

Canipek, Aras

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Aras Canipek

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Leibniz Institute for Financial Research SAFE
Sustainable Architecture for Finance in Europe

info@safe-frankfurt.de | www.safe-frankfurt.de

Bankruptcy Law Penalties and Board Independence^{*}

Aras Canipek[†]

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Abstract

A large theoretical literature suggests that bankruptcy law penalties can reduce agency problems, yet evidence remains scarce. To provide evidence, I examine whether firms implement independent directors as a substitute when penalties are eliminated. For identification, I exploit that penalties are relevant only for risky firms. Across countries, board independence is negatively related to penalties, but only among risky firms. Comparing board independence of risky and safe firms around bankruptcy reforms in Germany, Italy, and the US confirms the results. Economically, risky firms increase the number of independent directors by 21% relative to safe firms following the elimination of penalties.

JEL classification: G32, G33, G34, G38, K22.

Keywords: bankruptcy law, board independence, debt, corporate governance.

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[†] Leibniz Institute for Financial Research SAFE. E-mail: canipek@safe-frankfurt.de

“for debt to be an effective source of discipline it must be backed by an appropriate bankruptcy (or insolvency) procedure, i.e. there must be an appropriate ‘penalty’ in the event of default. A bankruptcy mechanism that is ‘soft’ on management – e.g. one that, like Chapter 11, keeps creditors at bay for a long period – may have the undesirable property that it reduces management’s incentive to avoid default, thus undermining the bonding or disciplinary role of debt.”

—Oliver Hart (1995, p. 685)

1. Introduction

A large body of theoretical research suggests that bankruptcy law penalties can reduce agency problems. In particular, it is argued that the threat of strict penalties, such as management dismissal or firm liquidation, motivates managers to avoid bankruptcy by pursuing high profits rather than unprofitable private benefits.¹ The existence of such penalties varies widely across countries: for example, they have historically been present in the UK but absent in the US under Chapter 11.

The hypothesis has two important implications. First, it can help explain the substantial variation in corporate governance structure across countries. For example, a well-documented question is why board independence is around 75% in the US but only about 40% in the UK (e.g., Ferreira and Kirchmaier, 2013). One explanation is that firms substitute among alternative governance mechanisms, with UK firms relying more on bankruptcy penalties as a source of discipline. Second, it has important implications for optimal bankruptcy design. For example, Aghion, Hart, and Moore (1992, pp. 532–533) argue that “a good bankruptcy procedure is one that (...) preserves the (ex ante) bonding role of debt by penalizing management adequately in bankruptcy states.” The absence of penalties may deprive firms of an effective governance device and thus impede their access to financing.

Despite the importance of the hypothesis, empirical evidence remains virtually absent (outlined further below). An extensive literature examines whether creditor-friendly laws facilitate debt financing through higher collateral value or hamper it through greater distress costs, but leaves unexplored the potential governance role of bankruptcy law. Likewise, a large literature examines whether debt mitigates agency problems through increased monitoring, reduced free cash flow, or

¹ For the role of bankruptcy penalties in constraining management from diverting funds, see, e.g., Grossman and Hart (1982); in inducing managerial effort, see, e.g., Dewatripont and Tirole (1994); and in curbing managerial empire building, see, e.g., Zwiebel (1996). For surveys and studies providing discussions on bankruptcy penalties as a governance mechanism, see, e.g., Aghion, Hart, and Moore (1992), Hart (1995, 2000, 2001, 2017), Shleifer and Vishny (1997), and Benmelech and Bergman (2008).

managerial restrictions following covenant violations, but not through bankruptcy penalties. This paper fills this gap.

To provide evidence, I build on the insight that firms substitute among different governance mechanisms (e.g., Hermalin and Weisbach, 2003, 2012; Adams, Hermalin, and Weisbach, 2010). Specifically, I examine whether firms implement independent directors as a substitute when bankruptcy penalties are eliminated.² For identification, I exploit the fact that penalties are relevant only for risky firms in which poor performance actually leads to bankruptcy, which allows for a natural control group in safe firms. The central test of my study is whether board independence increases for risky firms relative to safe firms following a reduction in bankruptcy penalties.

I conduct this test using two approaches. First, across countries, I study whether board independence is more negatively related to bankruptcy penalties among risky firms than among safe firms. I measure bankruptcy penalties using the creditor rights index of La Porta et al. (1998), which captures penalties by including information on management dismissal during bankruptcy and the likelihood of firm liquidation as the bankruptcy outcome (e.g., determined by provisions covering the ability of creditors to seize their assets and the inability of management to seek reorganization without creditors' consent).

Second, around four bankruptcy reforms, I compare changes in board independence of risky firms to those of safe firms. The first reform is Germany's 2012 reform, which reduced penalties by introducing a debtor-in-possession proceeding that allows management to stay in control during bankruptcy and imposes automatic stay on assets. The next two reforms are Italy's 2005–2006 reforms. The 2005 reform reduced penalties by removing strict restrictions for a debtor to enter the reorganization procedure. Afterwards, the 2006 reform increased penalties by implementing provisions that increase creditors' incentives to press for liquidation. The fourth reform is the US Bankruptcy Reform Act of 1978, which marks the origin of today's Chapter 11 and reduced penalties by introducing changes to the debtor-in-possession proceeding that lowered liquidation risk. The reform is analyzed out of sample using hand-collected data from Graham, Kim, and Leary (2020).

² For studies finding a substitution effect between board independence and alternative governance mechanisms, see, e.g., Gillan, Hartzell, and Starks (2006), Coles, Lemmon, and Wang (2008), and Ferreira, Ferreira, and Raposo (2011). For studies finding a substitution effect between other governance mechanisms, see, e.g., La Porta et al. (1998), Giroud and Mueller (2010), and Bharath and Hertz (2019).

I begin with the cross-country analysis. Consistent with the hypothesis that bankruptcy penalties induce discipline, I find a negative relation between board independence and penalties, but only among risky firms. Economically, a change from strictest to softest penalties is associated with a 21% increase in the number of independent directors (or a 6 percentage-point increase in the ratio of independents to board size) for risky firms relative to safe firms. This large effect suggests that penalties are viewed as a powerful mechanism for disciplining management.

Given the size of the effect, my findings explain a meaningful portion of the cross-country variation in board structure. For instance, differences in bankruptcy governance account for approximately 6% of the 35 percentage-point difference in the average ratio of independent directors to board size between the US and the UK.

Notably, I also find a discontinuous decrease in board independence at Altman's 1.81 Z-score threshold in countries with high penalties. This is consistent with the notion that investors commonly use the threshold to assess firms' risk status and reduce their demand for board governance when firms are subject to bankruptcy governance. In contrast, no such discontinuity exists in countries with low penalties.

Next, I examine the bankruptcy reforms. Consistent with the cross-country results, I find that risky firms increased the number of independent directors relative to safe firms following the reduction of penalties in Germany. Likewise, risky firms relatively increased (reduced) board independence following the reduction (increase) of penalties in Italy. Finally, risky firms relatively increased board independence following the reduction of penalties in the US. The economic magnitudes are also similar to those in the cross-country analysis.

To support the interpretation of a governance substitution channel, I analyze heterogeneity among risky firms. In particular, I find that the substitution effect between board independence and penalties is stronger for risky firms with potentially higher agency problems (specifically, low investment opportunities), that is, when corporate governance is more important. The substitution effect is also stronger for risky firms in which firm-specific knowledge is relatively unimportant, consistent with the board literature suggesting that independent directors play a governance role in less complex firms and an advisory role in more complex firms. I also find that the substitution effect is stronger for risky firms with more financial constraints, consistent with the notion that such firms must have strong governance to access financing.

Additional results confirm the causal interpretation of the findings. First, a concern with the cross-country evidence is that an omitted variable jointly determines bankruptcy law and board structure, and further affects board structure differently for risky and safe firms. However, across countries, bankruptcy law is not set by a single determinant but by different ones, such as financial crises, corporate scandals, or political factors. Moreover, these determinants are unlikely to affect risky and safe firms differently. Second, a concern with the findings from the bankruptcy reforms is that confounding shocks affected risky and safe firms differently. Yet, risky and safe firms exhibited parallel trends prior to the reforms, suggesting that both groups typically experience common shocks. Additionally, board structure is highly sticky, suggesting that it is largely determined by time-invariant factors. Finally, in other countries risky firms did not change board structure relative to safe firms following the German and Italian reforms, suggesting that the results are not driven by confounding shocks common across countries.

My paper makes three contributions. First, it contributes to the large literature studying how bankruptcy design can affect financing. The literature focuses on two channels through which a creditor-friendly law can facilitate or hamper financing. Specifically, it increases collateral value and thus may allow firms to increase debt, but it also increases distress costs and thus may induce firms to reduce debt (e.g., Acharya and Subramanian, 2009; Acharya, Amihud, and Litov, 2011; Vig, 2013; Ponticelli and Alencar, 2016; Rodano, Serrano-Velarde, and Tarantino, 2016; Schoenherr and Starmans, 2022; Canipek et al., 2026). My paper identifies a “governance channel”: a creditor-friendly law can provide good governance, thereby allowing firms to increase debt and equity financing. Although the governance role of bankruptcy law has been extensively discussed in theory, it has been largely ignored by the empirical bankruptcy literature.

Regarding policy implications, the findings support the notion that, in some situations, bankruptcy law should preserve its governance role by penalizing management in default; otherwise management may face difficulty securing financing *ex ante* (Aghion, Hart, and Moore, 1992). While my results show that firms attempt to substitute penalties with board independence, they do not indicate whether penalties are perfectly substitutable. For example, Canipek (2026) shows that penalties are not perfectly substitutable in dual-class firms, in which traditional governance mechanisms tend to function less effectively. Importantly, my findings do not imply that a creditor-friendly law is necessarily the optimal solution, as the distress costs channel may ultimately dominate in other situations. In this respect, the results lend further support to recent proposals advo-

cating a menu approach, in which a creditor-friendly and debtor-friendly code coexist, thereby allowing different firm types to select the procedure that suits them best (e.g., Schoenherr and Starmans, 2022; Becker and Oehmke, 2025; Canipek et al., 2026).³

Second, my paper contributes to the substantial literature examining whether debt reduces agency problems. The literature shows that debt mitigates problems through the channels of reduced free cash flows (e.g., Jensen, 1986), increased monitoring (e.g., Harvey, Lins, and Roper, 2004), and managerial restrictions following covenant violation (e.g., Chava and Roberts, 2008; Nini, Smith, and Sufi, 2009, 2012; Roberts and Sufi, 2009a, 2009b; Ferreira, Ferreira, and Mariano, 2018; Bharath and Hertz, 2019). I show that debt reduces agency conflicts through an additional channel, bankruptcy penalties. I am unaware of studies that provide such evidence.⁴ Notably, penalties may impose not only a direct incentive effect but also an indirect one by influencing the effectiveness of covenants. A creditor-friendly law strengthens creditors' bargaining power in renegotiations following covenant violation, thereby increasing the extent of possible new restrictions.

Finally, my paper contributes to the literature studying the determinants of board independence. The literature documents large cross-sectional variation in board independence (Doidge, Karolyi, and Stulz, 2007; Ferreira and Kirchmaier, 2013). Although it is recognized that country characteristics have greater explanatory power than firm characteristics, "much of the cross-sectional variation in board independence remains unexplained" (Ferreira and Kirchmaier, 2013, p. 212).^{5,6} Ferreira and Kirchmaier (2013) define the cross-country variation as the "independence

³ An alternative approach would be to incorporate the governance channel into a debtor-friendly law by including provisions that make bankruptcy penalties contingent on managerial misconduct (e.g., determined by the performance of comparable firms). Along these lines, for some firms such as unlisted large firms, the debtor-friendly law in Korea stipulates that the incumbent management may not be allowed to stay in control if bankruptcy was caused by material mismanagement (Park, 2008).

⁴ Related evidence comes from studies that find a negative relation between managerial entrenchment and debt and suggest that this is consistent with entrenched managers avoiding the disciplinary role of debt (Berger, Ofek, and Yermack, 1997; Garvey and Hanka, 1999), or from studies that find a positive relation between debt and firm value and suggest that this is consistent with debt being valued as a governance device (e.g., Jung, Kim, and Stulz, 1996; Harvey, Lins, and Roper, 2004). However, these papers examine the governance role of debt more broadly, encompassing not only the incentive effect from penalties but also those from the other channels.

⁵ Boone et al. (2007) and Linck, Netter, and Yang (2008) show that important firm characteristics can only explain about 20–30% of the variation in board independence. In contrast, Doidge, Karolyi, and Stulz (2007) show that country-level dummy variables can explain up to 70% of the variation in firm-level governance. However, when the authors attempt to explain this variation using country characteristics associated with corporate governance—such as economic and financial development, shareholder rights, and enforcement quality—they find that these variables only explain about 20% of the variation.

⁶ As noted by Ferreira, Ferreira, and Mariano (2018), the economic significance of the effects of important firm characteristics on board independence is low across virtually all regressions in the literature. For example, Boone et

gap”. To my knowledge, this is the first paper showing that differences in bankruptcy governance explain a meaningful share of the independence gap.

The remainder of the paper proceeds as follows. Section 2 describes the data. Section 3 presents the results. Section 4 offers discussions. Section 5 concludes.

2. Data and summary statistics

2.1 Data

I study the relation between board independence and bankruptcy penalties for risky and safe firms, controlling for country and firm characteristics. I obtain board data from BoardEx. The data on the creditor rights index as a country-specific measure of bankruptcy penalties are from 2003 and come from Djankov, McLiesh, and Shleifer (2007), who updated and enlarged the data of La Porta et al. (1998). Other country-level variables are from Djankov, McLiesh, and Shleifer (2007), Djankov et al. (2008), and the World Bank database. The firm-level variables are from Worldscope. Table A.1 in the Appendix presents detailed variable definitions and data sources.

I choose the sample period 2002–2016 to cover the years around the 2005–2006 Italian and 2012 German bankruptcy reforms that are used as natural experiments.⁷ I exclude firms from financial industries (SIC codes 6000–6999). Additionally, I exclude each firm-year observation without complete data on the dependent and control variables used in the main empirical analysis, without data on Altman’s Z-score (as a firm-specific measure of bankruptcy probability), or with negative or zero total assets or sales. Finally, I winsorize all firm-level control variables at the 1st and 99th percentiles to account for outliers. The final sample consists of 86,901 firm-year observations from 11,964 firms in 49 countries.

The data used to study the US Bankruptcy Reform Act of 1978 are described in Section 3.2.3 below.

al. (2007) and Ferreira, Ferreira, and Raposo (2011) show that a one-standard-deviation change in size, age, leverage, number of business segments, CEO tenure, and CEO ownership is associated with a 1.8, 2.4, 1.2, 1.3, 1.9, and 4.8 percentage-point change in board independence, respectively. The study by Ferreira, Ferreira, and Mariano (2018) is a notable exception, showing that the number of independent directors increases by 24% following covenant violations.

⁷ A concern with the sample period might be that the creditor rights index is from 2003 and that scores could have changed over the period. Although changes occasionally occur, Djankov, McLiesh, and Shleifer (2007) show that creditor rights scores are highly stable over time—for example, the correlation between the 1978 and 2003 scores is 0.95. In unreported results, I repeat the main cross-country tests in Table 2 below using only observations from 2003 and obtain similar results.

2.1.1 Data on board independence

Following Ferreira, Ferreira, and Mariano (2018), I use the absolute number of independent directors as the primary measure and not the ratio of independents to board size, for two reasons. First, independent directors can exert pressure on management regardless of their share of the board. The more independents, the higher the probability that someone is “unfriendly”, that is, someone who asks the right questions or initiates a CEO dismissal. Second, ratios are not informative about changes in either the number of independents or board size following board adjustments. For robustness, I also present results using the ratio of independents to board size, which also provides information about the potential influence of independents on board decisions. Additionally, I present results for board size, which allows inference as to whether independents replace outgoing directors or are added to the board following board changes.

2.1.2 Data on bankruptcy penalties

I use the creditor rights index of La Porta et al. (1998) as a country-specific measure of managerial bankruptcy penalties. The creditor rights index, CRIGHTS, is comprised by four binary components that include the power of creditors against management in bankruptcy: MANAGES, equals one if an administrator is appointed for running the business during the reorganization procedure, that is, management is dismissed, and zero if management retains corporate control during reorganization; REORG, equals one if there are restrictions, such as creditors’ consent, when a firm files for reorganization, and zero if management can unilaterally seek protection from creditors; AUTOSTAY, equals one if secured creditors are able to seize their collateral after the reorganization petition is approved, and zero if automatic stay on the assets prevents the firm from creditors; and SECURED, equals one if secured creditors are paid first from the proceeds of liquidating the firm, and zero if other claimants, such as the government or workers, have priority.

Consequently, the index measures penalties by including information on management dismissal during bankruptcy (MANAGES) and the likelihood of firm liquidation as the bankruptcy outcome (directly determined by REORG and AUTOSTAY, and indirectly by SECURED, which affects creditors’ incentives to press for liquidation). The index ranges from zero to four, with higher values indicating stricter penalties on management in bankruptcy.

2.1.3 Control variables

I control for a set of country and firm characteristics that are possible determinants of board independence or bankruptcy penalties. The country characteristics include legal origin, which can shape creditor rights in countries where bankruptcy law is adapted through conquest or imperialism (La Porta et al., 1998; Djankov, McLiesh, and Shleifer, 2007); shareholder rights, which can be a substitute for other governance mechanisms (La Porta et al., 1998); the quality of legal enforcement, which can substitute for or complement other governance mechanisms (La Porta et al., 1998; Doidge, Karolyi, and Stulz, 2007); and the levels of financial development (market capitalization) and economic development (GDP per capita), as stronger financial development can increase the benefits of governance through greater funding opportunities, while higher economic development can reduce governance costs through a more skilled labor force (Doidge, Karolyi, and Stulz, 2007; Aggarwal et al., 2009).

Following Boone et al. (2007) and Ferreira, Ferreira, and Raposo (2011), the firm characteristics include size, as size can be related to agency problems and firms with multiple business lines may require specialized monitoring; free cash flow and profitability, which can be related to agency problems; R&D expenditures and volatility, as outsider monitoring may be more costly and less effective for research-intensive or volatile firms; and the market-to-book ratio, which can be related to agency problems (i.e., investment opportunities). Additionally, I control for insider ownership, as higher ownership can increase managers' cost of extracting private benefits (Doidge, Karolyi, and Stulz, 2007); and for leverage, which can be related to agency problems and the need for governance mechanisms.⁸

For robustness, Table A.2 in the Appendix repeats the main cross-country tests in Table 2 below with additional country-level controls. These variables include accounting standards (which may substitute for or complement board independence, see La Porta et al., 1998; Anderson, Mansi, and Reeb, 2004), average institutional ownership (which may affect corporate governance, see Aggarwal et al., 2011), board structure (one-tier, two-tier, or mixed), and board rules requiring or encouraging board independence (rule-based, comply-or-explain, or no rule). While the inclusion of these variables considerably reduces the sample size, the findings remain unaffected. My iden-

⁸ For many firms, information on insider ownership is missing in some years but available in others. In case of missing data, I use the average ownership value computed over the years for which data is available. My results remain unaffected when excluding firm-years without ownership data or when extending the sample by including firms for which ownership data is never available.

tification strategy compares risky and safe firms, and these variables should affect both groups equally.⁹

2.2 Summary statistics

Table 1 reports summary statistics at the country level. Four facts are noteworthy. First, board independence varies significantly across countries. Ferreira and Kirchmaier (2013) refer to this phenomenon as the “independence gap”. For example, columns 1 and 5 show that the average number of independent directors and the average ratio of independents to board size are approximately 6 and 75% in the US, compared with only 3 and 40% in the UK.¹⁰ These differences suggest an important role for country variables in shaping board independence.

Second, board independence and bankruptcy penalties appear to be negatively related when comparing countries with similar characteristics. For example, the US and Canada have high independence and low penalties, whereas the UK and Germany have low independence and high penalties. Likewise, Finland, Sweden, and Norway have high independence and low penalties, while Denmark has lower independence and higher penalties.

Third, there is little within-firm variation in board independence. Column 3 shows that firms change the number of independents only about once every $1 / 0.37 = 3$ years. Column 4 further shows that the within-firm standard deviation is small, suggesting that these rare changes involve only minor adjustments.¹¹ Additional evidence comes from Figure 5 below, which plots board independence over time for different countries. While there is a trend toward more independence (likely caused by worldwide board reforms encouraging independence), there is little variation around this trend. This sticky feature of board structure suggests that it is determined largely by

⁹ There are also additional firm-level variables that may affect board independence, such as firm age or number of business segments (Boone et al., 2007; Ferreira, Ferreira, and Raposo, 2011), as well as the level of other substitute governance mechanisms, such as incentive compensation or takeover provisions. I do not include these variables, as their inclusion significantly reduces sample size. Again, potential endogeneity problems due to omitted variables are mitigated by the focus on the interaction between board independence and bankruptcy penalties across risky and safe firms. In particular, there is no obvious reason why omitted variables should differentially affect countries with different bankruptcy regimes or firms with different default probabilities.

¹⁰ For the large cross-sectional variation in board independence, see also, e.g., Doidge, Karolyi, and Stulz (2007). For the low economic effects of known determinants of board independence and their inability to explain the variation, see Boone et al. (2007), Doidge, Karolyi, and Stulz (2007), Linck, Netter, and Yang (2008), Ferreira, Ferreira, and Raposo (2011), Ferreira and Kirchmaier (2013), and Ferreira, Ferreira, and Mariano (2018).

¹¹ Of the 74,948 possible within-firm changes in the number of independent directors in my sample, only 27,753 resulted in a change. Of these, only 6,461 involved the addition or removal of more than one independent, and only 1,535 involved more than two.

static factors rather than by changing conditions, providing a good environment for a natural experiment by reducing concerns about confounding shocks.

Finally, observations from the US and the UK account for approximately 60% of the full sample. I also report the results excluding US and UK firms.

3. Results

3.1 Cross-country analysis

3.1.1 Results

The central test in this paper is whether risky firms implement independent directors relative to safe firms when bankruptcy legislation that is soft on management makes bankruptcy governance ineffective. In a first step, I conduct this test across countries. Specifically, I study whether board independence is more negatively related to bankruptcy penalties among risky firms relative to safe firms.

To this end, I divide firms into quartiles based on their bankruptcy risk ranking within their country in a given year, and define firms in the highest quartile as risky firms and firms in the lowest quartile as safe firms (excluding firms in the second and third quartiles). I estimate the following ordinary least squares (OLS) panel regression:

$$\begin{aligned}
 \text{Dependent variable}_{i,j,c,t} & \quad (1) \\
 &= \beta_0 + \beta_1(CRIGHTS_c * HighRisk_{i,j,c,t}) + \beta_2 CRIGHTS_c + \beta_3 HighRisk_{i,j,c,t} \\
 &+ \beta_4 X_{i,j,c,t} + \beta_5 Y_t + \beta_6 Z_j + \epsilon_{i,j,c,t},
 \end{aligned}$$

where the dependent variable is either the logarithm of the number of independent directors, the ratio of independents to board size, or the logarithm of board size; i indexes firms, j indexes industries, c indexes countries, and t indexes time; $CRIGHTS_c$ is the creditor rights index; $HighRisk_{i,j,c,t}$ is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution, and zero if it is in the lowest quartile; $X_{i,j,c,t}$ are the firm and country characteristics; Y_t are year fixed effects that control for time-varying factors common across firms; Z_j are industry fixed effects (based on the two-digit SIC code) that control for possible differences across industries; $\epsilon_{i,j,c,t}$ is the error term; and β_1 is the coefficient of interest, which measures the

relation between the dependent variable and bankruptcy penalties for risky firms relative to safe firms.

I measure bankruptcy risk with Altman's Z-score (Altman, 1968). Table A.3 in the Appendix repeats Table 2 below using the interest coverage ratio as a proxy for bankruptcy risk, and reports similar results. Finally, I cluster standard errors by country, although the conclusions are identical when errors are clustered by firm.¹²

Columns 1 and 2 of Panel A of Table 2 report the results for the logarithm of the number of independent directors (plus one to include observations with zero independents) as the primary measure of board governance. Column 1 presents the estimates for the full sample, and column 2 presents the estimates without US and UK firms. Consistent with the hypothesis that bankruptcy penalties induce discipline, in both columns the coefficient on $CRIGHTS_c * HighRisk_{i,j,c,t}$ is negative and statistically significant; that is, board independence is more negatively related to penalties among risky firms than among safe firms. In fact, for the more general case in column 2, while board independence and penalties are negatively related among risky firms, no relation exists among safe firms (t -value of -0.91 for the $CRIGHTS_c$ coefficient).¹³

The economic effect is sizable. Column 2 shows that a change from strictest to softest penalties is associated with an approximately $4 \times 0.052 = 21\%$ increase in the number of independent directors for risky firms relative to safe firms. This effect suggests that bankruptcy penalties are valued as a powerful mechanism for disciplining management. This is consistent with the substantial personal costs imposed on managers by dismissal and liquidation, who typically face significant difficulty finding comparable employment and incur large income losses following removal, as well

¹² I cluster standard errors at the country level as observations may be correlated within countries—corporate governance may be correlated within a country because some governance rules are mandated by country regulations (Aggarwal et al., 2011). This method is in line with other cross-country studies that examine the effect of firm and country characteristics on firm-level corporate governance (e.g., Doidge, Karolyi, and Stulz, 2007; Aggarwal et al., 2009; Aggarwal et al., 2011). However, the summary statistics show that board structure is persistent within a firm, suggesting that observations may not be independent over time within a firm. In unreported results, I mitigate this concern in two ways. First, I cluster errors at the firm level. I find that the errors are smaller than those clustered at the country level, suggesting that clustering by country presents the more conservative approach. Second, I estimate errors using country-level clustering, but only including observations from a single year (e.g., 2003, 2009, or 2016). I find that the results are similar to those of the main analysis.

¹³ When US and UK firms are included in column 1, there is also a negative relation between board independence and penalties among safe firms. However, since US and UK firms account for more than half of the full sample observations, this result likely reflects an omitted variable correlated with both board independence and bankruptcy law. As discussed in Section 3.1.4 below, while it is unlikely that such an omitted variable exists across most countries (bankruptcy law is typically determined by different reasons across countries), it is possible when considering only two countries.

as large liquidation costs related to firm-specific human capital and equity stakes (e.g., Eckbo, Thorburn, and Wang, 2016; Nielsen, 2024).

In columns 3 and 4, I repeat the analysis using the ratio of independent directors to board size as an alternative measure of board governance. The findings remain consistent. Column 4 implies that moving from the strictest to the softest penalties is associated with an approximately 6 percentage-point increase in the ratio for risky firms relative to safe firms. This result not only ensures the robustness of the findings, but also indicates that firms grant independent directors more voting power when bankruptcy governance is ineffective.

Finally, columns 5 and 6 report the estimates using the logarithm of board size as the dependent variable. Board size tends to be more negatively related to bankruptcy penalties for risky firms than for safe firms, but the difference disappears in the broader case in which US and UK firms are excluded. This result suggests that independents replace dependents rather than being added to the board. The result is consistent with the notion that small boards are more effective at monitoring management (Yermack, 1996) and further suggests that board independence is increased at relatively low costs.

In Table A.4 of the Appendix, I also interact $HighRisk_{i,j,c,t}$ with the individual components MANAGES, REORG, AUTOSTAY, and SECURED to examine differences across risky and safe firms in the relation between board independence and the components of the creditor rights index. The difference in the negative relation is strongest for the three components that impose high bankruptcy costs by mandating management dismissal during bankruptcy (MANAGES) or directly increasing liquidation risk (REORG and AUTOSTAY). In contrast, the difference is weakest for the component that imposes lower bankruptcy costs by increasing liquidation risk only indirectly (SECURED).

3.1.2 Bankruptcy governance and the independence gap

Given the size of the documented effect, bankruptcy governance may help explain an important part of the cross-country variation in board independence. For instance, how much of the 35 percentage-point independence gap between the US and the UK can be explained by differences in bankruptcy governance between the two countries?

To gain intuition, one approach is to classify roughly half of the firm population as risky firms (in which bankruptcy penalties play some role) and the other half as safe firms (in which penalties

play no role). Panel B of Table 2 repeats the analysis of Panel A, but divides the initial sample into two groups rather than four. $HighRisk_{i,j,c,t}$ is a dummy variable that equals one if a firm is in the upper half of the bankruptcy risk distribution, and zero if it is in the lower half.¹⁴

Columns 2 and 4 show that a change from strictest to softest penalties is associated with an increase in the number of independents by 13% and an increase in the ratio by 4 percentage-points for risky firms relative to safe firms. Note that these economic effects are smaller than those of Panel A, which is consistent with the fact that safer firms are included in the group of risky firms and riskier firms are included in the group of safe firms.

Given that the US and the UK represent the two extremes of a management-friendly and a creditor-friendly bankruptcy law, differences in bankruptcy governance can explain approximately $13 / 2 = 7\%$ of the difference in the average number of independent directors and $4 / 2 / 35 = 6\%$ of the difference in the average ratio of independents to board size between the two countries. Bankruptcy governance therefore explains a non-trivial share of the cross-country variation in board independence.

3.1.3 Visual evidence and discontinuity around Altman's 1.81 Z-score threshold

A visualization of the relation between board independence and bankruptcy risk across countries with high and low bankruptcy penalties provides additional insights. Figure 1 plots the number of independent directors against Altman's Z-score, separately for countries with high penalties in Panel A ($CRIGHTS > 2$) and countries with low penalties in Panel B ($CRIGHTS \leq 2$). Additionally, the figure indicates the conventional 1.81 Z-score threshold, which defines firms below the threshold as risky. To obtain a more general view, I exclude the US and UK.

Three facts emerge. First, the figure mirrors the findings of Table 2. Among safe firms (firms above the 1.81 threshold), board independence is similar across countries with high and low penalties; that is, a shift from high to low penalties does not change board independence. In contrast, among risky firms (firms below the 1.81 threshold), board independence is lower in countries with

¹⁴ To be considered in the analysis, a country needs to have at least four firms in Panel A and two firms in Panel B for a given year, which explains the variation in the number of countries and observations across panels as well as regarding the summary statistics in Table 1. Note that dividing firms by the bankruptcy risk ranking within their country in a given year may result in limited differentiation between risky and safe firms in country-years with few firms. Alternatives include dividing firms by the ranking over all years, over all countries, or applying Z-score thresholds to classify risky and safe firms (e.g., common thresholds define firms with a Z-score below 1.81 as risky and those above 3.3 as safe). In unreported tests, I find virtually identical results using these alternative approaches.

high penalties than in countries with low penalties; that is, a shift from high to low penalties increases board independence.

Second, the figure shows that the negative relation among risky firms is driven by risky firms in countries with high penalties reducing board independence, rather than by risky firms in countries with low penalties increasing board independence. Specifically, risky firms in countries with high penalties reduce board independence relative to safe firms, suggesting that these firms decrease board monitoring because they are subject to bankruptcy governance. In contrast, risky firms in countries with low penalties do not materially change board independence relative to safe firms.

Third, the figure shows a discontinuous decrease in board independence around the 1.81 threshold in countries with high penalties. This is consistent with investors commonly using the threshold to assess firms' risk status and reducing their demand for board monitoring for firms below the threshold. In contrast, there is no discontinuous change in board independence in countries with low penalties.

To statistically test for discontinuities, I estimate the following regression discontinuity (RD) model:

$$\begin{aligned} \text{Dependent variable}_{i,j,c,t} = & \beta_0 + \beta_1 1(ZS_{i,j,c,t} < \tau) + f(ZS_{i,j,c,t} - \tau) + \beta_2 X_{i,j,c,t} + \beta_3 Y_t + \beta_4 Z_j + \epsilon_{i,j,c,t}, \end{aligned} \quad (2)$$

where the dependent variable is one of the board variables of interest; i indexes firms, j indexes industries, c indexes countries, and t indexes time; $1(ZS_{i,j,c,t} < \tau)$ is a dummy variable that equals one if a firm has a Z-score $ZS_{i,j,c,t}$ below the 1.81 threshold τ , and zero otherwise; $(ZS_{i,j,c,t} - \tau)$ accounts for the effect of the Z-score on the dependent variable in the following way $f(\cdot)$; $X_{i,j,c,t}$ are the firm and country characteristics; Y_t are year fixed effects; Z_j are industry fixed effects; $\epsilon_{i,j,c,t}$ is the error term; and β_1 is the coefficient of interest, which measures the change in the dependent variable for firms below the threshold relative to firms above the threshold (the RD estimate). Standard errors are clustered by country.

I use an ad hoc bandwidth of three, although my findings are not sensitive to alternative bandwidth choices within a reasonable range. $f(\cdot)$ represents a linear fit on each side of the threshold,

based on the graphical observation that board independence around the threshold follows an approximately linear pattern.

Columns 1–6 of Table 3 present the results for countries with high penalties. Confirming the graphical evidence, columns 1–2 show that there is a discontinuous reduction in the number of independent directors around the threshold. Columns 3–4 show that there is also a decrease in the ratio of independent directors to board size. Columns 5–6 show that board size does not change. In contrast, columns 7–12 show that there are no discontinuous changes in the board variables in countries with low penalties.

3.1.4 Cross-country results and causal inference

A concern with the cross-country results is that an omitted variable is related to both bankruptcy law and board structure. Importantly, the fact that the negative relation between board structure and penalties differs for risky and safe firms significantly reduces this concern, as an omitted variable would also need to affect board structure differently for risky and safe firms. Moreover, the discontinuity around the 1.81 threshold largely eliminates concerns about omitted firm characteristics, as firms around the threshold should be similar.¹⁵ Consequently, the key identification problem is that, for most countries, an omitted country characteristic determines bankruptcy law and board structure and affects board structure differently for risky and safe firms.

How likely is the presence of this identification problem? A closer examination of the determinants of bankruptcy legislation suggests this is rather unlikely. Across countries, bankruptcy law is not set by a single determinant, but by different ones. For example, for Germany in 2012, the determinant was the 2007–2009 financial crisis, which led to weaker creditor rights to rescue distressed firms (Canipek et al., 2026); for Italy in 2005, a corporate scandal, which led to weaker creditor rights to rescue the affected firm (Rodano, Serrano-Velarde, and Tarantino, 2016); for South Korea in 2006, the 1997–1998 Asian financial crisis, which led to weaker creditor rights as demanded by the IMF and World Bank (Schoenherr and Starmans, 2022); for Brazil in 2005, an

¹⁵ The causal interpretation of the regression discontinuity estimates rests on two conditions. First, no changes in other firm characteristics caused the change in board independence. While bankruptcy law can affect firm characteristics through the credit costs and distress costs channels (see Section 4.1.2 below), the regressions in Table 3 control for important firm variables. Second, firms did not manipulate their Z-score to sort around the threshold. Although manipulation cannot be ruled out, this concern is mitigated by the fact that the Z-score is constructed from several variables, including the market value of equity, making manipulation difficult. In unreported results, I test for manipulation using a density test around the threshold and find no evidence of bunching.

attempt to promote lending via weaker creditor rights (Ponticelli and Alencar, 2016); for India in 2002, an attempt to promote lending via stronger creditor rights (Vig, 2013); for India before 2002, political considerations on electoral outcomes, which led to lower creditor rights (Vig, 2013); for the UK in 2020, the Covid-19 crisis, which led to weaker creditor rights to rescue distressed firms (Payne, 2021); and for the US in 1979, the political power of competing interest groups, which led to a debtor-friendly law (Posner, 1997). Additionally, such determinants should not affect board structure, or at least should not affect board structure differently for risky and safe firms.

3.2 Bankruptcy reforms

I next examine changes in board structure of risky firms relative to those of safe firms around four bankruptcy reforms. While the bankruptcy literature has comprehensively studied seven reforms—the 2012 reform in Germany, the 2005 and 2006 reforms in Italy, the 2006 reform in Korea, the 2005 reform in Brazil, the 2002 reform in India, and the 1979 reform in the US—I focus on the German and Italian reforms in a within-sample analysis, as these are the only settings for which BoardEx data coverage is sufficient for a meaningful analysis.¹⁶ Additionally, I study the US reform in an out-of-sample analysis, using hand-collected data from Graham, Kim, and Leary (2020).

3.2.1 Germany’s bankruptcy reform of 2012

In response to the economic consequences of the 2007–2009 financial crisis, Germany introduced the 2012 bankruptcy reform that was designed to facilitate the restructuring of distressed firms (Canipek et al., 2026). The reform was passed in October 2011 and became effective in March 2012. In particular, the reform reduced penalties by drawing on US Chapter 11 and introducing a debtor-in-possession proceeding. The proceeding is accessible without creditors’ consent, and it allows management to retain control during bankruptcy and imposes automatic stay on assets.^{17,18}

¹⁶ BoardEx improved data coverage over the course of the 2000s (BoardEx started collecting data in 1999), and at different speeds across countries. For the year of the reform, board data, in combination with the control variables and Altman’s Z-score, are available for only two firms in Brazil and no firms in Korea, India, and the US.

¹⁷ Similar to US Chapter 11, the law also offers a cram down option that allows the court to impose a restructuring plan on dissenting creditors (Canipek et al., 2026).

¹⁸ Under the old law, management was significantly penalized in bankruptcy. In particular, management was dismissed immediately after submitting the bankruptcy petition, and corporate control was transferred to an insolvency administrator. Moreover, the administrator’s overriding objective of protecting creditors’ asset values together with the threat of contingent liabilities, essentially gave secured creditors the power to seize their collateralized assets during bankruptcy, which in turn led to firm liquidation. Empirically, 86% of bankrupt firms were liquidated by the

In terms of the creditor rights index, the reform eliminated the individual creditor rights components MANAGES, REORG, and AUTOSTAY (only secured creditors' right to be paid first is left unchanged), thereby reducing Germany's creditor rights index by three points.¹⁹ According to the cross-country results, this should increase the number of independents by approximately 16% for risky firms relative to safe firms.

The data are the same as in the cross-country analysis. The sample period is from 2007 to 2016, covering five years before and after the reform. I divide firms into quartiles based on their four-year average pre-reform (2008 to 2011) measure of bankruptcy risk, and define firms in the highest quartile as risky firms and firms in the lowest quartile as safe firms (excluding firms in the middle). The full sample consists of 221 firms. The final sample with only the highest and lowest quartiles consists of 778 firm-year observations from 110 firms. Table A.5 in the Appendix reports summary statistics, separately for risky and safe firms.

To test for the expected effect, I estimate the following difference-in-differences regression:

$$\begin{aligned}
 & \text{Dependent variable}_{i,t} \\
 &= \beta_0 + \beta_1(Post_t * HighRisk_i) + \beta_2 Post_t + \beta_3 HighRisk_i + \beta_4 X_{i,t} + \beta_5 Y_t \\
 &+ \beta_6 Z_i + \epsilon_{i,t},
 \end{aligned} \tag{3}$$

where the dependent variable is one of the board variables of interest; i indexes firms, and t indexes time; $Post_t$ is an indicator variable that equals one for the years after the reform was passed (2012 to 2016), and zero for the years before the reform was passed (2007 to 2011); $HighRisk_i$ is an indicator variable that equals one for firms in the highest quartile of the bankruptcy risk ranking, and zero for firms in the lowest quartile; $X_{i,t}$ are the time-varying firm characteristics; Y_t are year fixed effects that control for time-varying factors common across firms; Z_i are firm fixed effects that control for time-invariant differences across firms; $\epsilon_{i,t}$ is the firm-specific error term; and β_1 is the coefficient of interest, which measures changes in the board variable for risky firms after the

administrator, and 89% underwent liquidation by the end of bankruptcy procedure. For the pre-reform law, see Canipek et al. (2026).

¹⁹ Canipek et al. (2026) document the empirical relevance of the changes introduced by the reform. The authors show that the acceptance rate of firms that filed for the debtor-in-possession proceeding was about 88% in 2017. Additionally, the continuation rate of filing firms was about 90%.

reform relative to safe firms. I cluster standard errors at the firm level, as corporate board structure should be correlated over time within a firm.

Columns 1 (without controls) and 2 (with controls) of Table 4 report the results for the logarithm of the number of independent directors as the dependent variable. Consistent with the cross-country results, both columns show that the coefficient on $Post_t * HighRisk_i$ is positive and statistically significant, indicating that risky firms increased the number of independents after the reform relative to safe firms. The economic effect is also consistent with that of the cross-country analysis. Column 2 shows that risky firms increased the number of independent directors by 29% relative to safe firms.

In columns 3 and 4, I present the estimates for the ratio of independents to board size as the dependent variable. The findings are similar. Column 4 shows that risky firms increased the ratio by 8 percentage-points relative to safe firms after the reform. Finally, columns 5 and 6 present the estimates for the logarithm of board size as the outcome variable. Risky firms did not change board size after the reform relative to safe firms.

Comparing risky and safe firms has the advantage of a control group in safe firms that accounts for confounding shocks common to all firms. Yet, a potential concern with my results is that a confounding shock affected risky and safe firms differently. To mitigate this concern, in Panel A of Figure 2, I plot the average number of independent directors for risky and safe firms over time (for an extended period from 2002–2017). As shown, risky firms increased the number of independents relative to safe firms after the reform. In contrast, risky and safe firms followed parallel trends before the reform, suggesting that both groups generally experience common shocks to board independence and thus would have followed the same trend in the absence of the reform.

To examine the statistical significance of possible changes, Panel B plots the yearly differences in the number of independent directors between risky and safe firms relative to the difference in the year prior to the reform, 2011. The point estimates are positive and statistically significant for the years after the reform, implying that the number of independents of risky firms increased relative to safe firms after 2011. In contrast, the point estimates are statistically insignificant for the years before the reform, implying that the difference in the number of independents between risky and safe firms before the reform was not different from that of 2011.

Notably, adjustments in boards after the reform were made over a number of years. This is consistent with the fact that specific dates of the annual shareholders' meeting (on which directors

are typically replaced), staggered board provisions, or existing contracts can lead to lags in replacing directors.

For robustness, Figure IA.1 in the Internet Appendix repeats the analysis of Figure 2 for the ratio of independents to board size as well as for board size. All findings are supported.

3.2.2 Italy's bankruptcy reforms of 2005–2006

Prompted by the Parmalat scandal, the Italian government introduced the 2005 and 2006 bankruptcy reforms (Rodano, Serrano-Velarde, and Tarantino, 2016).²⁰ The 2005 reform, aimed at rescuing the firm, was designed to facilitate firm continuation. The reform was introduced in March 2005 and became effective immediately. In particular, the reform reduced penalties by allowing debtors to enter the reorganization procedure unilaterally, thereby removing strict credit reimbursement requirements that previously applied (the debtor's plan had to provide the full repayment of secured creditors' claims along with at least 40% of unsecured creditors' claims).²¹

Afterwards, the 2006 reform made changes to the liquidation procedure. The reform was adopted in January 2006 and became effective in July 2006. Specifically, the reform increased penalties by introducing changes to speed up the lengthy liquidation procedures, thereby increasing creditors' incentive to press for liquidation.^{22,23}

With regard to the creditor rights index, the first reform eliminated the individual component REORG and partly weakened MANAGES and AUTOSTAY by facilitating access to the protected reorganization procedure under management. In contrast, the second reform affected the SECURED component by increasing expected recovery rates in liquidation. Based on the previous

²⁰ Parmalat was an Italian dairy and food company. At the end of 2003, the firm collapsed with total assets of approximately \$20 billion. To rescue the firm without violating European regulations on government bailouts, the Italian government introduced the 2005 reform (Rodano, Serrano-Velarde, and Tarantino, 2016).

²¹ Following US Chapter 11, the reform also introduced other changes that reduced bankruptcy penalties. In particular, the reform lowered the share of votes (from two-thirds to one-half) required for a reorganization plan to be accepted. Furthermore, the reform introduced a cram down option (Rodano, Serrano-Velarde, and Tarantino, 2016).

²² In Italy, a liquidation procedure is carried out by a court-appointed trustee. Prior to the reform, the combined effects of poor trustee incentives to speed up liquidation—the trustee's salary was independent of creditors' recovery rates or the duration of the procedure—and the lack of creditor rights to monitor the trustee—creditors could neither veto the trustee's decisions nor ask for the trustee to be replaced—made liquidations a lengthy affair. In contrast, the new law allows creditors to ask for the trustee to be replaced and moreover makes all trustee decisions subject to creditor approval (Rodano, Serrano-Velarde, and Tarantino, 2016). As a result, control over the liquidation procedure was effectively transferred to creditors, who typically are interested in a quick liquidation to preserve asset value.

²³ Empirically, Rodano, Serrano-Velarde, and Tarantino (2016) show that the share of reorganization procedures increased from about 2% before 2005 to about 10% in 2009. Additionally, the share of liquidation procedures that lasted longer than 24 months decreased from about 95% before 2005 to about 60% after 2005.

results, the expectation is that risky firms increased board independence after the 2005 reform and decreased board independence after the 2006 reform relative to safe firms.

The data are the same as for the cross-country study. The sample period is from 2002 to 2011 to study the ten years around the 2005–2006 reforms. For both reforms, I divide firms into quartiles based on their four-year average measure of default risk prior to the first reform (2002 to 2005), and define risky firms as those in the highest quartile and safe firms as those in the lowest quartile. The full sample consists of 53 firms. The final sample consists of 217 firm-year observations from 27 firms. The sample size is relatively small, which is why the findings may be regarded as supplementary evidence to the other results. Table A.6 in the Appendix shows summary statistics.

I test for the expected effects employing the difference-in-differences regression from equation (3) for each reform. For the 2005 reform, $Post_t$ equals one for the year after the reform was passed (2006), and zero for the years before the reform was passed (2002 to 2005). That is, I compare changes in board structure after the first reform, but before the second reform. For the 2006 reform, $Post_t$ equals one for the years after the reform was passed (2007 to 2011), and zero for the year before the reform was passed (2006). That is, I compare changes in board structure after the second reform relative to the year following the first reform.

Panels A and B of Table 5 respectively show the results for the 2005 and 2006 reforms. Confirming the previous results, columns 1 and 2 show that risky firms increased (decreased) the number of independent directors relative to safe firms following the reduction of penalties in 2005 (the increase of penalties in 2006). Columns 3 and 4 present the results for the ratio of independents to board size as the outcome variable and broadly support the findings. Finally, columns 5 and 6 show that risky firms did not change board size relative to safe firms after the reforms.

Figure 3 shows changes in the number of independent directors for risky and safe firms over time. While risky firms changed the number of independents relative to safe firms after the reforms, they did not change board independence relative to safe firms prior to the reforms. This is consistent with the assumption that both groups of firms would have followed the same trend without the reforms.²⁴

²⁴ In response to corporate scandals and following worldwide board reforms aimed at improving corporate governance, the Italian government passed board reforms in 2006 that require and encourage a certain level of board independence (Kim and Lu, 2013; Fauver et al., 2017). In particular, the board reforms require that firms have at least one independent director and furthermore encourage firms to form remuneration and control committees made up of a majority of independents, i.e., recommending at least two independents. For my empirical analysis, the key point is that the findings should not be affected by the board reforms, given that the reforms apply to both risky and safe firms.

3.2.3 US Bankruptcy Reform Act of 1978

The US Bankruptcy Reform Act of 1978 marks the origin of today's Chapter 11. While the reform process was triggered by increasing dissatisfaction with the law (considered complicated and ambiguous), the final outcome reflected the relative political power of competing interest groups, including debtors, managers, creditors, lawyers, judges, and politicians. Ultimately, the process resulted in a law designed to facilitate debt renegotiation in bankruptcy. The reform was passed in November 1978 and became effective in October 1979 (Posner, 1997; Hackbarth, Haselmann, and Schoenherr, 2015; Favara et al., 2017).

In particular, the reform reduced bankruptcy penalties by reducing liquidation risk. Specifically, the reform made three major changes to debtor-in-possession reorganization (Hackbarth, Haselmann, and Schoenherr, 2015; Favara et al., 2017). First, it reduced the share of votes required for a reorganization plan to be accepted. Second, it introduced a cram down option that allows the court to impose reorganization if a plan cannot be agreed upon. Third, it lowered the conditions under which firms can voluntarily file for reorganization, i.e., the new law does not require a firm to be insolvent (which allows distressed firms to shed debt obligations by strategically filing for reorganization).

Although the changes do not map directly onto the creditor rights index, a rough approximation may be that the reform eliminated the individual creditor rights component REORG by removing restrictions on continuing the firm. In any case, the prediction is that risky firms increased board independence relative to safe firms following the reform.

While conventional board databases do not provide coverage of the reform period, Graham, Kim, and Leary (2020) collect board data around the reform. Their database contains about 87,000 firm-year observations of NYSE/AMEX firms over 1920–2011, largely hand-collected from Moody's Industrial Manuals. The authors generously shared their data with me for the years 1972–1985. I merge this data with firm-level data from Compustat. Following the sample construction of Section 2.1, I exclude firms from financial industries; firm-year observations without complete data on the dependent and control variables, without data on Altman's Z-score, or with negative

A potential concern might be that the board reforms affected risky and safe firms disproportionately, i.e., that the reforms were binding for one group and non-binding for the other. In unreported results, I find that virtually all of the sample firms had at least 2 independents (just one firm had a single independent director), suggesting that the reforms were non-binding for both groups.

or zero total assets or sales; and winsorize control variables at the 1st and 99th percentiles. Table A.1 in the Appendix presents variable definitions.

I use the sample period 1976–1981, covering three years before and after the reform. I limit the period to three years to avoid the high delisting rates associated with the merger wave beginning around 1982, which may have disproportionately affected risky firms (e.g., Holmstrom and Kaplan, 2001; Fama and French, 2004). Based on the average pre-reform bankruptcy risk (1976–1978), I divide firms by the conventional Z-score thresholds and define firms with a score below 1.81 as risky and firms with a score above 3.3 as safe (excluding firms in the middle). I do not divide firms based on quartiles because only about 6% of firms had a score below 1.81 before the reform (see Fama and French (2004), who show that public markets were dominated by safe firms and that more risky firms only began entering in the 1980s). The final sample consists of 463 observations from 117 risky firms and 5,406 observations from 1,138 safe firms. Table A.7 in the Appendix reports summary statistics.

To test for the expected effects, I employ the difference-in-differences regression from equation (3). $Post_t$ equals one for the years after the reform was passed (1979 to 1981), and zero for the years before the reform was passed (1976 to 1978).

Panel A of Table 6 reports the results. Consistent with the previous findings, columns 1 and 2 show that risky firms increased the number of independent directors relative to safe firms following the reform. Columns 3 and 4 show that risky firms also increased the ratio of independents to board size relative to safe firms. Finally, columns 5 and 6 show that risky firms did not relatively change board size.

Figure 4 illustrates how board independence evolved over time. Risky firms increased board independence relative to safe firms following the reform, while exhibiting no differential trend before the reform. Risky firms adjusted their boards relatively quickly after the reform (in slight contrast to the findings on the German reform), consistent with the fact that staggered board provisions were uncommon at the time and boards were typically re-elected annually.

For robustness, Panel B of Table 6 presents the results using a balanced panel (i.e., firms with full observations throughout the post-reform period) to ensure that the findings are not affected by potentially disproportionate delisting rates, and confirms the results. Additionally, Panel C presents the results using a lower Z-score threshold of 1.31 to identify risky firms, and shows that the results are stronger than those of Panel A. Finally, Figure IA.2 in the Internet Appendix shows

how the ratio of independents to board size as well as board size evolved over time, and supports the findings.

Notably, the analysis can help explain part of the increase in board independence in the US between the 1970s and 1990s, which is a well-documented puzzle in the literature.²⁵ For example, Graham, Kim, and Leary (2020) show that “Board independence was stable at about 50% for four decades starting in the 1930s (...) [while] From the late 1970s to mid-1990s, average board independence increased to around 60%.” (p. 618). The bankruptcy reform can directly account for a small fraction of this increase—roughly $3.3 \text{ (increase in ratio)} * 0.06 \text{ (share of risky firms)} / 10 = 2\%$. However, because risky firms have higher board independence than safe firms under management-friendly bankruptcy regimes (e.g., Panel B of Figure 1), and because more risky firms entered public markets in the 1980s, the reform may indirectly explain a more substantial share of the increase.

3.2.4 Changes in board independence in other countries

As discussed above, a potential concern with my results is that a confounding shock affected risky and safe firms differently. The parallel trends between risky and safe firms prior to the reforms mitigate the concern. Additionally, recall that board structure is sticky, implying that it is determined by static variables that typically do not change over time, thereby further mitigating concerns of confounding shocks. In this subsection, I examine whether in other countries risky firms have changed board independence relative to safe firms around the reforms in Germany and Italy. This analysis further addresses these concerns by controlling for possible confounding shocks common to all countries, such as economic crises or worldwide trends in corporate governance.

As control countries, I consider countries that are similar to Germany and Italy in terms of economic and financial development. These countries include Austria, Belgium, France, Netherlands, and Switzerland. Additionally, I present the results for the US, which serves as the benchmark case for international shocks and trends on board independence. The empirical analysis is the same as for Germany and Italy. For each of the countries, I divide firms into quartiles (based on the average Z-score from 2008–2011 for the German reform and the average Z-score from 2002–2005 for the Italian reforms), and define firms in the highest quartile as risky firms and firms

²⁵ For more on the puzzling rise of independent directors in the US, see Hermalin and Weisbach (1988) and Gordon (2007).

in the lowest quartile as safe firms. I use the data from the cross-country analysis and study the ten years around the reforms.

Panel A of Table 7 presents the results regarding Germany's reform. The number of independent directors is the dependent variable in columns 1 (similar countries) and 4 (US). As shown, risky firms did not increase the number of independents relative to safe firms after the reform in 2011. Columns 2 and 5 show that the findings are similar when using the ratio of independents to board size as the outcome variable. Finally, columns 3 and 6 show that risky firms did not exhibit relative changes in board size after the reform.

In Figure 5, I plot changes in the number of independent directors for risky and safe firms over time. As can be seen, there were no changes in the number of independents for risky firms relative to safe firms, either before or after the reform.

Panels B and C of Table 7 respectively report the results for the 2005 reform and 2006 reform in Italy. Most importantly, risky firms did not change the number of independents relative to safe firms after the reforms. Figure 6 shows that risky and safe firms exhibited parallel trends in the number of independents, both before and after the reforms.

Overall, the results suggest that the findings in Germany and Italy are not affected by confounding shocks that were common to all countries. Ultimately, for a confounding event to explain the results, it would not only need to have different effects on risky and safe firms, but also be country-specific.

Before proceeding, I note that, in unreported tests, I also directly compare changes in board independence of German and Italian firms to those of firms from the other countries. Specifically, I find that board independence of risky firms from Germany and Italy changed after the reforms relative to risky firms from the other countries. In contrast, board independence of safe firms from Germany and Italy did not change after the reforms relative to safe firms from the other countries. The changes for risky firms also translate into an average effect; that is, board independence of all firms (all quartiles) from Germany and Italy changed after the reforms relative to all firms from the other countries. The results indicate direct changes in the board independence gaps across countries.

3.3 Heterogeneity among risky firms

I find that firms increase board independence following a reduction in bankruptcy penalties. The primary interpretation is that firms increase independence to substitute for the lost governance from penalties. To support the governance substitution channel, I analyze heterogeneity among risky firms. In particular, the substitution effect should be stronger for risky firms with potentially high agency problems, that is, when corporate governance is more important. Moreover, the substitution effect should be stronger for risky firms in which firm-specific knowledge is relatively unimportant. The board literature suggests that independent directors play a governance role in less complex firms and an advisory role in more complex firms (Coles, Daniel, and Naveen, 2008; Duchin, Matsusaka, and Ozbas, 2010; Ferreira, Ferreira, and Raposo, 2011). Finally, the substitution effect should be stronger for risky firms with more financial constraints, consistent with the notion that such firms must have strong governance to access financing (rather than merely reducing its costs or increasing equity value).

I measure potential agency problems by investment opportunities (Tobin's Q), following the Jensen (1986) setup suggesting that firms with low opportunities are prone to overinvestment without adequate monitoring. I measure complexity by R&D expenditures, following the board literature (Coles, Daniel, and Naveen, 2008; Ferreira, Ferreira, and Raposo, 2011). I measure financial constraints by the Whited and Wu (2006) index.

I test for the expected heterogeneities within the cross-country analysis as well as the German reform. I exclude the Italian reforms due to the limited number of firms and the out-of-sample US reform. Among risky firms—specifically, the 21,678 risky firms in Panel A of Table 2 and the 55 risky firms in Table 4—I divide firms into two groups based on their levels of Tobin's Q, R&D, and WW, and employ equation (1) for the cross-country setup and equation (3) for the German reform.

Columns 1 to 4 of Table 8 present the results regarding heterogeneity in investment opportunities. Panel A shows the cross-country results. $High_{i,j,c,t}$ equals one if a risky firm falls in the lower half of the Tobin's Q ranking within its country in a given year, and zero otherwise. Panel B shows the results for the German reform. $High_i$ equals one if a risky firm falls in the lower half of the Tobin's Q ranking based on the four-year average pre-reform (2008 to 2011) measure, and zero otherwise. As shown, board independence is more negatively related to penalties for risky firms with low growth opportunities than for risky firms with high growth opportunities across

countries. Similarly, risky firms with low growth opportunities increased board independence relative to risky firms with high growth opportunities following the reduction of penalties in Germany.

Columns 5 to 8 report the results regarding heterogeneity in firm complexity. *High* equals one if a risky firm has R&D expenditures below the 80th percentile, and zero otherwise. I follow Ferreira, Ferreira, and Raposo (2011) in adopting this cutoff, who note that fewer than half of all observations in their sample have positive R&D expenditures (a pattern that holds in my sample as well). As can be seen, risky firms with low R&D expenditures exhibit a greater negative relation between board independence and penalties across countries than risky firms with high R&D expenses, and increase board independence more following the reform.

Finally, columns 9 to 12 present the results regarding heterogeneity in financial constraints. *High* equals one if a risky firm is in the upper half of the WW distribution, and zero if it is in the lower half. As shown, risky firms facing tighter constraints exhibit a more strongly negative relation across countries than their less constrained counterparts. However, this heterogeneity is absent in the more general case excluding the US and UK, as well as in the analysis of Germany's reform. One possible explanation is that while US and UK capital markets also include many younger and smaller firms that typically face financing frictions, other markets tend to be dominated by established and large firms.

4. Alternative explanations and additional discussions

4.1 Alternative explanations

In this subsection, I examine whether the negative relation between board independence and bankruptcy penalties may be driven by alternative explanations. Although it is not possible to fully rule out these explanations, the discussions suggest that the negative relation is most consistent with the governance substitution story.

4.1.1 Recovery rates of creditors

One alternative story is based on changes in creditors' recovery rates. Because creditors expect lower recovery rates when their rights in bankruptcy are weak, they demand greater board independence to improve management quality and reduce default risk. Management, in turn, agrees to raise capital at lower credit costs.

From a theoretical perspective, there are three arguments that mitigate the relevance of this story. First, under both bankruptcy regimes—creditor-friendly (high recovery rates) or debtor-friendly (low recovery rates)—management may bond itself to the optimal level of board independence, namely, the level at which additional independence no longer generates value and does not reduce credit costs. In other words, under both regimes, management selects the same level of independence, as this level ensures financing. A shift from a creditor-friendly to a debtor-friendly regime should increase independence only if it changes the marginal value of additional independence, which is absent in the recovery rates story but central in the governance substitution story (additional independence restores management discipline).

Second, independent directors have a fiduciary duty to stockholders, and not creditors. For example, John and Litov (2010) argue that while good governance may be desirable for stockholders by aligning managers' interests with theirs, it might be harmful for creditors by encouraging risk taking that leaves them with downside risk. As such, creditors may not be interested in good governance, but may consider a firm with good governance as being riskier and thus demand higher credit costs.²⁶

Third, rather than demanding independent directors, it seems more likely that banks advocate for the appointment of a bank representative to the board. This is especially relevant under debtor-friendly laws, where a bank representative may mitigate firms' heightened incentive for risk-taking. Bank directors are common (e.g., Guner, Malmendier, and Tate, 2008), and particularly pronounced under Germany's bank-based system, in which banks are often represented on the company's board. Importantly, BoardEx does not classify bank representatives as independent, as they have material business relationships with the firm.²⁷

There are also pieces of empirical evidence that are inconsistent with the recovery rates story. First, the recovery rates story predicts that the negative relation between board independence and bankruptcy penalties should be driven by firms adding independents when penalties are low, in-

²⁶ Empirically, John and Litov (2010) find a positive relationship between weak corporate governance and leverage, arguing that entrenched managers receive better access to debt financing. Additionally, Bradley and Chen (2015) find that board independence increases the cost of debt and that independent directors typically set corporate policies that increase firm risk.

²⁷ In BoardEx, directors are classified as independent based on self-declared information by the firms, who follow exchange listing rules or country-level corporate governance codes. Typically, directors are defined as independent if they are not a current employee, a former executive, a relative of a current executive, or someone with material business relations with the firm. Under virtually all listing rules and governance codes, bank representatives are considered non-independent. In contrast, Graham, Kim, and Leary (2020) do not consider whether an independent director has material business relations with the firm because of data limitations. See Table A.1 in the Appendix for details.

stead of firms removing independents when penalties are high. However, as shown in Figure 1 above, risky firms do not significantly increase board independence relative to safe firms when penalties are low. In contrast, risky firms reduce board independence relative to safe firms when penalties are high, consistent with the governance substitution story.

Second, the recovery rates story predicts that the negative relation between board independence and the individual components of the creditor rights index should be strongest for the provision that determines whether creditors are paid out first (SECURED), which is a direct measure of creditors' expected recovery rates. As shown in Table A.4, however, the effects are weakest for this provision and strongest for those that imply strong management penalties (MANAGES, AUTOSTAY, and REORG).

Third, the recovery rates story predicts a positive relation between agency problems and bankruptcy penalties, as stronger creditor rights reduce creditors' demand for good corporate governance. In ongoing research, Canipek (2026) studies the relation between agency problems and bankruptcy penalties and finds a negative relation. This finding further supports the governance substitution story, which predicts that bankruptcy penalties reduce agency problems.

4.1.2 Collateral value and distress costs

A further alternative explanation is based on changes in collateral value and distress costs. As shown by the bankruptcy literature (e.g., Acharya and Subramanian, 2009; Acharya, Amihud, and Litov, 2011; Vig, 2013; Ponticelli and Alencar, 2016; Rodano, Serrano-Velarde, and Tarantino, 2016; Schoenherr and Starmans, 2022; Canipek et al., 2026), a creditor-friendly law can increase collateral value and thus relax financial constraints, but can also increase distress costs and thus reduce risk-taking. Both channels can affect important firm characteristics, such as leverage, investments, risk, or profitability, which in turn may affect board structure.

The explanation is mitigated by the fact that I control for a long list of firm characteristics that have been shown to be affected by bankruptcy law and that have been shown to be possible determinants of board structure. Additionally, the economic significance of the effects of important firm characteristics on board independence is low in essentially all regressions in the board literature. For example, Boone et al. (2007) and Ferreira, Ferreira, and Raposo (2011) show that a one-standard-deviation change in size, number of business segments, and leverage is related to a 1.8, 1.3, and 1.2 percentage-point change in board independence, respectively. This suggests that possible

changes in firm characteristics should not explain the observed large economic effect between board structure and bankruptcy law.

4.1.3 Independent directors' personal costs in bankruptcy

Another alternative explanation relates to changes in independent directors' personal costs in the event of bankruptcy. Under a liquidation-oriented regime, independent directors may anticipate greater individual costs—for instance, because liquidation terminates their board tenure and destroys the firm-specific knowledge they have accumulated, or because they face heightened litigation costs, as shareholders of liquidated firms may have stronger incentives to pursue legal actions. Consequently, independent directors may reduce their labor supply or request higher compensation, resulting in lower board independence.²⁸

Theoretically, several considerations mitigate this explanation. First, independent directors typically earn income from multiple directorships, and their average tenure at a given firm is relatively short at about 5–10 years (Gao and Huang, 2024), both of which make bankruptcy costs relatively small. Second, risky firms only operate around bankruptcy but, all else equal (i.e., no change in management efficiency), are not expected to enter bankruptcy. It is unlikely that a risky firm enters bankruptcy during the average tenure of an independent, making expected bankruptcy costs small. Third, litigation costs only arise if misconduct actually occurred, limiting litigation costs for diligent directors. Finally, higher expected bankruptcy costs may motivate independents to increase monitoring efforts, thereby increasing demand for independent directors in the presence of bankruptcy penalties (see Jiang, Wan, and Zhao, 2016, who show that independent directors are more effective when facing higher personal costs).

Empirically, the explanation is weakened by the negative relation between agency problems and bankruptcy penalties documented by Canipek (2026). If anything, the story predicts a positive relation because stricter penalties reduce the availability of board independence. Moreover, the explanation is weakened by the heterogeneity across risky firms discussed above. The story predicts no heterogeneity because directors should face similar bankruptcy costs across firms. Finally,

²⁸ Studies show that independent directors are also concerned about reputational costs affecting their other positions (e.g., Jiang, Wan, and Zhao, 2016). However, it is unclear how different bankruptcy regimes would generate differential reputational costs, given that default may signal incompetence under both regimes (for instance, Gilson (1990) shows that also under US Chapter 11 directors hold significantly fewer seats on other boards following a bankruptcy case). Moreover, if reputational costs are higher under a liquidation-oriented regime, the same arguments outlined in the main text would apply.

the explanation is weakened by the fact that board size is unrelated to penalties. The story predicts that independents leave the board as penalties tighten, suggesting changes in board size.

4.2 Additional discussions

In this subsection, I provide additional discussions that may help shed further light on the findings of this paper.

4.2.1 Indirect incentive effects of bankruptcy penalties through covenants

Bankruptcy penalties may impose not only a direct incentive effect but also an indirect one by influencing the effectiveness of the disciplinary effects of covenants. A substantial body of research suggests that covenants can induce discipline by imposing managerial restrictions after their violation (e.g., Chava and Roberts, 2008; Nini, Smith, and Sufi, 2009, 2012; Roberts and Sufi, 2009a, 2009b; Ferreira, Ferreira, and Mariano, 2018; Bharath and Hertz, 2019). Bankruptcy penalties may affect this mechanism by determining the bargaining power between creditors and managers during the renegotiations following violation. A creditor-friendly bankruptcy procedure gives creditors a credible threat to put the firm into bankruptcy (through high liquidation values for creditors and high bankruptcy costs for management) and thus increases the extent of possible new restrictions they can impose. In contrast, a management-friendly law strengthens managers' bargaining position and thus reduces the extent of possible new restrictions.²⁹ Notably, penalties may therefore not only set the lower bound of managerial inefficiency but may also play a governance role at earlier stages.

4.2.2 Relevance of bankruptcy penalties in the presence of covenants

Theoretical studies show that the threat of bankruptcy penalties can mitigate agency problems. Yet, a concern with these theories might be whether penalties are practically relevant in the presence of covenants. Given that covenant violations can trigger managerial restrictions, they can serve as an upstream disciplining mechanism, potentially making the incentive effect of penalties irrelevant.

²⁹ For models predicting that liquidation values affect renegotiation and determine the bargaining power between creditors and debtors, see, e.g., Berglöf and von Thadden (1994), Bolton and Scharfstein (1996), Hart and Moore (1998), and Benmelech and Bergman (2008). Empirically, Benmelech and Bergman (2008) show that firms can renegotiate their contracted obligations downward (in and outside of bankruptcy) when liquidation values are low.

However, bankruptcy penalties should be important for at least two reasons. First, while covenant violations may impose restrictions on management regarding financial and investment policies, they virtually never lead to firm liquidation or management dismissal. For example, Nini, Smith, and Sufi (2012) show that only about 1% of violations are resolved through bankruptcy and/or liquidation.³⁰ Additionally, they show that, despite several quarters of declining operating performance and market valuation prior to violation, the probability of forced CEO turnover is only about 1.5% during the four quarters before the violation and only about 2.5% during the four quarters after.³¹ The threat of firm liquidation and management dismissal should present the most dominant incentive effect on management quality and should not be rendered irrelevant by possible restrictions associated with covenant violation. Second, as noted above, bankruptcy penalties may not only define the lower bound of managerial inefficiency, but can also affect management earlier by influencing the effectiveness of covenants. Ultimately, whether bankruptcy penalties play a meaningful governance role is an empirical question, which this paper aims to address.

4.2.3 Endogeneity of corporate governance structure

My study follows the notion that firms substitute among different governance mechanisms when forming an optimal governance structure, such that the demand for one mechanism depends on the strength of alternative mechanisms (e.g., Hermalin and Weisbach, 2003, 2012; Adams, Hermalin, and Weisbach, 2010). Three points are worth noting. First, who advocates for the appointment of independent directors when bankruptcy governance becomes ineffective? This can be management seeking to access financing, reduce capital costs, or increase the value of its equity stake (bonding device). Alternatively, it can be stakeholders, such as institutional investors, pursuing higher equity value (disciplinary device).

Second, some governance mechanisms, such as legal enforcement, may complement others, raising the question of whether board independence and bankruptcy penalties are complements rather than substitutes. However, there seems to be no obvious reason why this should be the case. Board independence does not require bankruptcy penalties to induce discipline, and likewise,

³⁰ A number of different scenarios can arise when a firm violates a covenant. For example, the firm repays the loan (and takes out a new one), creditors grant a waiver, creditors impose tighter constraints, or the firm declares bankruptcy (either strategically or forced).

³¹ Nini, Smith, and Sufi (2012) show that whereas changes in investment and financing behavior follow from the renegotiated credit agreements, changes in management can occur through informal influence; e.g., creditors suggest actions to the board aimed at increasing the probability of receiving a covenant waiver.

bankruptcy penalties do not require board independence. Additionally, the two mechanisms have mutually exclusive empirical predictions, suggesting that if they were complements, one should observe a positive relation between them.

Third, the hypothesis that bankruptcy penalties mitigate agency problems cannot be rejected if there is no negative relation between board independence and bankruptcy penalties. This is because firms may have substituted penalties with other governance mechanisms besides board independence, such as incentive compensation, takeover provisions, or outside block-holding. Conversely, the finding that firms implement independent directors when penalties are eliminated presents a strong case that penalties are valued as a governance device.

4.2.4 Bankruptcy penalties and firm value

I evaluate the empirical relevance of bankruptcy governance by studying the relation between bankruptcy penalties and board independence. At first glance, an alternative approach may be to look at the relation between penalties and firm value, given that potential changes in agency problems should be reflected in the valuation of a firm. However, this approach is in fact not very meaningful, as changes in bankruptcy law affect not only the governance channel but also the collateral and distress channels. As a result, possible variation in the firm value may not come through changes in governance, but through changes in the other two channels. (Note that this also holds when looking at other standard outcome variables that may proxy for agency problems, such as firm size as a proxy for empire building.) Studying the relation between penalties and board independence provides a clean test of the governance channel that is largely insulated from alternative stories of the collateral value and distress costs channels.

5. Conclusions

A large theoretical literature suggests that bankruptcy penalties can mitigate agency problems, yet empirical evidence remains limited. In this paper, I provide evidence by examining whether firms implement independent directors as a substitute when penalties are eliminated. Central to my analysis is the fact that bankruptcy governance is relevant only for risky firms. Consistent with penalties serving as a governance mechanism, across countries board independence is negatively related to penalties, but only among risky firms. Comparing board independence of risky and safe firms

around bankruptcy reforms confirms these results. Economically, risky firms relatively increase the number of independent directors by 21% following the elimination of penalties.

My findings have two notable implications. First, they help explain the variation in corporate governance structure across countries. In my study, I find that bankruptcy governance explains a meaningful part of the cross-country variation in board structure—for example, accounting for about 6% of the difference in board structure between the US and the UK. Bankruptcy governance likely also plays an important role in shaping the use of other governance mechanisms, such as incentive compensation, corporate takeover provisions, or outside block-holding.

Second, they have important implications for optimal bankruptcy design. In particular, my findings suggest that, in some cases, the governance function of bankruptcy law should be preserved by stipulating management penalties, as otherwise management may have difficulties obtaining financing *ex ante*. However, my findings do not imply that a creditor-friendly law is always the best solution, as the distress costs channel of bankruptcy law can dominate in other cases. As such, the results lend further support to recent proposals of a menu approach, in which a creditor-friendly and a debtor-friendly code coexist, allowing different firm types to select the procedure that suits them best.

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Tables and Figures

Table 1

Summary statistics

This table presents summary statistics by country. The columns show: column 1, number of independent directors; column 2, within-firm growth in the number of independent directors per year (e.g., firms increase the number of independent directors by 0.12 per year); column 3, within-firm number of changes in the number of independent directors per year (e.g., firms change the number of independent directors 0.37 times per year); column 4, within-firm standard deviation in the number of independent directors; column 5, ratio of the number of independents to board size; column 6, within-firm growth in the ratio of the number of independents to board size per year; column 7, within-firm number of changes in the ratio of the number of independents to board size per year; column 8, within-firm standard deviation in the ratio of the number of independents to board size; column 9, board size; column 10, creditor rights index; column 11, Altman's Z-score; column 12, standard deviation of Altman's Z-score; column 13, number of observations; and column 14, number of firms. Refer to Table A.1 in the Appendix for variable definitions.

	Number of independent directors				Ratio of independents to board size				Board size (9)	Creditor rights (10)	Altman's Z-score		Observations (13)	Number of firms (14)
	Within-firm				Within-firm						Mean (11)	SD (12)		
	Mean (1)	Yearly growth (2)	Yearly changes (3)	SD (4)	Mean (5)	Yearly growth (6)	Yearly changes (7)	SD (8)						
Argentina	4.60	0.383	0.467	1.142	0.470	0.021	0.617	0.085	9.79	1	3.94	6.44	70	10
Australia	3.57	0.088	0.383	0.631	0.592	0.012	0.514	0.088	5.92	3	6.50	11.31	4,146	670
Austria	6.54	0.137	0.309	0.954	0.487	0.012	0.465	0.075	12.71	3	2.93	2.44	292	36
Belgium	4.05	0.030	0.340	0.704	0.445	0.007	0.515	0.078	9.32	2	3.68	5.28	668	76
Brazil	2.99	0.085	0.378	0.781	0.378	0.013	0.558	0.086	8.21	1	2.46	3.23	512	89
Canada	6.09	0.102	0.447	0.732	0.727	0.011	0.528	0.059	8.30	1	3.01	6.46	4,084	657
Chile	2.10	-0.036	0.270	0.373	0.266	-0.005	0.387	0.050	8.07	2	2.43	1.11	131	20
China	3.57	-0.006	0.152	0.273	0.442	0.003	0.333	0.034	8.52	2	3.31	3.96	1,162	193
Colombia	4.20	0.243	0.514	0.709	0.552	0.026	0.486	0.071	7.63	0	2.41	1.49	46	9
Croatia	0.95	0.118	0.059	0.316	0.067	0.008	0.471	0.023	14.26	3	4.47	2.20	19	2
Czech Rep.	0.70	-0.056	0.222	0.823	0.035	-0.002	0.333	0.043	17.40	3	3.38	1.64	20	2
Denmark	4.02	0.183	0.359	0.999	0.410	0.014	0.618	0.099	10.51	3	5.41	5.36	341	35
Egypt	1.70	0.143	0.143	0.363	0.180	0.015	0.286	0.035	10.63	2	2.59	2.16	27	6
Finland	6.22	0.100	0.428	0.786	0.854	0.014	0.346	0.061	7.36	1	3.18	2.04	482	54
France	3.64	0.163	0.340	0.780	0.345	0.016	0.509	0.079	9.98	0	2.63	3.14	3,400	430
Germany	1.77	0.175	0.147	0.624	0.134	0.011	0.282	0.049	13.39	3	3.39	4.17	2,299	290
Greece	2.94	0.049	0.192	0.493	0.321	0.004	0.304	0.048	9.91	1	2.23	3.18	320	34
Hong Kong	3.75	0.060	0.194	0.272	0.394	0.009	0.418	0.031	9.88	4	4.18	6.35	1,697	373
Hungary	3.43	0.136	0.227	0.467	0.417	0.022	0.364	0.049	9.50	1	3.34	2.75	30	8
India	4.72	0.033	0.408	0.564	0.507	0.006	0.559	0.047	9.36	2	5.01	5.86	1,467	406
Indonesia	2.51	-0.018	0.224	0.361	0.219	-0.003	0.606	0.032	11.67	2	4.24	5.19	218	53
Ireland	5.02	0.067	0.417	1.006	0.527	0.010	0.552	0.082	9.12	1	3.72	6.48	564	68
Israel	3.93	0.080	0.275	0.674	0.534	0.014	0.445	0.079	7.55	3	3.39	5.83	825	99
Italy	4.78	0.136	0.334	0.921	0.448	0.011	0.475	0.077	10.77	2	2.38	2.62	934	113
Japan	1.97	0.335	0.309	0.627	0.200	0.032	0.551	0.063	10.81	2	3.43	3.44	1,795	386
Kenya	5.90	0.235	0.235	1.526	0.544	0.024	0.471	0.156	10.70	4	3.33	3.89	20	3
Malaysia	3.78	0.050	0.282	0.417	0.494	0.005	0.419	0.044	7.82	3	4.16	5.45	700	144
Mexico	5.67	-0.004	0.318	0.585	0.494	0.005	0.500	0.044	11.59	0	3.78	4.60	284	48

Morocco	0.25	0.000	0.000	0.000	0.026	0.000	0.143	0.003	12.62	1	4.04	2.29	16	2
Netherlands	4.48	0.146	0.373	0.783	0.532	0.016	0.527	0.092	8.36	3	2.88	3.73	921	115
New Zealand	5.00	0.109	0.429	0.524	0.726	0.020	0.440	0.054	6.91	4	5.01	8.34	223	48
Nigeria	2.48	0.328	0.358	0.787	0.237	0.031	0.642	0.080	10.11	4	3.53	2.41	85	18
Norway	3.07	0.203	0.325	1.013	0.427	0.026	0.400	0.135	7.35	2	3.36	5.10	802	97
Pakistan	1.00	0.000	0.000	0.000	0.101	0.000	0.000	0.000	10.50	1	1.07	0.43	4	2
Peru	3.58	-0.053	0.474	0.548	0.445	-0.003	0.526	0.061	8.25	0	2.36	2.41	24	5
Philippines	2.82	0.000	0.158	0.284	0.274	0.001	0.250	0.027	10.41	1	2.94	3.49	147	27
Poland	2.62	0.179	0.348	0.916	0.202	0.010	0.589	0.074	12.88	1	3.05	1.81	137	25
Portugal	2.80	0.110	0.278	0.892	0.235	0.007	0.498	0.073	10.65	1	1.46	1.15	296	33
Russia	3.54	-0.014	0.466	0.944	0.346	-0.001	0.591	0.095	10.38	2	3.48	4.05	328	49
Singapore	3.92	0.003	0.252	0.394	0.519	0.002	0.416	0.047	7.54	3	2.89	4.34	1,064	200
South Africa	5.40	0.174	0.460	0.826	0.528	0.017	0.622	0.071	10.15	3	4.18	3.84	1,062	166
South Korea	2.48	-0.049	0.262	0.500	0.300	-0.007	0.390	0.057	8.05	3	3.41	2.94	210	46
Spain	4.22	0.082	0.380	0.792	0.369	0.009	0.581	0.073	11.72	2	2.35	3.36	881	110
Sweden	4.60	0.238	0.413	1.115	0.537	0.028	0.543	0.130	8.91	1	4.74	6.40	1,391	149
Switzerland	3.16	0.149	0.261	0.600	0.388	0.018	0.331	0.071	7.61	1	4.53	4.49	1,027	142
Thailand	5.93	0.009	0.346	0.464	0.443	-0.000	0.477	0.032	13.25	2	4.26	5.92	140	33
Turkey	2.60	0.135	0.177	0.300	0.279	0.012	0.271	0.032	9.61	2	2.82	2.51	121	25
UK	2.87	0.052	0.301	0.544	0.392	0.009	0.467	0.077	6.59	4	3.61	6.90	12,595	1,680
US	6.18	0.140	0.425	0.821	0.746	0.014	0.516	0.068	8.20	1	4.13	7.03	38,874	4,678
Mean/Total	4.77	0.119	0.370	0.700	0.576	0.013	0.494	0.068	8.35	1.84	3.91	6.64	86,901	11,964

Table 2**Bankruptcy penalties across countries and board independence**

This table presents estimates of OLS regressions for firms in the highest and lowest quartiles of the bankruptcy risk distribution (Panel A) and firms in the upper and lower half of the bankruptcy risk distribution (Panel B). The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 2, the ratio of the number of independent directors to board size in columns 3 and 4, and the logarithm of board size in columns 5 and 6. Columns 1, 3, and 5 show the results for the full sample, and columns 2, 4, and 6 show the results when US and UK firms are excluded. For Panel A, HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). For Panel B, HR is a dummy variable that equals one if a firm is in the upper half of the bankruptcy risk distribution, and zero if it is in the lower half. *t*-values are reported in parentheses and are based on standard errors clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. Quartile						
	Number of independent directors		Ratio of independents to board size		Board size	
	All countries (1)	Exclude US & UK (2)	All countries (3)	Exclude US & UK (4)	All countries (5)	Exclude US & UK (6)
CR x HR	-0.045*** (-8.23)	-0.052*** (-4.12)	-0.012*** (-7.43)	-0.014*** (-3.61)	-0.027*** (-4.84)	-0.016 (-1.27)
CR	-0.070*** (-3.08)	-0.029 (-0.91)	-0.042*** (-4.15)	-0.023 (-1.62)	-0.011 (-0.71)	0.009 (0.31)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	43,356	17,623	43,356	17,623	43,356	17,623
Countries	44	42	44	42	44	42
R ²	0.525	0.358	0.556	0.387	0.472	0.456
Panel B. Median						
	Number of independent directors		Ratio of independents to board size		Board size	
	All countries (1)	Exclude US & UK (2)	All countries (3)	Exclude US & UK (4)	All countries (5)	Exclude US & UK (6)
CR x HR	-0.024*** (-5.57)	-0.032*** (-3.92)	-0.008*** (-3.78)	-0.010** (-2.18)	-0.014*** (-3.52)	-0.009 (-0.91)
CR	-0.073*** (-3.41)	-0.036 (-1.30)	-0.042*** (-4.48)	-0.026* (-1.97)	-0.020 (-1.16)	0.006 (0.21)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	86,867	35,398	86,867	35,398	86,867	35,398
Countries	49	47	49	47	49	47
R ²	0.536	0.380	0.576	0.423	0.467	0.432

Table 3**Risk and board independence for high and low bankruptcy penalties**

This table presents regression discontinuity estimates. Columns 1 to 6 present the results for countries with high bankruptcy penalties ($\text{CRIGHTS} > 2$), and columns 7 to 12 present the results for countries with low bankruptcy penalties ($\text{CRIGHTS} \leq 2$). The dependent variable is the logarithm of the number of independent directors plus one in columns 1–2 and 7–8, the ratio of the number of independent directors to board size in columns 3–4 and 9–10, and the logarithm of board size in columns 5–6 and 11–12. Columns 1, 3, 5, 7, 9, and 11 show the results for the full sample, and columns 2, 4, 6, 8, 10, and 12 show the results when UK or US firms are excluded. $1(ZS_{i,j,c,t} < \tau)$ is a dummy variable that equals one if a firm has a Z-score below the 1.81 threshold, and zero otherwise. t -values are reported in parentheses and are based on standard errors clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

	High bankruptcy penalties						Low bankruptcy penalties					
	Independents		Ratio		Board size		Independents		Ratio		Board size	
	All coun-tries	Exclude UK	All coun-tries	Exclude UK	All coun-tries	Exclude UK	All coun-tries	Exclude US	All coun-tries	Exclude US	All coun-tries	Exclude US
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$1(ZS_{i,j,c,t} < \tau)$	-0.068*** (-3.33)	-0.077*** (-2.65)	-0.018** (-2.34)	-0.022** (-2.23)	-0.011 (-1.10)	-0.003 (-0.20)	0.001 (0.17)	0.010 (0.73)	-0.002 (-0.52)	-0.003 (-0.37)	-0.002 (-0.31)	0.001 (0.06)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	18,656	9,895	18,656	9,895	18,656	9,895	41,367	17,191	41,367	17,191	41,367	17,191
Countries	18	17	18	17	18	17	32	31	32	31	32	31
R ²	0.453	0.415	0.424	0.485	0.586	0.556	0.491	0.376	0.593	0.440	0.406	0.364
Bandwidth	3	3	3	3	3	3	3	3	3	3	3	3

Table 4**Bankruptcy reform in Germany and board independence**

This table presents estimates of difference-in-differences regressions for the bankruptcy reform in Germany. The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 2, the ratio of the number of independent directors to board size in columns 3 and 4, and the logarithm of board size in columns 5 and 6. HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). Post is a dummy variable that equals one for the years after the bankruptcy reform was passed (2012 to 2016), and zero for the years before the reform was passed (2007 to 2011). *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

	Number of independent directors		Ratio of independents to board size		Board size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x HR	0.270** (2.54)	0.286*** (2.78)	0.075** (2.49)	0.075** (2.56)	-0.025 (-0.62)	0.010 (0.23)
Post	0.402*** (4.21)	0.381*** (3.88)	0.101*** (3.63)	0.098*** (3.41)	-0.032 (-0.69)	-0.060 (-1.19)
Controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	778	778	778	778	778	778
Firms	110	110	110	110	110	110
R ² (within)	0.212	0.230	0.181	0.190	0.017	0.080

Table 5**Bankruptcy reforms in Italy and board independence**

This table presents estimates of difference-in-differences regressions for the bankruptcy reforms of 2005 (Panel A) and 2006 (Panel B) in Italy. The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 2, the ratio of the number of independent directors to board size in columns 3 and 4, and the logarithm of board size in columns 5 and 6. HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). For the 2005 reform, Post is a dummy variable that equals one for the year after the bankruptcy reform was passed (2006), and zero for the years before the reform was passed (2002 to 2005). For the 2006 reform, Post is a dummy variable that equals one for the years after the reform was passed (2007 to 2011), and zero for the year before the reform was passed (2006). *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. 2005 reform						
	Number of independent directors		Ratio of independents to board size		Board size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x HR	0.266** (2.06)	0.251** (2.10)	0.065 (1.39)	0.068 (1.37)	0.102 (1.07)	0.083 (0.99)
Post	-0.167 (-1.32)	-0.273** (-2.13)	-0.055 (-1.62)	-0.057 (-1.26)	-0.045 (-0.64)	-0.134 (-1.60)
Controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	107	107	107	107	107	107
Firms	27	27	27	27	27	27
R ² (within)	0.092	0.260	0.066	0.133	0.036	0.203
Panel B. 2006 reform						
	Number of independent directors		Ratio of independents to board size		Board size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x HR	-0.268** (-2.12)	-0.275** (-2.51)	-0.090** (-2.47)	-0.098*** (-3.11)	0.038 (0.38)	0.015 (0.18)
Post	0.149 (1.50)	0.137 (1.22)	0.045 (1.49)	0.063* (1.85)	0.029 (0.69)	0.049 (0.79)
Controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	135	135	135	135	135	135
Firms	25	25	25	25	25	25
R ² (within)	0.086	0.140	0.074	0.151	0.018	0.197

Table 6**Bankruptcy reform in the US and board independence**

This table presents estimates of difference-in-differences regressions for the bankruptcy reform in the US. Panels A and C show the results for an unbalanced sample, and Panel B shows the results for a balanced sample. The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 2, the ratio of the number of independent directors to board size in columns 3 and 4, and the logarithm of board size in columns 5 and 6. For Panels A and B, HR is a dummy variable that equals one if a firm has a Z-score below 1.81 (high risk), and zero if it has a Z-score above 3.3 (low risk). For Panel C, HR is a dummy variable that equals one if a firm has a Z-score below 1.31, and zero if it has a Z-score above 3.3. Post is a dummy variable that equals one for the years after the bankruptcy reform was passed (1979 to 1981), and zero for the years before the reform was passed (1976 to 1978). *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. Z-score < 1.81						
	Number of independent directors		Ratio of independents to board size		Board size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x HR	0.055** (2.04)	0.060** (2.18)	0.032*** (2.74)	0.033*** (2.80)	0.014 (0.79)	0.021 (1.23)
Post	0.100*** (10.86)	0.039*** (2.57)	0.050*** (12.22)	0.044*** (6.48)	0.018*** (3.28)	-0.041*** (-4.83)
Controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,869	5,869	5,869	5,869	5,869	5,869
Firms	1,255	1,255	1,255	1,255	1,255	1,255
R ² (within)	0.057	0.073	0.086	0.087	0.005	0.047
Panel B. Balanced panel						
	Number of independent directors		Ratio of independents to board size		Board size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x HR	0.084*** (2.76)	0.079** (2.49)	0.040*** (2.73)	0.039** (2.54)	0.022 (1.02)	0.021 (0.98)
Post	0.101*** (9.81)	0.045*** (2.63)	0.049*** (10.98)	0.041*** (5.67)	0.020*** (3.43)	-0.034*** (-3.54)
Controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4,295	4,295	4,295	4,295	4,295	4,295
Firms	762	762	762	762	762	762
R ² (within)	0.067	0.079	0.093	0.096	0.008	0.040
Panel C. Z-score < 1.31						
	Number of independent directors		Ratio of independents to board size		Board size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x HR	0.093*** (2.58)	0.104*** (3.01)	0.053*** (3.32)	0.057*** (3.42)	0.020 (0.83)	0.027 (1.28)
Post	0.099*** (10.67)	0.038** (2.45)	0.049*** (12.03)	0.043*** (6.18)	0.017*** (3.10)	-0.043*** (-4.86)
Controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,586	5,586	5,586	5,586	5,586	5,586
Firms	1,185	1,185	1,185	1,185	1,185	1,185
R ² (within)	0.057	0.071	0.086	0.087	0.005	0.045

Table 7

Bankruptcy reforms in Germany and Italy and board independence in other countries

This table presents estimates of difference-in-differences regressions for firms in other countries around the bankruptcy reform of 2012 in Germany (Panel A) and the bankruptcy reforms of 2005 (Panel B) and 2006 (Panel C) in Italy. The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 4, the ratio of the number of independent directors to board size in columns 2 and 5, and the logarithm of board size in columns 3 and 6. Columns 1 to 3 present the results for firms in Austria, Belgium, France, Netherlands, and Switzerland, and columns 4 to 6 present the results for US firms. HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). For the 2012 reform in Germany (Panel A), Post is a dummy variable that equals one for the years after the bankruptcy reform was passed (2012 to 2016), and zero for the years before the reform was passed (2007 to 2011). For the 2005 reform in Italy (Panel B), Post is a dummy variable that equals one for the year after the bankruptcy reform was passed (2006), and zero for the years before the reform was passed (2002 to 2005). For the 2006 reform in Italy (Panel C), Post is a dummy variable that equals one for the years after the reform was passed (2007 to 2011), and zero for the year before the reform was passed (2006). *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. 2012 reform in Germany						
	Similar countries			United States		
	Independents (1)	Ratio (2)	Board size (3)	Independents (4)	Ratio (5)	Board size (6)
Post x HR	0.014 (0.32)	0.016 (0.85)	-0.018 (-0.66)	-0.004 (-0.47)	-0.001 (-0.16)	-0.004 (-0.52)
Post	0.204*** (4.45)	0.084*** (4.36)	0.024 (0.97)	0.050*** (5.52)	0.047*** (8.93)	-0.008 (-0.96)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2,029	2,029	2,029	11,268	11,268	11,268
Firms	248	248	248	1,558	1,558	1,558
R ² (within)	0.133	0.138	0.069	0.076	0.066	0.049
Panel B. 2005 reform in Italy						
	Similar countries			United States		
	Independents (1)	Ratio (2)	Board size (3)	Independents (4)	Ratio (5)	Board size (6)
Post x HR	0.017 (0.38)	0.019 (1.20)	0.007 (0.23)	-0.015 (-1.57)	0.004 (0.86)	-0.024*** (-2.95)
Post	0.136** (2.23)	0.057** (2.49)	-0.068** (-2.04)	0.191*** (15.87)	0.124*** (18.77)	0.023*** (2.60)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	743	743	743	6,402	6,402	6,402
Firms	197	197	197	1,680	1,680	1,680
R ² (within)	0.159	0.179	0.023	0.183	0.229	0.044
Panel C. 2006 reform in Italy						
	Similar countries			United States		
	Independents (1)	Ratio (2)	Board size (3)	Independents (4)	Ratio (5)	Board size (6)
Post x HR	-0.032 (-0.80)	-0.019 (-1.31)	0.017 (0.75)	0.004 (0.41)	-0.001 (-0.30)	0.006 (0.70)
Post	0.160*** (4.58)	0.069*** (5.20)	-0.002 (-0.11)	0.036*** (4.40)	0.036*** (8.60)	-0.007 (-0.86)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	985	985	985	6,896	6,896	6,896
Firms	190	190	190	1,481	1,481	1,481
R ² (within)	0.093	0.078	0.068	0.061	0.061	0.039

Table 8

Bankruptcy penalties and board independence: heterogeneity among risky firms

This table presents estimates of OLS regressions (Panel A) and difference-in-differences regressions for the bankruptcy reform in Germany (Panel B). The dependent variable is the logarithm of the number of independent directors plus one in columns 1–2, 5–6, and 9–10, and the ratio of the number of independent directors to board size in columns 3–4, 7–8, and 11–12. For Panel A, columns 1, 3, 5, 7, 9, and 11 show the results for the full sample, and columns 2, 4, 6, 8, 10, and 12 show the results when US and UK firms are excluded. H is a dummy variable that equals one if a firm has low Tobin's Q, low R&D expenditures, or a high WW-score, and zero otherwise. For Panel B, Post is a dummy variable that equals one for the years after the bankruptcy reform was passed (2012 to 2016), and zero for the years before the reform was passed (2007 to 2011). *t*-values are reported in parentheses and are based on standard errors clustered at the country level (Panel A) or firm level (Panel B). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. Across countries												
	Investment opportunities				R&D expenditures				Financial constraints			
	Independents		Ratio		Independents		Ratio		Independents		Ratio	
	All coun-tries (1)	Exclude US & UK (2)	All coun-tries (3)	Exclude US & UK (4)	All coun-tries (5)	Exclude US & UK (6)	All coun-tries (7)	Exclude US & UK (8)	All coun-tries (9)	Exclude US & UK (10)	All coun-tries (11)	Exclude US & UK (12)
CR x H	-0.022*** (-3.88)	-0.022** (-2.27)	-0.005*** (-2.74)	-0.005 (-1.56)	-0.037*** (-5.65)	-0.023** (-2.08)	-0.013*** (-5.42)	-0.013*** (-2.92)	-0.025* (-1.78)	0.013 (0.77)	-0.012* (-2.00)	0.002 (0.37)
CR	-0.106*** (-5.85)	-0.072*** (-2.69)	-0.052*** (-6.15)	-0.037*** (-3.03)	-0.086*** (-5.46)	-0.064** (-2.44)	-0.044*** (-5.21)	-0.028** (-2.19)	-0.116*** (-7.18)	-0.101*** (-3.95)	-0.053*** (-5.86)	-0.044*** (-3.37)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	21,870	8,994	21,870	8,994	21,870	8,994	21,870	8,994	14,759	5,846	14,759	5,846
Countries	44	42	44	42	44	42	44	42	44	42	44	42
R ²	0.525	0.338	0.545	0.380	0.526	0.337	0.547	0.381	0.546	0.328	0.566	0.376
Panel B. 2012 reform in Germany												
	Investment opportunities				R&D expenditures				Financial constraints			
	Independents		Ratio		Independents		Ratio		Independents		Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post x H	0.353** (2.00)	0.354** (2.03)	0.068 (1.39)	0.066 (1.37)	0.494** (2.04)	0.516** (2.06)	0.097* (1.78)	0.101* (2.00)	-0.168 (-0.78)	-0.123 (-0.56)	0.017 (0.24)	0.021 (0.35)
Post	0.556*** (2.89)	0.566*** (2.94)	0.159*** (3.82)	0.157*** (3.70)	0.334 (1.20)	0.311 (1.04)	0.115* (1.97)	0.105* (1.80)	0.852*** (3.69)	0.783*** (3.12)	0.196*** (3.63)	0.176*** (3.18)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	385	385	385	385	385	385	385	385	277	277	277	277
Firms	55	55	55	55	55	55	55	55	35	35	35	35
R ² (within)	0.317	0.332	0.280	0.294	0.324	0.341	0.285	0.301	0.339	0.363	0.321	0.369

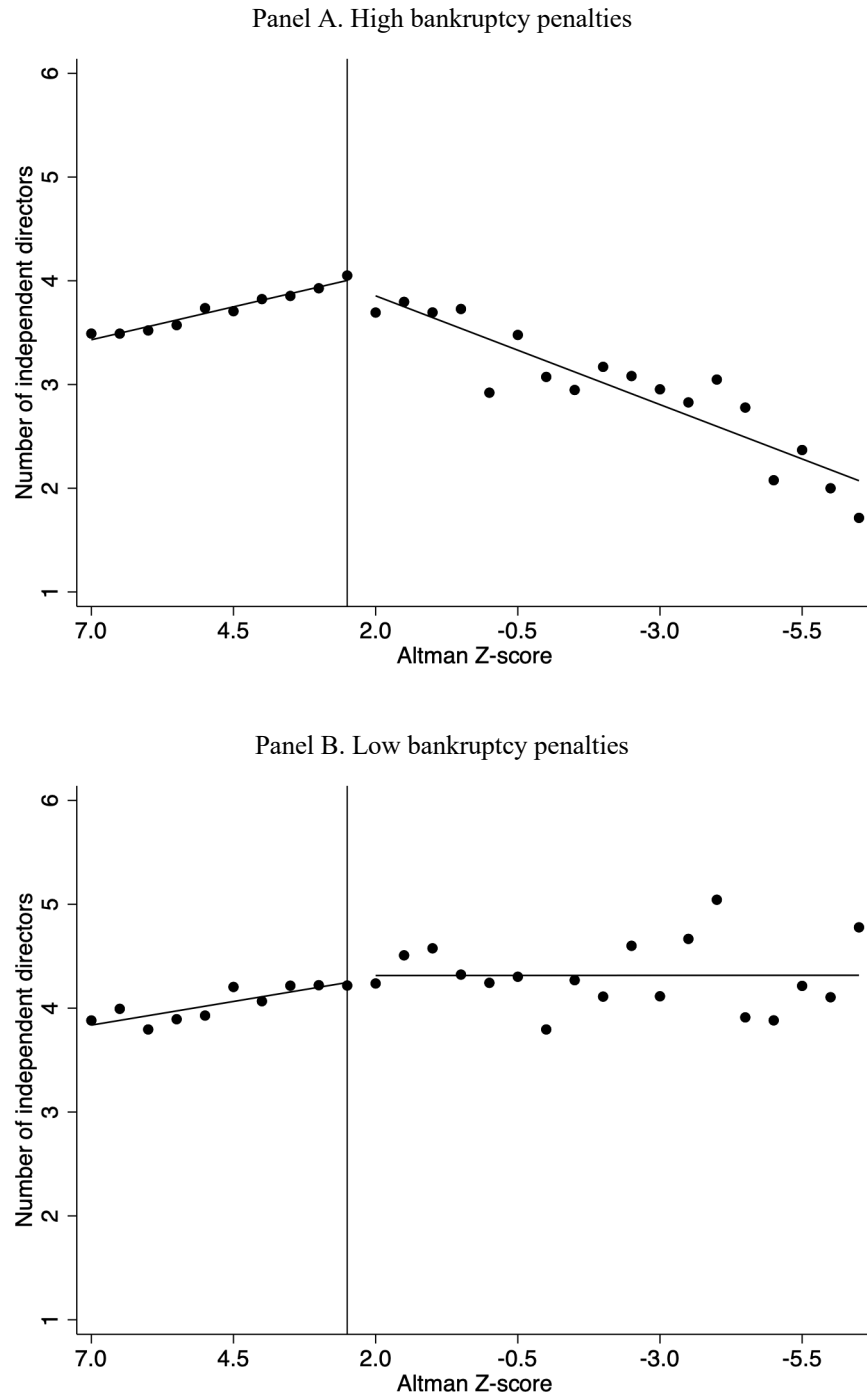


Figure 1

Risk and the number of independent directors for high and low bankruptcy penalties

This figure plots the average number of independent directors for countries with high bankruptcy penalties in Panel A (CRIGHTS > 2) and countries with low bankruptcy penalties in Panel B (CRIGHTS ≤ 2). Each dot is the average value for firms in Altman Z-score bins of 0.50. The lines show fitted values based on a linear fit for each side of the 1.81 Z-score threshold.

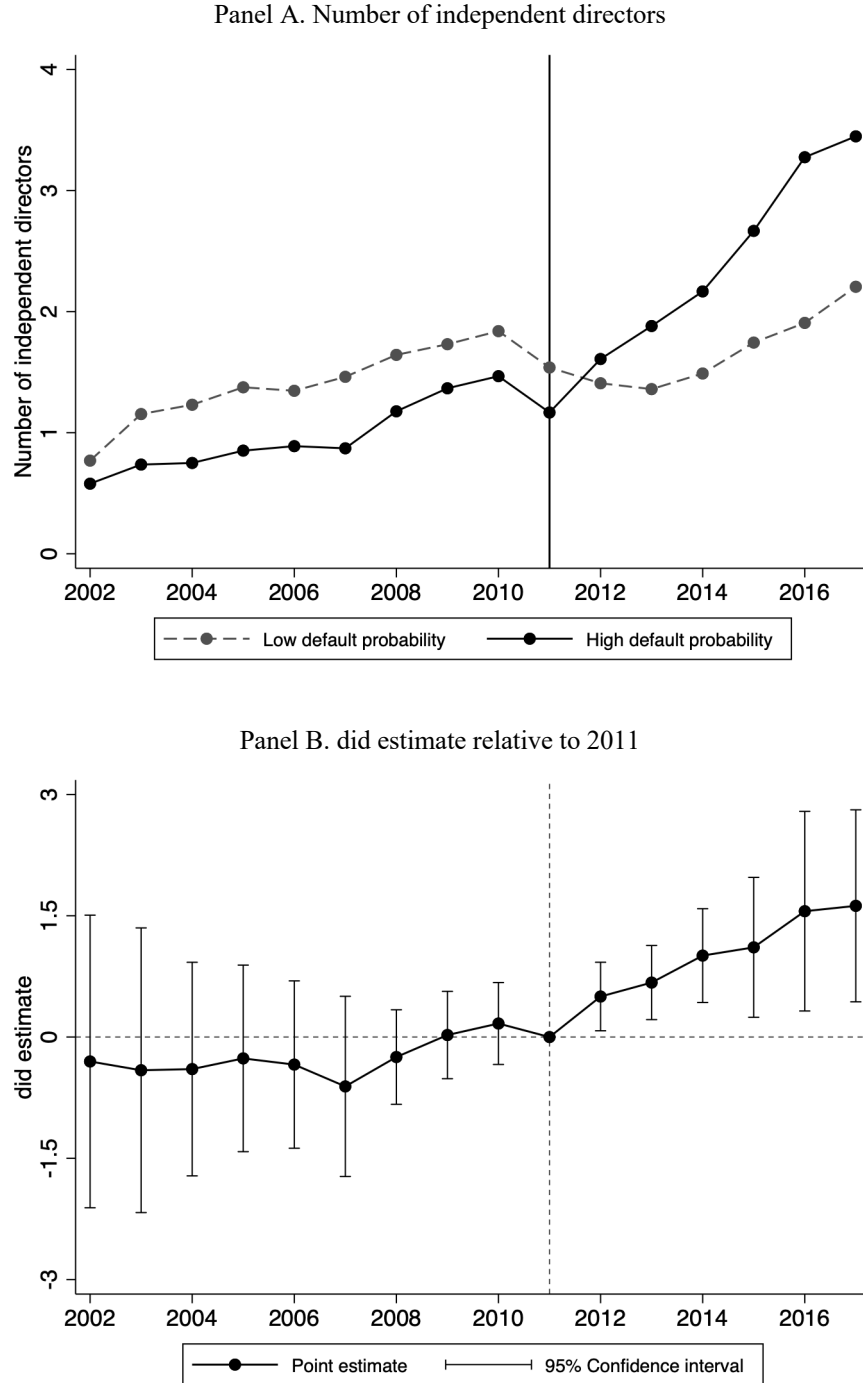


Figure 2

Bankruptcy reform in Germany and the number of independent directors

Panel A plots the average number of independent directors for risky and safe firms. Panel B plots the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reform, 2011. The dependent variable is the number of independent directors. The regression is specified as in column 2 of Table 4, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.1 in the Internet Appendix.

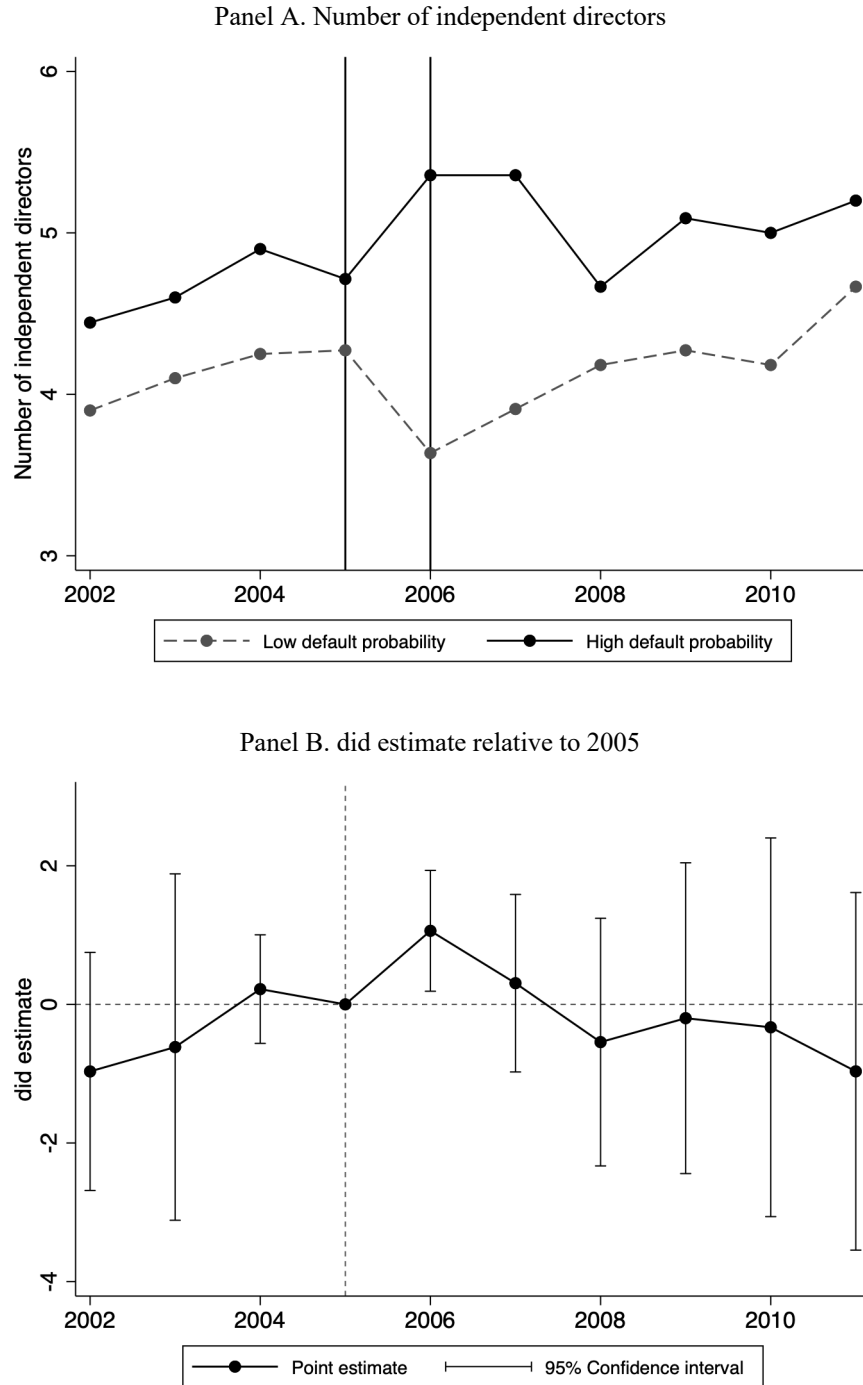


Figure 3

Bankruptcy reforms in Italy and the number of independent directors

Panel A plots the average number of independent directors for risky and safe firms. Panel B plots the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reforms, 2005. The dependent variable is the number of independent directors. The regression is specified as in column 2 of Table 5, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.2 in the Internet Appendix.

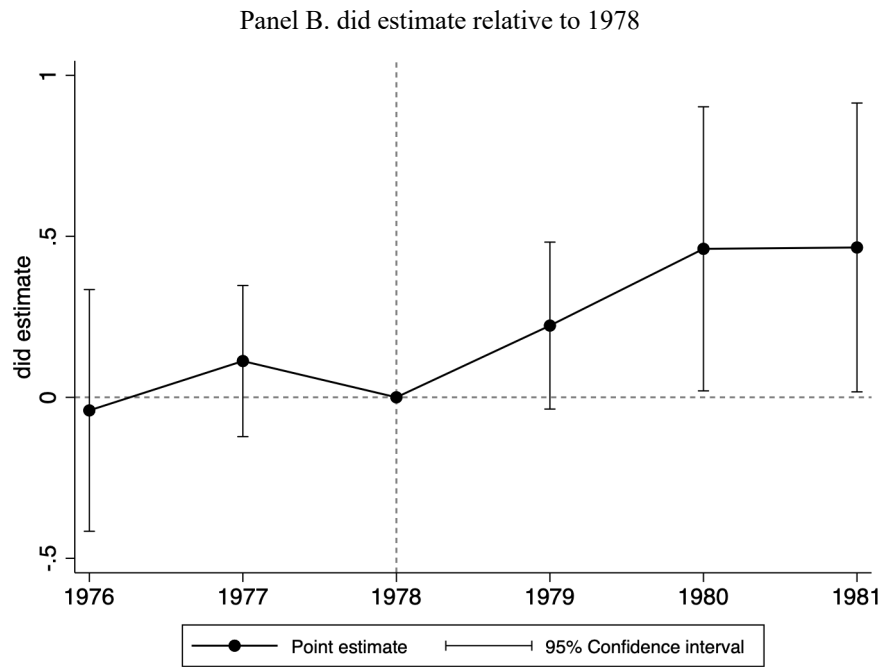
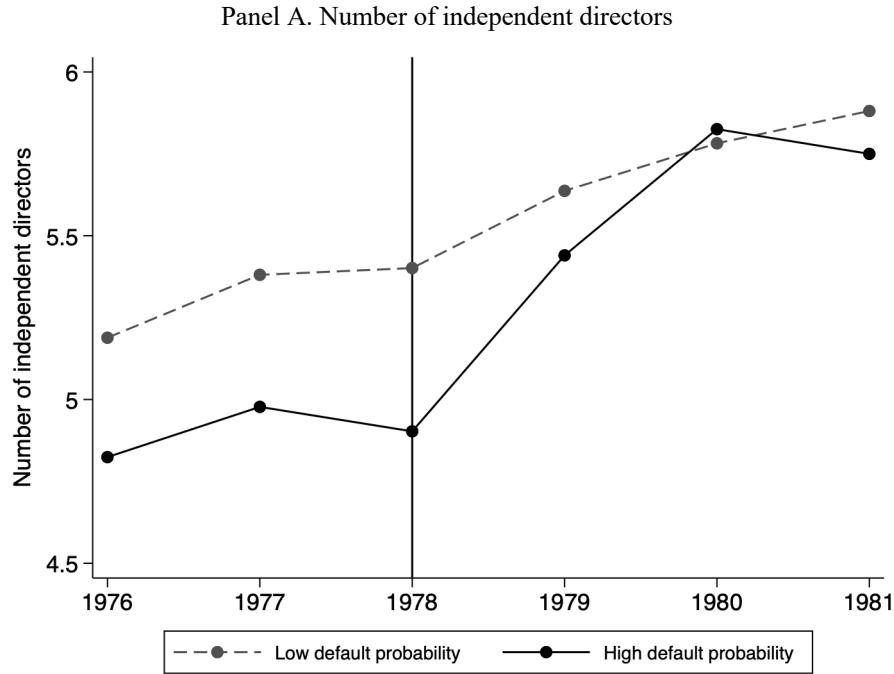
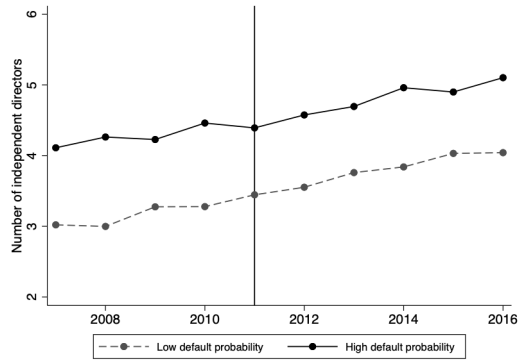


Figure 4

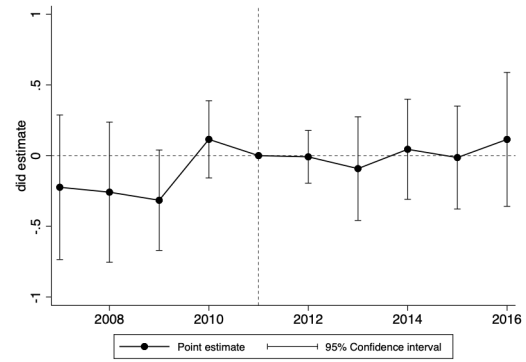
Bankruptcy reform in the US and the number of independent directors

Panel A plots the average number of independent directors for risky and safe firms. Panel B plots the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reform, 1978. The dependent variable is the number of independent directors. The regression is specified as in column 2 of Table 6, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.3 in the Internet Appendix.

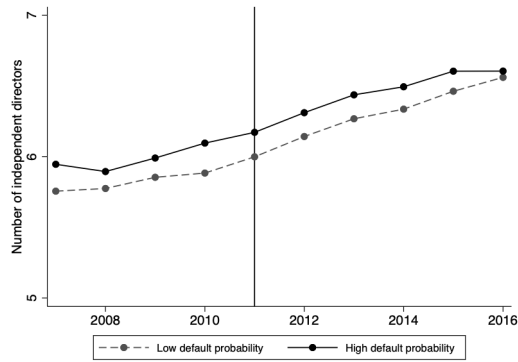
Panel A. Number of independent directors (similar countries)



Panel B. did estimate relative to 2011 (similar countries)



Panel C. Number of independent directors (US)



Panel D. did estimate relative to 2011 (US)

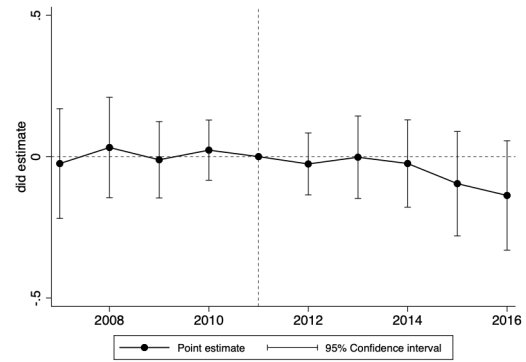
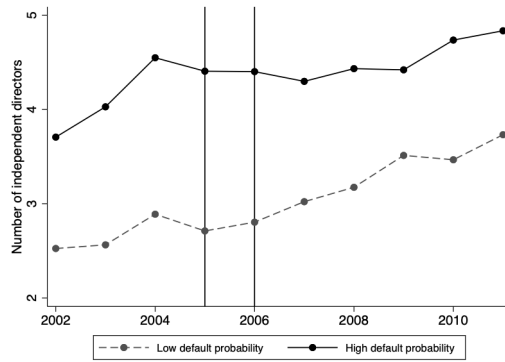


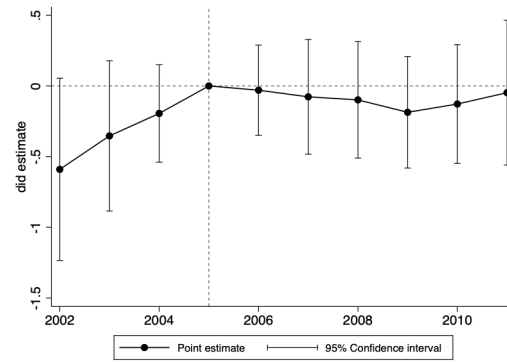
Figure 5

Bankruptcy reform in Germany and the number of independent directors in other countries
Panels A (similar countries) and C (US) plot the average number of independent directors for risky and safe firms. Panels B (similar countries) and D (US) plot the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reform, 2011. The dependent variable is the number of independent directors. The regression is specified as in column 1 of Table 7, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.1 in the Internet Appendix.

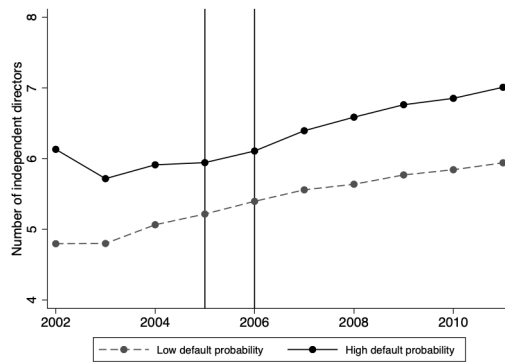
Panel A. Number of independent directors (similar countries)



Panel B. did estimate relative to 2005 (similar countries)



Panel C. Number of independent directors (US)



Panel D. did estimate relative to 2005 (US)

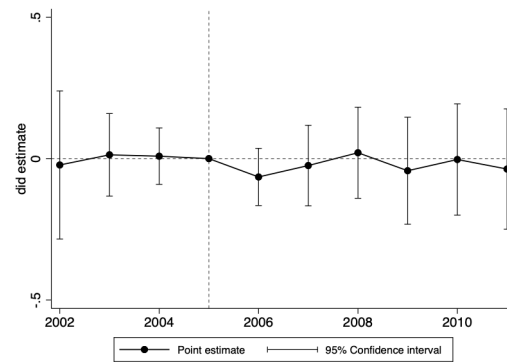


Figure 6

Bankruptcy reforms in Italy and the number of independent directors in other countries

Panels A (similar countries) and C (US) plot the average number of independent directors for risky and safe firms. Panels B (similar countries) and D (US) plot the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reforms, 2005. The dependent variable is the number of independent directors. The regression is specified as in column 1 of Table 7, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.2 in the Internet Appendix.

Appendix

Table A.1
Variable definitions

Variable name	Variable definition	Source
<i>Board characteristics</i>		
Number of independent directors	Logarithm of the number of independent board members plus one. Directors are classified as independent based on self-declared information by the firms, who follow exchange listing rules or country-level corporate governance codes. Typically, directors are defined as independent if they are not a current employee, a former executive, a relative of a current executive, or someone with material business relations (e.g., bankers) with the firm.	BoardEx
Ratio of the number of independents to board size	Ratio of the number of independent board members to the number of board members.	BoardEx
Board size	Logarithm of the number of board members.	BoardEx
<i>Country characteristics</i>		
Creditor rights (CR)	Aggregate index of creditor rights, following La Porta et al. (1998). The index is the sum of the four individual components described below. The index ranges from zero to four and higher values indicate stricter bankruptcy penalties on management in default. The data are from 2003 and come from Djankov, McLiesh, and Shleifer (2007), who updated and enlarged the data of La Porta et al. (1998).	Djankov, McLiesh, and Shleifer (2007)
No automatic stay (AUTOSTAY)	Equals one if secured creditors are able to seize their collateral after the reorganization procedure is approved, that is, if there is no automatic stay on the assets of the firm. Equals zero if the law imposes automatic stay on the assets, thereby protecting the debtor against secured creditors.	Djankov, McLiesh, and Shleifer (2007)
Reorganization (REORG)	Equals one if the reorganization procedure imposes restrictions, such as secured creditors' consent or minimum dividends, for a debtor to file for reorganization. Equals zero if management can seek protection from creditors unilaterally by filing for reorganization.	Djankov, McLiesh, and Shleifer (2007)
Secured creditors first (SECURED)	Equals one if secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm. Equals zero if other claimants, such as the government or workers, are given absolute priority.	Djankov, McLiesh, and Shleifer (2007)
No management stay (MANAGES)	Equals one if an administrator is automatically appointed for running the business during the reorganization procedure, that is, management is dismissed in the reorganization procedure. Equals zero if management retains corporate control during reorganization.	Djankov, McLiesh, and Shleifer (2007)
Shareholder rights	Aggregate index of shareholder rights, following La Porta et al. (1998). The index is formed by adding one when: (1) shareholders are allowed to mail their proxy vote to the firm, (2) shareholders are not required to deposit their shares prior to the general shareholders' meeting, (3) cumulative voting or proportional representation of minorities (shareholders owning 10% or less of the capital) in the board of directors is allowed, (4) an oppressed minorities mechanism is in place, (5) the minimum percentage of share capital that entitles a single shareholder to call for an extraordinary shareholders' meeting is less than or equal to 10%, and (6) shareholders have preemptive rights. The index ranges from zero to six and higher values indicate better legal protection of minority shareholders. The data are from 2003 and come from Djankov et al. (2008), who revised, updated, and enlarged the data of La Porta et al. (1998).	Djankov et al. (2008)
Legal origin	Dummy variables that identify the legal origin of the company law or commercial code of each country. The five origins are English, French, German, Nordic, and Socialist.	Djankov, McLiesh, and Shleifer (2007)
Rule of law	"captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence." The index ranges from -2.5 (weak) to 2.5 (strong). Details on the data sources, the aggregation method, and the precise interpretation of the index can be found in Kaufmann, Kraay, and Mastruzzi (2010).	Quotation and source are from World Bank (Worldwide Governance Indicators)
GDP per capita	Logarithm of the real GDP per capita. The data are in constant 2010 US dollars.	World Bank
Market cap	Logarithm of the average stock market capitalization in US dollars.	World Bank
<i>Firm characteristics</i>		
Altman's Z-score	Sum of 1.2 times net working capital divided by total assets, 1.4 times retained earnings divided by total assets, 3.3 times EBIT divided by total assets, 0.6 times market value of equity divided by total liabilities, and 0.99 times sales divided by total assets. Firms with low Z-score have high default probability and firms with high Z-score have low default probability.	Worldscope
Size	Logarithm of total assets in millions of US dollars.	Worldscope
Leverage	Ratio of total debt to total assets.	Worldscope
Return on assets	Ratio of EBITDA to total assets.	Worldscope

Return volatility	Average standard deviation of return on assets.	Worldscope
Market-to-book	Ratio of total assets plus market value of equity minus book value of equity to total assets.	Worldscope
Insider ownership	Ratio of the number of closely held shares by insiders (shareholders who hold at least 5% of the outstanding shares, such as officers and directors and immediate families, other corporations, or individuals) to the number of shares outstanding.	Worldscope
Free cash flow	Ratio of EBITDA minus capital expenditures to total assets.	Worldscope
R&D	Ratio of R&D expenditures to total assets.	Worldscope
WW-score	Sum of -0.091 times cash flow divided by total assets, -0.062 times a dummy indicating whether the firm pays dividends, 0.021 times long-term debt divided by total assets, -0.044 times logarithm of total assets in millions of US dollars, -0.035 times sales growth, and 0.102 times industry sales growth. Firms with high WW-score face high constraints and firms with low WW-score face low constraints.	Worldscope
<i>Out-of-sample (US)</i>		
Number of independent directors	Logarithm of the number of independent board members plus one. Directors are classified as independent by the authors. Directors are defined as independent if they are not a current or previous officer of the firm, or a family member of the CEO (proxied by having the same last name). The authors do not consider whether a director has material business relations with the firm, given that Moody's and Compact Disclosure do not provide such information.	Graham, Kim, and Leary (2020)
Ratio of the number of independents to board size	Ratio of the number of independent board members to the number of board members.	Graham, Kim, and Leary (2020)
Board size	Logarithm of the number of board members.	Graham, Kim, and Leary (2020)
Altman's Z-score	Sum of 1.2 times net working capital divided by total assets, 1.4 times retained earnings divided by total assets, 3.3 times EBIT divided by total assets, 0.6 times market value of equity divided by total liabilities, and 0.99 times sales divided by total assets.	Compustat
Size	Logarithm of total assets.	Compustat
Leverage	Ratio of total debt to total assets.	Compustat
Return on assets	Ratio of EBITDA to total assets.	Compustat
Market-to-book	Ratio of total assets plus market value of equity minus book value of equity to total assets.	Compustat
Free cash flow	Ratio of EBITDA minus capital expenditures to total assets.	Compustat
R&D	Ratio of R&D expenditures to total assets.	Compustat
<i>Appendix</i>		
Interest coverage ratio	Ratio of EBIT to interest expenses.	Worldscope
Board rules	Dummy variables that identify whether a country requires or encourages a certain level of board independence. The three board rules are rule-based, comply-or-explain, and no rule.	Fauver et al. (2017)
Board structures	Dummy variables that identify the board structure of each country. The three board structures are one-tier, two-tier, and mixed (choice over board structure).	Adams and Ferreira (2007) and Ferreira and Kirchmaier (2013)
Accounting standards	Index of accounting standards, created by the Center for International Financial Analysis and Research (CIFAR, 1995). The index is constructed by examining and rating companies' annual reports for their inclusion or omission of 85 items. The index ranges from zero to 100 and higher values indicate better accounting standards. The data come from Bhattacharya, Daouk, and Welker (2003) and Hope, Kang, and Zang (2007).	Bhattacharya, Daouk, and Welker (2003) and Hope, Kang, and Zang (2007)
Institutional ownership	Average institutional ownership in a country in 2010. The data are from Dyck et al. (2019). Because Dyck et al. (2019) do not report results for the US, the data for the US are from Aggarwal et al. (2011) and are from 2007.	Dyck et al. (2019) and Aggarwal et al. (2011)

Table A.2**Bankruptcy penalties across countries and board independence: additional controls**

This table presents estimates of OLS regressions for firms in the highest and lowest quartiles of the bankruptcy risk distribution (Panel A) and firms in the upper and lower half of the bankruptcy risk distribution (Panel B). The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 2, the ratio of the number of independent directors to board size in columns 3 and 4, and the logarithm of board size in columns 5 and 6. Columns 1, 3, and 5 show the results for the full sample, and columns 2, 4, and 6 show the results when US and UK firms are excluded. For Panel A, HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). For Panel B, HR is a dummy variable that equals one if a firm is in the upper half of the bankruptcy risk distribution, and zero if it is in the lower half. *t*-values are reported in parentheses and are based on standard errors clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. Quartile						
	Number of independent directors		Ratio of independents to board size		Board size	
	All countries (1)	Exclude US & UK (2)	All countries (3)	Exclude US & UK (4)	All countries (5)	Exclude US & UK (6)
CR x HR	-0.046*** (-7.25)	-0.057*** (-3.29)	-0.012*** (-6.27)	-0.017*** (-2.96)	-0.028*** (-4.19)	-0.014 (-0.80)
CR	-0.135*** (-4.02)	-0.142* (-2.03)	-0.068*** (-3.51)	-0.010 (-0.35)	-0.042 (-1.57)	-0.147** (-2.50)
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	39,935	14,202	39,935	14,202	39,935	14,202
Countries	27	25	27	25	27	25
R ²	0.556	0.411	0.573	0.429	0.506	0.531
Panel B. Median						
	Number of independent directors		Ratio of independents to board size		Board size	
	All countries (1)	Exclude US & UK (2)	All countries (3)	Exclude US & UK (4)	All countries (5)	Exclude US & UK (6)
CR x HR	-0.023*** (-5.12)	-0.032** (-2.49)	-0.005*** (-3.44)	-0.008 (-1.37)	-0.014** (-2.73)	-0.006 (-0.47)
CR	-0.132*** (-4.04)	-0.152** (-2.45)	-0.068*** (-3.60)	-0.012 (-0.44)	-0.045 (-1.68)	-0.163*** (-2.89)
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	79,907	28,438	79,907	28,438	79,907	28,438
Countries	27	25	27	25	27	25
R ²	0.568	0.436	0.591	0.468	0.509	0.523

Table A.3

Bankruptcy penalties across countries and board independence: interest coverage ratio

This table presents estimates of OLS regressions for firms in the highest and lowest quartiles of the bankruptcy risk distribution (Panel A) and firms in the upper and lower half of the bankruptcy risk distribution (Panel B). The dependent variable is the logarithm of the number of independent directors plus one in columns 1 and 2, the ratio of the number of independent directors to board size in columns 3 and 4, and the logarithm of board size in columns 5 and 6. Columns 1, 3, and 5 show the results for the full sample, and columns 2, 4, and 6 show the results when US and UK firms are excluded. For Panel A, HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). For Panel B, HR is a dummy variable that equals one if a firm is in the upper half of the bankruptcy risk distribution, and zero if it is in the lower half. *t*-values are reported in parentheses and are based on standard errors clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

Panel A. Quartile						
	Number of independent directors		Ratio of independents to board size		Board size	
	All countries (1)	Exclude US & UK (2)	All countries (3)	Exclude US & UK (4)	All countries (5)	Exclude US & UK (6)
CR x HR	-0.039*** (-9.36)	-0.037*** (-4.28)	-0.010*** (-5.25)	-0.011** (-2.32)	-0.019*** (-7.08)	-0.011** (-2.32)
CR	-0.070*** (-2.73)	-0.021 (-0.69)	-0.043*** (-3.74)	-0.022 (-1.42)	-0.011 (-0.67)	0.013 (0.45)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	43,326	17,593	43,326	17,593	43,326	17,593
Countries	44	42	44	42	44	42
R ²	0.507	0.348	0.557	0.387	0.430	0.429
Panel B. Median						
	Number of independent directors		Ratio of independents to board size		Board size	
	All countries (1)	Exclude US & UK (2)	All countries (3)	Exclude US & UK (4)	All countries (5)	Exclude US & UK (6)
CR x HR	-0.025*** (-8.20)	-0.029*** (-5.72)	-0.007*** (-5.94)	-0.009*** (-3.72)	-0.010*** (-5.04)	-0.007 (-1.30)
CR	-0.072*** (-3.42)	-0.038 (-1.42)	-0.041*** (-4.30)	-0.026* (-1.85)	-0.022 (-1.25)	0.005 (0.17)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	86,867	35,398	86,867	35,398	86,867	35,398
Countries	49	47	49	47	49	47
R ²	0.536	0.379	0.576	0.423	0.467	0.432

Table A.4

Bankruptcy penalties across countries and board independence: individual creditor rights components

This table presents estimates of OLS regressions. The dependent variable is the logarithm of the number of independent directors plus one in columns 1–4, the ratio of the number of independent directors to board size in columns 5–8, and the logarithm of board size in columns 9–12. HR is a dummy variable that equals one if a firm is in the highest quartile of the bankruptcy risk distribution (high risk), and zero if it is in the lowest quartile (low risk). *t*-values are reported in parentheses and are based on standard errors clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Refer to Table A.1 in the Appendix for variable definitions.

	Number of independent directors				Ratio of independents to board size				Board size			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
AUTOSTAY x HR	-0.099*** (-5.63)				-0.018** (-2.28)				-0.096*** (-9.55)			
AUTOSTAY	-0.108 (-1.68)				-0.094*** (-4.46)				0.002 (0.06)			
REORG x HR		-0.096*** (-4.68)				-0.028*** (-4.97)				-0.052** (-2.08)		
REORG		-0.163*** (-2.85)				-0.071** (-2.65)				-0.049 (-0.89)		
SECURED x HR			-0.086** (-2.15)				-0.019* (-1.76)				-0.035 (-0.90)	
SECURED			-0.053 (-0.45)				-0.009 (-0.18)				-0.061 (-1.04)	
MANAGES x HR				-0.094*** (-4.54)				-0.030*** (-5.22)				-0.040 (-1.51)
MANAGES				-0.137** (-2.30)				-0.086*** (-3.44)				0.005 (0.09)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	43,356	43,356	43,356	43,356	43,356	43,356	43,356	43,356	43,356	43,356	43,356	43,356
Countries	44	44	44	44	44	44	44	44	44	44	44	44
R ²	0.518	0.521	0.510	0.519	0.552	0.546	0.537	0.551	0.472	0.472	0.468	0.468

Table A.5

Summary statistics for the bankruptcy reform in Germany

This table presents summary statistics regarding the bankruptcy reform in Germany, separately for risky firms (column 1) and safe firms (column 2). Column 3 presents p -values of t -tests of difference in means between high and low risk firms. Refer to Table A.1 in the Appendix for variable definitions.

	Risky firms (1)	Safe firms (2)	p -value (3)
Number of independents	1.81	1.60	0.28
Ratio independents to board size	0.133	0.146	0.40
Board size	13.75	10.30	0.00
Size	14.29	13.12	0.00
Leverage	0.326	0.089	0.00
Return on assets	0.032	0.148	0.00
Market-to-book	1.67	2.36	0.00
Free cash flow	-0.013	0.112	0.00
Insider ownership	0.347	0.452	0.00
Altman's Z-score	0.55	6.79	0.00

Table A.6

Summary statistics for the bankruptcy reforms in Italy

This table presents summary statistics regarding the bankruptcy reforms in Italy, separately for risky firms (column 1) and safe firms (column 2). Column 3 presents p -values of t -tests of difference in means between high and low risk firms. Refer to Table A.1 in the Appendix for variable definitions.

	Risky firms (1)	Safe firms (2)	p -value (3)
Number of independents	4.96	4.13	0.01
Ratio independents to board size	0.453	0.432	0.46
Board size	11.50	10.19	0.01
Size	15.63	14.41	0.00
Leverage	0.335	0.164	0.00
Return on assets	0.071	0.152	0.00
Market-to-book	1.17	1.98	0.00
Free cash flow	0.013	0.107	0.00
Insider ownership	0.419	0.540	0.00
Altman's Z-score	1.07	4.55	0.00

Table A.7

Summary statistics for the bankruptcy reform in the US

This table presents summary statistics regarding the bankruptcy reform in the US, separately for risky firms (column 1) and safe firms (column 2). Column 3 presents p -values of t -tests of difference in means between high and low risk firms. Refer to Table A.1 in the Appendix for variable definitions.

	Risky firms (1)	Safe firms (2)	p -value (3)
Number of independents	5.21	5.53	0.01
Ratio independents to board size	0.560	0.541	0.02
Board size	9.03	10.03	0.00
Size	4.77	4.94	0.03
Leverage	0.668	0.451	0.00
Return on assets	0.058	0.140	0.00
Market-to-book	1.14	1.12	0.36
Free cash flow	-0.035	0.067	0.00
Altman's Z-score	1.76	4.59	0.00

Internet Appendix

Table IA.1

Detailed point estimates and *t*-values for figures on Germany's bankruptcy reform

This table reports the point estimates and *t*-values regarding Figures 2, IA.1, and 5. *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Figure 2 (Panel B) (1)	Figure IA.1 (Panel B) (2)	Figure IA.1 (Panel D) (3)	Figure 5 (Panel B) (4)	Figure 5 (Panel D) (5)
2002 x HR	-0.302 (-0.33)	0.026 (0.50)	1.978 (1.58)	-	-
Obs.	132	132	132	-	-
Firms	104	104	104	-	-
R ² (within)	0.477	0.504	0.398	-	-
2003 x HR	-0.411 (-0.46)	0.019 (0.34)	1.278 (1.56)	-	-
Obs.	132	132	132	-	-
Firms	104	104	104	-	-
R ² (within)	0.506	0.517	0.388	-	-
2004 x HR	-0.396 (-0.59)	0.003 (0.08)	2.095** (2.20)	-	-
Obs.	133	133	133	-	-
Firms	105	105	105	-	-
R ² (within)	0.567	0.588	0.378	-	-
2005 x HR	-0.264 (-0.45)	-0.003 (-0.09)	1.112 (1.24)	-	-
Obs.	151	151	151	-	-
Firms	108	108	108	-	-
R ² (within)	0.404	0.412	0.193	-	-
2006 x HR	-0.341 (-0.65)	0.002 (0.07)	1.047 (1.15)	-	-
Obs.	153	153	153	-	-
Firms	108	108	108	-	-
R ² (within)	0.410	0.432	0.247	-	-
2007 x HR	-0.611 (-1.09)	-0.023 (-0.79)	0.963 (1.40)	-0.224 (-0.86)	-0.025 (-0.25)
Obs.	157	157	157	408	2,527
Firms	110	110	110	243	1,521
R ² (within)	0.362	0.402	0.282	0.146	0.076
2008 x HR	-0.248 (-0.84)	0.010 (0.54)	-0.673 (-1.23)	-0.259 (-1.03)	0.032 (0.36)
Obs.	162	162	162	420	2,592
Firms	110	110	110	246	1,541
R ² (within)	0.364	0.357	0.233	0.138	0.071
2009 x HR	0.025 (0.09)	0.014 (1.08)	0.182 (0.22)	-0.316* (-1.75)	-0.011 (-0.16)
Obs.	156	156	156	402	2,496
Firms	104	104	104	224	1,436
R ² (within)	0.316	0.336	0.142	0.120	0.041
2010 x HR	0.167 (0.66)	0.013 (0.85)	-0.083 (-0.27)	0.115 (0.83)	0.023 (0.42)
Obs.	161	161	161	402	2,491
Firms	102	102	102	218	1,331
R ² (within)	0.142	0.138	0.081	0.060	0.036
2012 x HR	0.501** (2.35)	0.056 (1.74)	-0.296 (-1.06)	-0.009 (-0.09)	-0.026 (-0.47)
Obs.	195	195	195	414	2,345
Firms	100	100	100	219	1,246
R ² (within)	0.189	0.188	0.038	0.068	0.044
2013 x HR	0.674*** (2.92)	0.056 (2.26)	-0.208 (-0.59)	-0.092 (-0.49)	-0.002 (-0.03)
Obs.	192	192	192	408	2,251
Firms	100	100	100	220	1,248
R ² (within)	0.189	0.150	0.103	0.089	0.067
2014 x HR	1.007*** (3.44)	0.087*** (2.94)	-0.319 (-0.80)	0.045 (0.25)	-0.024 (-0.31)
Obs.	187	187	187	405	2,212
Firms	100	100	100	220	1,247
R ² (within)	0.254	0.216	0.146	0.109	0.094
2015 x HR	1.109*** (2.54)	0.086** (2.05)	-0.443 (-0.83)	-0.014 (-0.07)	-0.096 (-1.02)
Obs.	185	185	185	399	2,139
Firms	100	100	100	220	1,247
R ² (within)	0.253	0.209	0.123	0.150	0.087
2016 x HR	1.557*** (2.50)	0.105*** (2.18)	0.156 (0.34)	0.115 (0.48)	-0.137 (-1.39)
Obs.	183	183	183	395	2,055
Firms	100	100	100	218	1,244
R ² (within)	0.256	0.249	0.107	0.158	0.094
2017 x HR	1.623*** (2.71)	0.124** (2.43)	0.037 (0.07)	-	-
Obs.	177	177	177	-	-
Firms	100	100	100	-	-
R ² (within)	0.309	0.294	0.142	-	-
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Table IA.2Detailed point estimates and *t*-values for figures on the bankruptcy reforms in Italy

This table reports the point estimates and *t*-values regarding Figures 3 and 6. *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Figure 3 (Panel B) (1)	Figure 6 (Panel B) (2)	Figure 6 (Panel D) (3)
2002 x HR	-0.968 (-1.16)	-0.590* (-1.80)	-0.023 (-0.17)
Obs.	44	286	2,186
Firms	27	195	1,622
R ² (within)	0.306	0.291	0.387
2003 x HR	-0.616 (-0.51)	-0.353 (-1.31)	0.013 (0.18)
Obs.	45	313	2,872
Firms	27	196	1,670
R ² (within)	0.218	0.240	0.151
2004 x HR	0.221 (0.58)	-0.195 (-1.11)	0.009 (0.17)
Obs.	43	331	3,061
Firms	26	192	1,652
R ² (within)	0.524	0.138	0.053
2006 x HR	1.062** (2.51)	-0.030 (-0.19)	-0.065 (-1.26)
Obs.	50	377	3,008
Firms	25	192	1,600
R ² (within)	0.304	0.106	0.053
2007 x HR	0.306 (0.49)	-0.077 (-0.37)	-0.025 (-0.34)
Obs.	50	366	2,855
Firms	25	191	1,603
R ² (within)	0.450	0.072	0.082
2008 x HR	-0.544 (-0.63)	-0.099 (-0.47)	0.021 (0.25)
Obs.	48	357	2,734
Firms	25	191	1,600
R ² (within)	0.533	0.049	0.120
2009 x HR	-0.199 (-0.18)	-0.187 (-0.93)	-0.043 (-0.44)
Obs.	47	342	2,639
Firms	25	190	1,604
R ² (within)	0.230	0.157	0.159
2010 x HR	-0.331 (-0.25)	-0.128 (-0.60)	-0.003 (-0.03)
Obs.	46	339	2,590
Firms	25	191	1,605
R ² (within)	0.331	0.124	0.177
2011 x HR	-0.966 (-0.77)	-0.048 (-0.18)	-0.037 (-0.34)
Obs.	44	332	2,520
Firms	25	190	1,604
R ² (within)	0.358	0.201	0.165
Firm controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table IA.3

Detailed point estimates and *t*-values for figures on the bankruptcy reform in the US

This table reports the point estimates and *t*-values regarding Figures 4 and IA.2. *t*-values are reported in parentheses and are based on standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Figure 4 (Panel B) (1)	Figure IA.2 (Panel B) (2)	Figure IA.2 (Panel D) (3)
1976 x HR	-0.041 (-0.21)	-0.013 (-0.68)	0.061 (0.27)
Obs.	2,042	2,042	2,042
Firms	1,233	1,233	1,233
R ² (within)	0.047	0.054	0.025
1977 x HR	0.113 (0.98)	0.001 (0.07)	0.219 (1.08)
Obs.	1,924	1,924	1,924
Firms	1,097	1,097	1,097
R ² (within)	0.055	0.055	0.034
1979 x HR	0.222* (1.69)	0.020* (1.77)	0.193 (1.37)
Obs.	1,847	1,847	1,847
Firms	1,085	1,085	1,085
R ² (within)	0.067	0.047	0.035
1980 x HR	0.461** (2.05)	0.041** (2.17)	0.056 (0.21)
Obs.	1,775	1,775	1,775
Firms	1,070	1,070	1,070
R ² (within)	0.069	0.078	0.030
1981 x HR	0.465** (2.04)	0.042** (2.19)	0.173 (0.57)
Obs.	1,733	1,733	1,733
Firms	1,059	1,059	1,059
R ² (within)	0.111	0.117	0.048
Firm controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

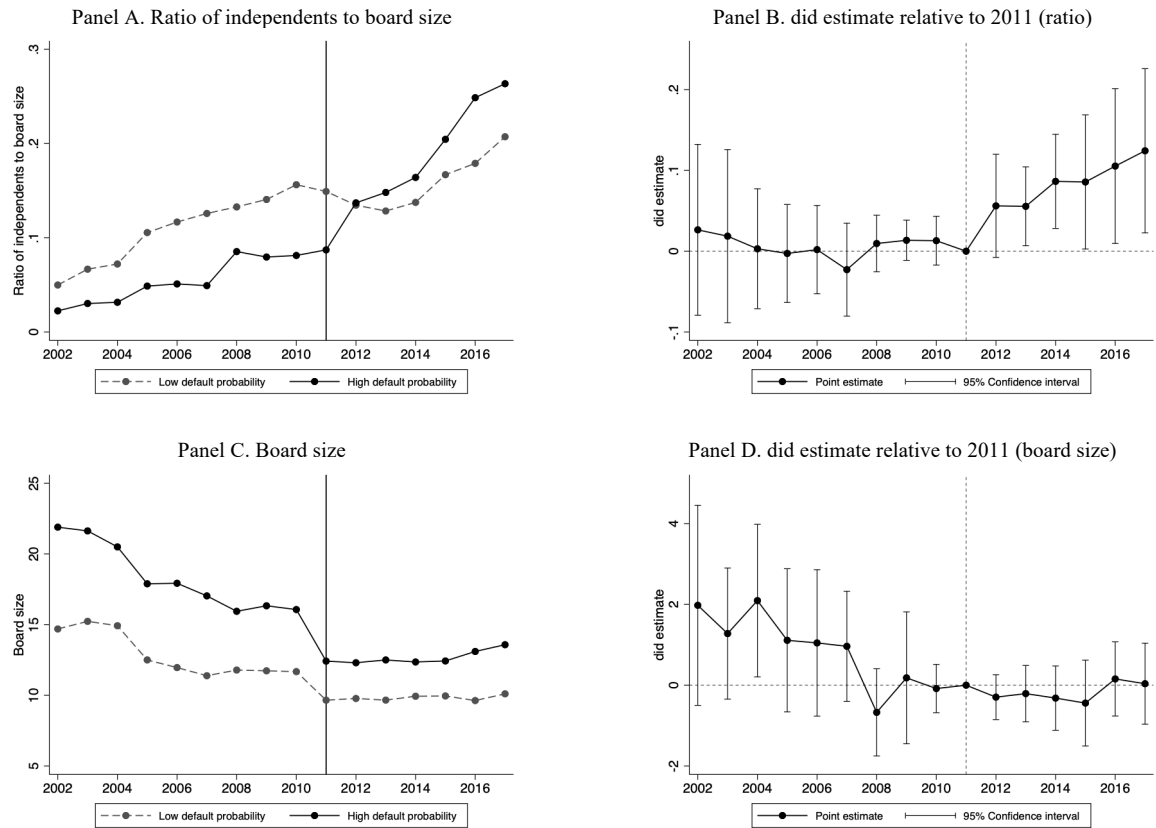


Figure IA.1

Bankruptcy reform in Germany, the ratio of independents to board size, and the board size

Panels A and C respectively plot the average ratio of independent directors to board size and the average board size for risky and safe firms. Panels B and D plot the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reform, 2011. The dependent variable is the ratio of independent directors to board size in Panel B and the board size in Panel D. The regression is specified as in columns 4 and 6 of Table 4, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.1 in the Internet Appendix.

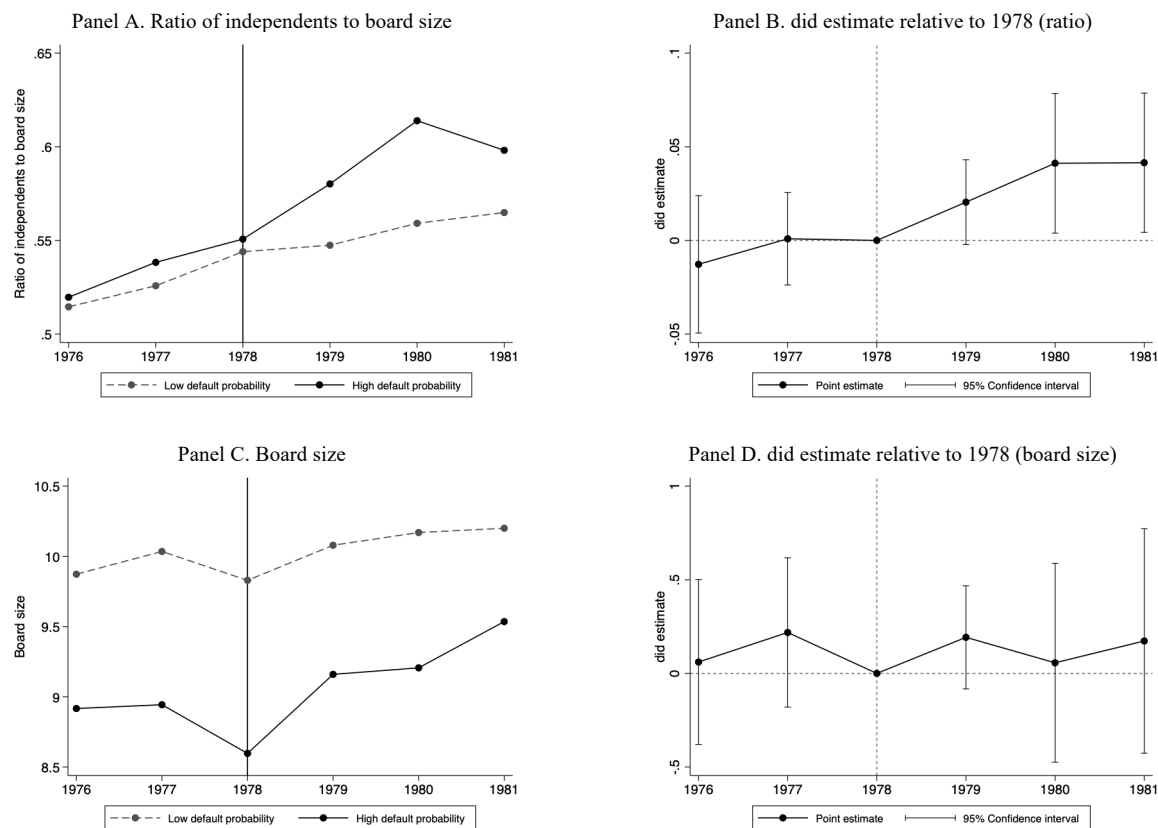


Figure IA.2

Bankruptcy reform in the US, the ratio of independents to board size, and the board size

Panels A and C respectively plot the average ratio of independent directors to board size and the average board size for risky and safe firms. Panels B and D plot the point estimates (black dots) and the 95% confidence intervals (grey bars) on the interaction terms between a set of time dummies and a dummy indicating firms with high risk. The point estimates are relative to the year prior to the reform, 1978. The dependent variable is the ratio of independent directors to board size in Panel B and the board size in Panel D. The regression is specified as in columns 4 and 6 of Table 6, that is, with firm fixed effects, year fixed effects, controls, and standard errors clustered on the firm level. Detailed point estimates and t -values can be found in Table IA.3 in the Internet Appendix.

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