio of public debt to total public and private debt. We use these proxies as the dependent variable *Debt Choice*. We exclude loan-level variables from Model (4b) because they are not relevant for macro levels of debt.

Panel B of Table 5 reports the results of Model (4b). Column 1 shows that the ratio of bank loans to total corporate debt increases with debt enforcement and column 2 shows that the ratio of public debt to total corporate debt is negatively associated with debt enforcement. Since bank loans are part of private debt, the result in column 2 is consistent with the result in column 1 in suggesting that bank loans and private debt become more attractive to borrowers if their debts can be enforced more efficiently. This evidence is in line with our main finding that debt enforcement alleviates the concerns of banks and therefore reduces borrowing costs and other loan constraints; it also suggests that the actual insolvency-related debt enforcement has different impacts on different types of lending contracts.

6.3. Debt enforcement and lender syndicate structure

We next explore the lender-side impact of debt enforcement by examining loan syndicate structure. Syndicates and loan ownership are important subjects of economic studies of laws and institutions (Qian and Strahan 2007), and debt enforcement is a critical concern when determining loan syndicate structures. Since in an environment with substantial debt enforcement friction, monitoring and re-contracting tend to be more difficult, the information asymmetry

problem between borrowers and lenders is likely to attract fewer lenders in a loan syndicate (Dennis and Mullineaux 2000; Sufi 2007; Bae and Goyal 2009; Kim, Song, and Zhang 2011). The literature, however, still lacks direct evidence on the relation between debt enforcement and loan syndication.[7] In this subsection, we investigate how debt enforcement changes the syndicate structure of lenders, using Model (5) below:

Syndicate Structure = θ_0 + θ_1(Debt Enforcement Index) + Controls + Industry Fixed Effects
+ Year Fixed Effects + ε   (5),

where *Syndicate Structure* refers to the structure of a particular syndicated loan. We use the number of lenders (*Number of Lenders*) and a funding share-based Herfindahl index (*Loan HHI*) to measure the concentration level of a lending syndicate. The results are reported in Table 6. Column 1 shows that debt enforcement index is significantly positively associated with the number of lenders in the syndicate. Column 2 shows that the loan share-based Herfindahl index, which is larger for more concentrated syndicates, is significantly negatively related to debt enforcement index, suggesting that more banks are willing to lend when there are fewer concerns about the friction of potential insolvency. These results are generally consistent with the arguments about loan structure and monitoring effort in the bank loan literature.

7. Robustness

7.1. Control for the simultaneity of loan terms

Prior literature shows that loan terms can be determined simultaneously. To address this issue and verify the robustness of our results, we follow Costello and Wittenberg-Moerman (2011) to construct the following models:

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[7] Bae and Goyal (2009) assess syndicate concentrations in different property rights groups without controlling for other variables. Consequently, their finding can at best be considered as indirect evidence.

Ln(Spread) = β₀ + β₁(Debt Enforcement Index) + β₂(Prior Loan Spread) + Controls
$\qquad$ *+ Industry Fixed Effects + Year Fixed Effects + ε* $\qquad$ (6a),

Covenants = β₀ + β₁(Debt Enforcement Index) + β₂(Syndicated Loan) + Controls
$\qquad$ *+ Industry Fixed Effects + Year Fixed Effects + ε* $\qquad$ (6b).

In Model (6a), we add prior loan spread (in logarithmic form), *Prior Loan Spread*, to the baseline model with *Ln(Spread)* as the dependent variable, because existing literature (Costello and Wittenberg-Moerman 2011; Ivashina and Sun 2011) points out that the spread of a firm's previous loan is associated with its current loan spread but not likely to relate to non-price terms. In Model (6b), when examining the relation between debt enforcement and number of loan covenants, we further control for an indicator variable for syndicated loan, *Syndicated Loan*, because prior studies suggest that syndicated loans are more likely to affect the number of covenants but less likely to inflence loan spread. We estimate Models (6a) and (6b) simultaneously and report the results in Panel A of Table 7. We find that the relations between debt enforcement and loan spread and between debt enforcement and covenants still hold after controlling for the simultaneity of loan terms.

7.2. Including additional characteristics in the debt enforcement index construction

When adopting the DHMS (2008) survey informaiton to construct the debt enforcement index, we follow Favara et al. (2017) and include 16 individual indicators. DHMS (2008) actually report a total of 24 indicators, but eight of them have no clear implications for the difficulty of debt enforcement (details are provided in the Appendix). We therefore exclude these eight indicators from our debt enforcement measure used in the main tests. As a robusness check, we extend the components of the debt enforcement construction by including all 24 DHMS (2008) indicators. As shown in Panel B of Table 7, in the same framework of Model (1), the new measure of *Extended Debt Enforcement Index* continues to have significantly negative relations

with the three loan terms – spread, colleteral, and covenants.

7.3. Regressions without weighted adjustment

As shown in Panel A of Table 1, loans issued to U.S. borrowers dominate our international sample by comprising more than three-fourth (32,478 out of 43,239) of the total loan observations. Some other countries such as Egypt and Israel have less than 10 loan observations each. To address this uneven distribution issue, we adopt the weighted regression scheme in the main tests. To show that our findings are not driven by this weighting approach, we re-estimate the baseline model using unweighted regressions and report the results in Panel C of Table 7. Without country-observation weighting, the impact of debt enforecemnt on loan spread becomes stronger and the impacts on colleteral and covenants become weaker. Nevertheless, all the basic results hold and higher debt enforcement index remains signficantly and negatively related to these loan terms.

7.4. Excluding loan observations from the U.S.

As an alternative way to address the problem of unbalanced cross-country observations, we re-estimate our baseline model after dropping sample loan facilities initiated in the U.S. Results reported in Panel D show that our baseline results remain robust; more interestingly, the effects of poor debt enforcement on stringent loan terms become more salient with a larger coefficient (in magnitude) on *Debt Enforcement Index* in Panel D, Table 7 than in the baseline results in Table 2, irrespective of the dependent loan term variables used. A potential reason is that, in the non-U.S. sample, the variation of debt enforcement strength becomes larger, inducing stronger statistical power.

7.5. Excluding sample years distant from the DHMS-survey period

The individual indicators about insolvency practices reported by DHMS (2008) are

compiled based on the information in 2005. In the main tests, we follow the literature (Favara et al. 2012; Favara et al. 2017) to impute them to all the sample years from 1994 to 2009. This raises a concern that, for the early years distant from 2005, the DHMS-survey data may not accurately reflect the actual insolvency resolution practices. To ease this concern, we exclude the years of 1994–2000, and only keep the four years before and the four years after 2005, i.e., 2001–2009, during which the DHMS-survey information is likely to be more relevant to the actual situation of insolvency institutions. Using this truncated sample period, we re-estimate the baseline regressions. Panel E shows that, although the impacts of debt enforcement on the three key loan terms become weaker relative to the baseline results, the main findings are qualitatively unchanged, i.e., the enforcement index is still significantly and negatively associated with loan spread, colleteral requirement likelihood, and number of total covenants.

7.6. Clustering by country

Our key independent variable of debt enforcement is a country-level variable, and within each country, the loan and firm variables could be related to each other and show similar traits. This potential clustering could induce bias in the standard error estimates and incorrect statistical references. To address this concern, we use adjusted standard errors clustered by country in the baseline regressions. The results after this adjustment are reported in Panel F and are consistent with the main results.

8. Conclusion

The enforcement of debt contracts has multi facets, of which the actual practices of insolvency institutions play an important role. A detailed narrative of these practices is provided by DHMS (2008) who offer a unique debt enforcement measurement scheme that is more

insolvency-focused and more easily compared across different jurisdictions. This enforceability metric supplements the macro-scope measures based on LLSV (1998) and is especially pertinent to examining individual contracts. In this study, we examine how debt enforcement affects bank contracting terms at the individual loan level, using a direct, insolvency practice-based debt enforcement measure derived from DHMS (2008), after controlling for the indirect, rule of law-based enforcement proxy from LLSV (1998). We find that the DHMS-metric supplements the LLSV-measure in loan contracting, and an improvement in the DHMS enforcement scheme is associated with lower loan spread, lower collateral requirement likelihood, and fewer covenant constraints.

We use a DiD setting to consider the exogenous shocks to debt enforcement and find that, after reforms that strengthen (weaken) the efficiency and quality of enforcement, the affected firms face better (worse) loan terms than firms that do not experience such reforms. We also find that lower fundamental distress risk and informational risk of a firm and weaker creditor rights protection mitigate the importance of debt enforcement in influencing loan terms. Better debt enforcement exhibits real effects by reducing covenant violation and changing borrowers' debt choice in favor of bank loans. Banks form less concentrated syndicates under a more efficient enforcement condition, consistent with lower monitoring and re-contracting costs in such an environment.

Overall, this study provides supplementary evidence and new insights into the influences of debt enforcement on bank loan contracting. We document the difference between the DHMS (2008) enforcement framework and the rule of law measurement. Our research highlights the importance of matching the feature of the issues to be addressed with the feature of the explanatory factors, which appears to be especially important for debt enforcement due to the

31

difficulty in understanding, interpreting, and assessing it. Prior literature involves a kaleidoscope of debt enforcement measures. Although not completely ad hoc, few studies specifically justify the appropriateness of adopting a particular source of data. Given that '(t)he data used in each study have their advantages and problems,' what is important 'is the consistency of results across both data collection procedures and spheres of activity (to be examined)' (La Porta, Lopez-de-Silanes, and Shleifer 2008). We believe that our effort in this study, by adopting a refined approach to debt enforcement research with regard to the choice of measurement schemes, helps researchers realize the importance of such 'consistency.'

Appendix: Variable definitions and constructions

Variable name	Definition and construction
Debt Enforcement Variables	
Debt Enforcement Index	The average of 16 binary indicators (0 if no, 1 if yes) from DHMS (2008) that are likely to strengthen the enforcement of debt contracts in insolvency, mainly via reducing friction against renegotiations. The indicator variables are (when a variable *v* decreases debt enforcement, then take 1 - *v*): 1. Out of court seizure and sale: Secured creditors may seize and sell their collateral without court approval; 2. No judge for enforcement: Secured creditors may enforce their security either in or out of court; 3. Floating charge: The entire business's assets can be pledged as collateral; 4. Case proceeds on appeal of insolvency: An insolvency order cannot be appealed at all; 5. Case proceeds on appeal of liquidation: A liquidation order cannot be appealed at all; 6. Case proceeds on claim amount dispute: An insolvency case is suspended until the resolution of the appeal; 7. Reorganization attempt required: The firm may enter liquidation without attempting reorganization; 8. Automatic trigger for liquidation: An automatic trigger mechanism can initiate insolvency; 9. Automatic stay on enforcement: Secured creditors may enforce their security upon commencement of the insolvency proceedings; 10. Automatic stay on lawsuits: Secured creditors may enforce their security in lawsuits; 11. Firm must cease operating: A defaulting firm must cease operations upon commencement of insolvency proceedings; 12. Management remains: Management does not remain in control of decisions during insolvency proceedings; 13. Creditor approves administrator: Secured creditors have the right to approve the appointment of the insolvency administrator; 14. Creditor dismisses administrator: Secured creditors may dismiss the insolvency administrator; 15. Creditor vote directly: Secured creditors vote directly on the reorganization plan; 16. Proof of reorganization prospects: Firm must submit proof of reorganization prospects before reorganization proceedings may commence. Sources: DHMS (2008); Favara et al. (2017).
Extended Debt Enforcement Index	The average of 24 binary indicators (0 if no, 1 if yes) from the DHMS (2008) survey. In addition to the 16 indicators compiled in the baseline *Debt Enforcement Index*, the eight remaining variables are: 1. Statutory time limits on appeals: Time limits on appeals are probably good for creditors to enforce their claim; 2. Restrictions on dismissals: The firm is not restricted from dismissing employees upon initiation of insolvency proceedings; 3. Contracts may be rescinded: Suppliers and customers may rescind contracts without penalty upon initiation of insolvency proceedings; 4. Specialized court: The authority with jurisdiction is either a specialized bankruptcy court or a specialized bankruptcy administrative authority; 5. Administrator paid on market value: The insolvency administrator is remunerated based on the market value of the insolvency estate; 6. Same judge for claim amount dispute: An appeal of the amount of the claim is handled by the same judge supervising the insolvency case; 7. Same judge for appeal of insolvency: An appeal of the initiation of the insolvency case is handled by the same judge supervising the insolvency case; 8. Same judge for appeal of liquidation: An appeal of the order to liquidate is handled by the same judge supervising the insolvency case. Sources: DHMS (2008); Favara et al. (2017).
Bank Loan Variables	
Spread	The amount a borrower pays in bps over LIBOR for each dollar drawn down. Source: Deal Scan.
Ln(Spread)	Natural logarithm of the amount a borrower pays in bps over LIBOR for each dollar drawn down. Source: Deal Scan.
Secured	Indictor variable that equals 1 if the loan involves collateral and 0 otherwise. Source: Deal Scan.
Covenants	Number of total covenants, including general and financial covenants. Source: Deal Scan.

Loan Size	The loan amount of the facility in million US$. Source: Deal Scan.
Ln(Loan Size)	Natural logarithm of the loan amount of the facility in million US$. Source: Deal Scan.
Loan Maturity	The number of the months to maturity. Source: Deal Scan.
Ln(Loan Maturity)	Natural logarithm of the number of the months to maturity. Source: Deal Scan.
Performance Pricing	Indictor variable that equals 1 if the loan includes performance pricing provisions and 0 otherwise. Source: Deal Scan.

Firm-Level Variables

Firm Size	Natural logarithm of total assets in million US$. Source: Compustat Global.
PPE	Gross property, plant and equipment scaled by total assets. Source: Compustat Global.
LEV	Current debt and long-term debt scaled by total assets. Source: Compustat Global.
ROA	Pretax income scaled by total assets. Source: Compustat Global.
Z-score	Modified Altman (1968, 2013) Z-score = ((0.3×Net Income + Sales + 1.4×Retained Earnings + 1.2×Working Capital) / Total Assets) + (0.6×Shares Outstanding×Stock Price / Total Liabilities). Source: Compustat Global.
Cash Flow Volatility	The standard deviation of operating cash flows divided by total assets over the current and past four fiscal years. Source: Compustat Global.

Country-Level Variables (other than debt enforcement measures)

GDP Growth	GDP growth rate, in constant 2005 US$. Sources: World Development Indicator, World Bank.
Inflation	Inflation rate in percentage. Sources: World Development Indicator, World Bank.
GDP	Natural logarithm of GDP per capita, in constant 2005 US$. Sources: World Development Indicator, World Bank.
Common Law	Indicator variable that equals 1 if the legal origin of a country is common law and 0 otherwise. Source: LLSV (1998).
Rule of Law	The assessment of the law and order tradition in a country, scaling from 0 to 10. Higher rule of law scores mean stronger tradition for law and order. Sources: LLSV (1998), Djankov, McLiesh, and Shleifer (2007).
Bank Environment	The first factor of principal component analysis (PCA) of the following four variables: total assets of development banks as share of GDP (Devta), total assets of bank-like institutions as share of GDP (Bia), ability of banks to engage in non-banking activities (Restrict), and share of the assets of three largest banks in total banking assets (Conc). Source: Beck et al. (2000).
Creditor Rights	Creditor rights index ranging from 0 to 4, with higher values indicating greater creditor rights. Source: LLSV (1998).

Variables in DiD Tests

Reform_Improvement	Indicator variable that equals 1 for borrowers in a country adopting a reform that improves the efficiency and quality of the insolvency process and 0 otherwise. Source: World Bank.
Reform_Deterioration	Indicator variable that equals 1 for borrowers in a country adopting a reform that reduces the efficiency and quality of the insolvency process and 0 otherwise. Source: World Bank.
Post	Indicator variable that equals 1 for the period after an insolvency improving or deteriorating reform and 0 otherwise. Source: World Bank.

Variables in Cross-Sectional Tests

Financial Distress	The probability of bankruptcy estimated from the Hazard model based on Shumway (2001). Source: Compustat Global.

Earnings Management	Abnormal accruals estimated using a modified Jones (1991) model following DeFond and Jiambalvo (1994) and Dechow, Sloan, and Sweeney (1995). Source: Compustat Global.
Strong Creditor Rights	Indicator variable that equals 1 if the creditor rights index is larger than sample median and 0 otherwise. Source: LLSV (1998).

Variables in Real Effect Tests

Covenant Violation	Indicator variable that equals 1 if the current ratio is less than the minimum current ratio or the debt-to-EBITDA ratio is greater than the maximum debt-to-EBITDA ratio allowed by the loan contract and 0 otherwise. Source: Deal Scan.
Bank Debt Ratio	Bank debt scaled by total debt. Bank debt is the sum of term loans and revolving credit. Total debt is the sum of all types of debts, including commercial paper, revolving credit, term loans, subordinated bonds and notes, senior bonds and notes, capital leases, and other debt. Source: Capital IQ.
Public Debt Ratio	Public debt scaled by total debt. Public debt is the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper. Total debt is defined as above. Source: Capital IQ.

Variables in Syndicate Structure Tests

Number of Lenders	Number of lenders of a syndicated loan. Source: Deal Scan.
Loan HHI	Herfindahl index based on each lender's allocation in a syndicated loan. Source: Deal Scan.

Variables in Robustness Tests

Prior Loan Spread	The spread (in logarithm) of the loan issued to the borrower prior to the current loan. Source: Deal Scan.
Syndicated Loan	Indicator variable that equals 1 for syndicated loan and 0 otherwise. Source: Deal Scan.

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Table 1. Sample distribution and summary statistics

Panel A reports cross-country distributions of country-level variables, and Panels B to D report full-sample summary statistics of loan-, firm-, and country-level variables used in the main tests. Details about variable definitions are provided in the Appendix.

Panel A: Cross-country distributions

Country/Region	Debt Enforcement Index	GDP Growth	Inflation	GDP	Common Law	Rule of Law	Bank Environment	Creditor Rights	Frequency
Argentina	0.31	0.00	0.06	8.62	0.00	5.35	0.68	1.00	66
Australia	1.00	0.03	0.04	10.43	1.00	10.00	0.60	3.00	715
Brazil	0.42	0.04	0.13	8.49	1.00	6.32	0.94	1.00	68
Canada	0.67	0.02	0.03	10.47	1.00	10.00	0.89	1.00	267
Chile	0.00	0.04	0.05	8.86	0.00	7.02	1.04	2.00	90
Egypt	0.50	0.05	0.08	7.21	0.00	4.17	0.68	2.00	8
Finland	0.69	0.02	0.02	10.50	0.00	10.00	0.25	1.00	40
France	0.23	0.01	0.02	10.48	0.00	8.98	0.57	0.00	459
Germany	0.46	0.01	0.01	10.48	0.00	9.23	0.48	3.00	254
Hong Kong	1.00	0.05	0.01	10.27	1.00	8.22	0.31	4.00	269
Indonesia	0.50	0.06	0.13	7.21	0.00	3.98	1.21	2.00	23
Israel	0.56	0.05	0.04	9.89	1.00	4.82	-0.02	3.00	5
Italy	0.23	0.00	0.02	10.38	0.00	8.33	0.83	2.00	171
Japan	0.54	0.00	-0.01	10.48	0.00	8.98	2.43	2.00	4,310
Malaysia	0.58	0.05	0.06	8.66	1.00	6.78	0.46	3.00	92
Mexico	0.27	0.03	0.09	8.94	0.00	5.35	0.94	0.00	111
Netherlands	0.25	0.03	0.02	10.67	0.00	10.00	0.41	3.00	249
New Zealand	1.00	0.02	0.03	10.22	1.00	10.00	0.23	4.00	95
Norway	0.39	0.02	0.05	11.08	0.00	10.00	0.58	2.00	96
Peru	0.54	0.03	0.05	7.78	0.00	2.50	0.88	0.00	10
Philippines	0.54	0.04	0.06	6.97	0.00	2.73	0.53	1.00	164
Singapore	1.00	0.05	0.00	10.16	1.00	8.57	1.08	3.00	164
South Africa	0.46	0.03	0.08	8.52	1.00	4.42	0.37	3.00	55
South Korea	0.54	0.05	0.02	9.75	0.00	5.35	1.17	3.00	760
Spain	0.46	0.02	0.03	10.17	0.00	7.80	0.54	2.00	226
Sweden	0.67	0.03	0.02	10.62	0.00	10.00	0.75	1.00	179
Switzerland	0.54	0.03	0.01	10.93	0.00	10.00	0.10	1.00	87
Taiwan	0.54	0.03	0.00	9.71	0.00	8.52	0.01	2.00	722
Thailand	0.69	0.03	0.04	7.94	1.00	6.25	0.74	2.00	16
Turkey	0.69	0.03	0.28	8.83	0.00	5.18	0.77	2.00	18
U.S.	0.54	0.03	0.02	10.60	1.00	10.00	1.41	1.00	32,478
U.K.	1.00	0.02	0.03	10.54	1.00	8.57	0.19	4.00	972

Panel B: Summary statistics of bank loan variables

Variable	Mean	Std.	P25	Median	P75	No. of Countries	No. of Obs.
Spread	175.600	121.000	75.000	150.000	250.000	32	27,318
Ln(Spread)	4.879	0.849	4.331	5.017	5.525	32	27,318
Secured	0.431	0.495	0.000	0.000	1.000	32	43,239
Covenants	3.565	4.198	0.000	2.000	7.000	32	43,239
Loan Size	266.207	504.373	15.000	85.000	270.000	32	43,239
Ln(Loan Size)	5.076	2.109	3.714	5.017	6.217	32	43,239
Loan Maturity	47.990	33.260	24.000	48.000	60.000	32	43,239
Ln(Loan Maturity)	3.660	0.714	3.219	3.892	4.111	32	43,239
Performance Pricing	0.336	0.472	0.000	0.000	1.000	32	43,239

Panel C: Summary statistics of firm-level variables

Variable	Mean	Std.	P25	Median	P75	No. of Countries	No. of Obs.
Firm Size	7.438	2.802	5.464	7.080	9.127	32	43,239
PPE	0.603	0.390	0.281	0.552	0.873	32	43,239
LEV	0.532	0.233	0.385	0.513	0.654	32	43,239
ROA	0.033	0.133	0.006	0.047	0.093	32	43,239
Z-score	2.613	2.615	1.097	2.006	3.237	32	43,239
Cash Flow Volatility	0.056	0.058	0.022	0.038	0.067	32	43,239

Panel D: Summary statistics of country-level variables

Variable	Mean	Std.	P25	Median	P75	No. of Countries	No. of Obs.
Debt Enforcement Index	0.556	0.248	0.436	0.538	0.679	32	32
GDP Growth	0.028	0.031	0.017	0.032	0.047	32	287
Inflation	0.044	0.084	0.010	0.028	0.054	32	287
GDP	9.625	1.137	8.758	10.180	10.490	32	287
Common Law	0.375	0.492	0.000	0.000	1.000	32	32
Rule of Law	7.419	2.402	5.350	8.275	10.000	32	32
Bank Environment	0.688	0.476	0.389	0.636	0.914	32	32
Creditor Rights	2.000	1.136	1.000	2.000	3.000	32	32

Table 2. Relation between debt enforcement and loan terms: Baseline results
The dependent variables *Ln(Spread)*, *Secured*, and *Covenants* refer to bank loan contracting terms that indicate the cost of loan, the existence of collateral provision, and the number of total covenants, respectively. The key independent variable is the DHMS-based debt enforcement index. Loan-, firm-, and country-level variables are controlled as in Model (1). Details about variable definitions are provided in the Appendix. Columns 1, 2, and 3 show results from OLS, Logit, and Poisson regressions, respectively. The regression coefficients for each independent variable are reported, followed by *t*- and *z*-statistics (in the parentheses) based on heteroskedasticity robust standard errors. For brevity, the coefficients for the industry and year dummies are not reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	Ln(Spread)	*Secured*	*Covenants*
Debt Enforcement Index	**-0.518***	**-7.068***	**-6.589***
	(-2.95)	**(-18.79)**	**(-20.11)**
Ln(Loan Size)	-0.123***	-0.237***	0.032***
	(-28.12)	(-15.72)	(6.52)
Ln(Loan Maturity)	0.254***	0.328***	0.178***
	(36.41)	(15.52)	(21.99)
Performance Pricing	-0.061***	0.897***	0.813***
	(-7.88)	(31.60)	(73.06)
Firm Size	-0.140***	-0.406***	-0.118***
	(-35.66)	(-29.89)	(-26.87)
PPE	-0.257***	-0.482***	-0.110***
	(-20.48)	(-10.41)	(-7.76)
LEV	0.503***	1.082***	0.330***
	(27.59)	(14.91)	(16.82)
ROA	-1.101***	-2.856***	-0.102***
	(-26.03)	(-17.58)	(-2.94)
Z-score	-0.026***	-0.048***	-0.008***
	(-13.25)	(-7.54)	(-3.88)
Cash Flow Volatility	0.439***	1.979***	-0.802***
	(5.00)	(5.99)	(-9.12)
GDP Growth	7.436***	13.284***	3.338
	(5.67)	(3.76)	(1.12)
Inflation	0.641	-2.033	-14.620***
	(1.03)	(-1.23)	(-6.64)
GDP	0.307***	0.881***	-0.368***
	(4.06)	(5.99)	(-2.82)
Common Law	0.292***	3.082***	3.878***
	(4.20)	(18.79)	(23.44)
Rule of Law	-0.186***	-0.658***	0.252***
	(-6.48)	(-9.63)	(4.01)
Bank Environment	0.062	-1.284***	-1.164***
	(1.04)	(-15.03)	(-10.92)
Creditor Rights	-0.069**	-0.142**	-0.074*
	(-2.37)	(-2.34)	(-1.80)
Intercept	3.583***	1.248	2.787***
	(6.64)	(1.11)	(3.03)
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.508	0.257	0.359

Table 3. Relation between debt enforcement and loan terms: DiD analysis
The dependent variables *Ln(Spread)*, *Secured*, and *Covenants* refer to bank loan contracting terms that indicate the cost of loan, the existence of collateral provision, and the number of total covenants, respectively. In Panel A, *Reform_Improvement* is an indicator coded as 1 for borrowers in a country adopting a reform that improves the efficiency and quality of the insolvency process and 0 otherwise. *Post* is a dummy variable that equals 1 for the period after an insolvency improving reform and 0 otherwise. In Panel B, *Reform_Deterioration* is an indicator coded as 1 for borrowers in a country adopting a reform that reduces the efficiency and quality of the insolvency process and 0 otherwise. *Post* is a dummy variable that equals 1 for the period after an insolvency deteriorating reform and 0 otherwise. Loan-, firm-, and time-varying country-level variables are controlled as in Models (2a) and (2b), as well as firm and year fixed effects. Details about variable definitions are provided in the Appendix. Columns 1, 2, and 3 show results from OLS, Logit, and Poisson regressions, respectively. The regression coefficients for each independent variable are reported, followed by *t*- and *z*-statistics (in the parentheses) based on heteroskedasticity robust standard errors. For brevity, the coefficients for the firm and year dummies are not reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Inclined to better enforcement			
	(1)	(2)	(3)
	Ln(Spread)	Secured	Covenants
Reform_Improvement×Post	**-0.251***	**-0.075***	**0.129**
	(-3.36)	**(-4.58)**	**(1.00)**
Ln(Loan Size)	-0.084***	-0.020***	0.044***
	(-23.44)	(-9.99)	(2.89)
Ln(Loan Maturity)	0.105***	0.015***	0.085***
	(20.06)	(4.70)	(3.46)
Performance Pricing	-0.064***	0.182***	3.559***
	(-9.53)	(38.70)	(96.76)
Firm Size	-0.118***	-0.059***	-0.112***
	(-16.77)	(-13.11)	(-3.16)
PPE	-0.172***	-0.0160	0.323***
	(-7.63)	(-1.06)	(2.78)
LEV	0.161***	0.080***	0.241*
	(6.74)	(4.95)	(1.89)
ROA	-0.577***	-0.238***	-0.244
	(-15.75)	(-10.31)	(-1.35)
Z-score	-0.023***	-0.006***	-0.050***
	(-10.08)	(-4.10)	(-4.25)
Cash Flow Volatility	0.711***	0.174**	0.137
	(6.31)	(2.49)	(0.25)
GDP Growth	-0.792	0.332	0.0140
	(-0.87)	(1.26)	(0.01)
Inflation	4.402***	0.861***	0.614
	(6.27)	(3.82)	(0.35)
GDP	0.0590	0.071***	0.265**
	(1.61)	(4.83)	(2.30)
Intercept	4.808***	-0.0470	-2.648**
	(12.37)	(-0.29)	(-2.12)
Firm & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.425	0.284	0.377

Panel B: Inclined to worse enforcement

	(1)	(2)	(3)
	Ln(Spread)	*Secured*	*Covenants*
Reform_Deterioration×Post	**0.533*** **	**-0.008**	**0.903** **
	(2.60)	**(-0.13)**	**(2.00)**
Ln(Loan Size)	-0.087***	-0.019***	0.043***
	(-23.20)	(-9.65)	(2.77)
Ln(Loan Maturity)	0.106***	0.015***	0.093***
	(19.37)	(4.76)	(3.75)
Performance Pricing	-0.072***	0.182***	3.575***
	(-10.31)	(38.70)	(96.21)
Firm Size	-0.121***	-0.059***	-0.115***
	(-16.50)	(-12.96)	(-3.21)
PPE	-0.169***	-0.0150	0.321***
	(-7.19)	(-1.00)	(2.73)
LEV	0.178***	0.082***	0.254**
	(7.11)	(5.01)	(1.97)
ROA	-0.634***	-0.238***	-0.232
	(-16.59)	(-10.32)	(-1.27)
Z-score	-0.023***	-0.006***	-0.051***
	(-9.58)	(-4.10)	(-4.32)
Cash Flow Volatility	0.723***	0.173**	0.0840
	(6.16)	(2.47)	(0.15)
GDP Growth	-0.521	0.307	0.167
	(-0.55)	(1.17)	(0.08)
Inflation	4.232***	0.993***	-0.0170
	(5.70)	(4.41)	(-0.01)
GDP	0.098**	0.073***	0.338***
	(2.50)	(4.75)	(2.77)
Intercept	4.401***	-0.0830	-3.386***
	(10.52)	(-0.50)	(-2.58)
Firm & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.425	0.279	0.378

Table 4. Relation between debt enforcement and loan terms: Cross-sectional tests

The dependent variables *Ln(Spread)*, *Secured*, and *Covenants* refer to bank loan contracting terms that indicate the cost of loan, the existence of collateral provision, and the number of total covenants, respectively. The key independent variables are the DHMS-based debt enforcement index, a firm distress measure (in Panel A) or an earnings measurement measure (in Panel B) or a strong creditor rights indicator (in Panel C), and their interaction term. Loan-, firm-, and country-level variables are controlled as in Model (3), and the ordinal values of creditor rights are excluded in Panel C. Details about variable definitions are provided in the Appendix. Columns 1, 2, and 3 show results from OLS, Logit, and Poisson regressions, respectively. The regression coefficients for each independent variable are reported, followed by *t*- and *z*-statistics (in the parentheses) based on heteroskedasticity robust standard errors. For brevity, the coefficients for the industry and year dummies are not reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Financial distress

	(1) Ln(Spread)	(2) Secured	(3) Covenants
Debt Enforcement Index	-0.154	-6.798***	-6.384***
	(-0.82)	(-17.26)	(-18.22)
Financial Distress	1.887***	1.403***	1.032*
	(8.09)	(2.62)	(1.83)
Debt Enforcement Index×Financial Distress	**-2.818***	**-1.921**	**-1.959*
	(-6.68)	**(-2.04)**	**(-1.88)**
Ln(Loan Size)	-0.121***	-0.235***	0.032***
	(-27.76)	(-15.60)	(6.52)
Ln(Loan Maturity)	0.255***	0.331***	0.177***
	(36.73)	(15.62)	(21.95)
Performance Pricing	-0.055***	0.902***	0.813***
	(-7.13)	(31.75)	(72.85)
Firm Size	-0.139***	-0.406***	-0.118***
	(-35.70)	(-29.90)	(-26.88)
PPE	0.484***	1.063***	0.331***
	(26.32)	(14.61)	(16.84)
LEV	-1.004***	-2.761***	-0.111***
	(-23.77)	(-17.04)	(-3.08)
ROA	-0.258***	-0.482***	-0.110***
	(-20.57)	(-10.40)	(-7.76)
Z-score	-0.026***	-0.048***	-0.008***
	(-13.12)	(-7.51)	(-3.90)
Cash Flow Volatility	0.400***	1.953***	-0.795***
	(4.51)	(5.91)	(-9.02)
GDP Growth	7.029***	13.197***	3.730
	(5.40)	(3.73)	(1.24)
Inflation	0.521	-2.180	-15.418***
	(0.83)	(-1.28)	(-6.90)
GDP	0.257***	0.863***	-0.357***
	(3.34)	(5.92)	(-2.70)
Common Law	0.349***	3.127***	3.938***
	(5.06)	(18.93)	(23.09)
Rule of Law	-0.163***	-0.645***	0.239***
	(-5.57)	(-9.45)	(3.75)
Bank Environment	0.0970	-1.252***	-1.143***
	(1.64)	(-14.52)	(-10.53)
Creditor Rights	-0.079***	-0.156**	-0.071*
	(-2.59)	(-2.53)	(-1.69)
Intercept	3.596***	1.081	2.601***
	(6.59)	(0.97)	(2.80)
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.511	0.257	0.358

Panel B: Earnings management

	(1) Ln(Spread)	(2) Secured	(3) Covenants
Debt Enforcement Index	-0.433**	-6.331***	-6.727***
	(-2.45)	(-16.16)	(-12.24)
Earnings Management	1.480***	7.540***	-0.804
	(5.62)	(6.60)	(-1.11)
Debt Enforcement Index×Earnings Management	**-1.628***	**-10.567***	**2.062**
	(-3.57)	**(-5.21)**	**(1.57)**
Ln(Loan Size)	-0.125***	-0.243***	0.031***
	(-28.63)	(-16.12)	(4.47)
Ln(Loan Maturity)	0.255***	0.335***	0.178***
	(36.65)	(15.79)	(15.31)
Performance Pricing	-0.059***	0.906***	0.815***
	(-7.64)	(31.85)	(48.78)
Firm Size	-0.135***	-0.393***	-0.115***
	(-34.36)	(-28.84)	(-15.77)
PPE	0.501***	1.081***	0.326***
	(27.50)	(14.80)	(10.13)
LEV	-1.051***	-2.729***	-0.0790
	(-24.82)	(-16.73)	(-1.52)
ROA	-0.254***	-0.476***	-0.109***
	(-20.25)	(-10.25)	(-4.53)
Z-score	-0.027***	-0.051***	-0.008***
	(-13.65)	(-7.92)	(-2.86)
Cash Flow Volatility	0.330***	1.653***	-0.853***
	(3.77)	(5.00)	(-6.05)
GDP Growth	7.325***	12.957***	3.367
	(5.59)	(3.71)	(0.77)
Inflation	0.742	-1.109	-14.723***
	(1.20)	(-0.73)	(-4.36)
GDP	0.306***	0.946***	-0.381
	(4.04)	(6.51)	(-1.53)
Common Law	0.291***	3.044***	3.886***
	(4.19)	(18.74)	(18.01)
Rule of Law	-0.181***	-0.664***	0.259**
	(-6.32)	(-9.90)	(2.12)
Bank Environment	0.0560	-1.314***	-1.164***
	(0.94)	(-15.40)	(-9.37)
Creditor Rights	-0.067**	-0.159***	-0.0770
	(-2.30)	(-2.65)	(-0.88)
Intercept	3.472***	0.207	2.894*
	(6.43)	(0.18)	(1.74)
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.510	0.259	0.358

Panel C: Creditor rights

	(1)	(2)	(3)
	Ln(Spread)	Secured	Covenants
Debt Enforcement Index	0.0110	-1.484**	-4.954***
	(0.04)	(-2.34)	(-9.81)
Strong Creditor Rights	0.323**	2.911***	1.001***
	(2.11)	(9.82)	(6.91)
Debt Enforcement Index×Strong Creditor Rights	-0.761***	-6.274***	-2.220***
	(-2.79)	(-10.75)	(-6.70)
Ln(Loan Size)	-0.123***	-0.236***	0.033***
	(-28.10)	(-15.69)	(6.53)
Ln(Loan Maturity)	0.254***	0.328***	0.178***
	(36.41)	(15.51)	(21.99)
Performance Pricing	-0.061***	0.896***	0.813***
	(-7.88)	(31.59)	(73.06)
Firm Size	-0.140***	-0.407***	-0.118***
	(-35.65)	(-29.92)	(-26.87)
PPE	0.503***	1.083***	0.330***
	(27.59)	(14.91)	(16.82)
LEV	-1.101***	-2.855***	-0.102***
	(-26.03)	(-17.57)	(-2.94)
ROA	-0.257***	-0.482***	-0.110***
	(-20.48)	(-10.42)	(-7.76)
Z-score	-0.026***	-0.048***	-0.008***
	(-13.25)	(-7.55)	(-3.88)
Cash Flow Volatility	0.438***	1.975***	-0.802***
	(5.00)	(5.97)	(-9.12)
GDP Growth	7.036***	10.874***	4.096
	(5.26)	(3.02)	(1.37)
Inflation	0.877	-0.0730	-13.195***
	(1.39)	(-0.05)	(-5.71)
GDP	0.295***	1.284***	-0.00400
	(4.25)	(9.43)	(-0.03)
Common Law	0.291***	2.554***	3.730***
	(4.30)	(13.94)	(19.82)
Rule of Law	-0.181***	-0.733***	0.0750
	(-6.99)	(-11.11)	(1.26)
Bank Environment	0.0750	-1.478***	-1.185***
	(1.34)	(-16.69)	(-11.75)
Intercept	0.291***	2.554***	3.730***
	(4.30)	(13.94)	(19.82)
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.508	0.257	0.358

Table 5. Relation between debt enforcement and borrower behavior: Real effect tests

In Panel A, the dependent variable *Covenant Violation* indicates the incidence of covenant violation. In Panel B, the dependent variables *Bank Debt Ratio* and *Public Debt Ratio* refer to the portion taken by bank loans in all debts and the share of public debt in the whole credit market, respectively. The key independent variable is the DHMS-based debt enforcement index. Loan-, firm-, and country-level variables are controlled as in Models (4a) (for Panel A) and (4b) (for Panel B). Details about variable definitions are provided in the Appendix. Panels A and B show results from Logit and OLS regressions, respectively. The regression coefficients for each independent variable are reported, followed by *t*- and *z*-statistics (in the parentheses) based on heteroskedasticity robust standard errors. For brevity, the coefficients for the industry and year dummies are not reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Debt enforcement and covenant violation

	(1)
	Covenant Violation
Debt Enforcement Index	**-6.138***
	(-5.99)
Ln(Loan Size)	0.203***
	(9.70)
Ln(Loan Maturity)	0.993***
	(28.27)
Performance Pricing	0.322***
	(8.11)
Firm Size	-0.261***
	(-13.35)
PPE	-0.796***
	(-13.81)
LEV	0.664***
	(8.42)
ROA	0.306**
	(2.11)
Z-score	-0.058***
	(-6.34)
Cash Flow Volatility	-2.404***
	(-6.77)
GDP Growth	7.296
	(1.14)
Inflation	1.575
	(0.17)
GDP	0.711
	(1.28)
Common Law	1.774***
	(3.80)
Rule of Law	-0.208
	(-1.05)
Bank Environment	-1.892***
	(-4.31)
Creditor Rights	-0.178
	(-0.79)
Intercept	-4.754
	(-1.21)
Industry & Year Fixed Effects	Included
Number of Observations	20,869
Pseudo R^2	0.131

Panel B: Debt enforcement and debt choice

	(1)	(2)
	Bank Debt Ratio	*Public Debt Ratio*
Debt Enforcement Index	**0.327***	**-0.293***
	(7.92)	**(-7.26)**
Firm Size	-0.063***	0.054***
	(-32.54)	(28.16)
PPE	-0.075***	0.074***
	(-8.71)	(8.45)
LEV	-0.057***	0.081***
	(-4.24)	(6.11)
ROA	-0.008	0.050*
	(-0.32)	(1.92)
Z-score	0.009***	-0.009***
	(4.47)	(-4.37)
Cash Flow Volatility	-0.065	-0.0320
	(-0.88)	(-0.43)
GDP Growth	-0.036	1.027***
	(-0.09)	(2.61)
Inflation	-0.140	-0.0880
	(-0.35)	(-0.23)
GDP	-0.203***	0.122***
	(-13.56)	(8.12)
Common Law	-0.426***	0.398***
	(-24.54)	(23.43)
Rule of Law	0.054***	-0.012*
	(8.37)	(-1.92)
Bank Environment	0.124***	-0.076***
	(17.57)	(-10.90)
Creditor Rights	0.050***	-0.040***
	(6.51)	(-5.37)
Intercept	2.725***	-1.315***
	(19.15)	(-9.29)
Industry & Year Fixed Effects	Included	Included
Number of Observations	14,951	14,951
Adjusted R^2	0.272	0.230

Table 6. Relation between debt enforcement and syndicate structure

The dependent variables *Number of Lenders* and *Loan HHI* refer to the number of lenders in a bank syndicate and a funding share-based Herfindahl index, respectively. The key independent variable is the DHMS-based debt enforcement index. Loan-, firm-, and country-level variables are controlled as in Model (5). Details about variable definitions are provided in the Appendix. Columns 1 and 2 show results from Poisson and OLS regressions, respectively. The regression coefficients for each independent variable are reported, followed by *z*-statistics (in the parentheses) based on heteroskedasticity robust standard errors. For brevity, the coefficients for the industry and year dummies are not reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)
	Number of Lenders	*Loan HHI*
Debt Enforcement Index	**0.553*****	**-0.057****
	(7.27)	**(-2.44)**
Ln(Loan Size)	0.344***	-0.059***
	(58.79)	(-37.34)
Ln(Loan Maturity)	0.076***	-0.055***
	(9.17)	(-23.12)
Performance Pricing	0.450***	0.009***
	(38.68)	(3.18)
Firm Size	0.093***	-0.014***
	(19.52)	(-10.83)
PPE	-0.091***	0.010**
	(-5.21)	(2.06)
LEV	0.197***	-0.056***
	(6.57)	(-7.63)
ROA	0.299***	-0.046***
	(5.60)	(-3.04)
Z-score	-0.007***	0.004***
	(-2.71)	(4.33)
Cash Flow Volatility	-0.876***	0.073**
	(-8.29)	(2.07)
GDP Growth	1.593*	-0.091
	(1.67)	(-0.42)
Inflation	-8.760***	0.146
	(-7.58)	(0.84)
GDP	-0.968***	0.179***
	(-25.77)	(16.19)
Common Law	-0.607***	0.097***
	(-14.61)	(9.59)
Rule of Law	0.409***	-0.094***
	(28.02)	(-19.49)
Bank Environment	0.160***	-0.081***
	(6.44)	(-15.76)
Creditor Rights	0.068***	-0.036***
	(4.59)	(-8.37)
Intercept	5.350***	-0.060
	(16.41)	(-0.66)
Industry & Year Fixed Effects	Included	Included
Number of Observations	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.343	0.138

Table 7. Relation between debt enforcement and loan terms: Robustness checks

The dependent variables *Ln(Spread)*, *Secured*, and *Covenants* refer to bank loan contracting terms that indicate the cost of loan, the existence of collateral provision, and the number of total covenants, respectively. The key independent variable is the DHMS-based debt enforcement index (In Panels A, C, D, E, F) and its extension (in Panel B). In Panel A, Models (6a) and (6b) are simultaneously estimated in order to control for the simultaneity of loan term determination; In Panel B, *Extended Debt Enforcement Index* includes additional characteristics from the DHMS (2008) survey; In Panel C, the baseline regression is re-estimated without weighted adjustment by country loan observations; In Panel D, the baseline regression is re-estimated after excluding U.S. sample observations; In Panel E, the baseline regression is re-estimated using the subsample of 2001 to 2009 only; In Panel F, the baseline regression is re-estimated with adjustment for clustered standard errors by country. Loan-, firm-, and country-level variables are controlled as in Model (1). Details about variable definitions are provided in the Appendix. Columns 1 and 2 in Panel A show results from OLS and Poisson regressions, respectively, and columns 1, 2, and 3 in Panels B to F show results from OLS, Logit, and Poisson regressions, respectively. The regression coefficients for each independent variable are reported, followed by *t*- and *z*-statistics (in the parentheses) based on heteroskedasticity robust standard errors. For brevity, the coefficients for the industry and year dummies are not reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Control for the simultaneity of loan terms		
	(1) *Ln(Spread)*	(2) *Covenants*
Debt Enforcement Index	**-0.258***	**-4.466***
	(-4.96)	**(-13.78)**
Controls	Included	Included
Industry & Year Fixed Effects	Included	Included
Number of Observations	16,980	27,292
Adjusted R^2 / Pseudo R^2	0.495	0.269

Panel B: Extended debt enforcement index			
	(1) *Ln(Spread)*	(2) *Secured*	(3) *Covenants*
Extended Debt Enforcement Index	**-0.451**	**-7.375***	**-6.042***
	(-2.01)	**(-14.40)**	**(-14.53)**
Controls	Included	Included	Included
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.508	0.257	0.358

Panel C: Regressions without weighted adjustment			
	(1) *Ln(Spread)*	(2) *Secured*	(3) *Covenants*
Debt Enforcement Index	**-0.644***	**-2.284***	**-2.420***
	(-7.08)	**(-10.30)**	**(-12.40)**
Controls	Included	Included	Included
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.508	0.298	0.444

Panel D: Exclude loan observations from the U.S.			
	(1) *Ln(Spread)*	(2) *Secured*	(3) *Covenants*
Debt Enforcement Index	**-0.786***	**-3.604***	**-1.633***
	(-4.51)	**(-10.21)**	**(-7.31)**
Controls	Included	Included	Included
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	1,751	10,730	10,761
Adjusted R^2 / Pseudo R^2	0.558	0.367	0.277

Panel E: Sample period of 2001–2009			
	(1)	(2)	(3)
	Ln(Spread)	*Secured*	*Covenants*
Debt Enforcement Index	**-0.310***	**-0.634***	**-4.520***
	(-1.75)	**(-13.88)**	**(-15.59)**
Controls	Included	Included	Included
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	16,980	28,236	28,236
Adjusted R^2 / Pseudo R^2	0.495	0.310	0.351
Panel F: Standard errors clustered by country			
	(1)	(2)	(3)
	Ln(Spread)	*Secured*	*Covenants*
Debt Enforcement Index	**-0.322****	**-0.566****	**-4.594***
	(-2.19)	**(-2.68)**	**(-4.38)**
Controls	Included	Included	Included
Industry & Year Fixed Effects	Included	Included	Included
Number of Observations	27,318	43,239	43,239
Adjusted R^2 / Pseudo R^2	0.508	0.257	0.358