

How Do Board Reforms Affect Debt Financing Costs Around the World?

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Abstract

In this study, we examine the effect of worldwide board reforms on the cost of debt financing. We document an increase of loan spread after a country initiates the reform. The increase is larger among firms that are more exposed to shareholder–debtholder conflicts. The results suggest that board reforms empower shareholders at the cost of debtholders. However, we also find that, while the reform component related to board independence leads to the increase in the cost of debt, the component related to audit committee independence helps decrease the cost.

I. Introduction

Debt financing is critical for the existence of businesses around the world. According to DeAngelo and Roll (2015), more than 50% of corporate funding in the U.S. comes from debt. The amount of debt accounts for an even higher portion of financing in the emerging economies, where poorer legal and institutional environment has further restricted firms from obtaining finance from alternative sources, such as the equity market.¹ Therefore, understanding the factors that affect debt financing costs for firms is economically significant. Among the potential shaping forces of debt financing costs, a group of recent studies has focused on the role of corporate governance structures (e.g., Chava, Livdan, and Purnanandam (2009), Brockman, Martin, and Unlu (2010)). These studies emerged in the aftermath of a few severe financial scandals in the early 2000s (e.g., Enron) and/or followed the

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¹This is based on statistics on debt financing obtained from the World Development Indicators of the World Bank.

corresponding policy advocacies for governance reforms around the world (e.g., the U.K. Cadbury Report, the U.S. Sarbanes-Oxley Act, and the OECD-Latin America Corporate Governance Roundtable²). While they all shed light on the Anglo-Saxon view of good practices in corporate governance, their results imply that these “good” governance practices are not uniformly beneficial when it comes to the impact on debtholders’ incentives and the cost of debt.³ Therefore, it is important to probe into individual governance forms to develop a nuanced and comprehensive understanding about the effect of corporate governance structures on the cost of debt.

In this paper, we examine whether and how specific changes in the board structures affect the debt financing costs for firms. We use worldwide governance reforms related to board practices to conduct the analysis. These reforms aim to strengthen shareholder rights and align the interests between managers and shareholders by improving the governance function of the board. We focus on board reforms because i) boards play a pivotal role in the governance functions of firms,⁴ and ii) the staggered board reforms across a large number of countries provide us with a suitable test ground to identify the causal effect of board structures on the cost of debt in an international context. Moreover, since the reforms target various components of the board, we can explore the effect of changes in different aspects of the board’s function on the cost of debt.⁵

Theoretically, the effect of enhanced board governance on the cost of debt is ambiguous. Under the classical agency framework (e.g., Jensen and Meckling (1976)), shareholders have a residual claim on firm value, while debtholders have a fixed claim. Therefore, the interests between shareholders and debtholders can be aligned to a certain extent or going against each other, implying contrasting effects of stronger board governance on the incentives of debtholders and the cost of debt. On the one hand, stronger board governance can benefit both the shareholders and debtholders, leading to a lower cost of debt. From the perspective of managerial supervision, board governance can discipline the managers, preventing them from shirking or engaging in self-dealing activities (e.g., Fama and Jensen (1983), Shleifer and Vishny (1997)). This, in turn, can enhance the performance and lower the default risk of firms, making debtholders more willing to charge a lower interest

²The OECD-Latin America Corporate Governance Roundtable was established to promote good governance practices in the emerging economies in Latin America and additional OECD countries. The roundtable considered these practices essential for improving firm performance and strengthening the foundation of a country’s long-term economic performance. More information is available at <https://www.oecd.org/daf/ca/latinamericanroundtableoncorporategovernance.htm>

³For example, Chava et al. (2008) find that firms with lower takeover defenses (i.e., stronger pressure from the market for corporate control) are charged a higher spread on their bank loans. Brockman et al. (2010) document that higher sensitivity of managerial compensation to firm performance leads to lower borrowing costs.

⁴For example, Masulis, Wang, and Xie (2012) and Masulis and Mobbs (2014) provide detailed evidence on how dedication and involvement of directors matter to CEO monitoring and firm value. See Hermalin and Weisbach (2003) and Bebchuk and Weisbach (2010) for more comprehensive reviews on the literature on the roles of the board of directors and their importance in corporate governance.

⁵Anderson, Mansi, and Reeb (2004) document that higher board quality is associated with lower borrowing costs based on large U.S. firms. Their studies focus on a single country and do not lead to strong causal inferences on the documented relations.

rate. From the perspective of information production, as the board has the duty to ensure adequate disclosure of corporate information to outside investors, better board governance can improve the transparency of firms and the integrity of financial information that debtholders rely on to assess the credit risk of firms and to enforce debt contracts (e.g., Dechow, Sloan, and Sweeney (1996)). Therefore, debtholders may also demand a lower risk premium when providing credit to these firms. In these regards, stronger board governance can lead to a lower cost of debt by extending benefits to debtholders.

On the other hand, however, a shareholder-friendly board can benefit shareholders at the cost of debtholders. According to the agency theory on shareholder–debtholder conflicts, shareholders, as residual claimers, are protected from downside risks by limited liability. Thus, they may have incentives to improve their own upside potentials by expropriating debtholders' wealth, such as taking excessively risky projects (i.e., assets substitution) or not making sufficient investment into positive net present value projects (i.e., underinvestment) (e.g., Jensen and Meckling (1976), Myers (1977)). As a result, this would increase the default risk of firms, making debtholders worse off and demanding for a higher return. Therefore, stronger board governance that strengthens shareholder rights can lead to a higher debt financing cost. Ultimately, we leave this question for empirical investigation.

As mentioned above, we use worldwide board reforms in this paper to study the effect of changes in specific board structures on the cost of debt. There are a few advantages of using this setting. First, these reforms are initiated following general advocacy for good governance practices at the region or country level, thus are plausibly exogenous to individual firms within a country, especially to the incentives of debtholders. Second, different countries adopt the board reforms in different years, generating a natural division of treated and control groups for us to implement a difference-in-differences (DID) design. Third, the board reforms focus on one or more dimensions of board characteristics, such as board independence, CEO duality, and/or audit committee. As each of the components changes exogenously following the reform that covers these aspects, we can identify both their joint and respective effect on the cost of debt. We use the international board reforms data over 41 economies compiled by Fauver, Hung, Li, and Taboada (2017), and conduct an analysis for the period of 1987 to 2015.⁶ We measure the cost of debt using loan spreads obtained from Thomson Reuters LPC's DealScan database. We focus on the private debt market because i) it is the largest source of corporate financing worldwide in recent decades; and ii) public-debt market is underdeveloped in many countries – even in the U.S., only 15% of public firms are financed through the corporate bond market (Nini, Smith, and Sufi (2009)). To further justify the validity of the setting, we verify in a dynamic test that no trends in loan spreads existed before the initiation of the board reforms. This premise satisfies the conditions for using the DID method by lending support to the exogeneity of the board reforms.

⁶We start from 1987 when the loan data become populated in the DealScan database. The results are robust if we start from 1982, the first year of data coverage, or from 1990, the starting year of the sample in Fauver et al. (2017).

We start our analysis by examining whether stronger shareholder rights, as induced by the board reforms, increase or decrease the cost of debt. We conduct the baseline analysis based on about 6,700 non-financial firms in the 41 economies adopting board reforms for the first time within our sample period. We identify for each country the period from 10 years before to 10 years after the first implementation of the reform in each country. As firms do not issue loans as frequently as in each year, this window preserves an adequate number of loan observations of each firm to ensure precision of estimation based on our DID design with firm fixed effects. Within this window, the average (medium) number of loan issuance deals by a firm is about three (two) before the reform and three (two) after the reform. The results are robust without this restriction to avoid truncation of sample, or within a window from 5 years before to 5 years after each reform to mitigate concerns about confounding events in a long window. We also include an assortment of the time-varying loan-, firm-, industry- and country-level characteristics that are commonly used in debt pricing literature to address potential omitted variable bias. Moreover, we include firm fixed effects to control for firm-specific, time-invariant characteristics and year fixed effects to condition out the effect from contemporaneous events. We specifically include banking policies of each country as they may be promulgated at the same time as the board reforms to influence loan spreads from the supply side. We cluster standard errors at the country-level to adjust for within-country correlations among the observations as the reforms are initiated by the national authorities of a country.

We find that the adoption of board reforms is associated with a statistically significant and economically large increase in the cost of debt. Depending on the specifications, the increase in loan spread is up to 19% for firms in countries after the initial board reforms compared to the changes of those in countries not yet adopting the reform. As the mean spreads prior to the reforms is 184 basis points, the reforms result in a jump of up to 35 basis points in the average cost of debt, which translates into an increase in interest expenditures of about 1.2 million USD per loan facility given the average loan size. The results are consistent with the implication from the agency theory on shareholder–debtholder conflicts.

Then, we examine the dynamic changes of loan spreads around the initial board reforms. Using a range of time dummies surrounding the actual reform years, we estimate a dynamic regression and plot the coefficients. We find that there are no significant changes in the cost of debt prior to the reforms, and loan spreads start to increase in the first year after a country initiates the reform. This suggests that the reforms are not driven by the firms or their debtholders, nor do debtholders anticipate the initiation of the reforms and change the pricing of loans *ex ante*. Instead, debtholders change their pricing strategies after they update their expectations about potential expropriation by shareholders following the reforms.

Next, we explore cross-sectional effects of the board reforms on the cost of debt. First, we separate credit lines from term loans and re-estimate the effect in each subsample. We find that the loan spreads increase for both credit lines and term loans taken by firms after the reforms. Second, we differentiate the effects by the approaches to the reforms – whether the changes promulgated by the board reforms are mandatory (i.e., rule-based) or advising (i.e., “comply-or-explain”). We split our sample into rule-based and “comply-or-explain” reforms, and find that loan spreads

increase significantly in the rule-based group but not in the other. This is consistent with the argument on shareholder–debtholder conflicts. If the board reforms aim to strengthen shareholder rights, stricter implementation can lead to a higher likelihood of debtholders being expropriated by shareholders, leading to a higher cost of debt. Third, we split the sample by the expected level of conflicts of interest between shareholders and debtholders. If our findings are in line with the agency theory on shareholder–debtholder conflicts, we should expect to observe a larger increase of loan spreads for firms with inherently larger conflicts between shareholders and debtholders. Specifically, we consider two conflicting conditions: i) firms with a lower ratio of tangible assets and hence less collaterals to pledge against their borrowing, and ii) firms that have prior dividend distribution practice that reduces the cash flows distributable to debtholders. Consistent with the conjecture, we find that the increase of loan spreads mainly concentrates among firms with a lower ratio of tangible assets or those with pre-reform dividend distribution, whereas firms in the other groups experience little changes.

Furthermore, as the board reforms involve more than one dimension of the board structure, we examine the effect of each specific reform component on the cost of debt. Specifically, a board reform may promote greater board independence, require the posts of CEO and the Chairman of the board to be taken by different individuals, and/or enhance the functions of audit committees. These components can play different roles in influencing debtholders' pricing incentives. While all three components help strengthen shareholder rights, the components related to board independence and CEO duality focus more on disciplining managers, and that related to audit committees focus more on corporate information production. Since a good information environment benefits both shareholders and debtholders, rather than intensify their conflicts, we may find a mitigating effect on the cost of debt from the audit-related component. Therefore, we separate the reforms that target each of the components individually to shed light on this conjecture. We find that, compared to the average effect of the reforms, reforms that involve only board independence increase the cost of debt further, whereas those that involve only audit committees reduce the cost of debt.

Besides costs, we also examine changes in other loan terms after the board reforms. Specifically, we find that debtholders are more likely to incorporate covenants into the loan contracts when they expect a higher likelihood of being expropriated by the shareholders. The results also hold if we focus on different types of covenants. This suggests that debtholders use more and different loan covenants as a way to mitigate the exacerbated conflicts with shareholders, which is in line with the baseline findings.

Moreover, we assess the value implication of our findings and link it to Fauver et al. (2017) that document an overall increase in firm value following the board reforms. Specifically, Fauver et al. (2017) have identified positive channels, such as strengthening shareholder monitoring, reducing managerial expropriation, and improving information environment, through which board reforms can increase firm value. Our findings, on the other hand, suggest that a negative channel may also exist, particularly among the firms that are relying on debt financing and are hence facing a higher debt financing cost after the board reforms. As these firms are subject to shareholder–debtholder conflicts that could offset the positive impact

of stronger shareholder rights to some extent, they may experience a downward pressure on firm value. Therefore, we formulate direct tests to assess the relative value impact of the board reforms on debt-dependent firms. To implement these tests, we construct an indicator variable for industries with greater external debt dependence and interact it with the reform dummy. We find that firms in industries with higher external debt dependence have a lower increase of firm value after the reforms. This confirms that a higher cost of debt can offset the benefits associated with better board governance to some extent, reducing the overall increase of firm value following the board reforms. Furthermore, we differentiate the firms by the risk of asset substitution. We find that the increase in firm value is further reduced after the board reforms if debt-dependent firms are operating in high-growth industries, where they are more likely to invest in overly risky projects that transfer the wealth of debtholders to shareholders (i.e., have greater asset substitution risk).

Finally, we provide additional validity tests at the firm level to strengthen our baseline findings. First, if the board reforms exacerbate the agency conflicts between shareholders and debtholders, we may observe an actual increase in dividend distribution. Indeed, we find that firms distribute more dividends following the reforms. Second, we conjecture and find that firms use more equity financing after the board reforms given that debt financing becomes more expensive. These results further support our baseline findings that the board reforms increase debt costs by exacerbating the conflicts between shareholders and debtholders.

This paper contributes to the literature in the following ways. It provides a comprehensive picture of whether and how stronger board governance affects the cost of debt financing, adding to the recent discussions on the effect of various governance practices and managerial incentives on debt financing (e.g., Chava, Kumar, Warga (2009), Pan, Wang, and Weisbach (2018)). More specifically, the paper finds that board reforms aiming at improving board governance and strengthening shareholder rights can intensify the conflicts between shareholders and debtholders, leading to a higher cost of debt. Thus, the paper also joins a line of emerging literature on the implications of shareholder–debtholder conflicts (e.g., Klock, Mansi, and Maxwell (2005), Cremers, Nair, and Wei (2007), Chava et al. (2009), Chava, Wang, and Zou (2019)). Furthermore, using the staggered adoption of the board reforms around the world, we provide causal inferences on the effect of board structure changes on the cost of debt in an international context. In this way, it also complements the recent cross-country studies that focus on the effect of board reforms, investor protection, and corporate governance worldwide (e.g., Defond and Hung (2004), Defond, Hung, and Trezevant (2007), and Fauver et al. (2017)). Finally, we differentiate the effects of specific components of the board structure and find that the cost of debt increases (decreases) following the reforms that mainly focus on board independence (audit committee independence). Since the changes of each component are induced plausibly exogenously by the reforms, our findings are valuable to the literature by shedding light on the differential roles of specific board components and functions in affecting the shareholder–debtholder conflicts, and adding more nuanced and comprehensive evidence on the causal effect of various aspects of board functions on debt financing costs.

The rest of this paper proceeds as follows: [Section II](#) introduces the data and methodology; [Section III](#) presents and discusses the empirical results; and [Section IV](#) concludes.

II. Data, Variables, and Methodology

In this section, we introduce the data sources, sample construction, variable definitions, and the empirical methods used in our examination of board reforms and the costs of debt.

A. Board Reforms

We begin by collecting the governance reform data compiled by Fauver et al. (2017), which are mainly sourced from the World Bank, the European Corporate Governance Institute, local stock exchange regulators, and Kim and Lu (2013). The data set includes board reform information from 41 economies in the world. Specifically, it contains information on the reform years, components, and approaches. We reproduce the board reform data in [Appendix B](#). We use the first reform of each country for our primary analysis because it signals a discrete jump in the probability of future changes in board structures and represents a plausibly exogenous shift toward a better governance environment. Our results hold when using the timing of the major board reforms alternatively. We restrict the sample to a period from 10 years before to 10 years after each reform. Unlike Fauver et al. (2017), in which firms generally have basic characteristics available in each year, firms issue loans much less frequently. Thus, this window preserves an adequate number of loan observations of each firm to ensure precision of estimation based on our DID design with firm fixed effects. Within this window, the average (medium) number of loan issuance deals by a firm is about three (two) times before the reform and three (two) times after the reform. Nevertheless, we also follow Fauver et al. (2017) and adopt a window from 5 years before to 5 years after each reform for robustness checks, as it may help mitigate the influence of confounding factors in a long window. We present all the main results based on the two windows in a parallel manner.

B. Loan Spreads

We measure the debt costs using loan spreads and conduct our main analyses at the loan level. The loan data are obtained from Thomson Reuters Loan Pricing Corporation's DealScan Database. The database provides multidimensional loan information, such as interest rates, loan maturity, loan size, and covenants, which allows us to construct relevant loan-level controls and conduct analysis on the non-spread features of loans as well. Following previous studies (e.g., Graham, Li, and Qiu (2008), Hertz and Officer (2012)), we define loan spread as the amount of interest in basis points paid over LIBOR (or LIBOR equivalent) for each dollar drawn down. The loan spread has included the relative fees paid to the lending banks (i.e., the all-in spread drawn item in DealScan). We take the natural logarithm of loan spread to mitigate potential problems caused by positive skewness in the data. As a firm can have different loan facilities with varying interest rates in the

same loan package, we treat each loan in a year as a single observation following the common practice in the literature (e.g., Graham et al. (2008), Hasan, Hoi, Wu, and Zhang (2014)).

C. Sample

We then obtain data from Thomson Reuters' WorldScope database to construct firm-level control variables. WorldScope covers financial data for publicly listed firms around the world and provides standardized account information for easier comparison across countries. We link loan information to firms in WorldScope by two steps. First, we use the link file provided by Michael Robert for the U.S. public firms (Chava and Roberts (2008)).⁷ Second, we manually match loan information to non-U.S. public firms in WorldScope based on the names and addresses of firms in both databases. We exclude financial firms, with Standard Industrial Classification (SIC) codes from 6000 to 6999, from the sample. By further ensuring the key variables to be non-missing, which we define below in detail, our final loan-level sample for analysis consists of 6,695 firms with 35,558 loan facilities issued in 25,306 packages (i.e., deals) from 1987 to 2015.

D. Methodology, Variable Definition, and Summary Statistics

We use DID method to examine the effect of board governance on debt pricing. As mentioned, the board reforms that promulgated changes in board governance are adopted across countries in different years in our sample period. Thus, we follow Bertrand and Mullainathan (2003) to classify firms into treatment and benchmark groups. The treatment group contains firms in the years after the countries have adopted board reforms, and the benchmark group includes firms in the years where the countries have not yet initiated the reforms. We then use the following regression model to test our hypothesis:

$$(1) \ln(\text{SPREADS})_{ij,c,t} = \alpha + \beta \text{POST}_{c,t} + \gamma_1 X_{ij,c,t} + \gamma_2 T_{j,c,t} + \gamma_3 Z_{c,t} + \delta_j + \delta_t + \varepsilon_{ij,c,t}$$

$\ln(\text{SPREADS})_{ij,c,t}$ is defined as the natural logarithm of the amount a borrower pays in basis points over the LIBOR rate (or equivalent) for each dollar drawn down from the loan, where i indicates the loan, j indicates the firm, c indicates the country where the firm is located, and t indicates time. POST is our major independent variable. We set POST equal to 1 in the years after a country adopts the board reform for the first time, and 0 otherwise.

To account for the fact that various loan-, firm-, and country-level characteristics could shape debt pricing, we include an assortment of controls that are commonly used in previous studies (e.g., Qian and Strahan (2007), Graham et al. (2008), Bae and Goyal (2009), and Hasan et al. (2014)). For loan-level features ($X_{ij,c,t}$), we control for loan size and maturity. For firm-level characteristics ($T_{j,c,t}$), we include the features that existing studies have found to influence debt financing costs (Graham et al. (2008), Hasan et al. (2014)). Specifically, we control for

⁷Specifically, we map the firm identifiers in DealScan to Compustat GVKEYs, and further to firms in WorldScope via the link between GVKEYs and CUSIPs.

FIRM_SIZE, MTB (market-to-book ratio), $\ln(\text{AGE})$ (the natural logarithm of the age of a firm), LEVERAGE, ROA, CASH, and PPE. We also include additional controls in Fauver et al. (2017) that are associated with the board reforms and may influence firms' debt financing costs, including FOREIGN_SALES, R&D, CAPEX, and CLOSELY_HELD (the fraction of shares held by insiders and large institutional investors of a firm). We further include an indicator variable, INVESTMENT_GRADE, which equals 1 if a firm is rated with "BBB-" or above according to S&P's Capital IQ, and 0 otherwise. Finally, we include a trend variable, INDUSTRY_Q, defined as the median Tobin's Q of the firms in an industry in a given year following Fauver et al. (2017).

With respect to country-level characteristics ($Z_{c,t}$), we include an assortment of variables used by Fauver et al. (2017) and previous cross-country studies on loan spreads (e.g., Qian and Strahan (2007), Bae and Goyal (2009)). The purpose is to control for the macro conditions and factors that may change at the same time as the board reforms and that may confound our findings. Specifically, we include GDP, FDI, RULE_OF_LAW index, the indicators on the enforcement of insider trading laws (INSIDER_TRADING_LAW) and the adoption of M&A laws (M&A_LAW), DIVIDEND_TAX, and CAPITAL_GAIN_TAX. Finally, as novel banking regulations can be introduced among the countries, especially after the 2008 financial crisis, we control for the stringency of capital regulation (CAPITAL_STRINGENCY_INDEX) to account for the regulatory changes that may affect the cost of debt from the supply side. We obtain this index from Barth, Caprio, and Levine (2013) and match it to the loan-level data by the major lender's country. That is, if the major lender in the syndication is from a foreign country, we use the capital regulatory index in that country instead of the home country of the borrower.⁸ Appendix A presents detailed definitions and data sources of all the variables used in this study. Appendix B gives the details about the board reforms. Table 1 shows the descriptive statistics of our key variables. For analysis with both $[-10, +10]$ years and $[-5, +5]$ years window, we present the statistics based on the longer window. In this window, the median loan spread is 175 basis points. The median size and maturity are \$125 million USD and 48 months, respectively.

Besides the characteristics explicitly measured and controlled at the loan-, firm-, and country-level, we also include firm fixed effects (δ_j) and time fixed effects (δ_t) in the regressions. The firm fixed effects control for time-invariant, unobservable characteristics of each firm. The time fixed effects control for overall trends and/or contemporaneous events worldwide. We cluster standard errors at the country-level to adjust for within-country correlations among the observations as the reforms are promulgated by the national authorities of a country.

III. Results

In this section, we first present and discuss the major results about the effect of board reforms on loan spreads. We then conduct robustness tests and extend

⁸We identify major lenders by the allocation amounts and the roles the lender takes in the syndication. A major lender has the largest allocation amount or a leading role in the syndication according to the description in DealScan.

TABLE 1
Summary Statistics

Table 1 contains the summary statistics of the key variables used in the regression analysis. It provides pooled statistics based on the primary sample of analysis where the variables have been used.

	<i>N</i>	<i>P10</i>	<i>Median</i>	<i>Mean</i>	<i>P90</i>	<i>Std. Dev.</i>
<i>Loan-Level Variables</i>						
ln(SPREAD)	35,558	3.6243	5.1648	4.9498	5.8721	0.8603
LOAN_SIZE	35,558	16.0611	18.6438	18.4230	20.6283	1.8316
MATURITY	35,558	2.4849	3.8712	3.6441	4.2767	0.6949
<i>Deal-level variables</i>						
D_COVENANTS	25,306	0	1	0.6937	1	0.4610
D_FINANCIAL_COVENANTS	25,306	0	1	0.5306	1	0.4991
D_GENERAL_COVENANTS	25,306	0	1	0.6692	1	0.4705
DEAL_SIZE	25,306	16.4182	18.9803	18.8110	20.9464	1.7658
AVERAGE_MATURITY	25,306	2.4849	3.7842	3.6019	4.2195	0.6640
<i>Firm-Level Variables and Industry Trend Variable</i>						
FIRM_SIZE	21,758	4.2920	6.8349	6.8659	9.5068	1.9496
MTB	21,758	0.5866	1.9429	2.6801	5.5271	3.7478
ln(AGE)	21,758	1.3863	2.7726	2.7636	4.3307	1.1086
LEVERAGE	21,758	0.0417	0.2938	0.3106	0.5688	0.2087
ROA	21,758	-0.1040	0.0372	0.0015	0.1370	0.2382
CASH	21,758	0.0059	0.0488	0.0928	0.2397	0.1168
PPE	21,758	0.0605	0.2763	0.3363	0.7198	0.2445
FOREIGN_SALES	21,758	0	0.0185	0.1818	0.5707	0.2489
R&D	21,758	0	0	0.0205	0.0662	0.0487
CAPEX	21,758	0.0107	0.0443	0.1270	0.2498	0.2820
CLOSELY_HELD	21,758	0.0020	0.1862	0.2525	0.6234	0.2425
INVESTMENT_GRADE	21,758	0	0	0.2023	1	0.4017
INDUSTRY_Q	21,758	1.0667	1.2917	1.3470	1.6418	0.2452
TOBIN'S_Q	157,818	0.7980	1.3036	2.7607	3.8451	7.8886
EQUITY_ISSUANCE	141,527	-0.0292	0.0068	0.1496	0.3378	0.6581
PAYOUT_RATIO	91,457	0	0.0378	0.1046	0.2745	0.1835
<i>Country-level variables</i>						
GDP	590	25.6945	26.9068	27.1182	28.7311	1.2024
FDI	590	0.0050	0.0280	0.0478	0.0974	0.0808
RULE_OF_LAW	590	-0.4927	1.2802	0.9744	1.9079	0.8722
INSIDER_TRADING_LAW	590	0	1	0.8068	1	0.3952
M&A_LAW	590	0	1	0.5119	1	0.5003
DIVIDEND_TAX	590	0	22.45	21.0836	40.4	14.9945
CAPITAL_GAIN_TAX	590	0	15	15.3605	40	15.6314
CAPITAL_STRINGENCY_INDEX	590	1	2	1.8356	3	0.7497

the analysis to non-spread features of loan issuances as well as firm-level value implications.

A. Baseline Results

We begin with the regression specification in [equation \(1\)](#). We first include only country-level controls, in addition to the firm and year fixed effects. This helps address the concern that some firm-level and loan-level variables may be endogenous bad controls. The results are shown in columns 1 and 4 of [Table 2](#), based on the $[-10, +10]$ years and $[-5, +5]$ years window, respectively. We find that loan spread increases markedly for firms after the adoption of board reforms. We then gradually add controls described in [Section II](#) to mitigate potential omitted variable biases. In columns 2 and 5, we include firm and industry characteristics. In columns 3 and 6, we control for all the loan-, firm-, industry-, and country-level variables. We find that the coefficients on POST enter into all the regressions with a significantly positive sign. That is, loan spread on average increases for firms after the adoption of board reforms; and the increase is not driven by the changes of other

TABLE 2
Board Reforms and Loan Spread

Table 2 presents the effect of the first board reform on loan spread. Columns 1–3 are based on the sample of observations from 10 years before to 10 years after the reform; columns 4–6 are based on the sample of observations from 5 years before to 5 years after the reform. The dependent variable is the natural logarithm of *All-in-drawn* spread of a loan in basis point. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable: ln(SPREAD)					
	[−10, +10] Years			[−5, +5] Years		
	1	2	3	4	5	6
POST	0.1891*** (3.40)	0.1857*** (3.52)	0.1637*** (3.01)	0.1411** (2.23)	0.1387** (2.33)	0.1357** (2.24)
<i>Country characteristics</i>						
GDP	−0.0644 (−0.14)	0.1744 (0.39)	0.1665 (0.35)	−0.9327 (−1.30)	−0.7353 (−1.03)	−0.7557 (−1.02)
FDI	−0.4375 (−1.46)	−0.3345 (−1.13)	−0.3130 (−1.11)	−0.0770 (−0.13)	0.0272 (0.05)	0.0916 (0.16)
RULE_OF_LAW	−0.4453** (−2.24)	−0.4629** (−2.30)	−0.4866** (−2.17)	−0.2500 (−0.96)	−0.2541 (−0.98)	−0.2396 (−0.87)
INSIDER_TRADING_LAW	−0.0837 (−0.69)	−0.1646 (−1.41)	−0.1856 (−1.57)	−0.2325 (−1.11)	−0.2748 (−1.36)	−0.2909 (−1.36)
M&A_LAW	−0.1508 (−0.87)	−0.1361 (−0.77)	−0.1503 (−0.80)	−0.1792 (−1.05)	−0.1791 (−0.99)	−0.1963 (−1.02)
DIVIDEND_TAX	−0.0007 (−0.32)	0.0003 (0.12)	0.0003 (0.14)	−0.0040* (−1.93)	−0.0035* (−1.73)	−0.0035 (−1.66)
CAPITAL_GAIN_TAX	0.0038 (0.98)	0.0034 (0.86)	0.0034 (0.84)	0.0071 (1.14)	0.0088 (1.65)	0.0109* (1.97)
CAPITAL_STRINGENCY_INDEX	0.0482*** (3.27)	0.0444*** (3.13)	0.0443*** (3.23)	0.0270 (1.46)	0.0195 (1.22)	0.0171 (1.07)
<i>Firm and industry characteristics</i>						
FIRM_SIZE		−0.1339*** (−36.51)	−0.0888*** (−7.85)		−0.1142*** (−29.28)	−0.0746*** (−5.14)
MTB		−0.0044*** (−12.11)	−0.0042*** (−11.67)		−0.0029*** (−5.12)	−0.0028*** (−4.92)
ln(AGE)		−0.0832*** (−14.84)	−0.0802*** (−14.69)		−0.0371*** (−3.87)	−0.0314*** (−3.07)
LEVERAGE		0.6682*** (49.65)	0.6828*** (51.59)		0.6321*** (28.22)	0.6427*** (28.49)
ROA		−0.2066*** (−11.15)	−0.2077*** (−11.32)		−0.2354*** (−14.48)	−0.2415*** (−14.76)
CASH		0.0981** (2.20)	0.0542 (1.50)		0.0060 (0.24)	−0.0239 (−0.74)
PPE		−0.3680*** (−8.10)	−0.3800*** (−9.39)		−0.4799*** (−10.34)	−0.4896*** (−11.04)
FOREIGN_SALES		0.1000** (2.07)	0.0879** (2.07)		0.0717 (1.27)	0.0540 (1.00)
R&D		0.3089 (1.58)	0.3245* (1.81)		0.2943 (1.64)	0.2675** (2.16)
CAPEX		0.0330** (2.68)	0.0289** (2.20)		0.0034 (0.20)	−0.0077 (−0.70)
CLOSELY_HELD		0.1592*** (9.25)	0.1460*** (8.08)		−0.0025 (−0.14)	−0.0132 (−0.69)
INVESTMENT_GRADE		−0.5802*** (−124.80)	−0.5641*** (−111.23)		−0.6654*** (−201.31)	−0.6489*** (−176.91)
INDUSTRY_Q		0.1564*** (6.94)	0.1631*** (7.34)		0.1713*** (4.28)	0.1857*** (4.79)
<i>Loan characteristics</i>						
LOAN_SIZE			−0.0755*** (−3.72)			−0.0675*** (−3.56)
MATURITY			0.0438*** (6.95)			0.0548*** (7.70)
No. of obs.	35,558	35,558	35,558	21,333	21,333	21,333
Adj. R ²	0.699	0.732	0.739	0.753	0.779	0.784
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

firm characteristics or macro policies. Under the specification in column 3, which has the full set of controls, we document an increase of 18% in the loan spreads ($= \exp(0.1637) - 1$) following the board reforms compared to the pre-reform loan spread. The effect is economically significant. Given that the pre-reform loan spread is 184 basis points on average, this implies a rise of 33 basis points ($= 18\% \times 184$) in loan spread. Moreover, as the average size of the loans in our sample is 343 million, this translates into an increase of 1.1 million ($= 0.33\% \times 343$) increase of interest expenses. The results are in line with the agency theory on shareholder–debtholder conflicts. As board reforms strengthen shareholder rights at the cost of debtholders, debtholders respond by charging a higher interest rate commensurate with the higher risk they bear.

B. Dynamic Effects

In this subsection, we analyze the dynamic effect of the board reforms on the cost of debt. By tracing the changes of loan spread around the board reforms, we can verify i) whether there are omitted factors that influence the loan spread of the treated and control groups differentially before the reforms, and ii) whether and when the actual effect of board reforms takes on after the reforms. We use the following regression specification in equation (2) to conduct the analysis:

$$(2) \ln(\text{SPREADS})_{i,j,c,t} = \alpha + \beta_{\tau} \sum_{\tau=4+}^{4+} D_{c,t}^{\tau} + \gamma_1 X_{i,j,e,t} + \gamma_2 T_{j,c,t} + \gamma_3 Z_{c,t} + \delta_j + \delta_t + \varepsilon_{i,j,c,t},$$

where $\tau \neq 0$.

Specifically, we augment the baseline specification by incorporating a series of relative year dummies as the major independent variables. We set D^{τ} equal to 1 in the $|\tau|$ -th year after (if $\tau > 0$) or before (if $\tau < 0$) a country passes its first board reform, and 0 otherwise. We define D^{4+} equal to 1 for the years on or beyond the fourth year after the reform until the 10th year, and D^{4-} equal to 1 for all of the years on or prior to the fourth year until the 10th year before the reform. The dummy for the year of reform (i.e., $\tau = 0$) is excluded as the year of reform serves as the benchmark. We include the full set of controls that are used in the baseline model, as well as the firm and year fixed effects. If unobservable confounding factors or systematic differences between the treated and control groups, other than board reforms, drive the cost of debt, we would expect to find significant changes in the loan spreads prior to the year of reform.

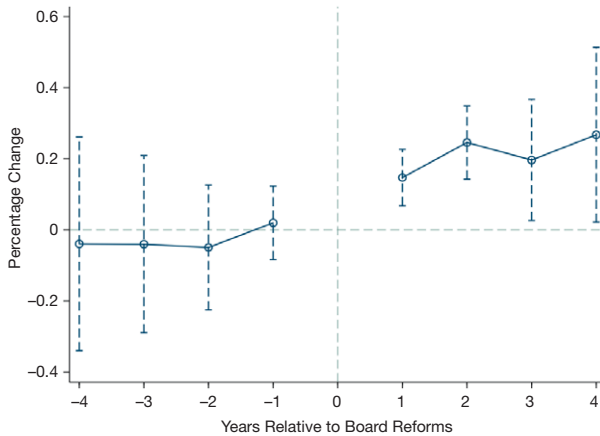
We plot the coefficients on the series of time dummies in Figure 1 to display the dynamic results. The horizontal axis represents the relative years from four (and more) years before to four (and more) years after the board reforms. The vertical axis represents percentage changes in loan spread. Each dot on the diagram represents the coefficient on each relative time dummy estimated using equation (2), which is further surrounded by a dotted line indicating the 90% confidence interval. As shown in the diagram, the coefficients on the relative year dummies are insignificant before the year of board reforms. That is, the treated and control groups are not systematically different prior to the reforms and they have no differential pre-trends in the loan spread. Therefore, it is unlikely that the relation between board reforms and the cost of debts is driven by other unobservable factors. There is

FIGURE 1
Dynamic Effect of Board Reforms on Loan Spread

Figure 1 shows the dynamic effect of the first board reform on loan spread. We plot the coefficient of relative time dummies around the reform based on regression specification (2):

$$\ln(\text{SPREADS})_{i,j,c,t} = \alpha + \beta_t \sum_{\tau=4-}^{4+} D_{c,t}^{\tau} + \gamma_1 X_{i,j,c,t} + \gamma_2 T_{j,c,t} + \gamma_3 Z_{c,t} + \delta_j + \delta_t + \varepsilon_{i,j,c,t} (\tau \neq 0).$$

The dependent variable is the natural logarithm of *All-in-drawn* spread of a loan in basis point. D^{τ} is indicator variables equal to 1 in the $|\tau|$ -th year after (if $\tau > 0$) or before (if $\tau < 0$) a country passes the first board reform, and 0 otherwise. D^{+} equals 1 for all years since the fourth year after the reform. D^{-} equals 1 for all years prior to the fourth year before the reform. Control variables include LOAN_SIZE, MATURITY, FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, CAPITAL_GAIN_TAX, and CAPITAL_STRINGENCY_INDEX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in the estimation. The dotted lines represent the 90% confidence interval of the estimated effect based on robust standard errors clustered at the country level. The year of reform is the omitted group that serves as the benchmark year.



also no evidence that debtholders anticipate the initiation of board reforms and change the loan pricing ex ante. This lends empirical support to the “parallel trend” assumption that is crucial for the validity of DID analysis.

Figure 1 also exhibits that the cost of debt increases significantly in the first year after the board reforms and the increase lasts until the fourth year afterward and beyond. This is consistent with the view that debtholders respond immediately and persistently to the reforms as they expect potential changes or observe actual changes in board structures brought about by the reforms that empower shareholders at their costs. We hereto confirm that the board reforms have a causal effect on the loan pricing incentives of debtholders, who charge higher interests when realizing a higher risk of being expropriated by shareholders.

C. Heterogeneous Results

In this subsection, we investigate the heterogeneous effects of the board reforms on debt costs. The cross-sectional analyses allow us to draw a more complete picture on the effect of the reforms, understand the mechanisms, and explore the channels through which expected changes in board structures affect the pricing incentives of debtholders.

TABLE 3
Board Reforms and Loan Spread: Subsample by Loan Types

Table 3 presents the effect of the first board reform on the spread of term loans and credit lines, respectively. Columns 1 and 2 are based on the sample of observations from 10 years before to 10 years after the reform; columns 3 and 4 are based on the sample of observations from 5 years before to 5 years after the reform. The dependent variable is the natural logarithm of *All-in-drawn* spread of a loan in basis point. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. Control variables include LOAN_SIZE, MATURITY, FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, CAPITAL_GAIN_TAX, and CAPITAL_STRINGENCY_INDEX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable: ln(SPREAD)			
	[−10, +10] Years		[−5, +5] Years	
	Term Loans	Credit Lines	Term Loans	Credit Lines
	1	2	3	4
POST	0.1242* (1.79)	0.2163*** (3.40)	0.1179** (2.03)	0.2889*** (5.44)
No. of obs.	10,726	19,510	6418	10,975
Adj. R^2	0.727	0.737	0.764	0.784
Loan-level controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

1. Heterogeneous Effects by Loan Types

First, we separate term loans and credit lines for our analysis. Theoretically, the board reforms should have an impact on the spread of both types of loans when they are contracted and committed after shareholder–debtholder conflicts are exacerbated. We follow the classification of loan types in DealScan and group the loans into term loans and credit lines.⁹ We apply the same regression specification in equation (1) to each subsample of loans. The results are shown in Table 3. We find that the financing costs for both term loans and credit lines increase significantly for firms located in the reforming country versus those in the countries where the reforms have not yet been adopted. The results are robust to the full set of loan characteristics, firm controls, industry trends, and macro policies, which are omitted from the presentation to conserve space.

2. Heterogeneous Effects by Reform Approaches

Second, we examine the heterogeneous roles of different reform approaches on the cost of debt. Following Fauver et al. (2017), we group reforms by the implementation approaches. Rule-based reforms require all firms to abide by the relevant board changes and are usually implemented through laws and codes promulgated by the government. “Comply-or-explain,” however, permits firms to implement the “best practice” guidelines. That is, the board can either adopt the changes suggested by the reforms or select an alternative plan to achieve the same governance goals. In other words, rule-based reforms can be viewed as compulsory, and “comply-or-explain” reforms as advisory.

⁹Some loans, such as 364-day facilities, acquisition facilities, and CAPEX facilities, are not assigned to either the group. However, our results are robust if we assign these facilities to the group of credit lines.

TABLE 4
Board Reforms and Loan Spread: Subsample by Rule Type

Table 4 presents the effect of the first board reforms on loan spread in countries adopting different rule types. Countries adopting “rule-based” reform impose mandatory rules, and those adopting “comply-or-explain” reform mainly provide recommendations. Columns 1 and 2 are based on the sample of observations from 10 years before to 10 years after the reform; column 3 and 4 are based on the sample of observations from 5 years before to 5 years after the reform. The dependent variable is the natural logarithm of *All-in-drawn* spread of a loan in basis point. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. Control variables include LOAN_SIZE, MATURITY, FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, CAPITAL_GAIN_TAX, and CAPITAL_STRINGENCY_INDEX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable: ln(SPREAD)			
	[-10, +10] Years		[-5, +5] Years	
	Rule-Based 1	Comply-or-Explain 2	Rule-Based 3	Comply-or-Explain 4
POST	0.2796*** (4.38)	0.0681 (0.87)	0.2657*** (3.55)	0.0173 (0.31)
No. of obs.	32,323	3235	19,537	1796
Adj. R^2	0.733	0.761	0.778	0.792
Loan-level controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

We split the sample into two groups according to the reform approach a country adopts. We apply the same regression specification as in equation (1) to each subsample. As reported in Table 4, we find that loan spreads increase materially and significantly after the adoption of rule-based reforms. According to the coefficient in column 1, the average increase is about 32% ($= \exp(0.2796) - 1$), amounting to an increase of 59 ($= 32\% \times 184$) basis points from the pre-reform interest rate and an additional 2-million-dollar ($= 0.59\% \times 343$) interest expense on average. The debt costs for countries with “comply-or-explain” approach, however, barely change as indicated by the insignificant coefficient of POST. The results are consistent with the agency argument on shareholder–debtholder conflict. Debtholders, being aware that mandatory reforms give shareholders strictly greater power to encroach on their wealth that increase the default risk, demand a higher level of compensation for risks and potential losses in terms of loan interests, whereas shareholders and debtholders may have greater leeway to work out a mutually beneficial agreement under the “comply-or-explain” approach.

3. Heterogeneous Effects by Inherent Shareholder–Debtholder Conflicts

Then, we examine whether the changes of loan spread following the board reforms vary in a theoretically predicable way. Specifically, if our results are driven by intensified conflicts between shareholders and debtholders, we would expect to find a larger effect of the reforms on firms in which the shareholder–debtholder conflicts are inherently more severe. Following this idea, we test how loan spread responds to the board reforms under different conflicting conditions. We consider two conflicting conditions and separate the sample into high and low conflict

groups. We then run the regressions in each subsample following the same baseline specification in equation (1).

In the first condition, we define a firm as having intense shareholder–debtholder conflicts if it has a low asset tangibility ratio prior to the reforms. Tangible assets, as discussed in earlier work (Rajan and Zingales (1995), Chaney, Sraer, and Thesmar (2012)), are easy to evaluate and liquidate. Thus, banks are willing to accept tangible assets as collateral to ensure future asset recovery capability. If the tangibility of assets is low for a firm, it implies that debtholders are faced with more credit risks and potentially more intense conflicts with the shareholders in case of default. Thus, we anticipate that board reforms that strengthen shareholder rights would further exacerbate the conflicts among the firms with low asset tangibility, leading to a higher increase of debt costs. Following Rajan and Zingales (1995), we measure the rate of tangibility as the value of property, plant, and equipment (PPE) divided by the total assets of the firm. We compute the mean of the PPE ratio of each firm over the pre-reform period. We then categorize a firm into the high (low) tangibility group if the average ratio of PPE prior to the reform is above (below) the sample median. We apply the same regression specification in equation (1) to the two subsamples and present the results of the $[-10, +10]$ years window in columns 1 and 2, and those of the $[-5, +5]$ years window in columns 5 and 6 of Table 5. Consistent with our conjecture, we find that loan spread increases as much as 54% ($= \exp(0.43) - 1$) in firms with a low tangibility ratio (high conflicts group) after the board reforms, whereas the changes are insignificant for firms with a high tangibility ratio (low conflicts group).

TABLE 5
Board Reforms and Loan Spread: Subsample by Debtholder-Shareholder Conflicts

Table 5 presents the effect of the first board reforms on loan spread in firms with high versus low debtholder-shareholder conflicts. Columns 1–4 are based on the sample of observations from 10 years before to 10 years after the reform; columns 5–8 are based on the sample of observations from 5 years before to 5 years after the reform. We measure debtholder-shareholder conflicts using pre-reform asset tangibility in columns 1, 2, 5, and 6, and dividend distribution practice in columns 3, 4, 7 and 8. A firm is in high (Low) asset tangibility group if the average ratio of PPE over total asset prior to the reform is above (below) the sample median. A firm is in high (low) group if it (did not distribute) distributed dividend prior to the reform. The dependent variable is the natural logarithm of *All-in-drawn* spread of a loan in basis point. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. Control variables include LOAN_SIZE, MATURITY, FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, CAPITAL_GAIN_TAX, and CAPITAL_STRINGENCY_INDEX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable: ln(SPREAD)							
	[-10, +10] Years				[-5, +5] Years			
	Asset Tangibility		Dividend Distribution		Asset Tangibility		Dividend Distribution	
Low	High	High	Low	Low	High	High	Low	
	1	2	3	4	5	6	7	8
POST	0.4300*** (3.88)	0.0808 (1.15)	0.1882** (2.47)	0.1146 (0.94)	0.3837*** (4.41)	0.0332 (0.42)	0.1497** (2.14)	0.0753 (0.61)
No. of obs.	14,717	14,710	16,541	12,886	9049	9219	10,358	7910
Adj. R ²	0.727	0.739	0.730	0.626	0.781	0.785	0.775	0.675
Loan-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

In the second condition, we proxy for shareholder–debtholder conflicts using pre-reform dividend distribution history of firms. Dividend payment is usually associated with stronger shareholder rights (La Porta, Lopez-De-Silanes, Shleifer, and Vishny (2000)) and is unfavorable among private debtholders (e.g., banks) because it reduces disposable cash flows and results in lower solvency in case of default (Rajan (1992), Aivazia, Booth, and Cleary (2006)). Therefore, we expect debtholders of firms with dividend distribution practice to charge a higher interest rate as the board reforms may further increase the default risk they face. To test this conjecture, we divided our sample into high and low dividend-paying groups. We assign a firm to the high dividend group (high conflicts group) if it distributes dividends before the initiation of the board reforms and to the low dividend group (low conflicts group) otherwise. Again, we apply the baseline specification in equation (1) to each subsample. The results are shown in columns 3 and 4 of Table 5 for the $[-10, +10]$ years window and in columns 7 and 8 for the $[-5, +5]$ years window. Specifically, we find that debt costs are more sensitive to board reforms among the firms with pre-event dividend distribution. According to the coefficient of POST in column 3, loan spread increases by 21% ($= \exp(0.1882) - 1$) on average after the reforms. The debt costs of firms without dividend distribution practices are barely affected. Taken together, the results confirm our baseline findings that board reforms generally lead to a higher cost of debt as because they tend to aggravate shareholder–debtholder conflicts.

D. Robustness Tests

In this section, we conduct a set of robustness tests to strengthen our baseline findings. First, there are concerns that the increase of loan spread can be driven by tightened credit supply from banks due to new policies aiming to regulate the industry, especially in the aftermath of the financial crisis. If these policies are adopted at the same time as the board reforms and push-up loan spreads, we may have documented a spurious effect of board reforms on the cost of debt. To ensure that our findings are not confounded by potentially simultaneous policy changes in the banking sector, we incorporate into the baseline regressions a series of indexes on banking policies in each country and reestimate the effect of board reforms. As mentioned above, if the major lender of a loan is from a foreign country, we use the indexes from that country rather than the home country of the borrower to ensure a more precise assessment on the regulatory pressures from the supply side.

Specifically, we obtain eight indexes from Barth et al. (2013) that evaluate various aspects of the regulations governing the banking sector of a country over time. OVERALL_CAPITAL_REQUIREMENT is an index that measures the overall stringency of capital requirements. BANKING_ACTIVITIES_RESTRICTIONS is an index measuring the extent to which banks are restricted from engaging in non-banking activities. FINANCIAL_CONGLOMERATES_RESTRICTIONS is an index measuring the restrictions on banks and non-bank institutions to own or control each other. FOREIGN_BANK_ENTRY and BANKING_ENTRY_RESTRICTIONS are two measures for the entry requirement of banking industry, where a higher value indicates greater entry restrictions and implies lower competition in the sector. We have two more indexes

measuring the strengthen of supervision and monitoring over banking industry by different parties, namely OFFICIAL_SUPERVISORY_POWER and PRIVATE_MONITORING_INDEX. The last index is DEPOSIT_INSURER_POWER, which measures the power of insurance authority to make decisions to intervene in a bank or to take legal action against bank directors or officials. [Appendix A](#) contains detailed definitions of these indexes. Since these regulations can influence credit supply of banks and loan spreads by imposing capital restrictions, configuring market structures, and strengthening oversight and authority, we need to properly control their influence in the analysis to strengthen our findings.

Therefore, we estimate the effect of board reforms controlling for these regulatory changes first one by one and then altogether. We present the results in Supplementary Material Table OA1. In columns 1 to 8, we add each index one at a time into the baseline regression. In column 9, we add all the eight indexes in addition to the baseline controls. We find that the coefficients of POST enter all the regressions with a positive sign significant at the 99% confidence intervals. The magnitude of the estimated treatment effect is also similar to the baseline estimate. The results suggest that, while regulatory changes in the banking sector may also shape the cost of debt, they do not account for the increase of loan spreads driven by the board reforms.

Second, we examine whether board changes, if any, subsequent to the first reform also affect debt costs of the firms. Specifically, we use the year of major reform, as identified by Fauver et al. (2017), to define the key independent variable POST. Note that, for many countries in our sample, the first and major reforms correspond to the same reform. We re-estimate baseline model in [equation \(1\)](#), controlling for loan-, firm-, industry- and country-level characteristics, as well as the firm fixed effects and time fixed effects. We cluster the standard errors at the country level. We present the results in Supplementary Material Table OA2, in which we continue to document a significantly positive effect of board reforms on the cost of debt, including term loans and credit lines. In other words, our results are robust to using the alternative timing for board reforms, suggesting that sequential board structure changes have a prolonged impact on corporate practices and the pricing incentives of debtholders.

E. Reform Components and the Cost of Debt

While we document an overall increase in the cost of debt following the board reforms, it is important to recognize that different aspects of board functions may play a different role in shaping the debt costs. The board reforms we examine focus on one or more of the following components. First, it may set requirements on the presence of independent directors on the board, aiming to improve overall board independence. Second, it may demand the posts of CEO and the Chairman of the board to be taken by different individuals (i.e., separating the duality role of CEO as Chairman). Third, it may also introduce independent audit committees and strengthen their function to improve corporate transparency. Although all of these components are viewed to strengthen shareholders' rights, the component related to the director independence can possibly intensify the shareholder–debtholder conflicts when shareholders play a larger role in influencing corporate policies for their

own benefits, whereas the component related to audit committee is likely to unambiguously benefit both shareholders and debtholders by improving corporate information environment. Specifically, the importance of audit committee independence has been documented by many studies (e.g., Carcello and Neal (2000)). As it increases the transparency and accuracy of financial reporting and other corporate disclosure, it allows banks and other creditors to assess the default risks of firms more precisely so as to revise or enforce their lending contracts more promptly (Easley and O’Hara (2004)). Therefore, we anticipate a smaller increase or a decrease in loan spreads around the board reforms that mainly focus on audit committee functions.

To test this, we define three separate indicator variables. BOARDINDP is set equal to 1 if the board reform of a country only focuses on board independence but not the other two components, and 0 otherwise. SEPDUAL and AUDIT are similarly defined. That is, SEPDUAL (AUDIT) is equal to 1 if the board reform involves only the separation of CEO-Chairman duality (audit committee) but not the other two components, and 0 otherwise. We then interact each of the three indicators with POST, include the interaction terms one at a time into the regressions, and then include all the interaction terms all at once. The results based on the [-10, +10] years window are presented in columns 1–4 of Table 6 and those based on the [-5, +5] years window in columns 5–8. We find that the coefficients of POST remain significantly positive across all the regressions. Besides, the interaction between BOARDINDP and POST takes on a significantly positive sign, while that of AUDIT and POST is significantly negative. This means that, compared to

TABLE 6
Reform of Specific Board Component and Loan Spread

Table 6 presents the differential effect of different component in the first board reform on loan spread. Columns 1–4 are based on the sample of observations from 10 years before to 10 years after the reform; columns 5–8 are based on the sample of observations from 5 years before to 5 years after the reform. The dependent variable is the natural logarithm of *All-in-drawn* spread of a loan in basis point. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. BOARDINDP, DEPDUAL, and AUDIT is an indicator variable equal to 1 if the first board reform of a country only involves components related to board independence, CEO duality and audit committee respectively, but not the other two components, and 0 otherwise. Control variables include LOAN_SIZE, MATURITY, FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, CAPITAL_GAIN_TAX, and CAPITAL_STRINGENCY_INDEX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable: ln(SPREAD)							
	[-10, +10] Years				[-5, +5] Years			
	1	2	3	4	5	6	7	8
POST	0.1630*** (3.02)	0.1599*** (2.96)	0.1709*** (3.14)	0.1655*** (3.10)	0.1264** (2.08)	0.1477** (2.07)	0.1458** (2.36)	0.1454* (2.02)
POST × BOARDINDP	0.3645* (1.80)			0.3559* (1.75)	0.6119*** (3.46)			0.5919*** (3.24)
POST × SEPDUAL		0.0453 (0.86)		0.0541 (0.99)		-0.0891 (-1.40)		-0.0669 (-1.03)
POST × AUDIT			-0.3788*** (-5.66)	-0.3749*** (-5.63)			-0.2436*** (-3.20)	-0.2336*** (-3.02)
No. of obs.	35,558	35,558	35,558	35,558	21,333	21,333	21,333	21,333
Adj. R ²	0.739	0.739	0.739	0.739	0.784	0.784	0.784	0.784
Loan-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

the average effect of the board reforms, the reforms that target only board independence push up loan spreads further, whereas the reforms that are only associated with audit committee functions lead to a decrease in loan spreads. The results are quantitatively and qualitatively similar when we include one interaction or all three interactions in one regression. Specifically, based on the estimates in column 4, the loan spread increases by 68% ($= \exp(0.1655 + 0.3559) - 1$) following a reform that is only related to board independence; the loan spread decreases by 19% ($= \exp(0.1655 - 0.3749) - 1$) after the adoption of a reform that focuses only on audit committee. In these regards, our results verify the agency theory at a more granular level. To the extent that the board reforms strengthen shareholder rights that discipline managers and benefit debtholders (e.g., the effect of improving audit committee independence dominates), we can observe a decrease in the debt financing costs. If the board reforms strengthen shareholder rights and enable them to expropriate debtholders instead, an increase of debt financing costs will dominate our findings. Therefore, our analyses have demonstrated the necessity to investigate the roles of specific governance practices and board component/function changes to develop a more comprehensive and nuanced understanding on the overall and detailed financial implications of the board reforms.

F. Other Impact of Board Reforms

In this section, we conduct a set of additional tests to draw broader implications on the effect of board reforms and provide further support for our baseline findings.

1. Board Reforms and Nonspread Loan Terms

In this subsection, we first assess whether the board reforms also shape other loan terms, such as the use of covenants. It is possible that debtholders use extra loan terms besides charging a higher spread to contract for the increased shareholder–debtholder conflicts following the board reforms. According to Aghion and Bolton (1992) and Armstrong, Guay, and Weber (2010), loan covenants can help reduce agency conflicts between shareholders and debtholders as they transfer certain rights to debtholders *ex ante* under the conditions when shareholders have greater incentives to expropriate debtholders, or directly place restrictions on explorative activities of shareholders. Therefore, we expect firms to increase the likelihood of using some of these provisions either under the pressure of debtholders or to reduce the loan spread. To test this conjecture, we construct three measures on the use of covenants as follows: *D_COVENANTS* is an indicator variable set equal to 1 if the loan issuance deal has imposed at least one covenant on the borrowing firm. As the same set of covenants are applied to all the loans (i.e., loan facilities) issued in the same deal (i.e., loan package) (Bradley and Roberts (2015)), this variable is defined at the deal level. We then follow the literature (e.g., Graham et al. (2008), Christensen and Nikolaev (2012)) and group the covenants into financial covenants and general covenants. Financial covenants include those that require firms to meet certain financial conditions during the loan contract period. For example, a financial covenant may require the firm to maintain an interest coverage ratio above a minimum threshold, or to keep the debt to EBITDA ratio below a certain limit.

TABLE 7
Board Reforms and Loan Covenants

Table 7 presents the effect of the first board reform on performance pricing and loan covenants. Columns 1–3 are based on the sample of observations from 10 years before to 10 years after the reform; columns 4–6 are based on the sample of observations from 5 years before to 5 years after the reform. The respective dependent variable is D_COVENANTS in columns 1 and 4, an indicator variable equal to 1 if a loan package includes covenants and 0 otherwise, D_FINANCIAL_COVENANTS in columns 2 and 5, an indicator variable equal to 1 if a loan package includes financial covenants and 0 otherwise, and D_GENERAL_COVENANTS in columns 3 and 6, an indicator variable equal to 1 if a loan package includes general covenants and 0 otherwise. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. Control variables include DEAL_SIZE, MATURITY, FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, CAPITAL_GAIN_TAX, and CAPITAL_STRINGENCY_INDEX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable					
	[−10, +10] Years			[−5, +5] Years		
	D_COVENANTS	D_FINANCIAL_COVENANTS	D_GENERAL_COVENANTS	D_COVENANTS	D_FINANCIAL_COVENANTS	D_GENERAL_COVENANTS
	1	2	3	4	5	6
POST	0.0919*** (3.68)	0.0458* (1.92)	0.0853*** (3.99)	0.0692** (2.35)	0.0225 (0.92)	0.0588** (2.46)
No. of obs.	25,306	25,306	25,306	15,187	15,187	15,187
Adj. R ²	0.419	0.388	0.468	0.464	0.406	0.516
Deal-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

General covenants normally restrict or specify certain activities of firms, such as restricting dividend distributions, specifying the capital sources for debt prepayment, and setting the required share of votes from lenders to change loan terms or to release collaterals. Accordingly, we define an indicator variable that measures the existence of each type of these covenants, namely, D_FINANCIAL_COVENANTS and D_GENERAL_COVENANTS.

Next, we perform analyses using the three measures, one at a time, as the dependent variable in the regressions. Since covenants are uniform across loans issued in the same deal, we conduct the regressions at the deal level and substitute the loan-level features with deal-level counterparts. That is, we include DEAL_SIZE, which is the natural logarithm of the total amount of loans issued (U.S. dollar) in a deal, and AVERAGE_MATURITY, which is the natural logarithm of average maturity (months) of loans issued in the same deal. The other controls remain the same as in equation (1). We present the results in Table 7. As shown, the likelihood of including at least one covenant or any of the two types of covenants in a deal mostly increase significantly. Therefore, the results suggest that the board reforms push debtholders to use covenants to mitigate agency conflicts with shareholders, confirming that board reforms on average empower shareholders at the cost of debtholders.¹⁰

¹⁰In Supplementary Material Table OA3, we also examine the impact of the board reforms on the use of performance pricing grids and the intensity of covenants. PERFORMANCE_PRICING is an indicator variable set equal to one if a loan contract contains performance pricing grids that specify the

2. Board Reforms and Implications on Firm Value

Thus far, we have documented a series of changes in loan terms as a result of the board reforms. It is interesting to take a step further to examine the value implications of our findings. Specifically, Fauver et al. (2017) have identified a few positive channels, such as enhancing board monitoring, restricting managerial expropriation, and improving information environment, through which the board reforms can lead to an increase in firm value. Our findings, on the other hand, suggest that the board reforms can also exacerbate shareholder–debtholder conflicts and subject the firms relying on debt to a higher financing cost. Therefore, the negative channel through the rising cost of debt can offset the positive impact of strengthened shareholder rights to some extent, implying a smaller increase in firm value. In view of this conjecture, we conduct the following tests to assess the value impact of the board reforms on the firms with external debt dependence in relation to the overall value impact of the reforms.

First, we re-establish the overall impact of board reforms on firm value. Following Fauver et al. (2017), we construct a firm-level panel data set consisting of firm-year observations from 5 years before to 5 years after each board reform. We focus on non-financial firms and keep the control variables used in Fauver et al. (2017). Similarly, we use TOBIN'S_Q as the measure for firm value. TOBIN'S_Q is defined as book value of assets minus book value of equity, plus market value of equity, and divided by book value of assets. We also include firm fixed effects and year fixed effects in the regression and cluster the standard errors at the country level. We present the result in column 1 of Table 8. As shown by the significantly positive coefficient of POST, board reforms increase firm value on average.

Second, we evaluate the relative value impact of the board reforms on firms relying on external debt for financing. We follow the spirits of Rajan and Zingales (1998) in defining external equity dependence and the definition in Huang and Ritter (2021) on debt issuance to construct the measure of external debt dependence (EDD). Specifically, we use industries in the U.S. as the benchmark for defining the degree of external debt dependence at the industry level, because the U.S. capital market is arguably the most developed in the world. We first calculate EDD for each U.S. firm in a year as the net debt issuance divided by total capital expenditures. We obtain the detailed data on long-term debt issuance, long-term debt reduction, and current debt changes from Compustat to calculate net debt issuance. Then, we take the average of EDD over the sample period for each firm to obtain the firm-level EDD. We further take average across all firms in an industry to obtain the EDD measure at the industry level. The EDD measure based on each U.S. industry is then used for the corresponding industry in all the countries in our sample. Next, we define HIGH_EDD as an indicator variable equal to 1 if the

conditions for interest rate adjustments based on the future financial performance and/or credit risks of borrowers, and zero otherwise. Intensity measures of covenants are constructed following Hasan et al. (2014). NO_OF_COVENANTS is equal to the number of covenants included in a loan package. NO_OF_FINANCIAL_COVENANTS and NO_OF_GENERAL_COVENANTS are similarly defined. We use the natural logarithm of one plus the total number of covenants of each type for the regression analysis. For performance pricing, we follow the same regression specification in (1) and perform the analysis at the loan level. For the intensity of covenants, we perform the analysis at the deal level.

TABLE 8
Board Reforms, External Debt Dependence, and Firm Value

Table 8 presents the effect of the first board reform on the value of firms with different external debt dependence and in high versus low asset substitution group. The dependent variable is TOBINS_Q, measured as total assets minus book value of equity plus market value of equity, and scaled by total assets. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. HIGH_EDD is an indicator variable equal to 1 if a firm is operating in industries with greater-than-median external debt dependence, and 0 otherwise. HIGH_ASSET_SUBSTITUTION_RISK is an indicator variable equal to 1 if a firm is operating in industries with higher-than-median sales growth, and 0 otherwise. Industry-level partitioning variables are benchmarked to the U.S. industries. Control variables include FIRM_SIZE, ln(AGE), LEVERAGE, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, and CAPITAL_GAIN_TAX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable: TOBINS_Q				
	All Sample Firms			High Asset Substitution Risk	Low Asset Substitution Risk
	1	2	3	4	5
POST	0.2282** (2.06)	0.3368*** (2.74)	0.2723** (2.25)	0.5175*** (2.93)	0.1821* (1.92)
POST × HIGH_EDD		-0.2415** (-2.49)	0.1425 (1.17)	-0.3951** (-2.31)	0.1722 (1.37)
POST × HIGH_ASSET_SUBSTITUTION_RISK			0.1812 (1.28)		
POST × HIGH_EDD × HIGH_ASSET_SUBSTITUTION_RISK			-0.5455** (-2.20)		
No. of obs.	157,818	157,818	157,818	95,294	62,524
Adj. R^2	0.673	0.673	0.673	0.686	0.614
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

industry EDD of a firm is above the sample median and 0 otherwise. We include the interaction term between POST and HIGH_EDD in the regression, and present the result in column 2 of Table 8. As shown by the coefficient of POST, firms in low EDD group continue to experience an increase in firm value. However, the interaction between POST and HIGH_EDD has a significantly negative coefficient, which suggests that the increase of firm value among those in high EDD group is smaller than that among the low EDD firms. In other words, while the board reforms strengthen shareholder rights and enhance firm value in general, the effect is weakened for firms relying on debt financing, where shareholder–debtholder conflicts and rising debt financing costs also play a non-trivial role.¹¹

Given that the value implications for debt-dependent firms diverge from the non-dependent firms, we further investigate the conditions under which such divergence would be larger or smaller. We draw from the agency theory of debt that shareholder–debtholder conflicts can be more serious if shareholders are more prone to take risky projects that transfer the wealth from debtholders (i.e., asset substitution; Jensen and Meckling (1976)). To capture the risk of asset substitution, which tend to be higher when there are more growth opportunities, we characterize each industry by its inherent growth prospects. Again, we use the U.S. industries

¹¹In Supplementary Material Table OA4, we show that the basic characteristics of firms issuing loans, such as size, age, and leverage, are also different from other firms on average.

as the benchmark and construct industry growth measures as follows: First, we calculate the annual sales growth of each public firm in the U.S. Then, we take the average of annual sales growth over the sample period for each firm. We further take the cross-sectional average across all firms in an industry to obtain a constant growth measure for the industry. We use this growth measure based on the U.S. firms for all the corresponding industries in the countries in our sample and we define an indicator variable, `HIGH_ASSET_SUBSTITUTION_RISK`, which is equal to 1 if the industry growth measure is above the sample median and 0 otherwise. To conduct the test, we interact `HIGH_ASSET_SUBSTITUTION_RISK` with `POST` and `HIGH_EDD`. We have also controlled for the interaction between `HIGH_ASSET_SUBSTITUTION_RISK` and `POST` in the regression. The interaction of `HIGH_EDD` and `HIGH_ASSET_SUBSTITUTION_RISK`, which is constant for firms in the same industry, has been subsumed by the firm fixed effects and does not appear in the regression result.

As the result in column 3 of Table 8 shows, the triple interaction between `POST`, `HIGH_EDD`, and `HIGH_ASSET_SUBSTITUTION_RISK` has a significantly negative coefficient. In other words, the downward pressure from the board reforms on the value of debt-dependent firms is mainly driven by those subjects to greater risk-shifting problems. We also confirm the findings in the subsample analysis, where we divide the sample by the median value of industry growth measure. The results are presented in columns 4 and 5. As shown, the interaction between `POST` and `HIGH_EDD` only takes on a significantly negative sign in the subsample of `HIGH_ASSET_SUBSTITUTION_RISK`. That is, debt-dependent firms that are more prone to take overly risky projects at the cost of debtholders have an even lower firm value following the board reforms.¹²

Kindly note for the results in Table 8 that our measure of firm value does not reflect actual changes in the market value of debt, because there are no readily available secondary market trading data for us to evaluate the market value of syndicated loans around the world. However, it serves as an upper bound on the firm value based on market evaluation, which may have potential (negative) changes due to the negative impact of the board reform on debtholder value. Therefore, it provides us with a conservative estimate on the effect of the board reforms on debtholder and firm value. Even within this framework, we have already observed a much smaller increase (column 2) or even a decrease (column 3) in the value of firms relying on debt. This suggests that the actual impact of the board reform on debtholder value should be even more negative that offsets more of the increase in shareholder value and leads to a relatively lower firm value as a whole.

3. Additional Validity Tests

Finally, we provide a set of additional validity tests at the firm level to render further support for our baseline findings. Specifically, we examine whether firms change other activities after the board reforms and whether these changes are

¹²In the robustness check in Panel B of Supplementary Material Table OA4, we use only firms in the loan sample to explore the value implications of the board reforms. Consistent with the full sample results partitioned by the degree of external debt dependence, the increase in the value of loans-issuing firms is much smaller and indistinguishable from zero, and there is a further decrease if they are operating in industries with greater asset substitution risk.

TABLE 9
Board Reforms, Equity Financing, and Dividend Distribution

Table 9 presents the effect of the first board reform on equity issuance and dividend distribution of firms in the full sample. The dependent variable is PAYOUT_RATIO in column 1, defined as the ratio of cash dividend over the summation of cash dividend and retained earnings, and EQUITY_ISSUANCE in column 2, defined as the change in book equity minus the change in retained earnings, and scaled by total assets. POST is an indicator variable equal to 1 after a country passes the first board reform, and 0 otherwise. Control variables include FIRM_SIZE, MTB, ln(AGE), LEVERAGE, ROA, CASH, PPE, FOREIGN_SALES, R&D, CAPEX, CLOSELY_HELD, INVESTMENT_GRADE, INDUSTRY_Q, GDP, FDI, RULE_OF_LAW, INSIDER_TRADING_LAW, M&A_LAW, DIVIDEND_TAX, and CAPITAL_GAIN_TAX. Appendix A provides detailed definitions of the variables. We include firm fixed effects and year fixed effects in all the regressions. Robust *t*-statistics are reported in parentheses, which are based on standard errors clustered at the country level. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	Dependent Variable	
	PAYOUT_RATIO	EQUITY_ISSUANCE
	1	2
POST	0.0097** (2.12)	0.0201** (2.37)
No. of obs.	91,457	141,527
Adj. R^2	0.602	0.594
Firm-level controls	Yes	Yes
Country-level controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes

consistent with the agency argument on shareholder–debtholder conflicts. First, we expect firms to distribute more income for dividends if shareholder–debtholder conflicts are exacerbated by the reforms. We measure dividend payout ratio as the share of cash dividends over the total of cash dividends and retained earnings of a firm. We then conduct the analysis in the same firm-level sample we used for the value impact analysis above. We include the same firm-, industry-, and country-level controls as in our baseline regressions, together with the firm fixed effects and year fixed effects, and we cluster the standard errors at the country level. The results are shown in column 1 of Table 9. Consistent with our expectation, we find that the payout ratio of firms increases significantly after a country passes the board reform, and the increase is about 26% of the sample median.

Then, we explore whether firms issue more equity after the board reforms given the cost of debt increases. Following Baker and Wurgler (2002), we define net equity issuance (EQUITY_ISSUANCE) as change in book equity minus change in retained earnings, divided by total assets of a firm. We use EQUITY_ISSUANCE as the dependent variable in column 2 of Table 9. Using the same regression specification as above, we find that firms indeed issue significantly more equity on a net basis after the board reforms, which is consistent with a rising debt financing cost.

IV. Conclusion

This study examines the effects of board governance on the cost of debt. Using the staggered board reforms across 41 countries, we identify a causal impact of potential changes in board structures that aim at strengthening shareholder rights on the cost of debt with a DID design. We find that board reforms lead to a significant increase in loan spreads by an average of up to 35 basis points, which is consistent

with the prediction from shareholder–debtholder conflict argument. This effect does not show up before the reforms, but emerges in the first year after the reforms and lasts for a sustained period. We find the effect holds with both credit lines and term loans, in a shorter event window, and is robust to the inclusion of an assortment of banking policies that may shape loan costs from the supply side. Through a variety of heterogeneity analyses, we further establish the channels of our findings. We find that the loan spread increase is more sensitive to rule-based reforms than to “comply-or-explain reforms”, suggesting that stricter implementation empowers shareholders to a larger extent so that they can expropriate wealth from debtholders. We also find that the loan spreads increase more following the reforms if the shareholder–shareholder conflicts are inherently more intense in the firms, such as those with a lower tangibility ratio and pre-event dividend distribution practices. Moreover, we identify the differential roles that each component of the board reform may play in shaping debt costs. We find that while the reform component related to director independence increases the loan spread significantly, the component related to audit committee independence and functionality reduces the loan spread by mitigating information asymmetries facing debtholders. This result sheds light on the importance of probing into specific aspects of a governance form to better understand the effect of improved corporate governance on the cost of debt.

In a set of additional tests, we extend the analysis beyond loan spreads. We find that, while the board reforms strengthen shareholder rights and aggravate the conflicts between shareholders and debtholders, they also induce debtholders to include more covenants in the loan contracts as a way to mitigate the risk of being expropriated by shareholders. The reforms also lead firms to distribute more dividends and use more equity financing, which is consistent with aggravated shareholder–debtholder conflicts and the increase in debt financing cost. Moreover, we assess the value impact of the board reforms in light of our baseline findings, and find that the increase of firm value is not homogeneous across firms. Since firms relying on external debt are more susceptible to the agency conflicts between shareholders and debtholders, and are thus more affected by the rising debt costs, they experience a relatively smaller increase of firm value after the board reforms. Therefore, our findings have generated new insights on the value implications of the board reforms, which help delineate a more comprehensive picture on the worldwide campaigns for better governance.

Appendix A. Variable Definitions

Appendix A provides definition and data sources of all the variables used in the analysis. They are grouped into four categories related to board reforms, macro indicators, firm characteristics, and loan characteristics.

Board Reform

POST: An indicator variable equal to 1 since the year when a country passes a board reform for the first time, and 0 otherwise. Source: Fauver et al. (2017).

BOARDINDP: An indicator variable equal to 1 if the reform of a country involves board independence but not CEO duality or audit-related component, and 0 otherwise. Source: Fauver et al. (2017).

SEPDUAL: An indicator variable equal to 1 if the reform of a country involves CEO duality but not board independence or audit-related component, and 0 otherwise. Source: Fauver et al. (2017).

AUDIT: An indicator variable equal to 1 if the reform of a country involves audit-related component but not board independence or CEO duality, and 0 otherwise. Source: Fauver et al. (2017).

Macro Variables

GDP: The natural logarithm of real Gross Domestic Product (GDP) measured in 2010 U.S. dollar of a country in a year. Source: World Bank-WDI.

FDI: Net flows of foreign direct investment over GDP of a country in a year. Source: World Bank-WDI.

RULE_OF_LAW: Rule of law index measuring the extent to which agents have confidence in the rules of the society, such as the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence, and observe the rules of the society. Source: World Bank-WGI, Kaufmann, Kraay, and Mastruzzi (2009).

INSIDER_TRADING_LAW: An indicator variable equal to 1 after a country enforces insider trading law and 0 otherwise. Source: Bhattacharya and Daouk (2002).

M&A_LAW: An indicator variable equal to 1 after a country adopts M&A laws and 0 otherwise. Source: Lel and Miller (2015).

DIVIDEND_TAX: Annual maximum statutory dividend tax rate in percentage. Source: Hail et al. (2017); IBDF; OECD tax database

CAPITAL_GAIN_TAX: Annual maximum statutory capital gains tax rate in percentage. Source: Hail et al. (2017); IBDF; OECD tax database.

CAPITAL_STRINGENCY_INDEX: An index measuring the extent to which certain funds may be used to initially capitalize a bank and whether the funds are verified by authorities; Higher values indicate greater stringency. Source: Barth et al. (2013).

OVERALL_CAPITAL_REQUIREMENT: An index measuring the extent to which the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined; higher values indicate greater stringency. Source: Barth et al. (2013).

BANKING_ACTIVITIES_RESTRICTIONS: An index measuring the extent to which banks are restricted from engaging in securities, insurance, and real estate activities; higher values indicate greater restrictiveness. Source: Barth et al. (2013).

FINANCIAL_CONGLOMERATES_RESTRICTIONS: An index measuring the extent to which banks (non-financial and non-bank financial firms) are restricted from owning and controlling non-financial firms (banks); higher values indicate greater restrictiveness. Source: Barth et al. (2013).

FOREIGN_BANK_ENTRY: An index measuring the extent to which foreign banks are prohibited from owning domestic banks and entering a country's banking industry; lower values indicate greater stringency. Source: Barth et al. (2013).

BANKING_ENTRY_RESTRICTIONS: An index on the types of legal submissions required to obtain a banking license; higher values indicate greater stringency. Source: Barth et al. (2013).

OFFICIAL_SUPERVISORY_POWER: An index measuring the extent to which the supervisory authorities have the authority to take specific actions to prevent and correct problems in banks and banking industry; higher values indicate greater power. Source: Barth et al. (2013).

PRIVATE_MONITORING_INDEX: An index measuring the degrees of incentives/abilities for private monitoring of banks; higher values indicate more private monitoring. Source: Barth et al. (2013).

DEPOSIT_INSURER_POWER: An index measuring the power of insurance authority to make the decision to intervene in a bank or take legal action against bank directors or officials; higher values indicate more power. Source: Barth et al. (2013).

INDUSTRY_Q: Median Tobin's Q for firms in the same industry-year, based on Fama and French 17 industries. Source: WorldScope.

HIGH_EDD: An indicator variable equal to 1 if a firm operates in industries with high external debt dependence, and 0 otherwise. We define external debt dependence of an industry using the U.S. industries as the benchmark. We first calculate external debt dependence of a firm in a year as the long-term debt issuance minus long-term debt reduction minus current debt changes, divided by total capital expenditures. We then calculate the average external debt dependence of a firm over the sample period, and further take the average across firms in each Fama and French 17 industry. HIGH_EDD is set to 1 if the industry EDD is above the sample median and 0 otherwise. Source: Compustat.

HIGH_ASSET_SUBSTITUTION_RISK: An indicator variable equal to 1 if a firm operates in high asset substitution group, and 0 otherwise. We capture asset substitution risk based on industry sales growth benchmarked to the U.S. We first calculate sales growth of a firm in a year. We then calculate the average annual sales growth of a firm over the sample period, and further take the average across firms in each Fama and French 17 industry. HIGH_ASSET_SUBSTITUTION_RISK is set to 1 if the industry sales growth is above the sample median and 0 otherwise. Source: Compustat.

Firm Characteristics

FIRM_SIZE: The natural logarithm of total assets (in million U.S. dollar) of a firm in a year. Source: WorldScope.

MTB: The ratio of market equity over book equity of a firm in a year. Source: WorldScope.

ln(AGE): The natural logarithm of firm age, defined as the number of years since the incorporation date of a firm and supplemented by the number of years since the first appearance of a firm in the WorldScope database if incorporation date is unavailable. Source: WorldScope.

- LEVERAGE: The ratio of total debt over total asset of a firm in a year. Source: WorldScope.
- ROA: Income before extraordinary item over total asset of a firm in a year. Source: WorldScope.
- CASH: Cash and short-term investments scaled by total assets of a firm in a year. Source: WorldScope.
- PPE: Net property, plant, and equipment scaled by total assets of a firm in a year. Source: WorldScope.
- FOREIGN_SALES: Two-year average of the share of foreign sales over total sales of a firm in a year. Source: WorldScope.
- R&D: Two-year average of the R&D expenditure scaled by total sales of a firm in a year. Source: WorldScope.
- CAPEX: Capital expenditures scaled by total sales of a firm in a year. Source: WorldScope.
- CLOSELY_HELD: The fraction of closely held shares of a firm in a year. Source: WorldScope.
- INVESTMENT_GRADE: An indicator variable equal to 1 if a firm is rated “BBB-” or above in a year. Source: Capital IQ.
- TOBIN’S_Q: Total assets minus book value of equity plus market value of equity, scaled by total assets of a firm in a year. Source: WorldScope.
- EQUITY_ISSUANCE: Net equity issuance measured as change in book equity minus change in retained earnings, scaled by total assets of a firm in a year. Source: WorldScope.
- PAYOUT_RATIO: Cash dividends divided by the summation of cash dividend and retained earnings of a firm in a year. Source: WorldScope.

Loan and Deal Characteristics

- ln(SPREAD): The natural logarithm of the amount the borrower pays in basis points over LIBOR (or equivalent) for each dollar drawn down from the loan. Source: DealScan.
- LOAN_SIZE: The natural logarithm of the dollar amount (U.S. dollar) of loan committed by the lenders. Source: DealScan.
- MATURITY: The natural logarithm of loan maturity in months. Source: DealScan.
- DEAL_SIZE: The natural logarithm of the total dollar amount (U.S. dollar) of the loans committed in a deal. Source: DealScan.
- AVERAGE_MATURITY: The natural logarithm of the average loan maturity in months of the loans in the same package. Source: DealScan.
- PERFORMANCE_PRICING: An indicator variable that equals 1 if a loan includes performance pricing grids. Source: DealScan.
- D_COVENANTS: An indicator variable equal to 1 if a loan package includes covenants and 0 otherwise. Source: DealScan.
- ln(1 + NO_OF_COVENANTS): The natural logarithm of 1 plus the total number of covenants included in a loan package. Source: DealScan.

D_FINANCIAL_COVENANTS: An indicator variable equal to 1 if a loan package includes financial covenants and 0 otherwise. Source: DealScan.

$\ln(1 + \text{NO_OF_FINANCIAL_COVENANTS})$: The natural logarithm of 1 plus the number of financial covenants included in a loan package. Source: DealScan.

D_GENERAL_COVENANTS: An indicator variable equal to 1 if a loan package includes general covenants and 0 otherwise. Source: DealScan.

$\ln(1 + \text{NO_OF_GENERAL_COVENANTS})$: The natural logarithm of 1 plus the number of general covenants included in a loan package. Source: DealScan.

Appendix B. International Board Reforms

Appendix B contains the detailed information on board reforms across countries. Panel A list the information for the first board reform of a country; Panel B list the information for the major board reform of a country. It includes the year of the reform, the component (board independence and the separation of CEO and chairman, audit committee and independence, and nonboard component) the reform involves, and the approaches adopted by the authorities to implement the reform. “Rule-based” means

Country	Year	Board Independence	CEO-Chairman Duality	Audit Committee	Non-Board Component	Approach
<i>Panel A. First Reforms</i>						
Argentina	2001	0	0	1	1	Rule-based
Australia	2003	1	0	1	1	Comply-or-explain
Austria	2002	1	0	1	1	Comply-or-explain
Belgium	1998	1	0	0	1	Comply-or-explain
Brazil	2002	0	0	0	1	Rule-based
Canada	2004	1	1	1	0	Rule-based
Chile	2001	0	0	1	1	Rule-based
China	2001	1	0	1	1	Rule-based
Colombia	2001	0	0	0	1	Rule-based
Czech Republic	2001	0	0	0	1	Rule-based
Denmark	2001	1	0	0	1	Comply-or-explain
Egypt	2002	1	0	1	1	Rule-based
Finland	2003	1	0	1	1	Comply-or-explain
France	2001	0	1	0	1	Rule-based
Germany	2002	1	0	1	1	Comply-or-explain
Greece	1999	0	0	0	1	Comply-or-explain
Hong Kong	2005	1	1	1	0	Comply-or-explain
Hungary	2003	0	0	0	0	Comply-or-explain
India	1998	0	0	0	1	Comply-or-explain
Indonesia	2000	1	0	0	1	Comply-or-explain
Israel	2000	1	1	1	1	Rule-based
Italy	2006	1	0	1	1	Rule-based
Japan	2002	0	0	1	0	Rule-based
Malaysia	2001	1	0	1	0	Comply-or-explain
Mexico	1999	1	0	1	1	Comply-or-explain
Netherlands	1997	0	0	0	1	Comply-or-explain
Norway	2005	1	1	1	1	Comply-or-explain
Pakistan	2002	0	0	1	0	Comply-or-explain
Peru	2002	1	1	1	0	Comply-or-explain
Philippines	2002	1	0	1	1	Comply-or-explain
Poland	2002	1	0	0	1	Comply-or-explain
Portugal	1999	0	0	0	1	Comply-or-explain
Singapore	2003	1	0	1	1	Comply-or-explain
South Korea	1999	1	0	1	1	Rule-based
Spain	1998	0	0	1	1	Comply-or-explain
Sweden	2005	1	1	1	0	Rule-based
Switzerland	2002	0	0	0	1	Comply-or-explain
Thailand	2002	1	0	1	1	Comply-or-explain
Turkey	1999	0	0	0	1	Rule-based
U.K.	1992	1	1	1	1	Comply-or-explain
U.S.	2003	1	0	1	1	Rule-based

Panel B. Major Reforms

Argentina	2001	0	0	1	1	Rule-based
Australia	2004	1	1	1	1	Comply-or-explain
Austria	2004	1	0	1	1	Comply-or-explain
Belgium	2005	1	1	1	1	Comply-or-explain
Brazil	2002	0	0	0	1	Rule-based
Canada	2004	1	1	1	0	Rule-based
Chile	2001	0	0	1	1	Rule-based
China	2001	1	0	1	1	Rule-based
Colombia	2001	0	0	0	1	Rule-based
Czech Republic	2001	0	0	0	1	Rule-based
Denmark	2001	1	0	0	1	Comply-or-explain
Egypt	2002	1	0	1	1	Rule-based
Finland	2004	1	1	1	1	Comply-or-explain
France	2003	0	0	1	1	Rule-based
Germany	2002	1	0	1	1	Comply-or-explain
Greece	2002	1	0	1	0	Rule-based
Hong Kong	2005	1	1	1	0	Comply-or-explain
Hungary	2003	0	0	0	0	Comply-or-explain
India	2002	1	0	1	1	Rule-based
Indonesia	2007	1	0	1	0	Rule-based
Israel	2000	1	1	1	1	Rule-based
Italy	2006	1	0	1	1	Rule-based
Japan	2002	0	0	1	0	Rule-based
Malaysia	2001	1	0	1	0	Comply-or-explain
Mexico	2001	1	0	1	1	Rule-based
Netherlands	2004	1	1	1	0	Comply-or-explain
Norway	2005	1	1	1	1	Comply-or-explain
Pakistan	2002	0	0	1	0	Comply-or-explain
Peru	2005	1	0	1	0	Comply-or-explain
Philippines	2002	1	0	1	1	Comply-or-explain
Poland	2002	1	0	0	1	Comply-or-explain
Portugal	2001	1	0	1	0	Rule-based
Singapore	2003	1	0	1	1	Comply-or-explain
South Korea	1999	1	0	1	1	Rule-based
Spain	2006	1	0	1	1	Comply-or-explain
Sweden	2006	1	1	1	1	Comply-or-explain
Switzerland	2002	0	0	0	1	Comply-or-explain
Thailand	2002	1	0	1	1	Comply-or-explain
Turkey	2002	1	1	0	1	Comply-or-explain
U.K.	1998	1	1	1	1	Comply-or-explain
U.S.	2003	1	0	1	1	Rule-based

the reforms are mandatory regulatory requirements; “Comply-or-explain” means the reforms are generally regulatory recommendations.

Supplementary Material

To view supplementary material for this article, please visit <http://doi.org/10.1017/S0022109022000801>.

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