When Should Bankruptcy Law Be Creditor- or Debtor-Friendly? Theory and Evidence

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August 2021

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Keywords: Bankruptcy, personal costs of bankruptcy, investment, law and economics.

JEL Classifications: G31, G32, G33, G38, K22

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1 Introduction

Empirical evidence on the optimal degree of creditor protection in bankruptcy is mixed. Pioneered by La Porta et al. (1997, 1998), several studies document a positive relationship between creditor protection and the size of credit markets.[1] In contrast, several recent studies suggest a negative relationship (Acharya and Subramanian 2009; Acharya, Amihud, and Litov 2011; Vig 2013). Given these opposing views, it remains an open question as to *when* firms borrow and invest more or less as creditor protection increases. Put differently, *when* should bankruptcy law be more creditor- or more debtor-friendly? Answering this question is crucial for policymakers who need to determine the optimal degree of creditor protection.

To address this question, we need to understand what determines how firms respond to changes in creditor protection. The theory points to personal costs of bankruptcy for firms' owners and managers as an important determinant. Stronger creditor protection can increase the personal costs that owners and managers incur in bankruptcy, for example, by increasing the likelihood that managers are dismissed in bankruptcy. Consistent with the mixed empirical evidence, an increase in owners' and managers' personal costs of bankruptcy has two opposing effects: While it can strengthen the incentives of owners and managers, it can also reduce their willingness to invest in valuable but risky investment projects.

In the first part of the paper, we develop a theoretical model and show that the level of owners' and managers' personal costs of bankruptcy determines whether a firm borrows and invests more or less as creditor protection increases. Specifically, a firm that starts out with a low level of owners' and managers' personal costs of bankruptcy is willing to invest but faces financial constraints due to the weak incentives of owners and managers. Stronger creditor protection strengthens the incentives of owners and managers by increasing the costs they incur in bankruptcy, which relaxes financial constraints and therefore increases borrowing and investment. In contrast, a firm that starts out with a high level of owners' and managers' personal costs of bankruptcy may be unwilling to invest in risky investment projects due to the high personal costs of bankruptcy even though it is not financially constrained. Stronger creditor protection further increases these costs, which further reduces the demand for credit and therefore reduces borrowing and investment.

In the second part of the paper, we empirically assess whether owners' and managers' personal costs of bankruptcy are an important determinant of how firms respond to changes in creditor

[1] See also Levine (1998, 1999); Djankov, McLiesh, and Shleifer (2007); Qian and Strahan (2007); Djankov et al. (2008); Haselmann, Pistor, and Vig (2010); Campello and Larrain (2016); Ponticelli and Alencar (2016); Calomiris et al. (2017); Favara, Gao, and Giannetti (2020).

protection. Empirically investigating the interaction between creditor protection and personal costs of bankruptcy is challenging for two reasons. First, owners' and managers' personal costs of bankruptcy are not directly observable. Second, it is necessary to identify variation in creditor protection that affects firms predominantly through its effect on owners' and managers' personal costs of bankruptcy.

To address the first challenge, we draw on theory and empirical evidence from the literature to identify three proxies for owners' and managers' personal costs of bankruptcy: ownership concentration, managers' inside ownership, and managers' distance to retirement. While the literature points to these variables as good proxies for personal costs of bankruptcy, data limitations typically prevent researchers from obtaining these variables. Access to micro-level data on ownership and manager characteristics allows us to compute these variables for a large set of firms.

To address the second challenge, we exploit a Korean bankruptcy reform that replaced a more creditor-friendly receivership system with a more debtor-friendly management stay system. The reform is unique in that it drastically reduces owners' and managers' personal costs of bankruptcy, while keeping other aspects of the bankruptcy code unchanged. Specifically, before the reform, managers are forced to resign, and ownership is transferred to new investors upon filing for bankruptcy. In sharp contrast, after the reform, managers stay in control and ownership of the firm is retained by the existing owners during the bankruptcy process.

Consistent with the key prediction from our model, the main finding from our empirical analysis is that firms with high personal costs of bankruptcy for owners and managers borrow and invest more under the more debtor-friendly management stay system. In contrast, firms with low personal costs of bankruptcy for owners and managers borrow and invest more under the more creditor-friendly receivership system. Overall, these findings suggest that owners' and managers' personal costs of bankruptcy are an important determinant of how firms respond to changes in creditor protection, which has important implications for bankruptcy law design.

We begin our analysis by comparing borrowing and investment for the average firm under the more creditor-friendly receivership and the more debtor-friendly management stay system, which is a separate contribution of our paper. To assess the differences in borrowing and investment between receivership and management stay for the average firm, we exploit three sources of variation in firms' sensitivity to the reform. First, risky firms are more sensitive to the reform, since they are more likely to end up in bankruptcy. Second, large firms are affected by the reform, whereas small firms are subject to a management stay system before and after the reform. Third, courts vary in how often they apply exemptions from management stay after the reform. Firms under the

jurisdiction of a court that exhibits a larger increase in the frequency of management stay during bankruptcy proceedings are more sensitive to the reform. Across all three sources of variation, we find that firms that are more sensitive to the reform increase borrowing and investment after the reform. In particular, our estimates imply that a 10 percentage-point increase in the rate of management stay leads to a 40 basis points higher interest rate, 62 basis points higher leverage, and 52 basis points higher investment for the average firm.

Next, we compare borrowing and investment for firms with different levels of personal costs of bankruptcy for owners and managers under the more creditor-friendly receivership and the more debtor-friendly management stay system. We find that firms with high personal costs of bankruptcy for owners and managers increase borrowing and investment relative to firms with low personal costs of bankruptcy for owners and managers following the change from the pre-reform receivership to the post-reform management stay system.

To sharpen the interpretation of our results, we implement a triple-difference estimation strategy. Specifically, we compare changes in borrowing and investment for firms with high and low personal costs of bankruptcy, separately for firms that are more and that are less sensitive to the reform, based on the three sources of variation in firms' sensitivity to the reform described above. We find that for firms with high personal costs of bankruptcy for owners and managers, borrowing and investment increase more for firms that are more sensitive to the reform. This implies that firms with high personal costs of bankruptcy borrow and invest more under the post-reform management stay compared with the pre-reform receivership system, consistent with the prediction that the more creditor-friendly receivership system discourages borrowing and investment for these types of firms by reducing the demand for credit. In contrast, we find that for firms with low personal costs of bankruptcy for owners and managers, borrowing and investment decrease for firms that are more sensitive to the reform. This implies that firms with low personal costs of bankruptcy borrow and invest more under the pre-reform receivership compared with the post-reform management stay system, consistent with the prediction that the more creditor-friendly receivership system encourages borrowing and investment for these types of firms by relaxing financial constraints.

An additional implication of our model is that the effect of stronger creditor protection is particularly strong for firms with high personal costs of bankruptcy for owners and managers and investment projects, which are characterized by a higher risk of failure. Consistent with this prediction, we find that firms with high personal costs of bankruptcy for owners and managers invest less in R&D, generate fewer patents, and exhibit less volatile cash flows under the pre-reform receivership system compared system with the post-reform management stay system.

We complement our empirical analysis with several robustness tests to strengthen the validity of our results. First, to mitigate concerns that the impact of the global financial crisis on the Korean economy may differentially affect borrowing and investment of firms with higher and lower personal costs of bankruptcy for owners and managers around the reform, we exclude the period during which the Korean economy was affected by the financial crisis and find qualitatively identical results. Moreover, we show that changes in firms' borrowing and investment occur sharply in 2006, when the reform first applies, rather than when the financial crisis starts to affect the Korean economy in 2008. In addition, the effects of the reform persist several years after the financial crisis ceases to affect the Korean economy. Second, to mitigate concerns that owners' and managers' personal costs of bankruptcy change endogenously in anticipation of the reform, we sort firms into personal costs of bankruptcy quintiles 5 years before the reform and find qualitatively identical results. Third, we drop firms associated with business groups (chaebols), since these firms have internal capital markets that isolate them from bankruptcy risk. Again, we find qualitatively identical results. Finally, we discuss potential contractual responses and other effects in Section 7.

Ultimately, our measures of personal costs of bankruptcy are proxies that may be correlated with other firm characteristics that interact with changes in the bankruptcy system. While we cannot think of specific characteristics, our analysis does not rule out that firm characteristics that are positively correlated with ownership concentration, inside ownership, and distance to retirement may contribute to the documented effects.

Our analysis contributes to the literature on bankruptcy law and creditor protection. The literature documents that stronger creditor protection can lead to an increase or decrease in the use of credit. By shedding light on the question as to *when* firms borrow and invest more or less as creditor protection increases, we are able to reconcile these opposing views. The first contribution of our paper is to document that the level of owners' and managers' personal costs of bankruptcy determines whether a firm increases or decreases borrowing and investment as a response to stronger creditor protection. We believe that our analysis is an important first step toward understanding the determinants of firms' responses to changes in creditor protection. While we uncover one important determinant, it is unlikely to be the only one. For example, Canipek, Kind, and Wende (2019) show that financial constraints and opaqueness can affect how firms respond to changes in creditor protection. A potential avenue for future research is to identify additional determinants to better inform policymakers, who need to choose the optimal degree of creditor protection.

Receivership and management stay are the two dominant bankruptcy systems around the world (La Porta et al. 1998). Yet there is no evidence on differences in firms' borrowing and investment

under the two systems in an otherwise stable institutional environment. We document that the average firm borrows and invests more under the management stay system compared with the receivership system. Documenting these differences is an important independent contribution of our paper. In addition, our analysis allows us to characterize the conditions under which either system may lead to higher borrowing and investment, which allows for the application of our insights to contexts that differ in terms of the distribution of personal costs of bankruptcy.

Similar to Vig (2013), we document that the average firm borrows and invests less as creditor protection increases. While we study the transition from receivership to management stay, Vig studies a reform that strengthens creditor protection by improving creditors' access to collateral. However, Vig argues that the reform may also give rise to personal costs of bankruptcy by introducing a liquidation bias that destroys private benefits of control, which can reduce the demand for credit. Vig cannot directly test the personal-costs-of-bankruptcy channel because the data source does not allow him to measure personal costs of bankruptcy. The first part of our contribution relative to Vig is to provide direct evidence on the negative demand effect of stronger creditor protection due to personal costs of bankruptcy. The second part of our contribution is to document the positive effect of stronger creditor protection in the presence of personal costs of bankruptcy, consistent with the relaxation of financial constraints. Our papers are complementary in that they suggest that personal costs of bankruptcy interact with several dimensions of creditor protection, such as creditors' access to collateral and management stay.

Taken together, our insights allow us to rationalize the mixed empirical evidence in the literature. Specifically, reforms that strengthen creditor protection without significantly increasing owners' and managers' personal costs of bankruptcy generate a positive relationship between creditor protection and borrowing and investment (Becker and Strömberg 2012; Campello and Larrain 2016; Cerqueiro, Ongena, and Roszbach 2016; Ponticelli and Alencar 2016). In contrast, reforms that strengthen creditor protection while also significantly increasing owners' and managers' personal costs of bankruptcy generate a negative relationship between creditor protection and borrowing and investment (Vig 2013). Thus, whether stronger creditor protection increases borrowing and investment depends on the level of personal costs of bankruptcy.

Our analysis has important implications for bankruptcy law design. Specifically, our findings suggest that there is no universally optimal design; rather, optimal bankruptcy law is context specific. In particular, it may be optimal to apply different degrees of creditor protection to different types of firms, depending on their level of owners' and managers' personal costs of bankruptcy.[2] If

[2]Applying different bankruptcy proceedings to different firms was more common, for example, in Korea before the 2006 Unified Bankruptcy Act and in the U.S. before the 1978 Bankruptcy Reform Act.

firm-specific bankruptcy procedures are infeasible, our analysis implies that the choice of creditor protection at the country level should depend on the distribution of owners' and managers' personal costs of bankruptcy in the economy. Specifically, a more debtor-friendly management stay system may be optimal in a country in which owners' and managers' personal costs of bankruptcy are high. In contrast, a more creditor-friendly receivership system may be optimal in countries in which owners' and managers' personal costs of bankruptcy are low.

Finally, our analysis has implications for firm risk-taking, which is a fundamental driver of economic growth (Acemoglu and Zilibotti 1997; Levine and Zervos 1998; Kogan et al. 2017). It has long been recognized that managers' risk aversion may stifle corporate risk-taking (Jensen and Meckling 1976). Our analysis implies that even when owners and managers are risk-neutral, their personal costs of bankruptcy make them averse to bankruptcy risk. Stronger creditor protection can increase personal costs of bankruptcy and can therefore lead to a shift from riskier (e.g., innovative) to safer investment projects.

The remainder of the paper is organized as follows. Section 2 describes the institutional setting, Section 3 provides a theoretical framework, Section 4 describes the data, Section 5 outlines the empirical strategy. Sections 6 and 7 present the empirical results. Section 8 concludes.

2 Institutional Background

This section describes the legislative history of the Unified Bankruptcy Act (UBA) and the changes it made to corporate bankruptcy proceedings in Korea. In addition, it documents the effects of the reform on bankruptcy filings and the outcomes of in-court reorganizations and out-of-court workouts.

2.1 Legislative History

As of April 1, 2006, the UBA replaced four laws: one that governed corporate liquidation, two that governed corporate reorganization proceedings, and one that governed private bankruptcy proceedings. The reform process was triggered in 1997 by the Asian Financial Crisis. In exchange for financial support, the IMF and the World Bank demanded, among other things, a modernization of bankruptcy laws in accordance with international best practice, which in essence meant convergence to U.S. bankruptcy law.[3] While other reforms were implemented right after the crisis, it took

[3]Other countries affected by the Asian Financial Crisis also underwent bankruptcy reforms in the aftermath of the crisis on the initiative of the IMF (e.g., Indonesia in 1998 and Thailand in 1998/1999).

more than 8 years for the bankruptcy reform to be implemented.

Following minor amendments to bankruptcy proceedings in 1998, the Korean government and the IMF agreed that a comprehensive reform of the bankruptcy law was necessary. In 1999, the Ministry of Justice brought together a group of consultants, led by a Korean (Shin and Kim) and an American (Orrick, Herrington & Sutcliffe) law firm. In December 2000, the group submitted a first draft to the Ministry of Justice. From 2001 to 2003, the Ministry of Justice circulated different drafts to judges, the Korean Bar Association, and the bankers' association for consultation. Finally, the National Assembly passed the UBA in March 2005 and it was applied from April 1, 2006. As demanded by the IMF and World Bank, the resulting law closely resembled U.S. bankruptcy law.

2.2 Changes in Bankruptcy Law

Before the UBA, corporate restructuring was governed by two separate laws. Due to their large size, the relevant law for firms in our main sample was the Corporate Reorganization Act (CRA). Under the CRA, a firm's bankruptcy filing triggers the replacement of incumbent management by a court-appointed receiver.[4] It is standard practice for the court-appointed receiver to engage in a sales process upon bankruptcy filing (Ko 2007). The second law, the Composition Act (CA), applied to small firms with simple debt structures, a restriction that was strictly applied from 1998 (Park 2005). Under the CA, incumbent management stays in control of the firm following its bankruptcy filing. For some tests, we extend our sample to include small firms that are subject to the CA.

The UBA replaced the two restructuring laws. The new corporate reorganization procedure, which is referred to as "rehabilitation" under the new law, conserved most features of the CRA (Ko 2007; Halliday and Carruthers 2009). The major change concerns the treatment of incumbent management during the reorganization process. Under the receivership system of the CRA, incumbent management is replaced by a court-appointed receiver. In contrast, under the new management stay system, incumbent management remains in control and negotiates a restructuring plan with the firm's creditors under court supervision. Effectively, instead of appointing an external receiver, the court appoints the incumbent manager as receiver under the UBA.[5]

[4] Park (2008): "The incumbent management might be appointed as a trustee [...], but in practice, there were virtually no cases in which the incumbent management managed to keep their positions."

[5] Incumbent management was not allowed to run the firm during restructuring if financial distress could be attributed to fraudulent activity on the part of incumbent management, creditors provided reasonable grounds for appointing a third-party receiver, or the court considered the appointment of a third-party receiver to be essential. In practice, incumbent management remained in control in most reorganization cases after the reform (Ko 2007).

The UBA had a dramatic effect on firms' owners and managers. Under the post-reform management stay system, the CEO remains in control of the firm in 88.14% of the bankruptcy cases in our sample, compared with only 4.76% under the pre-reform receivership system (Table 1, Panel A). Under the pre-reform receivership system, ownership transfer occurs in 90.91% of cases that do not result in liquidation, compared with 19.09% of cases under the post-reform management stay system. Further, filings for reorganization increase substantially under the post-reform management stay system, from 57 in 2005 to 117 in 2006, 215 in 2007, and steadily more cases in the following years (Table 1, Panel B). In contrast, liquidation filings, which are unaffected by the reform, do not increase during this time period, suggesting that the increase in reorganization filings is not driven by economic conditions.

2.3 Alternative Restructuring Mechanisms

Debtors and creditors have the option to renegotiate the firm's debt obligations outside of court instead of invoking in-court bankruptcy proceedings.[6] The UBA does not affect the legal framework for firms to restructure their debt outside of court. Since both contracting parties have the option to default to in-court bankruptcy proceedings, the expected outcome from in-court proceedings is a benchmark for both parties in reaching an agreement outside of court. Due to their private nature, data on out-of-court renegotiations are scarce. In Korea, firms with assets over 50 billion South Korean won (KRW)[7] are required to engage in supervised out-of-court restructuring, called "workouts," under some conditions.

The evidence from this workout sample suggests that creditors are less willing to compromise under the pre-reform receivership system compared with the post-reform management stay system. Under the pre-reform receivership system, creditors in private workouts require the departure of incumbent management and owners in the majority of cases, and private workouts are less likely to succeed (Table 1, Panel C).[8] In 2004, the fraction of workouts that result in bankruptcy or liquidation is 60.00%, and in 2005 it is 44.58%. Under the post-reform management stay system, creditors' willingness to renegotiate out of court increases substantially, and the failure rate drops to 22.13% in 2006 and 25.35% in 2007.[9]

[6]The relationship between bankruptcy proceedings and out-of-court restructurings is examined theoretically in Donaldson et al. (2020).

[7]As a rule of thumb, 1 U.S. dollar is between 1,000 and 1,200 KRW.

[8]In addition, in 2001, even in cases in which the workout did not fail, the CEO was forced to resign in 84% of cases (*Yonhap News*, May 23, 2001, "84% of CEOs in Work-Out Companies have Changed").

[9]In general, smaller firms are not required to register their workouts. However, beginning in June 2004, smaller firms are required to register their workout proceedings. The evidence suggests they are largely unsuccessful in

3 Theoretical Framework

In this section, we develop a stylized model that is motivated by Korea's institutional environment. The model borrows features from Bolton and Scharfstein (1990), Zwiebel (1996), and Holmström and Tirole (1997). The objective is to determine how the level of owners' and managers' personal costs of bankruptcy affects firms' borrowing and investment in a receivership system compared with a management stay system.

3.1 Model Setup

There are three dates $t \in \{0,1,2\}$ and no time discounting. A firm is owned and run by a risk-neutral manager. If the owner-manager invests $I > 0$ at $t = 0$, the firm generates a cash flow $R \geq 0$ in the event of success and 0 in the event of failure at $t = 1$. Before the investment decision at $t = 0$, R is drawn from a uniform distribution with support $[0, \bar{R}]$ and is publicly observable, where $\bar{R} > 0$. The probability of success is equal to p if the owner-manager exerts effort, and equal to $p - \Delta$ if she shirks, where $0 < \Delta < p < 1$. The owner-manager's effort is noncontractible and generates the disutility $c > 0$. We assume that the investment project has a negative net present value (NPV) if the owner-manager shirks, that is, $(p - \Delta)\bar{R} - I < 0$. With effort, the project has a positive NPV if and only if $R > \bar{\rho} := \frac{I+c}{p}$.

The owner-manager has no wealth and needs to borrow I from risk-neutral competitive lenders using short-term debt with a face value F to be paid to lenders at $t = 1$. If the owner-manager invests, the firm defaults if the project fails at $t = 1$. In the event of default, the firm enters bankruptcy and the owner-manager remains in control of the firm with probability μ_s, but is dismissed and the lenders take control of the firm with probability $1 - \mu_s$. We consider a management stay system, $s = m$, and a receivership system, $s = r$, where $1 > \mu_m > \mu_r > 0$. In words, the owner-manager is more likely to remain in control of the firm under management stay compared with receivership. We refer to the reform as a change from the receivership to the management stay system.

If the owner-manager remains in control of the firm until $t = 2$, she receives the noncontractible private benefit $B \geq 0$. For example, B may capture the owner-manager's private benefits of control, future income from the firm, or other career benefits of remaining in control of the firm. The owner-manager loses her private benefit B with probability $1 - \mu_s$ in the event of default. We therefore refer to $(1 - \mu_s)B$ as the owner-manager's personal costs of bankruptcy, which depends

restructuring their debt in out-of-court negotiations under the receivership system (*Money Today*, August 8, 2004, "Bank-SME Workouts in Slump").

on the bankruptcy system $s \in \{m, r\}$ through the conditional probability of dismissal, $1-\mu_s$. In addition, it depends on the level of the owner-manager's private benefit, B. Independent of the investment decision and independent of whether the owner-manager controls the firm at $t=2$, the firm generates a payoff of V at $t=2$, where $0<V<I$. Intuitively, V captures the future investment opportunities of the firm.

3.2 Borrowing and Investment

Since lenders are competitive, they break even in expectation. Specifically, assuming that the owner-manager exerts effort, the face value F_s in bankruptcy system $s \in \{m, r\}$ is determined by

$$pF_s + (1-p)(1-\mu_s)V = I \Leftrightarrow F_s = \frac{I-(1-p)(1-\mu_s)V}{p}. \tag{1}$$

Assumption $V<I$ implies that $F_s>0$. Since $V>0$ and $1-\mu_r > 1-\mu_m$, the expected payoff lenders receive in default, $(1-\mu_s)V$, is higher under receivership compared with management stay. As a result, the face value is lower under receivership compared with management stay, that is, $F_m > F_r > 0$. Note that the cost of credit is the same in both bankruptcy systems, since lenders break even in expectation. If we interpret a higher face value as a higher interest rate, this has the following implication:

Implication 1. *Interest rates increase after the reform.*

Since the investment project has a negative NPV if the owner-manager shirks, the loan has to induce effort. Given a loan with face value F_s, the owner-manager exerts effort if and only if

$$p\,(R-F_s+V+B) + (1-p)\mu_s(V+B) - c \geq (p-\Delta)\,(R-F_s+V+B) + (1-p+\Delta)\mu_s(V+B).$$

Using the face value F_s determined in (1), this can be written as

$$R \geq \frac{c}{\Delta} + \frac{I-(1-\mu_s)V}{p} - (1-\mu_s)B =: \rho_s^{\mathrm{FC}}(B). \tag{2}$$

As is standard, the agency problem may introduce financial constraints. Specifically, if $\rho_s^{\mathrm{FC}}(B) > R > \bar{\rho}$, then the project has a positive NPV but the owner-manager is unable to obtain financing. We therefore refer to (2) as the "financial constraint." Notice that higher personal costs of bankruptcy $(1-\mu_s)B$ relax the financial constraint (2). Intuitively, higher personal costs of bankruptcy give the

owner-manager a stronger incentive to exert effort, since effort reduces the probability of incurring these costs.

The owner-manager is less financially constrained under receivership compared with management stay (i.e., $\rho_m^{\mathrm{FC}}(B) > \rho_r^{\mathrm{FC}}(B)$). First, the owner-manager's personal costs of bankruptcy are higher under receivership compared with management stay. Second, lenders require a lower face value under receivership compared with management stay due to the higher expected payoff lenders receive in default, which gives the owner-manager a larger stake in the project's success under receivership compared with management stay. Taken together, this gives the owner-manager stronger incentives to exert effort under receivership compared with management stay.

To focus on the interesting cases, we assume that if $B = 0$ (i.e., without personal costs of bankruptcy), the owner-manager is financially constrained for some positive NPV projects; that is, we assume that $\bar{R} > \rho_s^{\mathrm{FC}}(0) > \bar{\rho}$.[10]

Given a loan with face value F_s, the owner-manager is willing to invest if and only if

$$p\,(R - F_s + V + B) + (1-p)\mu_s(V + B) - c \geq V + B.$$

Using the face value F_s determined in (1), this can be written as

$$R \geq \frac{I + c + (1-p)(1-\mu_s)B}{p} = \bar{\rho} + \frac{(1-p)(1-\mu_s)B}{p} =: \rho_s^{\mathrm{D}}(B) \geq \bar{\rho}. \tag{3}$$

We refer to (3) as the "credit demand constraint." The owner-manager invests if the project's NPV, $pR - I - c$, exceeds the expected personal costs of bankruptcy, $(1-p)(1-\mu_s)B$. An increase in the owner-manager's personal costs of bankruptcy reduces the owner-manager's demand for credit. As a result, if $B > 0$, the owner-manager's demand for credit is lower under receivership compared with management stay (i.e., $\rho_r^{\mathrm{D}}(B) > \rho_m^{\mathrm{D}}(B)$), since the personal costs of bankruptcy are higher under receivership compared with management stay. An important insight is that even though the owner-manager is risk-neutral, personal costs of bankruptcy make her averse to bankruptcy risk. As such, management stay provides better insurance for the owner-manager against bankruptcy risk, and the value of this insurance is increasing in the level of the owner-manager's personal costs of bankruptcy.

In summary, the owner-manager invests if cash flow R is sufficiently high such that it satisfies both the financial constraint (2) and the credit demand constraint (3). Higher personal costs of

[10] A sufficient condition for these inequalities to hold is given by $V \leq \frac{p-\Delta}{\Delta} c \leq p\bar{R} - I - c$.

bankruptcy increase the owner-manager's incentives but make her more averse to bankruptcy risk. As a result, higher personal costs of bankruptcy relax the financial constraint but reduce credit demand. The following result characterizes the owner-manger's investment decision as a function of the private benefit B.

Proposition 1. *There exists a threshold $\bar{B} > 0$ such that the probability of investment is higher under receivership compared with management stay if $B < \bar{B}$, and the probability of investment is lower under receivership compared with management stay if $B > \bar{B}$.*

Proposition 1 shows that the owner-manager's response to the reform depends on the underlying level of personal costs of bankruptcy. We refer to a firm with $B > \bar{B}$ as a high-B firm and to a firm with $B < \bar{B}$ as a low-B firm, and summarize the insight in the following implication:

Implication 2. *Borrowing and investment increase for high-B firms after the reform, whereas borrowing and investment decrease for low-B firms after the reform.*

Investment requires that the owner-manager is not financially constrained and is willing to invest. For low-B firms, the financial constraint is the relevant constraint. The reform reduces personal costs of bankruptcy, which reduces the owner-manager's incentive to exert effort and therefore tightens the financial constraint. In contrast, for high-B firms, the credit demand constraint is the relevant constraint. The reduction in personal costs of bankruptcy resulting from the reform increases the owner-manager's willingness to invest and therefore increases credit demand. Put differently, management stay provides better insurance for the owner-manager against bankruptcy risk, which makes her more willing to invest. As such, the reform implies a trade-off between incentives and insurance. Management stay provides weaker incentives by reducing personal costs of bankruptcy, but also provides better insurance for the owner-manager against loss of the private benefit in the event of default.

Finally, we study how the level of risk affects the owner-manager's borrowing and investment decision.

Proposition 2. *Let $B > \bar{B}$ such that $\rho_m^D(B) > \rho_m^{FC}(B)$ and $\rho_r^D(B) < \bar{R}$, then the difference in the probability of investment between receivership and management stay decreases in p.*[11]

An increase in the riskiness of investment (i.e., a lower p) increases expected personal costs of bankruptcy more under receivership compared with management stay. For high-B firms, invest-

[11] An increase in p increases the project's ex ante NPV: $p\mathbb{E}[R] - I - c$. To keep the ex ante NPV unchanged, we could additionally consider a shift of the support of the distribution of R.

ment is determined by the credit demand constraint, which tightens more under receivership compared with management stay as risk increases. Intuitively, management stay provides insurance against bankruptcy risk for high-B firms and the insurance becomes more valuable as bankruptcy risk increases. This yields the following implication:

Implication 3. *For high-B firms, the increase in borrowing and investment after the reform is higher for riskier investment projects.*

For low-B firms, the effect of an increase in risk is ambiguous. The reason is that while the incentive constraint determines equilibrium investment if B is low, an increase in risk can make the demand constraint the relevant constraint, and the reform effect is negative in the former case but positive in the latter, rendering the overall effect ambiguous.[12]

3.3 Proxies for Personal Costs of Bankruptcy

The reform provides sharp variation in personal costs of bankruptcy for owners and managers. To test the empirical implications of the model that depend on the firm-specific level of personal costs of bankruptcy for owners and managers, we use proxies to classify firms into those with higher and lower personal costs of bankruptcy for owners and managers. Guided by theory and empirical evidence from the literature, we identify three proxies for owners' and managers' personal costs of bankruptcy: ownership concentration, managers' inside ownership, and managers' distance to retirement.

3.3.1 Ownership Concentration

Ownership concentration is positively related to owners' personal costs of bankruptcy through two channels. First, firms with concentrated ownership tend to be controlled by underdiversified owners, for example, family firms. In our data, the correlation between ownership concentration and portfolio concentration of owners is 0.3. Less diversified owners are more exposed to idiosyncratic risk compared with more diversified owners. In particular, less diversified owners are more exposed to idiosyncratic bankruptcy risk. Consistent with this argument, several empirical papers document that firms with concentrated ownership invest in less risky projects (Shleifer and Vishny 1997; Anderson, Mansi, and Reeb 2003; Faccio, Machica, and Mura 2011). Faccio, Machica, and

[12] Specifically, let $\bar{B}_s$ denote the crossing point of $\rho_s^{\mathrm{D}}(B)$ and $\rho_s^{\mathrm{FC}}(B)$, which is the threshold that determines whether the incentive or the demand constraint determines equilibrium investment. Simple algebra verifies that $\bar{B}_s$ is increasing in p.

Mura (2011) point out that not all large shareholders are relatively underdiversified. For example, financial investors, such as investment funds or banks, may hold large ownership stakes in firms while being relatively well diversified. Therefore, in robustness tests, we explicitly distinguish between large owners that are relatively well diversified (e.g., institutional investors) and large owners that are relatively underdiversified (e.g., owners of family firms).

Second, large controlling owners can generate private benefits of control, which are not shared by small minority owners, and the loss of private benefits of control in the event of bankruptcy generates personal costs of bankruptcy for owners. For example, controlling owners may extract nonpecuniary private benefits of control, such as reputation and prestige (Harris and Raviv 1988; Aghion and Bolton 1992), or pecuniary private benefits of control by expropriating minority owners, for example, through self-dealing (La Porta, Lopez-De-Silanes, and Shleifer 2000). Fan et al. (1999) and La Porta et al. (2002) suggest that expropriation of minority owners by large controlling owners is prevalent. Consistent with this, Barclay and Holderness (1989) show that private benefits of control can be large. Importantly, Dyck and Zingales (2004) provide evidence that private benefits of control are larger for firms with higher ownership concentration. Thus, the loss of private benefits of control in bankruptcy generates higher personal costs of bankruptcy for owners of firms with higher ownership concentration.

3.3.2 Managers' Inside Ownership

Underdiversification is also the main channel that generates a positive relationship between managerial inside ownership and managers' personal costs of bankruptcy. Managers resemble concentrated owners in terms of their underdiversification and their sensitivity to bankruptcy risk. A large share of managers' income is typically concentrated in the firm they work for. As a consequence, managers tend to be underdiversified because income from their firm is overweight in their portfolio. Any additional inside ownership by managers further amplifies the underdiversification problem and increases managers' sensitivity to bankruptcy risk.

Consistent with this argument, Lang (1987) argues that the wedge between the optimal levels of leverage and investment and those chosen by managers increases in the ownership share they risk losing in the event of bankruptcy. Empirically, Friend and Lang (1988) support this argument by showing that higher managerial inside ownership is associated with lower corporate risk-taking.

3.3.3 Managers' Distance to Retirement

The link between managers' distance to retirement and outstanding future labor income generates a positive relationship between distance to retirement and managers' personal costs of bankruptcy. Managers who lose their job due to bankruptcy experience a negative shock to their current labor income and, through a negative effect on their career prospects, also to their future labor income. The total loss in future labor income after a bankruptcy event increases with the distance to retirement (Fama 1980).

Empirically, Eckbo, Thorburn, and Wang (2016) document that the average cumulative loss in labor income for managers is equivalent to five times their annual pre-bankruptcy income for managers who lose their job due to bankruptcy, whereas managers who stay in control of the firm through bankruptcy experience no loss in income. In addition, Gilson (1989) shows that income shocks from job loss due to bankruptcy are permanent, since managers who lose their job due to bankruptcy are unlikely to return to senior management roles. We observe the same pattern in our data: No manager who loses her job due to bankruptcy returns to a senior management role in any of our sample firms.

4 Data

This section describes the data we use for our empirical analysis. We obtain accounting and ownership data from the Korea Information Service (KIS). Firms with assets of more than 7 billion KRW are required to submit financial statements to the Financial Supervisory Service (FSS) throughout our sample period. These financial statements are available through KIS. In most cases, KIS also collects ownership data during this process. Firms that cross the threshold once, often continue to report their information, even in years in which they fall below the cutoff. We drop firms that never cross the threshold, but voluntarily provide their accounting information from our main sample to avoid potential selection issues. For some tests, we use an extended sample that includes firms with assets below 7 billion KRW. Hereafter, we specifically state when we us this extended sample. KIS obtains data for small firms when they apply for bank loans or procurement contracts and the bank or procurer asks KIS to process the firm's financial information.

KIS also provides data on firms' executives, including their birthdate. This allows us to compute the age of a firm's CEO in any given year. Data on bankruptcy filings are available from KIS. For our analysis, we require ownership data or data on the CEO's age in 2005, the year before the

UBA applies. Finally, data on patents are available from the Korea Intellectual Property Rights Information Service (KIPRIS) and include all patent applications and approvals.

We sort firms into quintiles based on their level of personal costs of bankruptcy in the year before the UBA applies. We use the three proxies for personal costs of bankruptcy introduced in Section 3.3. Our proxy for owners' personal costs of bankruptcy is ownership concentration (OC): the Herfindahl index of ownership. Our first proxy for managers' personal costs of bankruptcy is inside ownership (IO): the fraction of the firm owned by the CEO and her family. Our second proxy for managers' personal costs of bankruptcy is the CEO's distance to retirement (DR): the difference between the retirement age of 65 and the age of the CEO. Whenever we sort firms into quintiles based on other variables, we also use the value from 2005, the year before the UBA applies.

Descriptive statistics are reported in Table 2. We present them separately for firms with high personal costs of bankruptcy for owners and managers (high-B firms) and firms with low personal costs of bankruptcy (low-B firms). Panel A reports descriptive statistics from accounting data. Low-B firms are larger and have lower leverage than high-B firms. Both groups of firms pay similar interest rates on their debt, hold similar levels of cash, and exhibit similar levels of investment.[13] Panel B presents patent data and shows that low-B firms are more likely to hold at least one patent and to hold more patents than high-B firms. Panels C and D show information on the three personal costs of bankruptcy proxies. Panel E lists the correlation between the personal costs of bankruptcy proxies. While ownership concentration and managers' inside ownership are positively correlated (0.41), managers' distance to retirement is not correlated with either of the ownership-based proxies.

5 Empirical Strategy

This section describes our empirical strategy, which is guided by the testable implications in Section 3. The validity of our empirical analysis relies on several identifying assumptions that we discuss and support in Sections 6 and 7.

We start our analysis by assessing differences in borrowing and investment for the average firm under the pre-reform receivership system compared with the post-reform management stay system

[13] We measure interest rates as interest expenses over debt outstanding.

by estimating

$$Y_{i,t} = \alpha_i + \alpha_{ind,t} + \gamma_1 \cdot controls_{i,t-1} + \gamma_2 \cdot controls_{i,t-1} * reform_t + \delta_1 \cdot treated_i + \delta_2 \cdot reform_t + \delta_3 \cdot treated_i * reform_t + \varepsilon_{i,t}, \quad (4)$$

where $Y_{i,t}$ is the value of the outcome of interest for firm i in year t,[14] $controls_{i,t-1}$ is a set of lagged control variables,[15] the dummy variable $reform_t$ takes the value of 0 before the reform (2001 to 2005) and 1 after the reform (2006 to 2010), and $treated_i$ is a variable that captures the degree to which firm i is affected by the reform. Firm fixed effects α_i ensure that we track changes for the same firm. Industry-year fixed effects $\alpha_{ind,t}$ control for industry-specific shocks. Interacting control variables with the reform dummy ensures that we control for varying effects of firm characteristics under the pre-reform and post-reform regime. Standard errors are clustered at the industry level. All results are robust to clustering standard errors at the firm level. The parameter of interest is δ_3, which measures changes in the different outcome variables for firms that are more sensitive to the reform relative to firms that are less sensitive to the reform around the reform.

We exploit three sources of variation in the degree to which firms are affected by the reform. First, safe firms, which are further from the bankruptcy boundary, are less sensitive to a bankruptcy reform compared with risky firms (Becker and Strömberg 2012). Thus, we first define $treated_i$ as a variable that sorts firms into quintiles of default risk ($risk_i$) measured by firms' interest coverage ratio, which is a widely used proxy for default risk that can be computed for public and private firms.

Second, small firms with simple debt structures fall under a separate bankruptcy system before the reform. Specifically, small firms are subject to a management stay system before the reform rather than a receivership system (see Section 2.2). Thus, small firms are subject to a management stay system before and after the reform and do not experience a shift from a receivership to a management stay system. The law does not apply a fixed threshold for the decision regarding which bankruptcy regime to apply. Rather, bankruptcy judges have discretion to define firms as small or large on a case-by-case basis. The Financial Supervisory Service (FSS) uses an asset threshold of 7 billion KRW to classify firms as small or large for the purpose of auditing their

[14] The outcome variables we examine are interest rates ($IR_{i,t}$), debt to assets ($DebtA_{i,t}$), investment to assets ($InvA_{i,t}$), profit growth ($\Delta\, Profits_{i,t}$), return on assets ($ROA_{i,t}$), and different measures of the riskiness of firms' investment.

[15] Control variables are standard in the literature and comprise profitability, asset tangibility, sales growth, and firm size for leverage regressions. For interest rate regressions, leverage is added as an additional control variable. Investment regressions also include cash to assets as a control variable.

financial statements. In Figure 1, we plot the distribution of total assets for firms that were subject to the management stay system (Composition Act) and firms that were subject to the receivership system (Corporate Reorganization Act) before the reform. As is evident from the top plot in Figure 1, the management stay system applies only to very small firms. The bottom plot, which shows the distributions around the 7 billion KRW threshold used by the FSS, shows that no firm with assets below 7 billion KRW was subject to the receivership system, and only a small fraction of firms with assets above 7 billion KRW close to the threshold were subject to management stay. Together, this suggests that 7 billion KRW constitutes a sensible threshold for sorting firms into small firms that are never subject to receivership before the reform and large firms that are unlikely to be subject to management stay before the reform. Thus, for our extended sample, which includes small firms, we define $treated_i$ as a dummy variable $affected_i$ that takes the value of 1 for firms with assets above 7 billion KRW and 0 for firms with assets below 7 billion KRW.

Third, we exploit variation in the implementation of the management stay system by individual courts after the reform. By applying exemptions to management stay more or less frequently, some courts allow management stay in all restructuring cases after the reform whereas other courts block management stay in some cases. For example, the court that applies exemptions most frequently allows management stay in only 66.02% of cases after the reform. For each court, we compute the increase in the frequency of firms' CEOs being allowed to stay in control in bankruptcy proceedings from the pre-reform receivership system to the post-reform management stay system. Depending on the location of a firm's headquarters, the firm falls under the jurisdiction of a specific court.[16] The change in the rate of management stay therefore captures the change in the probability of management stay for all firms in a court's jurisdiction. We define $treated_i$ as the change in the rate of management stay of firm i's court ($CEOStay_i$).

Next, to assess how owners' and managers' personal costs of bankruptcy affect firms' borrowing and investment under the pre-reform receivership system compared with the post-reform management stay system, we estimate

$$Y_{i,t} = \alpha_i + \alpha_{ind,t} + \gamma_1 \cdot controls_{i,t-1} + \gamma_2 \cdot controls_{i,t-1} * reform_t + \beta_1 \cdot B_i + \beta_2 \cdot reform_t + \beta_3 \cdot B_i * reform_t + \varepsilon_{i,t}, \quad (5)$$

where B_i is a quintile rank variable ranging from 1 for firms with personal costs of bankruptcy in the lowest quintile to 5 for firms with personal costs of bankruptcy in the highest quintile, sorted in

[16] Firms located outside of major urban centers can choose between their local court and the court in the next larger city. For these firms, we assume that they choose the court that treats managers more favorably.

2005, the year before the reform applies. All other variables are defined as before. The parameter of interest is β_3, which measures changes in the different outcome variables for high-B relative to low-B firms around the reform.

Finally, analogous to the analysis of changes in borrowing and investment for the average firm around the reform, we estimate equation (4) separately for high-B and low-B firms. This allows us to separately assess whether high-B firms borrow and invest more under the pre-reform receivership or the post-reform management stay system, and whether low-B firms borrow and invest more under the pre-reform receivership or the post-reform management stay system.

6 Results

This section presents and discusses the results of estimating equations (4) and (5) to assess differences in firms' borrowing and investment under the pre-reform receivership and the post-reform management stay system for the average firm and for firms with different levels of owners' and managers' personal costs of bankruptcy.[17]

6.1 Average Reform Effects

We start our analysis by examining the reform's effects on borrowing and investment for the average firm using all three sources of variation in firms' sensitivity to the reform. Panels I to III of Figure 2 plot the time series of interest rates for firms that more sensitive to the reform (solid lines) and firms that are less sensitive to the reform (dashed lines), where each panel uses one of the three sources of variation in firms' sensitivity to the reform. Figures 3 and 4 provide the plots for leverage and investment, respectively. While we observe parallel trends in the outcome variables for all groups of firms before the reform, we observe a distinct increase in interest rates, leverage, and investment following the implementation of the reform in 2006 for firms that are more sensitive to the reform compared with firms that are less sensitive to the reform. Firms that are more sensitive to the reform continue to show persistently higher levels of interest rates, leverage, and investment under the post-reform management stay system. To confirm the insights statistically, we estimate equation (4) with interest rates, leverage, and investment as dependent variables. The results are shown in Table 3.

[17] Differences in observations across panels and columns in all tables are driven by the availability of data to compute the various proxies and control variables.

Firm Risk In Panel A of Table 3, we compare risky firms, which are more sensitive to the reform, with safe firms, which are less sensitive to the reform. We find that interest rates increase by 35 basis points more per risk quintile after the reform (column I). In addition, leverage increases by 33 basis points more (column II) and investment increases by 29 basis points more (column III) per risk quintile after the reform. Finally, profit growth increases by 14 basis points more per risk quintile after the reform (column IV), and return on assets (ROA) increases by 8 basis points more (although not statistically significant) per risk quintile after the reform (column V).

Bankruptcy Law Variation In Panel B of Table 3, we compare large firms with assets above the 7 billion KRW threshold, which experience a change from receivership to management stay after the reform, with small firms with assets below the 7 billion KRW threshold, which are subject to management stay before and after the reform. We find that interest rates increase by 2.12 percentage points more for large firms after the reform (column I). In addition, leverage increases by 1.64 percentage points more (column II), and investment increases by 2.33 percentage points more (column III) for large firms after the reform. Finally, profit growth increases by 78 basis points more for large firms after the reform (column IV), and ROA increases by 73 basis points more for large firms after the reform (column V).

Court Variation In Panel C of Table 3, we compare firms that fall under the jurisdiction of courts with a greater increase in the rate of management stay after compared with before the reform, with firms that fall under the jurisdiction of courts with a lower increase in the rate of management stay. The coefficients can be interpreted as the marginal effect of an increase in the probability of management stay in bankruptcy proceedings. For example, the estimate of 0.0398 in column I can be interpreted as an increase in interest rates by 3.98 percentage points for the average firm when moving from a 0% probability of management stay to a 100% probability of management stay. This implies that a 10 percentage-point increase in the probability of management stay leads to 40 basis points higher interest rates. Similarly, the results in columns II and III suggest that leverage and investment increase by 62 and 52 basis points, respectively, per 10 percentage-point increase in the rate of management stay for the average firm. Finally, profit growth (column IV) and ROA (column V) increase by 15 basis points per 10 percentage-point increase in the rate of management stay.

Together, these results suggest that the average firm borrows and invests more under the post-reform management stay system compared with the pre-reform receivership system. This is consistent with the view that while weaker creditor protection under management stay simultaneously

increases the demand for credit and makes firms more financially constrained, the former effect dominates the latter for the average firm. Specifically, the average firm borrows and invests more under management stay, with the additional investment flowing to profitable projects. The fact that we observe consistently higher borrowing and investment under management stay for firms that are more sensitive to the reform based on three distinct sources of variation in firms' sensitivity to the reform using firm-, legal-, and court-level variation strongly suggests that the results are not driven by confounding factors related to general time-series changes in borrowing and investment.

6.2 Heterogeneous Reform Effects

Next, we assess whether differences in firms' borrowing and investment under the pre-reform receivership system and the post-reform management stay system vary with firm-level personal costs of bankruptcy by estimating equation (5). To assess whether high-B and low-B firms borrow and invest more under the pre-reform receivership system or the post-reform management stay system, we estimate equation (4) separately for high-B and low-B firms. This allows us to identify which of the two opposing effects of stronger creditor protection dominates for high-B and for low-B firms.

Interest Rates We start by examining changes in interest rates around the reform. Implication 1 of our theoretical framework states that lower recovery rates under the post-reform management stay system compared with the pre-reform receivership system lead to higher interest rates for both high-B and low-B firms after the reform.

Panels IV to VI of Figure 2 plot the time series of interest rates for high-B (solid lines) and low-B (dashed lines) firms based on the three proxies for personal costs of bankruptcy. While we observe parallel trends in interest rates for high-B and low-B firms before the reform, we observe a distinct increase in interest rates for high-B firms compared with low-B firms following the implementation of the reform in 2006. High-B firms continue to show persistently higher levels of interest rates under the post-reform management stay system. While our theoretical framework predicts an increase in interest rates for high-B and low-B firms after the reform, it does not predict differences in interest rates for high-B compared with low-B firms. The higher increase in interest rates for high-B firms is consistent with a higher aggregate demand for credit from high-B firms under management stay. While our theoretical framework captures changes in the firm-specific demand for credit, it does not capture changes in aggregate demand. To confirm these insights statistically, we estimate equation (5) with interest rates as the dependent variable. The results are

displayed in column I of Table 4. After the reform, interest rates increase by 6 to 19 basis points more per quintile of personal costs of bankruptcy.[18]

To assess whether interest rates increase for high-*B* and low-*B* firms that are more sensitive to the reform relative to firms that are less sensitive to the reform, we implement a triple-difference estimation strategy by estimating equation (4) with interest rates as the dependent variable separately for high-*B* and low-*B* firms. The results are shown in columns I and II of Tables 5 to 7, where each table uses a different source of variation in firms' sensitivity to the reform, as discussed in Section 5. In Table 5, we compare the reform effect for riskier and safer firms, in Table 6 we compare the reform for large and small firms, and in Table 7 we compare the reform effect for firms across court jurisdictions with different changes in the rate of management stay. Column I in Table 5 shows that for high-*B* firms, interest rates increase by 30 to 34 basis points more per risk quintile after the reform, and the results in column II show that for low-*B* firms, interest rates increase by 14 to 27 basis points more per risk quintile after the reform. Column I in Table 6 shows that for high-*B* firms, interest rates increase by 1.68 to 2.45 percentage points more for large firms after the reform, whereas for low-*B* firms, interest rates increase by 1.32 to 2.27 percentage points more for large firms after the reform. Finally, column I in Table 7 shows that for high-*B* firms, interest rates increase by 20 to 54 basis points per 10 percentage-point increase in the rate of management stay, whereas for low-*B* firms interest rates increase by 12 to 20 basis points per 10 percentage-point increase in the rate of management stay.

Taken together, the evidence on differences in interest rates for high-*B* and low-*B* firms under the pre-reform receivership and the post-reform management stay system is consistent with Implication 1 of our theoretical framework. Lower recovery rates in default under management stay induce creditors to demand higher interest rates from all firms.

Borrowing Next, we examine changes in leverage around the reform. Implication 2 from our theoretical framework predicts that high-*B* firms increase leverage after the reform, whereas low-*B* firms reduce leverage after the reform. Intuitively, low-*B* firms face financial constraints. The reform reduces personal costs of bankruptcy, which reduces the owner-manager's incentives, and therefore renders the firm more financially constrained. In contrast, high-*B* firms are not financially constrained but may be unwilling to invest due to high personal costs of bankruptcy. The

[18] We replicate the analysis of estimating equation (5) for all proxies and outcomes variables for the sample of small firms that are not affected by the reform in Table IA.1 in the Internet Appendix. We do not observe systematic changes in outcome variables for high-*B* and low-*B* firms for these firms. This suggests that differential changes in outcomes for high-*B* and low-*B* firms are limited to the set of firms affected by the reform.

reduction in personal costs of bankruptcy resulting from the reform increases the owner-manager's willingness to invest, and therefore increases credit demand.

Panels IV to VI of Figure 3 plot the time series of leverage for high-*B* (solid lines) and low-*B* (dashed lines) firms based on the three proxies for personal costs of bankruptcy. While we observe parallel trends in leverage for high-*B* and low-*B* firms before the reform, we observe a distinct increase in leverage for high-*B* firms compared with low-*B* firms following the implementation of the reform in 2006. High-*B* firms continue to show persistently higher levels of leverage under the post-reform management stay system. To confirm these insights statistically, we estimate equation (5) with leverage as the dependent variable. The results are displayed in column II of Table 4, and indicate that leverage increases by 29 to 85 basis points more per quintile of personal costs of bankruptcy under the post-reform management stay system. This implies that firms with high personal costs of bankruptcy borrow more compared with firms with low personal costs of bankruptcy under the post-reform management stay system relative to the pre-reform receivership system.

To assess whether leverage increases or decreases for high-*B* and low-*B* firms that are more sensitive to the reform relative to firms that are less sensitive to the reform, we implement a triple-difference estimation strategy by estimating equation (4) with leverage as the dependent variable separately for high-*B* and low-*B* firms. The results are shown in columns III and IV of Tables 5 to 7, where each table uses a different source of variation in firms' sensitivity to the reform, as discussed in Section 5. Column III in Table 5 shows that for high-*B* firms, leverage increases by 71 to 162 basis points more per risk quintile after the reform, whereas the results in column IV show that for low-*B* firms, leverage decreases by 71 to 93 basis points more per risk quintile after the reform. Similarly, column III in Table 6 shows that for high-*B* firms, leverage increases by 2.45 to 2.71 percentage points more for large firms after the reform, whereas column VI shows that for low-*B* firms, leverage decreases by 1.12 to 1.89 percentage points more for large firms after the reform. Finally, column III in Table 7 shows that for high-*B* firms, leverage increases by 87 to 128 basis points per 10 percentage-point increase in the rate of management stay, whereas for low-*B* firms leverage decreases by 88 to 120 basis points per 10 percentage-point increase in the rate of management stay.

Together, the results suggest that while high-*B* firms take on higher leverage under the post-reform management stay system, low-*B* firms have higher leverage under the pre-reform receivership system, consistent with Implication 2 from our theoretical framework. These contrasting results show that whether firms increase or decrease borrowing as creditor protection increases depends on the level of personal costs of bankruptcy at the firm level, which may explain the mixed

evidence in the literature (La Porta et al. 1997, 1998; Acharya, Amihud, and Litov 2011).

Investment Next, we examine changes in investment around the reform. Implication 2 from our theoretical framework also predicts that high-*B* firms increase investment after the reform, whereas low-*B* firms reduce investment after the reform.

Panels IV to VI of Figure 4 plot the time series of investment for high-*B* (solid lines) and low-*B* (dashed lines) firms based on the three proxies for personal costs of bankruptcy. While we observe parallel trends in investment for high-*B* and low-*B* firms before the reform, we observe a distinct increase in investment for high-*B* firms compared with low-*B* firms following the implementation of the reform in 2006. High-*B* firms continue to show persistently higher levels of investment under the post-reform management stay system. To confirm these insights statistically, we estimate equation (5) with investment to assets as the dependent variable. The results are displayed in in column III of Table 4. The results show that investment increases by 20 to 68 basis points more per personal costs of bankruptcy quintile after the reform. This implies that firms with high personal costs of bankruptcy experience a higher increase in investment compared with firms with low personal costs of bankruptcy under the post-reform management stay system relative to the pre-reform receivership system.

To assess whether investment increases or decreases for high-*B* and low-*B* firms that are more sensitive to the reform relative to firms that are less sensitive to the reform, we implement a triple-difference estimation strategy by estimating equation (4) with investment to assets as the dependent variable separately for high-*B* and low-*B* firms. The results are shown in columns V and VI of Tables 5 to 7, where each table uses a different source of variation in firms' sensitivity to the reform, as discussed in Section 5. Column V in Table 5 shows that for high-*B* firms, investment increases by 47 to 118 basis points more per risk quintile after the reform, whereas the results in column VI show that for low-*B* firms, investment decreases by 33 to 59 basis points more per risk quintile after the reform. Column V in Table 6 shows that for high-*B* firms, investment increases by 2.02 to 3.26 percentage points more for large firms after the reform, whereas column VI shows that for low-*B* firms, investment decreases by 1.97 to 2.24 percentage points more for large firms after the reform. Finally, column V in Table 7 shows that for high-*B* firms, investment increases by 77 to 110 basis points per 10 percentage-point increase in the rate of management stay, whereas for low-*B* firms, investment decreases by 52 to 144 basis points per 10 percentage-point increase in the rate of management stay.

Whether higher investment is desirable depends on the efficiency of the additional invest-

ment. A receivership system may prevent firms from engaging in overinvestment and risk-shifting (Jensen 1986; Harris and Raviv 1990; Skeel 1993; Zwiebel 1996) by increasing owners' and managers' personal costs of bankruptcy. Alternatively, high personal costs of bankruptcy under a receivership system may lead to underinvestment in positive NPV projects that involve risk (Donaldson 1969; Amihud and Lev 1981; Rasmussen 1994). It is important to emphasize that it is challenging to evaluate the efficiency of corporate investment. To provide suggestive evidence on the efficiency of the additional investment of high-*B* firms under the post-reform management stay system and of low-*B* firms under the pre-reform receivership system, we examine differences in firms' profits by estimating equations (5) and (4) with profit growth and ROA as dependent variables.

The results of estimating equation (5) are displayed in columns IV and V of Table 4. We find that profit growth is higher for high-*B* firms than for low-*B* firms under the management stay system by 9 to 24 basis points more per personal costs of bankruptcy quintile (column IV). Additionally, ROA increases by 6 to 11 basis points more per personal costs of bankruptcy quintile after the reform (column V).

The results of estimating equation (4) separately for high-*B* and low-*B* firms are shown in columns VII and VIII of Tables 5 to 7. Column VII in Table 5 shows that for high-*B* firms, profit growth increases by 35 to 61 basis points more per risk quintile after the reform, whereas the results in column VIII show that for low-*B* firms, profit growth decreases by 77 to 90 basis points more per risk quintile after the reform. Column VII in Table 6 shows that for high-*B* firms, profit growth increases by 1.38 to 2.46 percentage points more for large firms after the reform, whereas column VIII shows that for low-*B* firms, profit growth decreases by 79 to 135 basis points more for large firms after the reform. Finally, column VII in Table 7 shows that for high-*B* firms, profit growth increases by 36 to 41 basis points per 10 percentage-point increase in the rate of management stay, whereas column VIII shows that for low-*B* firms profit growth decreases by 20 to 49 basis points per 10 percentage-point increase in the rate of management stay.

Taken together, the evidence on firm investment suggests that firms with high levels of personal costs of bankruptcy invest more in profitable investment under a more debtor-friendly management stay system compared with a more creditor-friendly receivership system. In contrast, firms with low levels of personal costs of bankruptcy invest more in profitable investment projects under a more creditor-friendly receivership system. Moreover, the results on ROA (column V, Table 4) suggest that the return on new investment is higher than the average return on previous investment. This is consistent with the view that high personal costs of bankruptcy can prevent firms from

investing in risky but highly profitable projects.

Risk-taking Finally, Implication 3 predicts that investment for high-*B* firms increases more for riskier investment projects after the reform. Intuitively, since personal costs of bankruptcy occur when firms default, their impact on firms' demand for credit is particularly salient for projects that exhibit high risk of failure. Thus, credit demand, which matters for high-*B* firms, increases more strongly in the post-reform management stay system for high-risk investment projects. In addition, our model shows that for low-*B* firms, the effect of an increase in risk is ambiguous.

In Table 8, we examine relative changes in risk-taking for high-*B* and low-*B* firms around the reform. The results in column I show that R&D spending as a fraction of assets increases by 14 to 30 basis points more per personal costs of bankruptcy quintile after the reform. The results in columns IX and X in Tables 5 to 7 consistently show that the relative increase in risk-taking under the post-reform management stay system is driven by an increase in risk-taking by high-*B* firms, whereas risk-taking is unchanged for low-*B* firms after the reform.

The increase in R&D spending is not simply a result of the overall increase in investment for high-*B* firms. In Table 8, column II, we find that firms increase R&D spending as a fraction of total investment by 6 to 11 basis points more per personal costs of bankruptcy quintile. Firms also increase innovation output with an additional increase of 0.0018 to 0.0047 patents per billion KRW of assets, or 6.45 to 16.85% relative to the mean (0.0279), per personal costs of bankruptcy quintile (column III). Finally, we directly measure changes in risk by comparing firms' cash flow volatility in the 5 years before and the 5 years after the reform in column IV. Cash flow volatility increases by 0.0182 to 0.0551 more per personal costs of bankruptcy quintile after the reform.

Altogether, these results are consistent with Implication 3. For high-*B* firms, management stay increases investment in risky projects compared with receivership. In contrast, for low-*B* firms, the riskiness of investment is similar under management stay and receivership.

Proxies for Financial Constraints Our data allow us to further examine differences in borrowing and investment for firms classified as financially constrained based on quintiles of leverage, cash holdings, and free cash flow, as suggested by Hadlock and Pierce (2010). The results are summarized in Table IA.2 in the Internet Appendix. The estimates are broadly consistent with financially constrained firms borrowing and investing more under the pre-reform receivership system compared with the post-reform management stay system across all proxies: debt-to-assets in Panel A, cash-to-assets in Panel B, free cash flow-to-assets in Panel C, and the average of all three

measures in Panel D. This suggests that financially constrained firms borrow and invest more under the more creditor-friendly receivership system compared with the more debtor-friendly management stay system.

6.3 Implications

Our results have important implications for bankruptcy law design. As we outline in our model and document in the empirical analysis, whether the financial constraint or the credit demand constraint determines firms' borrowing and investment may vary with firm characteristics. Specifically, our results suggest that for firms with high personal costs of bankruptcy for owners and managers, the relevant constraint is the credit demand constraint and we observe higher borrowing and investment under the more debtor-friendly management stay system. In contrast, for firms with low levels of personal costs of bankruptcy for owners and managers, the relevant constraint is the financial constraint and we observe more borrowing and investment under the more creditor-friendly receivership system.

While our analysis focuses on cross-sectional differences in personal costs of bankruptcy for owners and managers, a similar argument applies to other characteristics that determine which of the two constraints determines firms' borrowing and investment. For example, as we show in our model, the credit demand constraint tends to determine firms' borrowing and investment for more risky investment projects. This implies that a more debtor-friendly bankruptcy regime may increase borrowing and investment in industries characterized by risky investment projects (e.g., high R&D intensity).

Moreover, the relative importance of financial constraints and credit demand may vary across countries. For example, in countries with high corporate governance standards or a large fraction of firms with diversified owners and therefore low personal costs of bankruptcy (e.g., the U.K.), the financial constraint is more likely to determine firms' borrowing and investment than the credit demand constraint, and a more creditor-friendly bankruptcy regime may encourage more borrowing and investment. In contrast, in countries with lower governance standards and more closely held firms, and therefore high personal costs of bankruptcy (e.g., Korea), the credit demand constraint may be more likely to determine firms' borrowing and investment and a more debtor-friendly bankruptcy regime may encourage more borrowing and investment. This further implies that it may be optimal to apply different bankruptcy systems to firms with different characteristics or that different systems may be optimal in different institutional environments (e.g., in different countries), depending on which constraint is more likely to determine firms' borrowing and invest-

ment. This implication is consistent with different bankruptcy systems being observed around the world.[19]

7 Discussion and Robustness Tests

This section discusses alternative contracting solutions to reduce potential inefficiencies arising from the bankruptcy system, addresses potential concerns about confounding effects or measurement errors, and discusses other potential effects of the reform.

7.1 Alternative Contracting Solutions

We first discuss alternative contractual arrangements, which may undo the effects of the bankruptcy system on firms' borrowing and investment, and discuss their limitations.

7.1.1 Alternative Financing Sources

In our model, firms can only use risky debt to finance the investment project, which leads to personal costs of bankruptcy due to the dismissal of the owner-manager in the event of default. A natural question is whether firms could mitigate personal costs of bankruptcy by financing additional investment with equity. There are several reasons for why firms issue debt rather than equity. First, equity financing might be costly or infeasible due to information asymmetries (Myers and Majluf 1984) or large fixed costs. Second, issuing outside equity might reduce the private benefits of control for firm insiders, which are particularly large in the context of Korean firms (Nenova 2003; Dyck and Zingales 2004). Similarly, new outside owners might be unwilling to become minority owners in firms in which insiders can extract large private benefits of control. Third, debt has a tax advantage compared with equity. Moreover, even if firms use equity to finance a large portion of their operations, they typically have debt-like obligations, such as employee wages, which, if not honored, can cause financial distress.

An alternative way to finance an investment project is to sell assets. While asset sales may be a feasible source of financing in some cases, there are limitations. Firms may not have enough non-core assets that can be sold without affecting the firm's operations. Further, asset sales are regularly prohibited by existing debt contracts. Thus, whereas in some cases financing new investment with

[19] Table IA.3 in the Internet Appendix provides information about management stay provisions across a broad range of countries.

asset sales might be feasible, firms face constraints in their ability to liquidate assets for new investment.

7.1.2 Compensation Contracts

In our model, ownership and control are not separate. If ownership and control are separate, conflicts of interest between owners and managers may arise. In particular, if the manager has high personal costs of bankruptcy, she may be unwilling to invest. In contrast, if owners have lower personal costs of bankruptcy, they might prefer to invest. A potential solution to this problem is to compensate the manager for her personal costs of bankruptcy. While this might be feasible in some cases, the cost of compensating the manager for personal costs of bankruptcy simply means that they will be borne by the owners, who may in turn be unwilling to invest.

In addition, if the manager has low personal costs of bankruptcy, the firm might be unable to obtain credit due to the manager's lack of incentives to exert effort. Owners could use contracts to increase the manager's incentive to exert effort. However, if the manager has limited wealth or is protected by limited liability, there are limits to creating such incentives. It may therefore be too costly to generate sufficiently strong incentives. Contractual arrangements may therefore not be able to fully resolve the manager's incentive problem.

7.2 Confounding Factors and Robustness Tests

Next, we consider the possibility of confounding factors and present results from additional robustness tests.

7.2.1 Confounding Factors

In any empirical study that relies on one main event, an important consideration is whether confounding events occur around the same time period. In our case, for such confounding events to be able to explain all of our results, they must differentially affect firms sorted into groups with higher and lower levels of personal costs of bankruptcy, risky and safe firms, large and small firms, and be correlated with rates of management stay in bankruptcy proceedings across courts.

Global Financial Crisis The most salient event that occurred during our sample period that could differentially affect risky and safe or large and small firms is the global financial crisis.

While the financial sector in Korea was not directly affected through subprime exposure, as an export-dependent economy, Korea experienced lower growth rates in 2008 and 2009. In 2010, growth rates were back to pre-2008 levels.

Several pieces of evidence suggest that the financial crisis does not affect our analysis. We find that all outcome variables diverge sharply for firms that are more and less sensitive to the reform as well as high-B and low-B firms in 2006, when the bankruptcy reform applies, rather than in 2008, when the global financial crisis starts to affect the Korean economy (see Figures 2 to 4). Additionally, we do not observe detectably different patterns during the crisis years of 2008 and 2009. Moreover, when we extend the analysis to 2013, we find that the patterns persist well beyond the 2008–2009 period.

To formally assess whether our results are affected by the 2008–2009 period, in Tables IA.4 and IA.5 in the Internet Appendix, we replicate our analysis excluding the period from 2008 to 2009, during which the Korean economy was affected by the financial crisis. Removing the 2008–2009 period has no material effect on our results. Together with the timing of the effects and the persistence beyond our main sample period, this suggests that the effect of the financial crisis on the Korean economy does not explain the patterns in firms' borrowing and investment around the reform.

Firm Size One firm characteristic that is likely to be correlated with the majority of the outcome variables in the paper and that is also correlated with all personal costs of bankruptcy proxies is firm size. The correlation between firm size and ownership concentration is -0.0745, the correlation between firm size and managers' inside ownership is -0.1976, and the correlation between firm size and managers' distance to retirement is -0.2391. That is, small firms are more likely to have higher ownership concentration and more inside ownership, and to be run by younger CEOs than large firms.

To start with, it should be noted that we control for firm size in all regressions and that firm size is not correlated with some of the sources of variation we exploit, for example, the rate of management stay across courts. We directly assess changes in borrowing and investment for smaller compared with larger firms by replacing personal costs of bankruptcy quintiles in equation (5) with quintiles of firm size in Table IA.6, Panel A, in the Internet Appendix.[20] We find that firm size is not an important determinant of changes in borrowing and investment around the reform. This evidence strengthens the view that our results are not driven by correlation between firm size and

[20]We drop firm size as a separate control variable for this test.

personal costs of bankruptcy.

7.2.2 Anticipation of the Reform

The bankruptcy reform process spanned several years before the reform applied in 2006. Anticipating the reform, firms may have endogenously altered their ownership structure or CEO incentives. This could affect our estimates—for example, if firms with risky investment opportunities hire younger CEOs before the reform, anticipating that high personal costs of bankruptcy are less likely to constrain risky investment under the post-reform management stay system.

From the outset, it should be noted that the personal costs of bankruptcy proxies are highly persistent in the data. To formally address concerns that firms endogenously alter their ownership structure or CEO hiring in anticipation of the reform, we re-sort firms into quintiles of personal costs of bankruptcy according to our proxies in 2001—5 years before the reform was applied—and estimate equations (5) and (4) based on the earlier sorting. The results in Tables IA.7 and IA.8 in the Internet Appendix show that the earlier sorting of firms leaves the results virtually unaffected, consistent with the persistence of the variables that underlie the personal costs of bankruptcy proxies. This suggests that our results are not affected by endogenous sorting of firms with respect to personal costs of bankruptcy.

7.2.3 Chaebols

A nontrivial share of firms in Korea belong to business groups (chaebols). Since these firms may be insulated from default risk through their business groups' internal capital markets (Gopalan, Nanda, and Seru 2007), sorting them into default-risk quintiles without taking business group affiliations into account may bias our results. For example, firms belonging to a business group may look like high-B firms based on their concentrated ownership, and some may be classified as risky firms based on the interest coverage ratio. Such misclassification should lead to attenuation bias by sorting firms into groups that are sensitive to the reform when in fact they are not.

To formally assess the possibility that misclassifying firms belonging to business groups affects our estimates, we repeat our analysis and exclude all firms in the sample that have ownership by another firm. The results are shown in Tables IA.9 and IA.10 in the Internet Appendix. Excluding firms connected to business groups overall renders the results somewhat stronger, consistent with the misclassification of these firms leading to attenuation bias.

7.3 Additional Reform Effects

Finally, we discuss additional channels through which the reform may affect firms' borrowing and investment separate from its effect on personal costs of bankruptcy.

7.3.1 Firm-specific Human Capital

Managers may develop firm-specific human capital over time; for example, by gathering important information about the firm they are managing. In this case, a potential reason why firms are reluctant to take on higher leverage and increase firm risk under the pre-reform receivership system could be that managers' firm-specific human capital is lost under forced resignation.

Several observations from the outcomes of corporate restructuring, both in court and out of court, are inconsistent with managers' firm-specific human capital being an important consideration. First, under the receivership system, the receiver or the new owners of the firm face no restriction in reappointing the previous manager. However, in the data, we do not observe a single case in which a firm reappoints the old manager. This is not consistent with the view that managers have an important positive effect on firm value as a result of firm-specific human capital they develop. Similarly, even in out-of-court restructurings, creditors demand the replacement of incumbent management in the majority of cases, which is further inconsistent with firm-specific human capital of incumbent management being a first-order concern for firm value.[21]

7.3.2 Excessive Liquidation

Under the pre-reform receivership system, it is easier for creditors to liquidate bankrupt firms. If creditor control leads to excessive liquidation, firms' demand for credit could be reduced.[22] Since the additional liquidations would be more costly for firms in which owners and managers have high personal costs of bankruptcy, this channel could reduce the demand for credit by high-B firms under the pre-reform receivership system. This is not an alternative channel, but rather a specific manner in which high personal costs of bankruptcy materialize under receivership.

Additionally, the design of the pre-reform receivership system in Korea makes it unlikely that excessive liquidations play a major role. Under the pre-reform receivership system, if the firm is

[21] The evidence is also consistent with lower incentives of managers to invest in firm-specific human capital ex ante when personal costs of bankruptcy are higher (Berkovitch, Israel, and Zender 1997).

[22] Creditors have a fixed claim on the firm and do not take into account the upside potential of risky investment opportunities that accrues to the firm (Ma, Tong, and Wang 2019).

not liquidated, creditors are compensated from the proceeds of the sale of bankrupt firms to new investors. Since the new owners of the firm have the option to preserve the firm as a going concern, the purchase price of the firm should reflect the upside potential of the firm's investment opportunities. Thus, creditors benefit from the upside potential of the firm's investment opportunities through the sale process under the pre-reform bankruptcy proceedings. Creditors even have the option to take over the firm by bidding for it, if they believe that a residual claim on the firm's assets is more valuable than their fixed claim, which we occasionally observe in the data.

To directly assess whether concerns about excessive liquidation differentially affect borrowing and investment under the pre-reform receivership and post-reform management stay systems, we compare changes in borrowing and investment around the reform for firms with different levels of asset tangibility by replacing personal costs of bankruptcy quintiles with asset tangibility quintiles in equation (5). Firms with higher levels of asset tangibility tend to be easier to liquidate and are therefore more subject to concerns about excessive liquidation (Vig 2013). The results are reported in Table IA.6, Panel B, in the Internet Appendix. Overall, we observe no significant changes in borrowing and investment for high-tangibility compared with low-tangibility firms around the reform. This supports our conjecture that concerns about excessive liquidation are not a primary determinant of differences in borrowing and investment under receivership and management stay.

7.3.3 Owner Coordination

Higher ownership concentration may facilitate coordination among owners in the event of default. Owner coordination matters more under management stay, since owners have more say during the bankruptcy process. For example, better coordination among owners may reduce creditors' ability to force management to resign in negotiations, which reduces managers' expected personal costs of bankruptcy. In addition, better coordination among owners may enable them to extract higher payments in bankruptcy proceedings, leading to lower recovery rates for creditors. A potential concern for our cross-sectional analysis with respect to the personal costs of bankruptcy proxy based on ownership concentration is that the proxy may be correlated with the ability of owners to coordinate upon default. Note that while this is a concern for ownership concentration, it does not apply to our other proxies for personal costs of bankruptcy.

Our data allow us to differentiate between personal costs of bankruptcy and owner coordination effects. The main channel through which ownership concentration affects personal costs of bankruptcy is through a lack of diversification of the firm's owners. However, for a subset of firms, ownership concentration is high even though owners are also diversified: firms with large insti-

tutional blockholders. In Table IA.11 in the Internet Appendix, we replicate our comparison of changes in borrowing and investment for firms with high and with low ownership concentration separately for two groups of firms. In Panel A, we consider firms in which individual investors are the largest group of owners, who are typically relatively undiversified. In Panel B, we consider firms in which institutional investors are the largest group of owners, who are typically relatively well diversified. For individual investors (Panel A) we find increases in interest rates (column I), leverage (column II), investment (column III), and profit growth (column IV) that are even higher than those in the base test in Table 4, Panel A. For institutional investors (Panel B) we do not find any differences between firms with high or low levels of ownership concentration for these firms. This suggests that differences in borrowing and investment under receivership and management stay for firms with high or low ownership concentration are not driven by differences in owner coordination, but rather by differences in owners' personal costs of bankruptcy arising from differences in the level of diversification.

7.3.4 Indirect Reform Effects

In our main specification in equation (5), we update control variables each year. This ensures that our results only capture direct effects related to changes in the design of the bankruptcy system around the reform. In this section, we test whether the reform induces additional indirect effects on borrowing and investment by affecting other firm characteristics. To capture both direct and indirect effects, we keep control variables fixed based on their pre-reform values in Table IA.12 in the Internet Appendix. Overall, the size of the estimates is very similar to the base specification in Table 4. In particular, the estimates are neither systematically higher or lower for any of the outcome measures. This suggests that the reform effect is mostly captured by direct effects of the reform on interest rates, borrowing, and investment rather than indirect effects through the reform's effect on other firm characteristics.

8 Conclusion

In this paper, we examine differences in the borrowing and investment of firms with different levels of personal costs of bankruptcy for owners and managers under a more creditor-friendly receivership system and a more debtor-friendly management stay system. Theoretically, we show that stronger creditor protection implies a trade-off. On the one hand, the more creditor-friendly receivership system relaxes financial constraints by mitigating agency conflicts between creditors

and owners or managers. On the other hand, when owners and managers face high personal costs of bankruptcy, the more creditor-friendly receivership system reduces firms' demand for credit. Which of these effects matters in equilibrium depends on the relative importance of agency problems and personal costs of bankruptcy. In particular, for firms with high levels of personal costs of bankruptcy, the credit demand constraint determines borrowing and investment and firms borrow and invest more under the management stay system. For firms with low levels of personal costs of bankruptcy, the financial constraint determines borrowing and investment and firms borrow and invest more under the receivership system.

We find empirical support for these predictions by exploiting a reform in Korea that changed the bankruptcy system from a receivership to a management stay system in 2006. Our insights allow us to reconcile the seemingly conflicting views in the literature on the optimal degree of creditor protection. The broader insight of our analysis is that the effect of stronger creditor protection depends on whether it is associated with an increase in owners' and managers' personal costs of bankruptcy. Consistent with this view, in contexts in which reforms strengthen creditor protection without significantly altering owners' and managers' personal costs of bankruptcy, the literature finds a positive relationship between creditor protection and borrowing and investment (Becker and Strömberg 2012; Campello and Larrain 2016; Cerqueiro, Ongena, and Roszbach 2016; Ponticelli and Alencar 2016). In contrast, in contexts in which reforms strengthen creditor protection and also significantly increase owners' and managers' personal costs of bankruptcy, the literature documents a negative relationship between creditor protection and borrowing and investment (Vig 2013).[23]

In addition, we show that the average firm borrows and invests more under the post-reform management stay system compared with the pre-reform receivership. This is consistent with the view that the higher demand for credit under management stay outweighs the tightening of financial constraints for the average firm. However, given our cross-sectional results that document the trade-off between higher demand for credit and tighter financial constraints, this result critically depends on the distribution of firms in our sample in terms of personal costs of bankruptcy, which may differ in other countries.

Taken together, our analysis offers important insights for optimal bankruptcy design, which has been an important aspect of the policy agenda in many countries and international organizations in recent years. Our analysis suggests that the optimal design of bankruptcy law is context-specific

[23]This is also consistent with the findings of Acharya, Amihud, and Litov (2011), who show in a cross-country study that not allowing managers to stay in control of the firm during bankruptcy proceedings has a negative effect on corporate risk-taking.

and depends on a trade-off between relaxing financial constraints and sustaining credit demand. The main contribution of our paper is to shed light on the nature of this trade-off. As we document, the balance of the trade-off varies across different types of firms, and therefore also across countries with different distributions of firm types. This insight raises a question: What other firm or institutional characteristics affect this trade-off? Further work in this area is important to inform policymakers, who need to determine the optimal degree of creditor protection.

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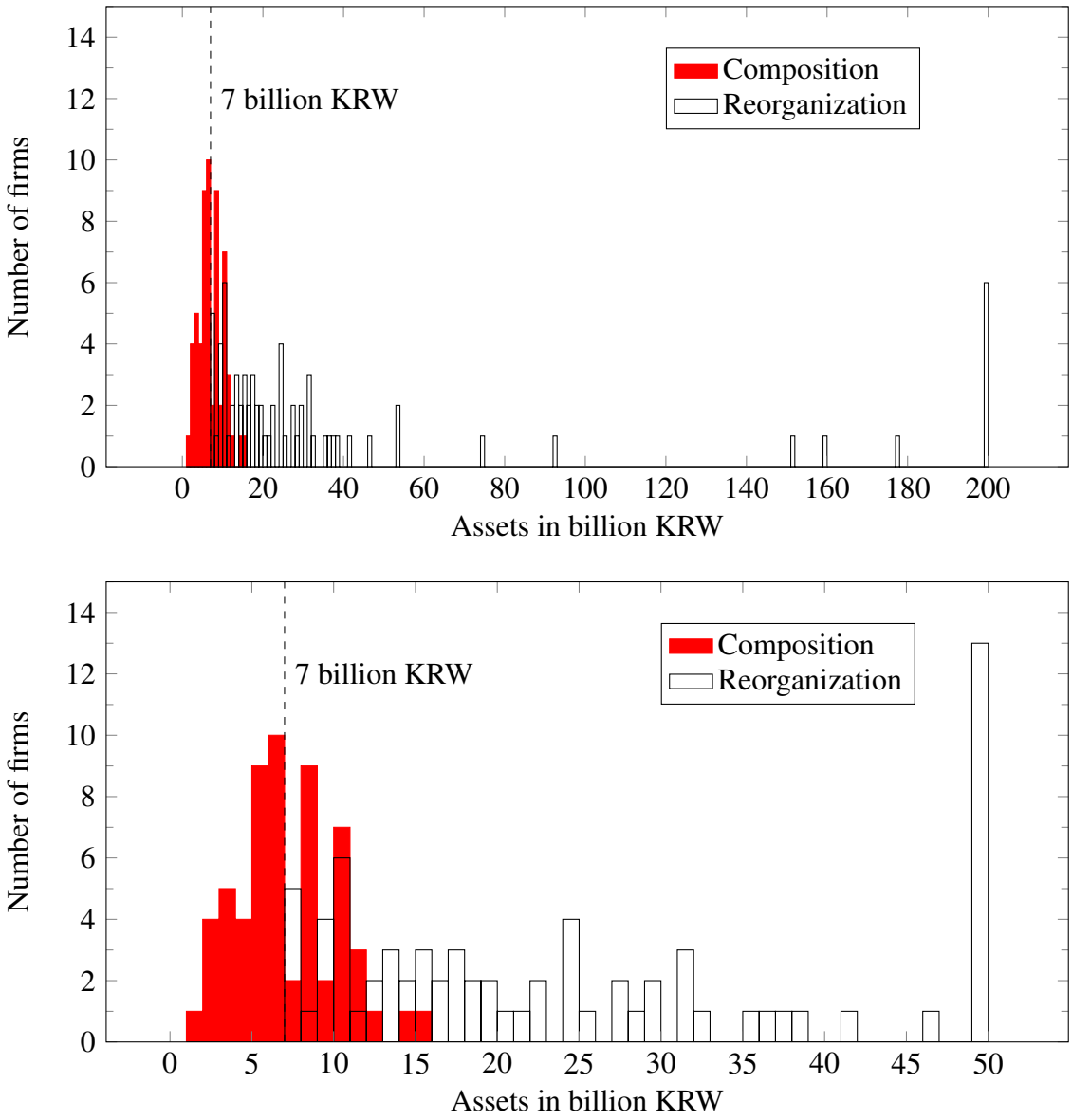
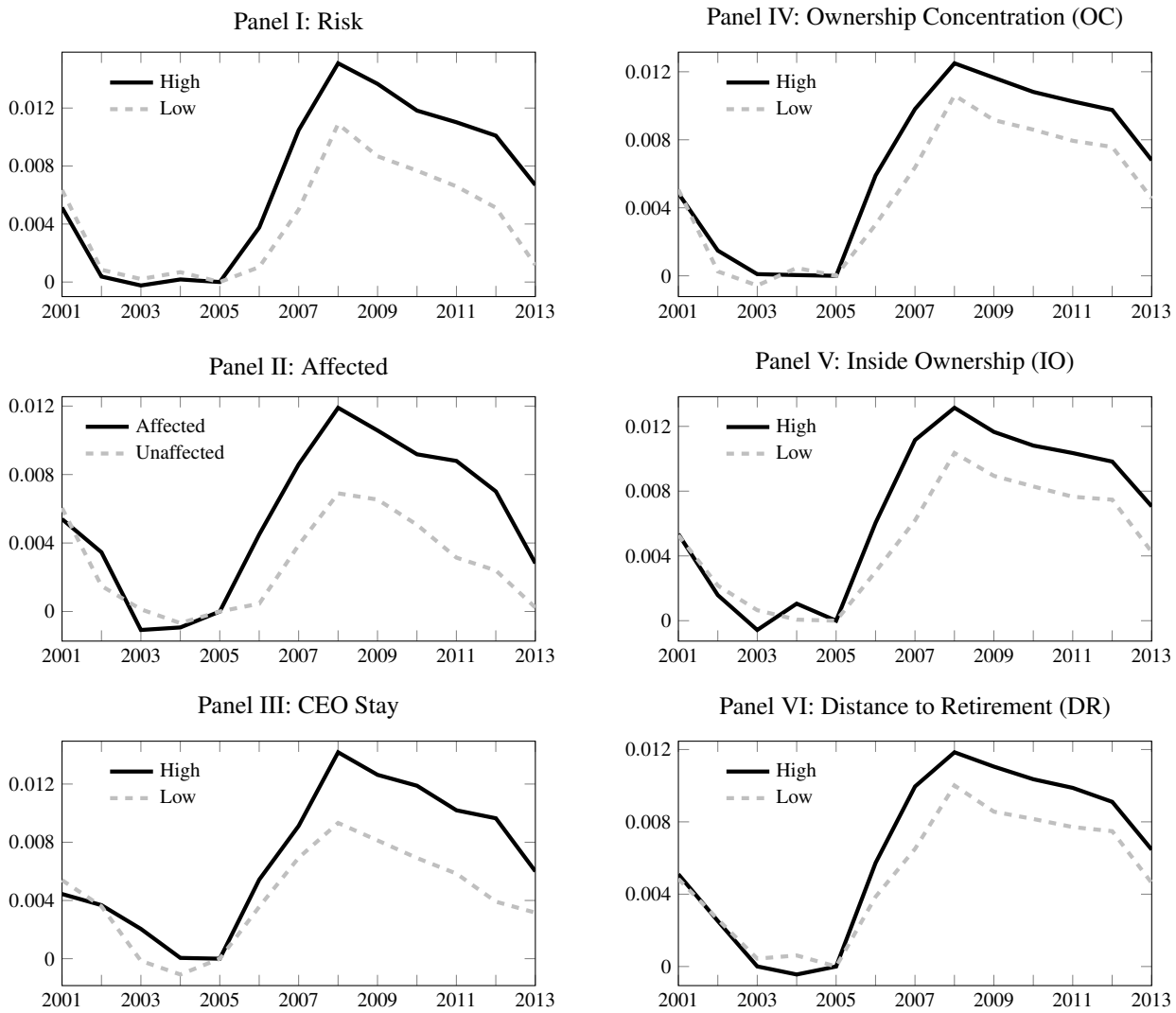
Figure 1: Composition and Reorganization Cases



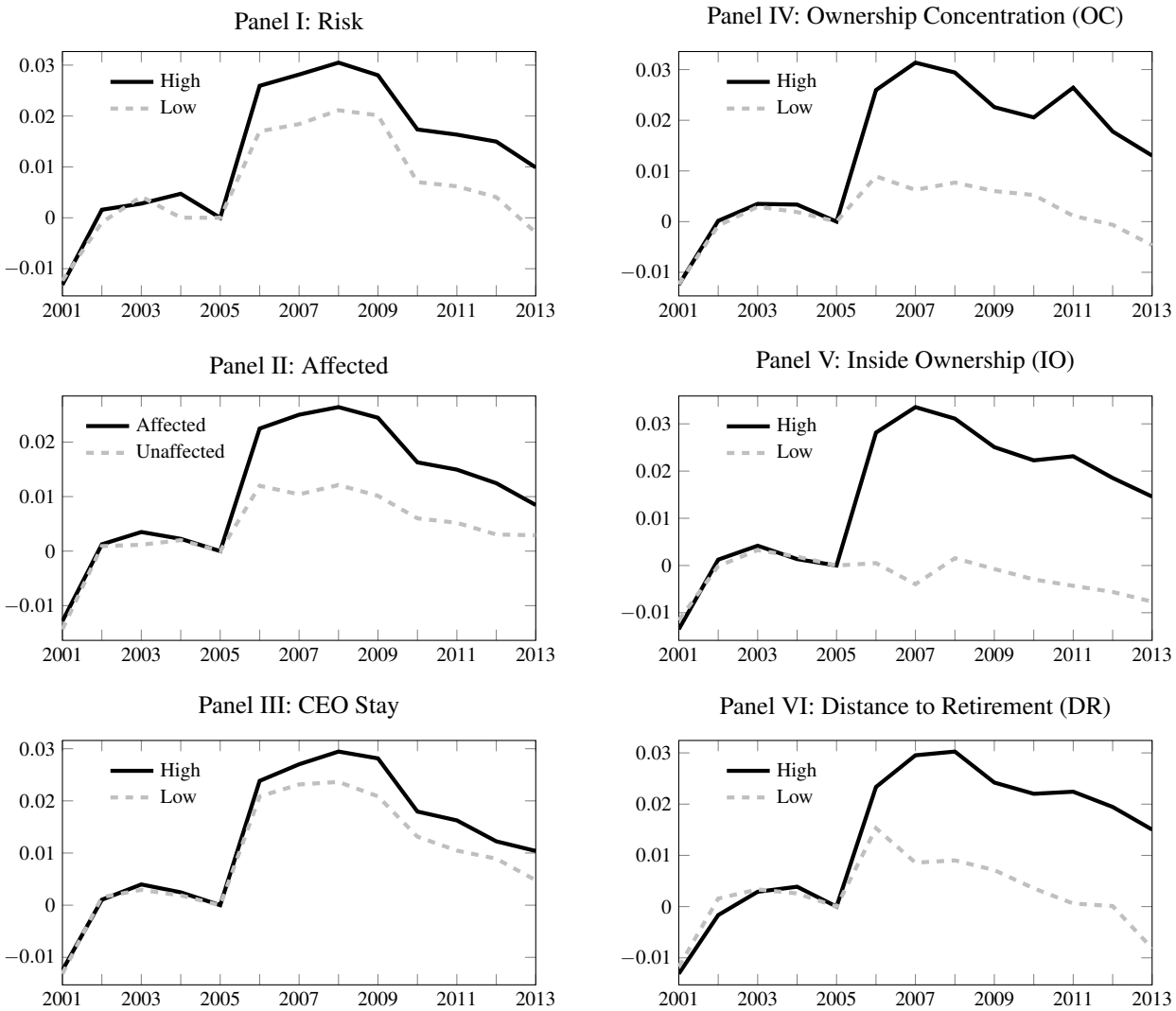
The top panel plots the distributions of bankruptcy filings under the Composition Act (CA) and under the Corporate Reorganization Act (CRA) before the reform in terms of firms' assets. Red bars are filings under the CA and transparent bars are filings under the CRA. Each bar shows the number of firms that filed under the respective bankruptcy law in the 1 billion KRW interval in terms of assets. The bar for the CRA for assets between 199 billion and 200 billion KRW comprises all firms with assets larger or equal to 199 billion KRW. The bottom panel plots the distributions for the range up to 50 billion KRW, where the bar for the CRA for assets between 49 billion and 50 billion KRW comprises all firms with assets larger or equal to 49 billion KRW.

Figure 2: Interest Rates



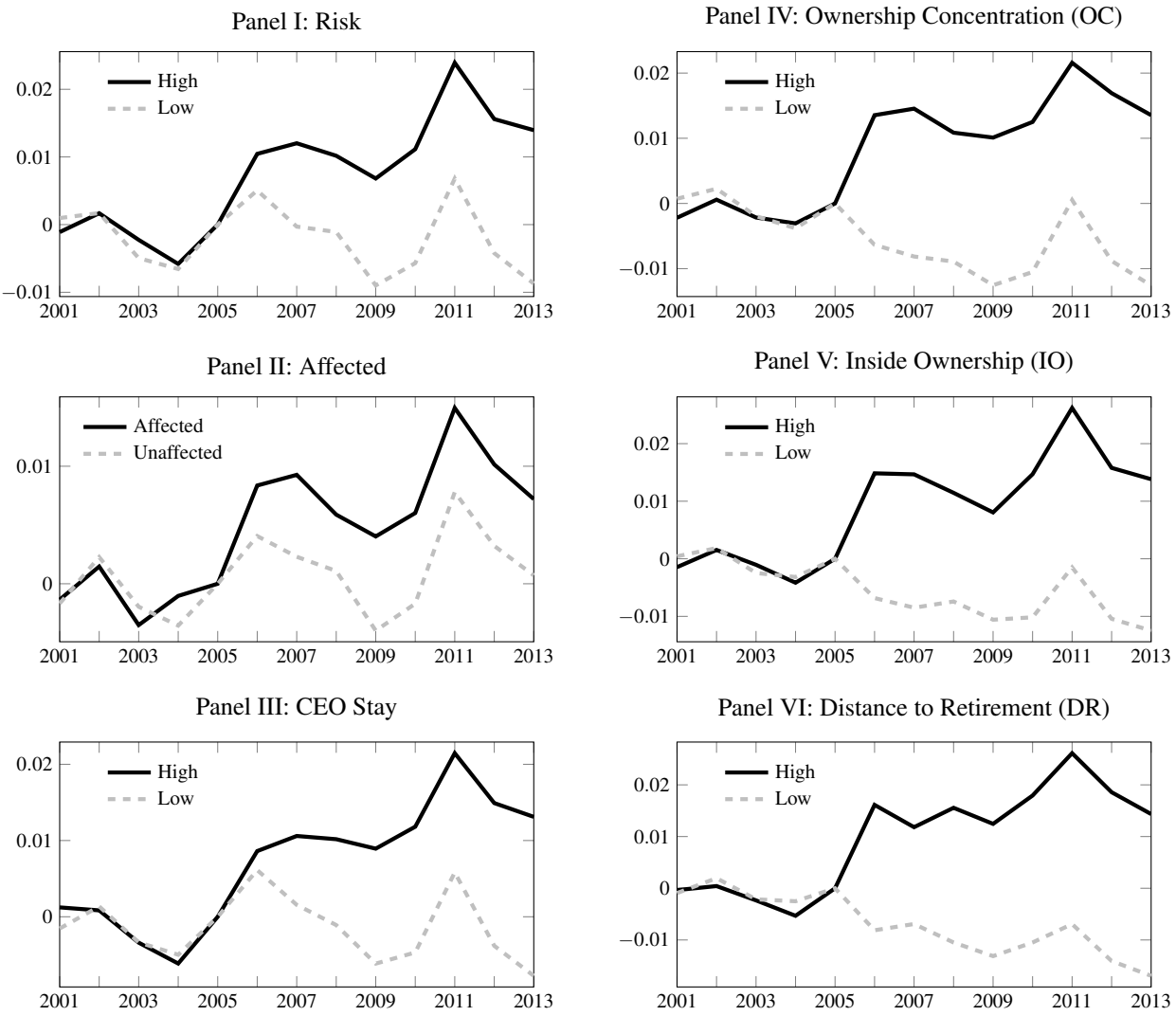
This figure plots the time series of interest rates around the reform, normalized to zero in 2005, for firms in the top two (solid line) and bottom two (dashed line) quintiles of default risk in Panel I, large firms that are affected by the reform (solid line) and small firms from the extended sample that are unaffected by the reform (dashed line) in Panel II, firms in the top two (solid line) and bottom two (dashed line) quintiles of the frequency of CEOs staying in control of the firm in bankruptcy proceedings in a firm's jurisdiction in Panel III, firms in the top two (solid line) and bottom two (dashed line) quintiles of ownership concentration in Panel IV, firms in the top two (solid line) and bottom two (dashed line) quintiles of inside ownership in Panel V, and firms in the top two (solid line) and bottom two (dashed line) quintiles of distance to retirement in Panel VI.

Figure 3: Leverage



This figure plots the time series of leverage around the reform, normalized to zero in 2005, for firms in the top two (solid line) and bottom two (dashed line) quintiles of default risk in Panel I, large firms that are affected by the reform (solid line) and small firms from the extended sample that are unaffected by the reform (dashed line) in Panel II, firms in the top two (solid line) and bottom two (dashed line) quintiles of the frequency of CEOs staying in control of the firm in bankruptcy proceedings in a firm's jurisdiction in Panel III, firms in the top two (solid line) and bottom two (dashed line) quintiles of ownership concentration in Panel IV, firms in the top two (solid line) and bottom two (dashed line) quintiles of inside ownership in Panel V, and firms in the top two (solid line) and bottom two (dashed line) quintiles of distance to retirement in Panel VI.

Figure 4: Investment



This figure plots the time series of investment to assets around the reform, normalized to zero in 2005, for firms in the top two (solid line) and bottom two (dashed line) quintiles of default risk in Panel I, large firms that are affected by the reform (solid line) and small firms from the extended sample that are unaffected by the reform (dashed line) in Panel II, firms in the top two (solid line) and bottom two (dashed line) quintiles of the frequency of CEOs staying in control of the firm in bankruptcy proceedings in a firm's jurisdiction in Panel III, firms in the top two (solid line) and bottom two (dashed line) quintiles of ownership concentration in Panel IV, firms in the top two (solid line) and bottom two (dashed line) quintiles of inside ownership in Panel V, and firms in the top two (solid line) and bottom two (dashed line) quintiles of distance to retirement in Panel VI.

Table 1: Bankruptcy Filings and Workouts

Panel A: Bankruptcy Outcomes (Sample Firms)	I All filings	II Reorganization (pre-reform)	III Reorganization (post-reform)
Number of filings	421	42	354
Share liquidation (%)	36.34	26.19	35.88
Duration (months)	41.98	34.12	41.88
CEO stay (%)	79.81	4.76	88.14
Ownership transfer (%)	30.71	90.91	19.09

Panel B: Bankruptcy Filings (Administrative Data) Year	I Reorganization	II Liquidation
2001	82	170
2002	57	108
2003	86	303
2004	116	162
2005	57	129
2006	117	132
2007	215	132
2008	582	191
2009	1,192	226
2010	1,227	253

Panel C: Workouts (Administrative Data) Year	I Total Cases	II Successful	III Failed	IV Failure Rate
2004-Q4	360	144	216	0.6000
2005	581	322	259	0.4458
2006	1,491	1,161	330	0.2213
2007	1,353	1,010	343	0.2535
2008	1,219	771	448	0.3675

Panel A displays the outcomes of corporate reorganization cases for all sample firms. The information comprises the number of filings, share of cases ending in liquidation, duration of the proceedings, fraction of CEOs staying in control throughout the proceedings, and the fraction of cases that do not end in liquidation with ownership transfer. Panel B lists administrative data on the number of reorganization and liquidation filings from 2001 to 2010 in Korea. Panel C lists administrative data on workouts, including the number of cases (column I) either successfully resolved (column II) or resulting in bankruptcy or liquidation (column III).

Table 2: Descriptive Statistics

		High-*B* Firms				Low-*B* Firms			
	Proxy	Obs.	Mean	Median	Std.	Obs.	Mean	Median	Std.
Panel A: Accounting Data									
Total assets (in m KRW)	OC	39,802	26,972	13,056	34,039	41,265	32,154	14,073	39,280
	IO	37,502	22,164	11,581	28,401	42,024	35,739	15,285	42,352
	DR	28,254	22,495	10,948	30,400	30,771	35,642	16,531	40,825
Debt to assets	OC	39,754	0.2878	0.2557	0.2559	41,214	0.2286	0.2515	0.2395
	IO	37,418	0.3343	0.3056	0.2776	41,999	0.2568	0.2175	0.2289
	DR	28,206	0.3042	0.2791	0.2551	30,753	0.2847	0.2538	0.2386
Interest rates	OC	34,211	0.0484	0.0425	0.0363	37,493	0.0534	0.0466	0.0379
	IO	32,633	0.0516	0.0446	0.0386	37,450	0.0517	0.0452	0.0376
	DR	24,889	0.0518	0.0449	0.0383	27,690	0.0501	0.0446	0.0352
Cash to assets	OC	37,972	0.0768	0.0338	0.0991	39,788	0.0718	0.0334	0.0926
	IO	35,224	0.0695	0.0268	0.0958	40,658	0.0787	0.0389	0.0972
	DR	26,711	0.0836	0.0384	0.1041	29,902	0.0625	0.0283	0.0840
Net investment to assets	OC	37,420	0.0331	-0.0015	0.1175	39,459	0.0360	-0.0010	0.1196
	IO	34,539	0.0293	-0.0013	0.1142	40,370	0.0402	-0.0008	0.1244
	DR	26,340	0.0468	-0.0001	0.1298	29,712	0.0245	-0.0033	0.1081
Panel B: Patent Data									
Number of patents	OC	4,122	3.57	2.00	4.56	6,497	3.97	2.00	5.00
	IO	2,762	2.85	2.00	3.44	7,196	4.28	2.00	5.37
	DR	3,501	3.27	2.00	4.04	3,852	4.24	2.00	5.49
Panel C: Ownership Data									
Ownership concentration	OC	39,804	0.6548	0.5713	0.2164	41,259	0.1991	0.2123	0.0737
	IO	37,502	0.5224	0.4313	0.2593	42,026	0.3096	0.2531	0.2307
	DR	25,259	0.3894	0.3349	0.2426	28,233	0.4232	0.3496	0.2710
Inside ownership	OC	39,802	0.7454	0.8267	0.2663	41,256	0.5068	0.4539	0.2724
	IO	37,502	0.9560	1.0000	0.0643	42,024	0.3375	0.3495	0.1270
	DR	25,258	0.6169	0.6000	0.2914	28,231	0.6303	0.6428	0.2930
Panel D: CEO Data									
Distance to retirement	OC	27,222	12.66	13.00	8.84	27,845	13.02	14.00	9.54
	IO	23,885	12.97	13.00	9.33	29,222	13.19	14.00	9.37
	DR	28,256	21.11	21.00	5.95	30,774	5.67	7.00	5.67
Panel E: Correlations									
Proxy		OC	IO	DR					
	OC	1.00							
	IO	0.41	1.00						
	DR	-0.02	0.01	1.00					

This table provides descriptive statistics on accounting data (Panel A), patent data (Panel B), ownership data (Panel C), and CEO data (Panel D), separately for firms in the highest two quintiles of our personal costs of bankruptcy proxies (high-*B* firms) and firms in the lowest two quintiles of the personal costs of bankruptcy proxies (low-*B* firms). Ownership concentration (OC) is computed using the Herfindahl index of a firm's ownership, inside ownership (IO) is computed as the fraction of shares owned by the firm's CEO and her family, and distance to retirement (DR) is computed as the difference between 65 and a CEO's age. Panel E depicts the correlations between the different personal costs of bankruptcy quintiles.

Table 3: Borrowing and Investment - Average Reform Effects

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: Risky vs. Safe Firms					
$risk_i * reform_t$	0.0035***	0.0033**	0.0029***	0.0014**	0.0008
	[0.0004]	[0.0016]	[0.0011]	[0.0006]	[0.0006]
Observations	105,218	113,641	112,558	113,636	113,619
R-squared	0.618	0.770	0.386	0.208	0.554
Panel B: Affected vs. Unaffected Firms					
$affected_i * reform_t$	0.0212***	0.0164**	0.0233***	0.0078***	0.0073***
	[0.0060]	[0.0070]	[0.0068]	[0.0029]	[0.0028]
Observations	140,085	162,159	157,266	162,043	162,007
R-squared	0.691	0.677	0.685	0.196	0.537
Panel C: Management Stay Intensity					
$CEOstay_i * reform_t$	0.0398**	0.0624**	0.0517***	0.0154**	0.0153*
	[0.0190]	[0.0303]	[0.0174]	[0.0076]	[0.0090]
Observations	77,420	88,487	87,780	87,850	87,916
R-squared	0.648	0.779	0.403	0.392	0.566
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and return on assets ($ROA_{i,t}$) on the interaction of a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010 and a measure of the degree to which firms are affected by the reform: in Panel A, variable $risk_i$ sorts firms into quintiles according to their default risk based on the interest coverage ratio, in Panel B dummy variable $affected_i$ takes the value of one for large firms that are affected by the reform and zero for small firms from the extended sample that are unaffected by the reform, and in Panel C variable $CEOstay_i$ measures the change in the frequency of the CEO of a firm in firm i's jurisdiction staying in control of the firm in bankruptcy proceedings. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Borrowing and Investment - Personal Costs of Bankruptcy

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: OC					
$B_i * reform_t$	0.0007***	0.0029***	0.0020***	0.0009***	0.0007**
	[0.0002]	[0.0009]	[0.0006]	[0.0004]	[0.0003]
Observations	80,232	88,183	87,936	88,510	88,500
R-squared	0.599	0.761	0.367	0.194	0.525
Panel B: IO					
$B_i * reform_t$	0.0010***	0.0046***	0.0022***	0.0014***	0.0006**
	[0.0002]	[0.0011]	[0.0007]	[0.0004]	[0.0003]
Observations	80,232	88,183	87,936	88,510	88,500
R-squared	0.599	0.761	0.367	0.193	0.540
Panel C: DR					
$B_i * reform_t$	0.0006**	0.0035**	0.0045***	0.0013**	0.0006*
	[0.0003]	[0.0015]	[0.0008]	[0.0005]	[0.0003]
Observations	60,037	65,912	65,735	66,137	66,131
R-squared	0.604	0.767	0.380	0.209	0.550
Panel D: Mean(OC,IO,DR)					
$B_i * reform_t$	0.0019***	0.0085***	0.0068***	0.0024***	0.0011***
	[0.0003]	[0.0015]	[0.0009]	[0.0004]	[0.0004]
Observations	85,378	93,827	93,548	94,184	94,169
R-squared	0.595	0.763	0.367	0.192	0.539
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equation (5) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and return on assets ($ROA_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile of personal costs of bankruptcy and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of shares owned by the firm's CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and in Panel D the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Heterogeneous Reform Effects - Firm Risk

Dep. var.	I	II	III	IV	V	VI	VII	VIII	IX	X
	$IR_{i,t}$		$DebtA_{i,t}$		$InvA_{i,t}$		$\Delta\ Profits_{i,t}$		$RnDA_{i,t}$	
Sample	High B	Low B	High B	Low B	High B	Low B	High B	Low B	High B	Low B
Panel A: OC										
$risk_i * reform_t$	0.0032***	0.0023***	0.0104***	-0.0093***	0.0107***	-0.0035**	0.0036**	-0.0089***	0.0052***	0.0007
	[0.0007]	[0.0008]	[0.0030]	[0.0027]	[0.0019]	[0.0017]	[0.0019]	[0.0016]	[0.0012]	[0.0012]
p-value	0.312		0.000		0.000		0.000		0.001	
Observations	30,694	34,187	33,684	36,367	33,564	36,286	33,680	36,361	3,981	5,445
R-squared	0.655	0.604	0.787	0.765	0.421	0.420	0.378	0.370	0.820	0.837
Panel B: IO										
$risk_i * reform_t$	0.0031***	0.0027***	0.0071**	-0.0071***	0.0047**	-0.0052***	0.0050***	-0.0077***	0.0067***	0.0003
	[0.0007]	[0.0007]	[0.0036]	[0.0026]	[0.0020]	[0.0015]	[0.0017]	[0.0015]	[0.0016]	[0.0009]
p-value	0.690		0.003		0.000		0.000		0.000	
Observations	27,848	34,598	30,169	37,303	30,051	37,229	30,164	37,299	2,639	6,551
R-squared	0.671	0.608	0.792	0.762	0.432	0.422	0.400	0.362	0.835	0.836
Panel C: DR										
$risk_i * reform_t$	0.0030***	0.0014*	0.0120***	-0.0077**	0.0069***	-0.0033*	0.0035*	-0.0090***	0.0061***	0.0021**
	[0.0008]	[0.0007]	[0.0040]	[0.0033]	[0.0024]	[0.0019]	[0.0021]	[0.0017]	[0.0021]	[0.0008]
p-value	0.094		0.000		0.001		0.000		0.066	
Observations	21,805	25,920	23,417	27,704	23,340	27,644	23,413	27,701	3,729	3,652
R-squared	0.634	0.648	0.761	0.801	0.472	0.408	0.422	0.377	0.812	0.879
Panel D: Mean(OC,IO,DR)										
$risk_i * reform_t$	0.0034***	0.0023***	0.0162***	-0.0090***	0.0118***	-0.0059***	0.0061***	-0.0087***	0.0082***	-0.0006
	[0.0007]	[0.0008]	[0.0036]	[0.0028]	[0.0020]	[0.0016]	[0.0021]	[0.0016]	[0.0015]	[0.0011]
p-value	0.266		0.000		0.000		0.000		0.000	
Observations	27,015	32,387	29,469	34,598	29,328	34,523	29,463	34,594	3,554	5,474
R-squared	0.661	0.630	0.783	0.774	0.444	0.427	0.409	0.365	0.838	0.873
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and R&D spending-to-assets ratio ($RnDA_{i,t}$) on the interaction of a variable ($risk_i$) that takes the value of 1 for firms in the lowest quintile of default risk to 5 for firms in the highest quintile of default risk and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In columns entitled High B the sample is limited to firms in the highest two quintiles of personal costs of bankruptcy, in columns entitled Low B the sample is limited to firms in the lowest two quintiles of personal costs of bankruptcy. The table reports p-values on the difference in the estimate for the high-B and low-B firm samples. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of shares owned by the firm's CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and in Panel D the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6: Heterogeneous Reform Effects - Firm Size

Dep. var.	I	II	III	IV	V	VI	VII	VIII	IX	X
	$IR_{i,t}$		$DebtA_{i,t}$		$InvA_{i,t}$		$\Delta\ Profits_{i,t}$		$RnDA_{i,t}$	
Sample	High B	Low B	High B	Low B	High B	Low B	High B	Low B	High B	Low B
Panel A: OC										
$affected_i * reform_t$	0.0245***	0.0227***	0.0252***	-0.0133*	0.0326***	-0.0204**	0.0138***	-0.0079	0.0290**	0.0009
	[0.0079]	[0.0086]	[0.0086]	[0.0069]	[0.0100]	[0.0100]	[0.0019]	[0.0049]	[0.0130]	[0.0124]
p-value	0.351		0.000		0.000		0.000		0.089	
Observations	49,400	43,588	53,557	50,437	53,494	50,378	54,812	51,619	6,480	8,909
R-squared	0.743	0.753	0.786	0.722	0.742	0.760	0.377	0.358	0.816	0.853
Panel B: IO										
$affected_i * reform_t$	0.0174**	0.0132*	0.0271**	-0.0112*	0.0268***	-0.0197**	0.0185***	-0.0095*	0.0230**	0.0047
	[0.0069]	[0.0078]	[0.0117]	[0.0066]	[0.0020]	[0.0015]	[0.0036]	[0.0049]	[0.0113]	[0.0134]
p-value	0.690		0.003		0.000		0.000		0.068	
Observations	40,915	52,073	44,871	55,342	44,818	55,276	45,922	56,638	4,598	10,232
R-squared	0.744	0.756	0.763	0.730	0.715	0.707	0.367	0.362	0.833	0.845
Panel C: DR										
$affected_i * reform_t$	0.0168**	0.0152*	0.0246**	-0.0189*	0.0255***	-0.0207**	0.0246***	-0.0135***	0.0594**	0.0232
	[0.0070]	[0.0081]	[0.0119]	[0.0100]	[0.0108]	[0.0102]	[0.0070]	[0.0045]	[0.0246]	[0.0202]
p-value	0.568		0.003		0.003		0.000		0.063	
Observations	31,380	37,086	38,458	45,146	37,812	44,582	38,862	45,557	5,526	5,511
R-squared	0.722	0.725	0.761	0.801	0.674	0.735	0.362	0.339	0.841	0.849
Panel D: Mean(OC,IO,DR)										
$affected_i * reform_t$	0.0211***	0.0138*	0.0245**	-0.0186*	0.0202***	-0.0224*	0.0214***	-0.0085**	0.0311**	0.0098
	[0.0069]	[0.0077]	[0.0114]	[0.0102]	[0.0075]	[0.0120]	[0.0057]	[0.0043]	[0.0148]	[0.0196]
p-value	0.170		0.004		0.004		0.000		0.295	
Observations	37,539	44,908	43,016	50,294	42,942	50,220	44,011	51,434	5,387	8,465
R-squared	0.711	0.758	0.768	0.753	0.668	0.722	0.308	0.307	0.835	0.847
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and R&D spending-to-assets ratio ($RnDA_{i,t}$) on the interaction of a variable ($affected_i$) that takes the value of 1 for large firms with assets above 7 billion KRW and zero for small firms from the extended sample with assets below 7 billion KRW and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010 for the extended sample including small firms. In columns entitled High B the sample is limited to firms in the highest two quintiles of personal costs of bankruptcy, in columns entitled Low B the sample is limited to firms in the lowest two quintiles of personal costs of bankruptcy. The table reports p-values on the difference in the estimate for the high-B and low-B firm samples. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of shares owned by the firm's CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and in Panel D the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Heterogeneous Reform Effects - Management Stay Intensity

Dep. var.	I	II	III	IV	V	VI	VII	VIII	IX	X
	$IR_{i,t}$		$DebtA_{i,t}$		$InvA_{i,t}$		$\Delta\ Profits_{i,t}$		$RnDA_{i,t}$	
Sample	High B	Low B	High B	Low B	High B	Low B	High B	Low B	High B	Low B
Panel A: OC										
$CEOstay_i * reform_t$	0.0256***	0.0173*	0.0904**	-0.1204**	0.1088***	-0.1438**	0.0358***	-0.0485***	0.0718**	0.0162
	[0.0075]	[0.0098]	[0.0432]	[0.0618]	[0.0416]	[0.0726]	[0.0168]	[0.0188]	[0.0350]	[0.0310]
p-value	0.383		0.004		0.003		0.002		0.226	
Observations	25,878	22,733	28,056	25,422	28,023	25,390	28,731	26,041	3,895	4,166
R-squared	0.712	0.747	0.785	0.773	0.413	0.446	0.381	0.426	0.919	0.908
Panel B: IO										
$CEOstay_i * reform_t$	0.0200*	0.0161*	0.0874**	-0.1001	0.1101***	-0.0524**	0.0409**	-0.0195	0.0350**	-0.0015
	[0.0105]	[0.0083]	[0.0438]	[0.0639]	[0.0382]	[0.0230]	[0.0174]	[0.0128]	[0.0163]	[0.0170]
p-value	0.443		0.002		0.000		0.004		0.018	
Observations	21,434	27,287	23,506	28,991	23,565	28,956	25,056	29,170	2,908	4,860
R-squared	0.705	0.728	0.784	0.771	0.426	0.455	0.394	0.444	0.898	0.905
Panel C: DR										
$CEOstay_i * reform_t$	0.0209**	0.0199**	0.1281**	-0.0883*	0.0774***	-0.0574**	0.0403***	-0.0206	0.0758*	0.0027
	[0.0095]	[0.0082]	[0.0541]	[0.0520]	[0.0291]	[0.0295]	[0.0150]	[0.0137]	[0.0430]	[0.0178]
p-value	0.906		0.001		0.001		0.000		0.105	
Observations	16,483	19,482	20,146	23,650	19,908	23,254	20,558	23,665	2,995	2,787
R-squared	0.739	0.744	0.797	0.752	0.459	0.482	0.402	0.478	0.941	0.930
Panel D: Mean(OC,IO,DR)										
$CEOstay_i * reform_t$	0.0539**	0.0122**	0.1002***	-0.0882*	0.0969***	-0.1387*	0.0410**	-0.0460***	0.0632**	0.0012
	[0.0232]	[0.0058]	[0.0348]	[0.0520]	[0.0314]	[0.0734]	[0.0167]	[0.0177]	[0.0148]	[0.0188]
p-value	0.048		0.000		0.004		0.000		0.051	
Observations	19,665	23,535	22,734	26,146	22,595	26,208	23,055	26,944	3,322	3,934
R-squared	0.710	0.699	0.764	0.755	0.467	0.418	0.379	0.492	0.915	0.917
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and R&D spending-to-assets ratio ($RnDA_{i,t}$) on the interaction of a variable ($CEOstay_i$) that measures the change in the frequency of a firm's CEO being allowed to stay in control during bankruptcy proceedings based on the jurisdiction in which firm i is located and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In columns entitled High B the sample is limited to firms in the highest two quintiles of personal costs of bankruptcy, in columns entitled Low B the sample is limited to firms in the lowest two quintiles of personal costs of bankruptcy. The table reports p-values on the difference in the estimate for the high-B and low-B firm samples. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of shares owned by the firm's CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and in Panel D the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Risk-Taking

Dep. var.	I $RnDA_{i,t}$	II $RnDI_{i,t}$	III $PaA_{i,t}$	IV $VolaCF_{i,t}$
Panel A: OC				
$B_i * reform_t$	0.0014***	0.0010***	0.0022***	0.0237***
	[0.0003]	[0.0003]	[0.0006]	[0.0095]
Observations	13,086	12,703	88,520	22,664
R-squared	0.865	0.536	0.507	0.651
Panel B: IO				
$B_i * reform_t$	0.0018***	0.0007**	0.0018**	0.0182***
	[0.0004]	[0.0003]	[0.0007]	[0.0065]
Observations	13,086	12,703	88,520	22,662
R-squared	0.865	0.534	0.507	0.651
Panel C: DR				
$B_i * reform_t$	0.0015***	0.0006*	0.0022***	0.0452***
	[0.0004]	[0.0004]	[0.0008]	[0.0085]
Observations	9,849	9,564	66,143	16,517
R-squared	0.875	0.545	0.508	0.660
Panel D: Mean(OC,IO,DR)				
$B_i * reform_t$	0.0030***	0.0011***	0.0047***	0.0551***
	[0.0005]	[0.0004]	[0.0009]	[0.0118]
Observations	13,751	13,323	94,195	24,476
R-squared	0.867	0.534	0.507	0.652
Firm FE	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes
Controls	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind

This table shows the results of estimating equation (5) regressing firms' R&D spending-to-assets ratio ($RnDA_{i,t}$), R&D spending-to-total investment ratio ($RnDI_{i,t}$), patent-to-assets ratio ($PaA_{i,t}$), and cash flow volatility ($VolaCF_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile of personal costs of bankruptcy and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of shares owned by the firm's CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and in Panel D the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, and ** denote statistical significance at the 1%, and 5% levels, respectively.

Appendix A. Unified Bankruptcy Act

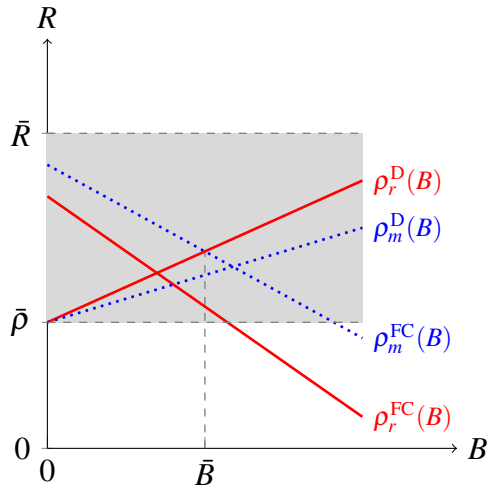
This section lists the additional changes in corporate reorganization law due to the UBA.

- While the UBA does not contain an automatic stay mechanism, the court may grant a comprehensive stay order, restricting claim enforcement of secured and unsecured creditors. Under the CRA, the debtor had to apply to the court for stay orders for each creditor separately.
- Under the CRA, all creditors were required to file their claims before a deadline set by the court for the claims to be considered. The new act automatically assumes that all claims have been filed if they appear on a list of creditors submitted by the receiver.
- Under the UBA, each creditor is guaranteed to receive at least the amount they would receive under liquidation unless the creditor agrees to a lower amount. The old law did not grant such a guarantee to creditors.
- Under the UBA, the establishment of a creditors' committee is mandatory. The creditors' committee coordinates the interest of the creditors and may demand specific information from the debtor and request an investigation of the propriety of management control during rehabilitation.
- Under the UBA, international bankruptcy proceedings may be recognized in Korea for the settlement of international cases, whereas under the old law only bankruptcy proceedings filed in Korea were recognized.

Appendix B. Proofs

Appendix B.1. Proof of Proposition 1

The following figure plots the thresholds $\rho_s^{\mathrm{FC}}(B)$ from (2) and $\rho_s^{\mathrm{D}}(B)$ from (3) for the receivership system ($s = r$) and for the management stay system ($s = m$). The area shaded in gray are projects with nonnegative NPV.



For $B < \bar{B}$, we have $\max\left\{\rho_r^{\mathrm{FC}}(B), \rho_r^{\mathrm{D}}(B)\right\} < \max\left\{\rho_m^{\mathrm{FC}}(B), \rho_m^{\mathrm{D}}(B)\right\}$, such that the probability of investment is higher under receivership compared with management stay. For $B > \bar{B}$, we have $\max\left\{\rho_r^{\mathrm{FC}}(B), \rho_r^{\mathrm{D}}(B)\right\} > \max\left\{\rho_m^{\mathrm{FC}}(B), \rho_m^{\mathrm{D}}(B)\right\}$, such that the probability of investment is lower under receivership compared with management stay. ■

Appendix B.2. Proof of Proposition 2

The derivative of $\rho_s^{\mathrm{D}}(B)$ with respect to p is given by $-\frac{1}{p^2}(I + c + (1-\mu_s)B) < 0$. The difference in the probability of investment between management stay and receivership is equal to

$$\mathbb{P}\left(\rho_m^{\mathrm{D}}(B) \leq R \leq \rho_r^{\mathrm{D}}(B)\right) = \int_{\rho_m^{\mathrm{D}}(B)}^{\rho_r^{\mathrm{D}}(B)} \frac{1}{\bar{R}}\,\mathrm{d}R = \frac{1}{\bar{R}}\left(\rho_r^{\mathrm{D}}(B) - \rho_m^{\mathrm{D}}(B)\right).$$

The first-order condition with respect to p is given by

$$-\frac{1}{\bar{R}}\frac{1}{p^2}(I + c + (1-\mu_r)B) + \frac{1}{\bar{R}}\frac{1}{p^2}(I + c + (1-\mu_m)B) = \frac{1}{\bar{R}}\frac{1}{p^2}B(\mu_r - \mu_m),$$

which is negative since $\mu_m > \mu_r$. ■

Internet Appendix to "When Should Bankruptcy Law Be Creditor- or Debtor-Friendly? Theory and Evidence"

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Table IA.1: Borrowing and Investment - Small Firms

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: OC					
$B_i * reform_t$	0.0001	-0.0009	-0.0013	-0.0006	-0.0004
	[0.0010]	[0.0009]	[0.0011]	[0.0004]	[0.0003]
Observations	34,636	44,174	44,264	46,947	47,095
R-squared	0.737	0.744	0.753	0.242	0.625
Panel B: IO					
$B_i * reform_t$	0.0004	0.0007	0.0020**	0.0005	-0.0000
	[0.0008]	[0.0007]	[0.0008]	[0.0004]	[0.0003]
Observations	34,636	44,174	44,264	46,947	47,095
R-squared	0.737	0.744	0.744	0.240	0.632
Panel C: DR					
$B_i * reform_t$	0.0002	0.0008	0.0016	0.0005	-0.0006*
	[0.0012]	[0.0008]	[0.0013]	[0.0005]	[0.0004]
Observations	28,784	42,774	41,377	43,607	41,726
R-squared	0.739	0.728	0.750	0.265	0.635
Panel D: Mean(OC,IO,DR)					
$B_i * reform_t$	0.0002	0.0010	0.0007	0.0003	-0.0008
	[0.0015]	[0.0014]	[0.0010]	[0.0007]	[0.0005]
Observations	34,707	44,271	44,331	47,075	47,182
R-squared	0.737	0.745	0.745	0.262	0.627
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equation (5) for firms with assets below 7 billion KRW, regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\ Profits_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile of personal costs of bankruptcy and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and in Panel D the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. **, and * denote statistical significance at the 5%, and 10% levels, respectively.

Table IA.2: Borrowing and Investment - Financial Constraints Proxies

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$
Panel A: Debt to assets (LEV)				
$FC_i * reform_t$	0.0047***	-0.0087***	-0.0027***	0.0005
	[0.0003]	[0.0013]	[0.0010]	[0.0006]
Observations	94,458	103,716	102,982	103,315
R-squared	0.584	0.754	0.368	0.250
Panel B: Cash to assets (CA)				
$FC_i * reform_t$	0.0018***	-0.0022**	-0.0019***	-0.0013***
	[0.0002]	[0.0010]	[0.0007]	[0.0004]
Observations	91,203	99,777	99,534	99,636
R-squared	0.574	0.750	0.358	0.238
Panel C: Free cash flow to assets (FCFA)				
$FC_i * reform_t$	0.0017***	-0.0017	-0.0066***	-0.0023**
	[0.0002]	[0.0014]	[0.0009]	[0.0006]
Observations	85,955	94,136	94,031	94,274
R-squared	0.576	0.734	0.362	0.224
Panel D: Mean(LEV, CA, FCFA)				
$FC_i * reform_t$	0.0053***	-0.0106***	-0.0061***	-0.0032***
	[0.0037]	[0.0020]	[0.0012]	[0.0008]
Observations	94,270	103,305	102,985	103,103
R-squared	0.585	0.742	0.368	0.252
Firm FE	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes
Controls	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind

This table shows the results of estimating equation (5) replacing personal costs of bankruptcy quintiles (B_i) with firm financial constraints quintiles (FC_i) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\ Profits_{i,t}$) on the interaction of a variable (FC_i) that takes the value of 1 for firms in the lowest quintile of financial constraints to 5 for firms in the highest quintile of financial constraints and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In Panel A, financial constraints are computed using leverage, in Panel B using cash to assets, in Panel C using free cash flow to assets, and in Panel D using the average of all three measures. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, and ** denote statistical significance at the 1%, and 5% levels, respectively.

Table IA.3: Management Stay in Bankruptcy

English Law		French Law		German Law	
Australia	1	Argentina	1	Austria	1
Canada	1	Belgium	1	Germany	1
Hong Kong	0	Brazil	1	Japan	0
India	0	Chile	1	South Korea	1
Ireland	1	Colombia	1	Switzerland	1
Israel	0	Ecuador	0	Taiwan	1
Kenya	0	Egypt	0	Scandinavian Law	
Malaysia	0	France	1	Denmark	1
New Zealand	0	Greece	0	Finland	1
Nigeria	0	Indonesia	0	Norway	1
Pakistan	0	Italy	1	Sweden	1
Singapore	0	Mexico	1		
South Africa	0	Netherlands	1		
Sri Lanka	0	Peru	1		
Thailand	0	Philippines	1		
U.K.	0	Portugal	1		
U.S.	1	Spain	1		
Zimbabwe	0	Turkey	1		
		Uruguay	1		
		Venezuela	0		

This table reports information on management stay in different countries. A country with a management stay system is denoted by 1. Data are from La Porta et al. (1998) and updated for the introduction of management stay in Korea through the UBA. Other countries did not experience a change in management stay until 2005 (Djankov, McLiesh, and Shleifer 2007).

Table IA.4: Borrowing and Investment - Excluding Financial Crisis Period

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: OC					
$B_i * reform_t$	0.0006***	0.0035***	0.0026***	0.0010***	0.0006**
	[0.0002]	[0.0009]	[0.0006]	[0.0004]	[0.0003]
Observations	63,657	69,889	69,683	70,122	70,114
R-squared	0.616	0.772	0.403	0.234	0.548
Panel B: IO					
$B_i * reform_t$	0.0008***	0.0047***	0.0026***	0.0010**	0.0006**
	[0.0002]	[0.0010]	[0.0007]	[0.0005]	[0.0003]
Observations	63,657	69,889	69,683	70,122	69,988
R-squared	0.616	0.772	0.403	0.233	0.564
Panel C: DR					
$B_i * reform_t$	0.0005*	0.0036**	0.0048***	0.0009	0.0005
	[0.0003]	[0.0014]	[0.0009]	[0.0007]	[0.0003]
Observations	47,558	52,185	52,037	52,347	52,091
R-squared	0.623	0.777	0.414	0.248	0.575
Panel D: Mean(OC,IO,DR)					
$B_i * reform_t$	0.0017***	0.0091***	0.0074***	0.0020***	0.0008**
	[0.0003]	[0.0014]	[0.0009]	[0.0006]	[0.0004]
Observations	67,622	74,252	74,021	74,510	74,355
R-squared	0.612	0.773	0.405	0.234	0.564
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equating (5) excluding the financial crisis period (2008–2009), regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and return on assets ($ROA_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2007 and 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.5: Heterogeneous Reform Effect - Excluding Financial Crisis Period

Dep. var.	I	II	III	IV	V	VI	VII	VIII
	$IR_{i,t}$		$DebtA_{i,t}$		$InvA_{i,t}$		$\Delta\ Profits_{i,t}$	
Sample	High B	Low B	High B	Low B	High B	Low B	High B	Low B
Panel A: OC								
$risk_i * reform_t$	0.0024***	0.0015**	0.0097***	-0.0087***	0.0061***	-0.0064***	0.0041**	-0.0078***
	[0.0006]	[0.0007]	[0.0028]	[0.0027]	[0.0019]	[0.0018]	[0.0020]	[0.0019]
p-value	0.306		0.000		0.000		0.000	
Observations	24,337	27,181	26,664	28,919	26,567	28,848	26,660	28,913
R-squared	0.667	0.623	0.797	0.775	0.437	0.439	0.407	0.399
Panel B: IO								
$risk_i * reform_t$	0.0027***	0.0019***	0.0075**	-0.0069***	0.0049**	-0.0067***	0.0033*	-0.0087***
	[0.0007]	[0.0007]	[0.0037]	[0.0025]	[0.0025]	[0.0021]	[0.0017]	[0.0018]
p-value	0.425		0.012		0.000		0.000	
Observations	21,995	27,459	23,837	29,578	23,734	29,516	23,832	29,574
R-squared	0.685	0.627	0.802	0.773	0.456	0.456	0.435	0.392
Panel C: DR								
$risk_i * reform_t$	0.0018**	0.0015**	0.00126***	-0.0085***	0.0045*	-0.0076***	0.0031	-0.0071***
	[0.0009]	[0.0007]	[0.0042]	[0.0031]	[0.0025]	[0.0019]	[0.0023]	[0.0021]
p-value	0.391		0.000		0.000		0.003	
Observations	16,718	20,738	18,391	22,160	18,325	22,107	18,387	22,157
R-squared	0.653	0.664	0.768	0.813	0.509	0.439	0.460	0.409
Panel D: Mean(OC,IO,DR)								
$risk_i * reform_t$	0.0028***	0.0013*	0.0145***	-0.0087***	0.0080***	-0.0091***	0.0061**	-0.0069***
	[0.0007]	[0.0007]	[0.0036]	[0.0026]	[0.0019]	[0.0017]	[0.0025]	[0.0019]
p-value	0.147		0.000		0.000		0.000	
Observations	21,212	25,790	23,128	27,552	23,013	27,487	23,122	27,548
R-squared	0.676	0.622	0.793	0.786	0.481	0.464	0.446	0.396
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4) excluding the financial crisis period (2008–2009), regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\ Profits_{i,t}$) on the interaction of a variable ($risk_i$) that takes the value of 1 for firms in the lowest quintile of default risk to 5 for firms in the highest quintile of default risk and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2007 and 2010. In columns entitled High B the sample is limited to firms in the highest two quintiles of personal costs of bankruptcy, in columns entitled Low B the sample is limited to firms in the lowest two quintiles of personal costs of bankruptcy. The table reports p-values on the difference in the estimate for the high-B and low-B firms' samples. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.6: Borrowing and Investment - Other Firm Characteristics

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$
Panel A: Firm Size				
$Size_i * reform_t$	0.0005*	-0.0012	0.0014	-0.0002
	[0.0003]	[0.0015]	[0.0009]	[0.0006]
Observations	91,360	100,148	99,484	100,145
R-squared	0.580	0.749	0.306	0.187
Panel B: Asset Tangibility				
$Tang_i * reform_t$	0.0003	0.0014	0.0013	0.0005
	[0.0002]	[0.0011]	[0.0008]	[0.0003]
Observations	90,811	99,492	99,074	99,488
R-squared	0.587	0.754	0.315	0.187
Firm FE	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes
Controls	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind

This table shows the results of estimating equation (5) replacing personal costs of bankruptcy quintiles (B_i) with firm size quintiles ($Size_i$) and asset tangibility quintiles ($Tang_i$), regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\ Profits_{i,t}$) on the interaction of a variable ($Size_i$) in Panel A that takes the value of 1 for firms in the lowest size quintile to 5 for firms in the highest size quintile, a variable ($Tang_i$) in Panel B that takes the value of 1 for firms in the lowest tangibility quintile to 5 for firms in the highest tangibility quintile and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. * denotes statistical significance at the 10% level.

Table IA.7: Borrowing and Investment - Early Sorting

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: OC					
$B_i * reform_t$	0.0007***	0.0031***	0.0021***	0.0009***	0.0006*
	[0.0002]	[0.0010]	[0.0006]	[0.0004]	[0.0003]
Observations	76,938	84,061	83,807	84,193	84,031
R-squared	0.589	0.757	0.360	0.204	0.537
Panel B: IO					
$B_i * reform_t$	0.0009***	0.0048***	0.0023***	0.0013***	0.0005*
	[0.0002]	[0.0011]	[0.0007]	[0.0004]	[0.0003]
Observations	76,938	84,061	83,807	84,193	84,031
R-squared	0.589	0.757	0.360	0.204	0.553
Panel C: DR					
$B_i * reform_t$	0.0005*	0.0038**	0.0042***	0.0013***	0.0005
	[0.0003]	[0.0014]	[0.0008]	[0.0005]	[0.0004]
Observations	57,988	63,255	63,077	63,363	63,149
R-squared	0.599	0.767	0.375	0.223	0.567
Panel D: Mean(OC,IO,DR)					
$B_i * reform_t$	0.0017***	0.0084***	0.0061***	0.0025***	0.0011***
	[0.0003]	[0.0016]	[0.0009]	[0.0005]	[0.0004]
Observations	81,546	89,038	88,750	89,184	88,998
R-squared	0.586	0.760	0.361	0.204	0.554
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equating (5), regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and return on assets ($ROA_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.8: Heterogeneous Reform Effect - Early Sorting

Dep. var.	I	II	III	IV	V	VI	VII	VIII
	$IR_{i,t}$		$DebtA_{i,t}$		$InvA_{i,t}$		$\Delta\ Profits_{i,t}$	
Sample	High B	Low B	High B	Low B	High B	Low B	High B	Low B
Panel A: OC								
$risk_i * reform_t$	0.0031***	0.0031***	0.0079**	-0.0106***	0.0092***	-0.0032*	0.0060***	-0.0074***
	[0.0006]	[0.0008]	[0.0032]	[0.0029]	[0.0018]	[0.0017]	[0.0019]	[0.0016]
p-value	0.978		0.000		0.000		0.000	
Observations	30,104	30,785	32,902	32,728	32,767	32,655	32,894	32,722
R-squared	0.646	0.606	0.785	0.769	0.399	0.425	0.364	0.392
Panel B: IO								
$risk_i * reform_t$	0.0032***	0.0031***	0.0075**	-0.0093***	0.0074***	-0.0043***	0.0065***	-0.0070***
	[0.0007]	[0.0008]	[0.0034]	[0.0026]	[0.0021]	[0.0015]	[0.0015]	[0.0017]
p-value	0.939		0.012		0.000		0.000	
Observations	28,948	31,111	31,125	33,572	30,997	33,499	31,116	33,568
R-squared	0.638	0.617	0.781	0.770	0.410	0.430	0.379	0.382
Panel C: DR								
$risk_i * reform_t$	0.0033***	0.0007	0.00124***	-0.0067**	0.0082***	-0.0024	0.0031*	-0.0064***
	[0.0009]	[0.0006]	[0.0041]	[0.0032]	[0.0023]	[0.0021]	[0.0019]	[0.0017]
p-value	0.023		0.000		0.000		0.000	
Observations	20,095	23,839	21,503	25,533	21,428	25,479	21,498	25,528
R-squared	0.631	0.670	0.760	0.811	0.470	0.420	0.433	0.403
Panel D: Mean(OC,IO,DR)								
$risk_i * reform_t$	0.0030***	0.0027***	0.0160***	-0.0093***	0.0113***	-0.0043***	0.0088***	-0.0073***
	[0.0007]	[0.0009]	[0.0033]	[0.0030]	[0.0021]	[0.0016]	[0.0017]	[0.0017]
p-value	0.790		0.000		0.000		0.000	
Observations	27,838	28,655	30,093	30,638	29,944	30,575	30,084	30,634
R-squared	0.633	0.620	0.771	0.786	0.422	0.441	0.391	0.396
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4), regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\ Profits_{i,t}$) on the interaction of a variable ($risk_i$) that takes the value of 1 for firms in the lowest quintile of default risk to 5 for firms in the highest quintile of default risk and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2010. In columns entitled High B the sample is limited to firms in the highest two quintiles of personal costs of bankruptcy, in columns entitled Low B the sample is limited to firms in the lowest two quintiles of personal costs of bankruptcy. The table reports p-values on the difference in the estimate for the high-B and low-B firms' samples. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.9: Borrowing and Investment - Excluding Business Groups

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: OC					
$B_i * reform_t$	0.0012***	0.0043***	0.0028***	0.0009**	0.0006**
	[0.0002]	[0.0011]	[0.0007]	[0.0004]	[0.0003]
Observations	66,509	72,184	71,974	72,456	72,448
R-squared	0.603	0.758	0.376	0.204	0.527
Panel B: IO					
$B_i * reform_t$	0.0010***	0.0042***	0.0014*	0.0012***	0.0006*
	[0.0002]	[0.0012]	[0.0008]	[0.0005]	[0.0003]
Observations	66,509	72,184	71,974	72,456	72,319
R-squared	0.603	0.758	0.376	0.203	0.540
Panel C: DR					
$B_i * reform_t$	0.0003	0.0035**	0.0040***	0.0011*	0.0009**
	[0.0003]	[0.0017]	[0.0010]	[0.0007]	[0.0004]
Observations	44,452	48,112	47,993	48,269	48,039
R-squared	0.609	0.759	0.391	0.224	0.555
Panel D: Mean(OC,IO,DR)					
$B_i * reform_t$	0.0020***	0.0090***	0.0058***	0.0022***	0.0009**
	[0.0004]	[0.0016]	[0.0010]	[0.0005]	[0.0005]
Observations	66,509	72,184	71,974	72,456	72,319
R-squared	0.600	0.758	0.376	0.203	0.540
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equation (5) excluding firms that are part of business groups, regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and return on assets ($ROA_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.10: Heterogeneous Reform Effect - Excluding Business Groups

Dep. var.	I	II	III	IV	V	VI	VII	VIII
	$IR_{i,t}$		$DebtA_{i,t}$		$InvA_{i,t}$		$\Delta\ Profits_{i,t}$	
Sample	High B	Low B	High B	Low B	High B	Low B	High B	Low B
Panel A: OC								
$risk_i * reform_t$	0.0038***	0.0019***	0.0142***	-0.0067**	0.0115***	-0.0038*	0.0051**	-0.0077***
	[0.0008]	[0.0007]	[0.0034]	[0.0031]	[0.0024]	[0.0020]	[0.0021]	[0.0020]
p-value	0.075		0.000		0.000		0.000	
Observations	25,208	27,495	27,163	29,106	27,064	29,033	27,160	29,100
R-squared	0.663	0.615	0.790	0.766	0.433	0.440	0.400	0.396
Panel B: IO								
$risk_i * reform_t$	0.0031***	0.0022***	0.0069*	-0.0023	0.0079**	-0.0067***	0.0056***	-0.0054***
	[0.0007]	[0.0008]	[0.0039]	[0.0035]	[0.0021]	[0.0023]	[0.0016]	[0.0022]
p-value	0.357		0.106		0.000		0.000	
Observations	27,241	23,649	29,467	25,039	29,352	24,988	29,463	25,036
R-squared	0.673	0.612	0.791	0.764	0.434	0.450	0.403	0.404
Panel C: DR								
$risk_i * reform_t$	0.0024**	0.0025***	0.0119**	-0.0092**	0.0065**	-0.0042*	0.0044*	-0.0082***
	[0.0009]	[0.0009]	[0.0055]	[0.0042]	[0.0029]	[0.0030]	[0.0027]	[0.0019]
p-value	0.880		0.005		0.012		0.001	
Observations	16,718	18,778	17,761	19,840	17,709	19,802	17,758	19,838
R-squared	0.647	0.658	0.761	0.794	0.489	0.438	0.443	0.422
Panel D: Mean(OC,IO,DR)								
$risk_i * reform_t$	0.0034***	0.0022**	0.0143***	-0.0080***	0.0113***	-0.0084***	0.0058***	-0.0081***
	[0.0008]	[0.0009]	[0.0039]	[0.0033]	[0.0023]	[0.0023]	[0.0022]	[0.0022]
p-value	0.277		0.000		0.000		0.000	
Observations	23,344	22,444	25,285	23,796	25,170	23,743	25,281	23,793
R-squared	0.671	0.620	0.789	0.774	0.452	0.459	0.418	0.406
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of estimating equation (4) excluding firms that are part of business groups, regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\ Profits_{i,t}$) on the interaction on the interaction of a variable ($risk_i$) that takes the value of 1 for firms in the lowest quintile of default risk to 5 for firms in the highest quintile of default risk and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005, and 1 for the post-reform period from 2006 to 2010. In columns entitled High B the sample is limited to firms in the highest two quintiles of personal costs of bankruptcy, in columns entitled Low B the sample is limited to firms in the lowest two quintiles of personal costs of bankruptcy. The table reports p-values on the difference in the estimate for the high-B and low-B firms' samples. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table IA.11: Borrowing and Investment - Owner Coordination

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\, Profits_{i,t}$
Panel A: OC (Individual-Owned)				
$B_i * reform_t$	0.0011***	0.0048***	0.0037***	0.0023**
	[0.0002]	[0.0011]	[0.0007]	[0.0010]
Observations	66,694	71,044	70,876	71,251
R-squared	0.595	0.751	0.374	0.348
Panel B: OC (Institutional Investor-Owned)				
$B_i * reform_t$	-0.0002	0.0000	-0.0001	0.0001
	[0.0006]	[0.0024]	[0.00013]	[0.0004]
Observations	13,538	17,139	17,060	17,259
R-squared	0.715	0.801	0.480	0.205
Firm FE	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes
Controls	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind

This table shows the results of estimating equation (5) regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), and growth rate of profits ($\Delta\, Profits_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of ownership concentration to 5 for firms in the highest quintile and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In Panel A, the sample comprises all firms in which individual investors hold the largest fraction of the firm, in Panel B, the sample comprises all firms in which institutional investors hold the largest fraction of the firm. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Details on control variables can be found in the text. *** and ** denote statistical significance at the 1% and 5% levels, respectively.

Table IA.12: Borrowing and Investment - Fixed Controls

Dep. var.	I $IR_{i,t}$	II $DebtA_{i,t}$	III $InvA_{i,t}$	IV $\Delta\ Profits_{i,t}$	V $ROA_{i,t}$
Panel A: OC					
$B_i * reform_t$	0.0005***	0.0025**	0.0029***	0.0017***	0.0007**
	[0.0002]	[0.0012]	[0.0005]	[0.0003]	[0.0003]
Observations	80,251	88,757	86,248	86,913	86,863
R-squared	0.540	0.711	0.279	0.156	0.485
Panel B: IO					
$B_i * reform_t$	0.0009***	0.0061***	0.0018***	0.0014***	0.0006**
	[0.0003]	[0.0012]	[0.0006]	[0.0004]	[0.0003]
Observations	80,251	88,757	86,248	86,913	86,863
R-squared	0.540	0.710	0.279	0.156	0.523
Panel C: DR					
$B_i * reform_t$	0.0015***	0.0059**	0.0027***	0.0013***	0.0006*
	[0.0003]	[0.0016]	[0.0007]	[0.0005]	[0.0004]
Observations	60,175	66,479	64,613	64,222	64,043
R-squared	0.555	0.723	0.322	0.204	0.550
Panel D: Mean(OC,IO,DR)					
$B_i * reform_t$	0.0021***	0.0072***	0.0027***	0.0014***	0.0014***
	[0.0003]	[0.0017]	[0.0007]	[0.0004]	[0.0004]
Observations	85,221	94,285	91,425	92,157	92,141
R-squared	0.536	0.712	0.279	0.178	0.536
Firm FE	yes	yes	yes	yes	yes
Ind-Year FE	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind

This table shows the results of estimating equation (5) with fixed controls regressing firms' interest rates ($IR_{i,t}$), debt-to-assets ratio ($DebtA_{i,t}$), investment-to-assets ratio ($InvA_{i,t}$), growth rate of profits ($\Delta\ Profits_{i,t}$), and return on assets ($ROA_{i,t}$) on the interaction of a variable (B_i) that takes the value of 1 for firms in the lowest quintile of personal costs of bankruptcy to 5 for firms in the highest quintile of personal costs of bankruptcy and a dummy variable ($reform_t$) that takes the value of 0 for the pre-reform period from 2001 to 2005 and 1 for the post-reform period from 2006 to 2010. In Panel A, personal costs of bankruptcy quintiles are computed using ownership concentration (the Herfindahl index of a firm's ownership), in Panel B using managers' inside ownership (the fraction of the firm owned by the CEO and her family), in Panel C using CEOs' distance to retirement (the retirement age of 65 minus the CEO's age), and the average of all three measures in Panel D. Standard errors are reported in brackets. The bottom section provides information on fixed effects and the clustering of standard errors. Control variables are computed as of 2005 and not updated annually. Further details on control variables can be found in the text. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

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