Bankruptcy Law, Private Benefits, and Risk-Taking*

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Abstract

Exploiting a bankruptcy reform in Korea, I examine how shareholders' and managers' personal bankruptcy costs affect firms' financing and investment decisions. Under the pre-reform auction system incumbent management is forced to resign and the firm is sold to new investors. Under the post-reform management stay system, existing shareholders and incumbent management stay in control of the firm during bankruptcy proceedings. I find that firms curb risk-taking under the auction system, when bankruptcy states are costlier for managers and shareholders. Specifically, firms take on lower leverage, forego risky investment projects, and undertake less innovation under the auction regime. The effects are stronger for firms where private benefits of control are large and firms in which managers' wealth is more concentrated in the firm.

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1 Introduction

Pioneered by La Porta, Lopez-de Silanes, Shleifer, and Vishny (1997, 1998), several empirical studies document a positive role of stronger creditor rights in contributing to larger financial markets and economic growth.[1] The underlying theoretical argument is compelling. If creditors expect higher recovery rates in default states, they are willing to provide more credit at a cheaper price ex ante. Advocates of strong creditor rights often argue that strengthening creditor rights leads to a Pareto improvement by expanding the available contracting space. An implicit assumption in this argument is that strengthening creditor rights does not turn previously existing contracts infeasible. However, due to its mandatory nature, bankruptcy law may overwrite private contracting solutions available under a regime of weaker creditor rights. In this case, the optimality of a stronger creditor rights regime depends on whether the set of available contracts dominates the set of contracts available under a weaker creditor rights regime.

Strengthening creditor rights can mitigate problems associated with incomplete contracting such as risk-shifting or strategic default[2]. Additionally, making bankruptcy states costlier for managers can elicit managerial effort and prevent the manager from investing in inefficient, self-serving projects (Grossman and Hart 1982; Innes 1990; Zwiebel 1996). However, ex ante incentive effects of stronger creditor rights are not unambiguously positive. If bankruptcy states are sufficiently costly for shareholders and managers, firms may try to prevent default states to the extent that they forego positive NPV projects that involve risk (Donaldson 1969; Amihud and Lev 1981; Eberhart and Senbet 1993). Moreover, risk-shifting in distressed firm can be excacerbated when bankruptcy states are costlier for shareholders and managers (White 1989, Gertner and Scharfstein 1991). Thus, whether stronger creditor rights improve contracting solutions is ultimately an empirical question.

Given the rich theoretical literature, empirical evidence on ex ante incentive effects of different aspects of bankruptcy law is surprisingly scant. Most existing studies examine how aggregate measures of creditor protection affect the size of credit markets with mixed results. While La Porta et al. (1997, 1998), Levine (1998, 1999), Djankov, McLiesh, and Shleifer (2007), Qian and Strahan (2007), Djankov et al. (2008), and Haselmann, Pistor,

[1] Levine (1998, 1999), Djankov, McLiesh, and Shleifer (2007), Qian and Strahan (2007), Djankov, Hart, McLiesh, and Shleifer (2008), and Haselmann, Pistor, and Vig (2010).

[2] Jensen and Meckling (1976), Townsend (1979), Diamond (1984), Gale and Hellwig (1985), Bolton and Scharfstein (1990), Hart and Moore (1998), Bebchuk (2001).

and Vig (2010) find that stronger creditor rights lead to larger credit markets and boost economic growth, a small number of studies presents evidence that stronger creditor rights can be associated with lower firm-level leverage (Acharya and Subramanian 2009; Acharya, Amihud, and Litov 2011). For a reform in India that facilitates creditors' access to collateral, Vig (2013) documents a decline in the demand for secured credit. The mixed empirical evidence suggests that aggregate measures of creditor rights are too crude a measure to capture the subtle effects of different aspects of creditor rights.

In this paper, I assess how shareholders' and managers' personal bankruptcy costs affect firms' financing and investment decisions. Consistent with the ambiguous theoretical predictions, views on the merits and demerits of bankruptcy regimes that impose high personal bankruptcy costs on shareholders and managers vary widely. While Skeel (1993) emphasizes the disciplining effects of high personal bankruptcy costs by denying the "soft landing" of a debtor controlled reorganization to prevent shareholders and managers from "gambling excessively with the firm's assets", Rasmussen (1994) expresses concerns about excessive conservatism induced by high personal bankruptcy costs leading to "a significant underinvestment problem even where the firm is solvent".

The Unified Bankruptcy Act of 2005 (UBA) in Korea provides exogenous variation in the costliness of bankruptcy states for shareholders and managers allowing me to examine the effects of shareholders' and managers' personal bankruptcy costs on real firm performance. Under the pre-reform "auction" system, incumbent management is forced to resign upon bankruptcy filing and a court-appointed trustee sells the firm to new investors.[3] In contrast, under the post-reform "management stay" system, incumbent management and existing shareholders stay in control of the firm during the reorganization process, similar to Chapter 11 in the U.S.[4] The main insight that emerges from the analysis is that firms curb risk-taking under the auction system when bankruptcy states are costly for shareholders and managers. Specifically, firms take on lower leverage, forego profitable investment projects that involve risk, and reduce both innovation input (R&D investment) and output (patents).

[3]Following job loss in bankruptcy, it is unlikely for managers to find new employment in senior management (Gilson 1989). The psychology literature identifies job loss as one of the most detrimental events to happiness (Di Tella, MacCulloch, and Oswald 2001; Helliwell 2003; Layard 2005).

[4]Section 2 provides a detailed description of changes to the bankruptcy law under the UBA. The introduction of management stay in corporate reorganization was considered the most significant change to bankruptcy proceedings (Ko 2007; Park 2008). In the sample of reorganization cases in this paper, under the pre-reform regime, management was replaced in 95.34%, and ownership transferred in 90.91% of the cases, compared with only 11.86% and 19.09% after the reform.

The main identification strategy to evaluate the reform's effects is to compare changes in financing and investment for risky firms who are more sensitive to changes in bankruptcy proceedings changes in safe firms that are less sensitive to changes in bankruptcy proceedings. After the reform, firms in the highest risk quintile increase their debt to assets ratio by about seven percentage points more than firms in the lowest risk quintile. Additionally, their investment to assets ratio increases by three and a half percentage points more than for safe firms and increase innovation input (R&D expenses) and output (patents) relative to safe firms. Together, these findings are consistent with an increase in risk-taking associated with more investment under the management stay system. Interestingly, I find that interest rates increase for risky firms after the reform, in particular for risky firms in which creditor claims are not well protected (firms with a low share of tangible assets). This further suggests that the increase in leverage under the management stay system is driven by an increase in the demand for credit rather than an increase in the supply of credit.

To strengthen the interpretation of the results and to sharpen the identification of the underlying channel, I exploit cross-sectional differences in the reform's effects. Loss of ownership under the pre-reform auction system is particularly costly for shareholders in firms where private benefits of control are large.[5] Thus, if the increase in leverage and investment under the management stay system is driven by a reduction in the likelihood of ownership transfer, the effects should be stronger for firms in which private benefits of control are large, such as family firms and other firms with concentrated ownership. Indeed, I find that the increase in leverage and investment after the reform is significantly higher for family firms and firms with more concentrated ownership. This suggests that private benefits of control play an important role in determining firms' willingness to take risk under a regime that imposes high bankruptcy costs on shareholders and managers.

Since their wealth is more concentrated in the firm, managers tend to be more risk-averse than shareholders (Jin 2002). Thus, they have a preference for financing and investment strategies that reduce the risk of default (Leland and Pyle 1977; Amihud and Lev 1981; May 1995; Tufano 1996; Graham, Harvey, and Puri 2013). Wealth concentration tends to be more severe for managers that hold a larger fraction of the firm's stocks (Jensen and Meckling 1976; Friend and Lang 1988). In case of forced resignation in bankruptcy, those managers simultaneously experience a large shock to their labor income and their financial

[5]Nenova (2003) and Dyck and Zingales (2004) document that private benefits of control are high in Korea (16–48% of firms' market capitalization).

wealth.[6] Accordingly, I find that firms with higher CEO shareholdings increase leverage and investment more after the reform. This further strengthens the interpretation on the results that allowing managers to stay in control of the firm increases their willingness to take more risk.

Firms' willingness to take risks in the pursuit of profitable investment opportunities is a fundamental driver of long-run economic growth (DeLong and Summers 1991; Acemoglu and Zilibotti 1997; Baumol, Litan, and Schramm 2007; John, Litov, and Yeung 2008). Lowering shareholders' and managers' bankruptcy costs to increase their willingness to take risk under the management stay system could reduce underinvestment in positive NPV projects and thereby contribute to economic growth (Rasmussen 1994). Alternatively, low bankruptcy costs under the management stay system may induce managers to engage in inefficient overinvestment and increase risk-shifting incentives (Jensen 1986; Harris and Raviv 1990; Skeel 1993; Zwiebel 1996).[7]

To differentiate between these alternatives, I investigate whether the additional investment is undertaken by firms with good or bad investment opportunities. I find that risky firms with good investment opportunities increase investment significantly more after the reform, suggesting that the additional investment goes to profitable investment projects. This interpretation is further strengthened by a relatively higher increase in profits for risky firms after the reform. Strikingly, the increase in profits is driven exactly by those firms that increase investment most after the reform. Additionally, I find that risky firms' cash flow volatility increases after the reform, further suggesting that the increase in investment is driven by firms' willingness to invest in riskier projects when bankruptcy costs are lower for shareholders and managers. Together, these results suggest that the threat of job loss and ownership transfer under the auction system led firms to forego profitable investment project that increased the risk of entering bankruptcy states consistent with Donaldson (1969), Amihud and Lev (1981), Eberhart and Senbet (1993), and Rasmussen (1994).

Given the foregone investment in positive NPV projects, one natural question is why firms and investors cannot contract around the inefficiencies and share the profits of efficiency gains

[6]Theoretically, it is not unambiguously clear that managers that own a larger fraction of their firm's shares would reduce risk at the expense of expected profits as higher ownership increases the costs managers bear from inefficient investment that may reduce firm value. Empirically, Friend and Lang (1988) and Gormley and Matsa (2015) find that the risk-aversion effect dominates and firms with higher inside ownership reduce risk.

[7]Nini, Smith, and Sufi (2009) find that firm value increases after firms sign a new debt contract with a restriction on investment, suggesting that creditor control may reduce value-destroying overinvestment.

before the reform. One alternative is financing with new equity. However, while issuing equity itself does not increase default risk, investment in risky projects still increases the risk of entering financial distress. This could make shareholders and managers unwilling to finance very risky projects even with equity. Moreover, even if additional investment has positive NPV under debt financing, equity investment might be prohibitively costly in the presence of information asymmetries (Myers and Majluf 1984).

Alternatively, in the presence of profitable investment projects, distressed firms might be able to issue new debt to prevent default. Information asymmetries, in combination with covenants that prevent issuing new debt with higher seniority are likely to make financing from new creditors costly, which in some cases may exceed the benefits of additional investment. Debt restructuring under incumbent management during the pre-reform regime is further impeded by existing creditors' option to acquire the firms' shares in reorganization proceedings. Thus, existing creditors may actually prefer for the firm to default when the firm is profitable in the long-run as holding a residual claim on the firm yields higher returns than their fixed claim (Rasmussen 1994).[8] The option for creditors to resort to official bankruptcy proceedings that provide creditors with a high level of control over the bankruptcy process also undermines creditors' incentives to compromise with shareholders and managers in out-of-court restructurings.[9]

The results in the paper contribute to the literature on the optimal design of bankruptcy law. Empirical evidence on the effects of ownership transfer in bankruptcy as promoted by Baird (1986), Bebchuk (1988) and Aghion, Hart, and Moore (1992) is scarce. Strömberg (2000), Thorburn (2000), and Eckbo and Thorburn (2003) provide descriptive evidence from Sweden which uses an auction system, including forced CEO resignation, for bankrupt firms. They find that the auction system does not lead to excessive liquidation, honors the priority of claims, and is quicker and less costly than U.S. Chapter 11 cases. Additionally, they argue that distressed firms do not engage in excessive risk-shifting before filing for bankruptcy.[10]

[8] A competitive bidding process could reduce this type of rents. However, it is unlikely for a fully competitive auction to occur for bankrupt firms due to the limited number of bidders (Shleifer and Vishny 1992) and existing creditors' informational advantage. Meier and Servaes (2015) find that buyers acquire bankrupt firms at a discount due to limited bidder competition.

[9] Consistent with the lower incentive for creditors to compromise in out-of-court workouts before the reform, out-of-court restructuring consistently fails before the reform resulting in liquidation (52.29% of pre-reform workouts, compared with 23.74% of post-reform workouts). Even when workouts succeed existing shareholders and managers lose control in the majority of cases (see Section 2.3 for details).

[10] Eckbo and Thorburn (2003) argue that CEOs abstain from risk-shifting to increase the probability of being rehired by the firm. However, most cases in which management stays in control of the firm are cases where the firm is resold to incumbent management in the auction process in their paper.

However, comparing evidence from different bankruptcy regimes across countries is tricky as they are embedded in very different institutional environments. The switch from an auction system to a management stay system through the UBA, provides a unique opportunity to compare the effects of an auction system and a management stay system in an otherwise fairly persistent institutional environment. The results in the paper highlight that ownership transfer and forced management resignation in an auction system can lead firms to abandon investment in positive NPV projects that involve risk.

Moreover, the results in this paper provide evidence of an important channel that can explain the negative relationship between the level of creditor rights and firm leverage documented in previous studies (Acharya and Subramanian 2009; Acharya, Amihud, and Litov 2011; Vig 2013). While these papers document a negative effect of stronger creditor rights on the demand for credit, the empirical evidence presented in these papers is silent about the precise channel through which stronger creditor rights affect firms' demand for credit. The results in this paper show that private benefits of control play an important role in reducing firms' demand for credit under strong creditor rights.

The paper also relates to the literature on the impact of managerial risk-aversion on firms' financing and investment decisions. The results in this paper show that higher personal bankruptcy costs lead managers to curb risk-taking (Amihud and Lev 1981; Friend and Lang 1988). By documenting increased investment in risky, positive NPV projects following a reduction in managers' personal bankruptcy costs, the findings in the paper suggest that it can be beneficial to increase risk-taking by making default states less costly for managers. Whether lowering personal bankruptcy costs improves managers' risk-taking incentives depends on whether managers otherwise take on too much or too little risk. In situations where managers are prone to excessive risk-taking and overinvestment mandatory management replacement in bankruptcy might mitigate risk-taking and overinvestment problems. In contrast, in situations where managers take on too little risk and underinvest, a bankruptcy law that imposes high personal bankruptcy costs on managers aggravates the problems.

An important question is how generalizable the results are to other countries and different institutional environments. It seems very plausible that the results apply to countries with high levels of family ownership where private benefits are large. Family ownership is the typical ownership structure in emerging economies, but also widespread in developped countries (La Porta, Lopez-de Silanes, and Shleifer 1999; Claessens, Djankov, and Lang 2000; Faccio and Lang 2002). Contrary to common perception, family ownership is prevalent in

most developped countries as well, even in the U.S. (Anderson and Reeb 2003; Villalonga and Amit 2006; Holderness 2009). Thus, private benefits of control are an important consideration for shareholders and managers in a large fraction of firms around the world. This suggests that the documented results are relevant beyond the specific context in this paper.

The remainder of the paper is organized as follows. Section 2 describes the institutional setting, Section 3 provides a theoretical framework for the empirical analysis, Section 4 describes the data, Section 5 outlines the empirical strategy, Sections 6 presents the results, Section 7 discusses alternative explanations and provides results from robustness tests, and Section 8 concludes.

2 Institutional Background

This section provides a brief summary of the legislative history of the Unified Bankruptcy Act (UBA), describes the important changes in corporate bankruptcy proceedings, and documents evidence on the real effects of the law on bankruptcy filings and outcomes in in-court reorganizations and out-of-court workouts.

2.1 Legislative History

On March 31, 2005, President Rho Moo-Hyun proclaimed the UBA, replacing as of April 1, 2006, four separate laws that governed corporate liquidation, different corporate reorganization proceedings, and personal bankruptcy. The reform process leading to the UBA was triggered by the Asian Financial Crisis in 1997. In exchange for financial aid, the IMF and World Bank demanded among others a modernization of bankruptcy laws in accordance with international best practice, essentially with U.S. bankruptcy law.[11] While other reforms were implemented during or soon after the crisis, the bankruptcy reform process spanned eight years. After the IMF's intervention, existing bankruptcy laws experienced amendments to increase transparency and efficiency in 1998. Initially, the Korean Ministry of Finance and Economics tried to encourage private workouts instead of in-court restructuring. However, private proceedings were subject to free-rider problems as private agreements could not be made legally binding on non-participating creditors. Thus, the need for reliance on in-court

[11] It is common for the IMF to demand bankruptcy reform. Also other countries hit by the Asian financial crisis underwent bankruptcy reform in the aftermath of the crisis (Indonesia in 1998, Thailand in 1998/1999).

restructuring became apparent. Consequently, the Korean Government and the IMF agreed on the necessity for a new comprehensive bankruptcy law.

In 1999, the Ministry of Justice gathered a group of consultants with funding from the World Bank, led by a Korean (Shin and Kim) and an American (Orrick, Herrington & Sutcliffe) law firm. In December 2000, the group submitted a first draft outlining several different policy options to the Ministry of Justice. A drafting team of the Ministry of Justice circulated different drafts to judges, the Korean bar association, and the bankers' association in the course of the period from 2001 to 2003 for comments and feedback, and in 2003 submitted the final draft to the IMF for review. Due to critical comments from the Judiciary Committee the draft was substantially revised and introduced to the National Assembly in late 2004. Finally, the National Assembly enacted the UBA in March 2005. The resulting law ultimately bore close resemblance to US bankruptcy law as introduced in the Bankruptcy Reform Act of 1978, as initially demanded by the IMF and the World Bank.

2.2 Changes in Bankruptcy Law

Before the UBA, two separate bankruptcy proceedings regulated corporate restructuring. Under the Composition Act, intended for usage by small firms with simple debt structures, a restriction that was strictly applied from 1998 (Park 2005), incumbent management stayed in control of the firm and developed a plan for restructuring.[12] Since composition filings apply to smaller firms they are of minor relevance for the firms in my sample. Under the Corporate Reorganization Act, bankruptcy filing triggered the replacement of incumbent management by a court-appointed trustee.[13] Additionally, the court had the power to cancel part of the company's stock and sell the firm to new investors, the proceeds of which can be used to pay creditors (Nam and Oh 2000). Removing incumbent management and engaging in a sales process was standard court practice (Ko 2007).

The UBA merged the two separate reorganization laws governed by the Corporate Reorganization Act (CRA) and the Composition Act into a single rehabilitation proceeding.[14]

[12]If courts considered a firm as too large or to have a too complicated debt structure, they changed the filing into a reorganization or liquidation filing (Park 2005). Park (2008) notes that many companies that went into composition eventually ended up in liquidation proceedings. Consequently, composition filings occurred only rarely after 1998.

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

[14]Rehabilitation filings can be made by management of the debtor company, creditors and shareholders

The new rehabilitation procedure conserved most of the features of the CRA. Thus, the merger effectively meant the abolition of the composition procedure (Ko 2007, Halliday and Carruthers 2009). However, while the new rehabilitation procedure conserved most of the features of the CRA, the main change concerned the treatment of owners and managers during the reorganization process. Whereas under the CRA incumbent management was replaced by a court-appointed trustee, the new rehabilitation procedure introduced a management stay system that allowed debtor-management to stay in control and did not require a sale of the firm to new investors.[15]

The introduction of the UBA had significant effects on managers and shareholders of bankrupt firms. In 88.14% of the rehabilitation cases in the sample, the CEO remains in control of the firm under the post-reform regime, compared to only 4.76% of the cases under the pre-reform regime (see Table 1). Even in cases in which rehabilitation proceedings result in liquidation of the company, the CEO stays in the firm for 32.59 months on average, compared with 9.09 months under the pre-reform regime. Under the pre-reform reorganization system, existing shareholders lost ownership in 90.91% of the cases in the sample that did not result in liquidation (Table 1), whereas during rehabilitation filings under the new system ownership was transferred to new investors only in 19.09% of the cases. The reduction in the adverse consequences for shareholders and the CEO increased the willingness of firms to file for in-court reorganization (Ko 2007; Park 2008; Halliday and Carruthers 2009). Reorganization filings increased from 57 in 2005 to 117 in 2006 and 215 in 2007 (Table 2, Panel A). In contrast, liquidation filings did not experience an increase. Thus, the increase in reorganization filings was driven by changes in incentives and not related to changing economic conditions.

2.3 Alternative Restructuring Mechanisms

Before a firm defaults, debtors and creditors can renegotiate the firm's obligations outside of court. This may allow them to undo inefficiencies of in-court bankruptcy proceedings if they can reach a private agreement. Since both contracting parties have the option to default to

holding more than ten percent of the debtor's stock.

[15]Following a rehabilitation filing the court appoints as a receiver the incumbent management except for cases in which: financial distress can be attributed to fraudulent activity on account of management, the company's creditors provide reasonable ground for appointing a third-party receiver, or the court considers the appointment of a third-party receiver as essential for the rehabilitation procedure. In practice, incumbent management remains in control in virtually all rehabilitation cases (Ko 2007).

in-court reorganization procedures, the expected outcome from in-court proceedings (minus potential costs) is a benchmark for both contracting parties to reach an agreement out-of-court. Due to their private nature, it is generally difficult to obtain data on outcomes of out-of-court renegotiations. In Korea firms with assets over 50 billion Korean won (the threshold was reduced to 5 billion Korean won in June 2004) can be required to engage in officially supervised workout negotiations by their creditors. This provides a sample of workouts for which data on workout outcomes is available.

The evidence suggests that creditors were rarely willing to compromise with managers and shareholders under the pre-reform regime due to the high control they enjoyed in in-court proceedings. Creditors required departure of incumbent management and controlling shareholders in the majority of cases[16] and private workouts were less likely to succeed before the reform (Table 2, Panel B). In 2004, the fraction of workouts that resulted in bankruptcy or liquidation is 60.00%, in 2005 it is 44.58%. After the reform, creditors' willingness to restructure firms out-of-court increased substantially and the failure rate dropped to 22.23% in 2006, and 25.35% in 2007. During the financial crises period the failure rate in private workouts increases sightly, but remains clearly below the pre-reform values.

It is possible that workouts in smaller firms led to different outcomes then for large firms required to file for official workout proceedings. However, anecdotal evidence on workout proceedings for the period from June 2004 when smaller firms were required to register their workout proceedings as well (firms with assets above 5 billion Korean won), suggests that smaller firms were hesitant to engage in workouts as management and shareholders resented the loss of control in workout proceedings (Money Today, August 8, 2004, 'Bank-SME Workouts in Slump'). Altogether, the evidence from private workouts suggests that workouts did not remedy the high costs of bankruptcy states for managers and shareholders before the UBA.

3 Theorectical Framework

This section presents a stylized model of debt financing motivated by the institutional environment in Korea to provide a theorectical framework to guide the empirical analysis.

[16]For 84% of cases in official workouts in mid-2001 the CEO was forced to resign (Financial Supervisory Service of Korea 2001).

3.1 Investment Opportunity

There are four periods ($t = 0, 1, 2, 3$). Cashflows are not verifiable and there is no discounting. Consider a cashless firm with assets in place. In period $t = 0$, the firm can invest in a positive NPV investment project that yields either C_1^H with probability θ, or C_1^L with probability $1 - \theta$ in period $t = 1$. The project requires an investment of I in period $t = 0$ that needs to be financed by outside investors. In period $t = 2$ the firm's assets in place generate a cashflow of either C_2^H with a probability of γ, or C_2^L with a probability of $1 - \gamma$. Without loss of generality, let $C_1^H = C_2^H = C^H$ and $C_1^L = C_2^L = C^L$. In period $t = 3$, the firm's assets in place generate a cashflow of C_3, which can be viewed as the long-run (expected) value of the firm.[17] Figure 1 depicts the cashflows generated by the firm. The firm is run by an entrepreneur who also owns the firm. If the entrepreneur stays in control of the firm into period $t = 3$, she enjoys a private benefit B. The private benefit is not transferable to new investors.

3.2 Financing Choices

I assume that the only way to finance the project is by risky short-term debt, that is $C_L < I < C^H$. Since cashflows are not verifiable, a contract that stipulates state-dependent repayments does not fulfill the revelation principle as the firm would always have an incentive to report the state that requires lower repayments. Thus, the optimal contract requires a state-independent coupon payment of R.

3.3 Bankruptcy Proceedings

If the firm does not repay the coupon in period $t = 1$, bankruptcy proceedings are invoked. Under the pre-reform system, creditors have the option to liquidate the firm at liquidation value L. If they choose not to liquidate the firm, the firm is sold to new investors, who will pay P, the expected value of all future cashflows. I assume that liquidation is inefficient ($L < C_3$).[18] Under the post-reform regime, the entrepreneur stays in control of the firm

[17] There is an ϵ probability that $C_3 = 0$, where ϵ is infinitesimally small. This implies that C_3 cannot be pledged. For notational convenience, I take the expected cashflows in period $t = 3$ to be C_3.

[18] For simplicity, I assume that creditors receive the full sales price P. This can be justified by assuming either that the expected value of future cashflows does not exceed R, or that auction bids do not exceed expected future cashflows in which case creditors can take over the firm themselves.

for one period after bankruptcy filing. Creditors can only liquidate the firm after cashflows in the next period $t = 2$ are realized and cannot sell the firm to new owners. Under the post-reform regime, the firm can use the cashflows from period $t = 2$ to repay its creditors to emerge from bankruptcy proceedings to prevent liquidation. The firm and the creditors can renegotiate the coupon payment during the management stay period. The outcome of the renegotiation depends on the relative bargaining power of the firm and the creditors. The entrepreneur's payoff from keeping control of the firm beyond period $t = 2$ is $C_3 + B$, which is the maximum she is willing to pay to the creditors. The creditors' outside option is the liquidation value L. Thus, the renegotiated repayment S is between $C_3 + B$ and L and depends on the relative bargaining power of the entrepreneur and the creditors.[19] To restrict the problem to the interesting case where preventing default in the second period is optimal for the entrepreneur if the good state occurs and the increase in the expected private benefit is higher than the efficiency loss from liquidation, I assume that $2C^L < S \leq C^L + C^H$ and $\gamma B > (1 - \gamma)(C_3 - L)$.

3.4 Solution

For the pre-reform system, the entrepreneur faces the following maximization problem, where his maximization is over the decision to invest or not ($\mathbb{1}_{inv} \in \{0, 1\}$):

$$\begin{aligned}\max_{\mathbb{1}_{inv}} \quad & \mathbb{1}_{inv} \left[\theta \left[C^H + \gamma C^H + (1-\gamma)C^L + C_3 + B - R\right]\right] \\ & +(1 - \mathbb{1}_{inv}) \left[\gamma C^H + (1-\gamma)C^L + C_3 + B\right]\end{aligned}$$

If the firm invests and the high state occurs, the firm can repay its creditors and continue operations under control of the incumbent entrepreneur. Thus, the entrepreneur retains all cashflows minus the payment to the investor and enjoys her private benefit. In the low state the payoff to the entrepreneur is zero as the firm cannot repay its debt and the firm will be sold to new investors. If the firms does not invest, the entrepreneur enjoys her private benefit from operating the firm and obtains the cashflows generated by the assets in place.

For financing to be viable, the creditors' participation constraint must be satisfied. That

[19] Note that R cannot be greater than S. If R were higher than S, the firm would prefer to default and renegotiate the coupon payment to S. Thus, a condition for the creditor to break even and financing to occur is that creditors have sufficient bargaining power such that $S \geq R$. Otherwise the contract is not renegotiation-proof.

is, the creditors need to break-even to be willing to provide credit. I assume that capital markets are competitive such that the participation constraint is satisfied with equality:

$$\theta\left[R\right]+(1-\theta)\left[C^{L}+\gamma C^{H}+(1-\gamma)C^{L}+C_{3}\right]=I \qquad (IR^{B}_{pre})$$

which leads to a required repayment of $R_{pre}=\frac{I-(1-\theta)(\gamma C^{H}+(2-\gamma)C^{L}+C_{3})}{\theta}$ for the creditors to break-even.

To ensure that the firm repays its creditors in the high state, the payoff after repayment must be at least as high as the payoff in case of not repaying the creditors:

$$C^{H}+\gamma C^{H}+(1-\gamma)C^{L}+C_{3}+B-R\geq C^{H}-C^{L} \qquad (IC^{F}_{pre})$$

which implies a minimum value for the private benefit of $\underline{B}_{pre}=R-2C^{L}-\gamma(C^{H}-C^{L})-C_{3}=\frac{I-2C^{L}-\gamma(C^{H}-C^{L})-C_{3}}{\theta}$ to ensure repayment.

In order for the entrepreneur to invest in the first period, the expected payoff after investment needs to be at least as high as the expected payoff in case of no investment. Thus, the firm's participation constraint is:

$$\theta\left[C^{H}+\gamma C^{H}+(1-\gamma)C^{L}+C_{3}+B-R\right]\geq\gamma C^{H}+(1-\gamma)C^{L}+C_{3}+B \qquad (IR^{F}_{pre})$$

which, after plugging in R from IC^{F}_{pre}, implies a maximum value for the private benefit of $\overline{B}_{pre}=\frac{\theta C^{H}+(1-\theta)C^{L}-I}{1-\theta}$. If the private benefit increases above this threshold, the entrepreneur would not be willing to invest in the project as the expected cost from losing her private benefit would be too high.

For the post-reform system, the entrepreneur maximizes:

$$\begin{aligned}\max_{\mathbb{1}_{inv}}\mathbb{1}_{inv}[\theta&\left[C^{H}+\gamma C^{H}+(1-\gamma)C^{L}+C_{3}+B-R\right]\\&+(1-\theta)\gamma\left[C^{H}+C_{3}+B-(R-C^{L})\right]]\\&+(1-\mathbb{1}_{inv})\left[\gamma C^{H}+(1-\gamma)C^{L}+C_{3}+B\right]\end{aligned}$$

Compared with the pre-reform period, the firm now has the option to avoid bankruptcy in the low state if during the reorganization period $t=2$ the high cashflow C^{H} is realized.

The creditors' participation constraint becomes:

$$\theta[R] + (1-\theta)\left[\gamma R + (1-\gamma)(2C^L + L)\right] = I \qquad (IR^B_{post})$$

which leads to a required repayment of $R_{post} = \frac{I-(1-\theta)(1-\gamma)(2C^L+L)}{\theta+(1-\theta)\gamma}$ for creditors to break-even.

Proposition 1. *The cost of credit is higher under the post-reform regime: $R_{post} > R_{pre}$.*

Proof. In equilibirum, payment to creditors (R) is constraint by the high state cashflows (C_H), thus $R_{post} = \frac{I-(1-\theta)\left[C^L+\gamma R+(1-\gamma)(C^L+L)-\gamma C^L\right]}{\theta} \geq \frac{I-(1-\theta)\left[C^L+\gamma C^H+(1-\gamma)(C^L+L)\right]}{\theta}$.
From the assumption that liquidation is inefficient, i.e., $L < C_3$, it follows that
$\frac{I-(1-\theta)\left[C^L+\gamma C^H+(1-\gamma)(C^L+L)\right]}{\theta} > \frac{I-(1-\theta)\left[C^L+\gamma C^H+(1-\gamma)(C^L+C_3)\right]}{\theta} = R_{pre}$. □

Under the post-reform regime, the entrepreneur's incentive constraint to repay creditors becomes:

$$2C^H + C_3 + B - R \geq 2C^H - 2C^L \qquad (IC^F_{post})$$

which implies a minimum value for the private benefit of $\underline{B}_{post} = R_{post} - 2C^L - C_3$ to ensure repayment. Note that if (IC_F) is satisfied, the incentive constraint for the firm is also satisfied for the case when the sum of cashflows in periods $t = 1$ and $t = 2$ is $C^H + C^L$.

Proposition 2. *The minimum required level of private benefits required to incentivize the entrepreneur to repay creditors and make investment feasible is higher under the post-reform regime: $\underline{B}_{post} > \underline{B}_{pre}$.*

Proof. Since equilibirum payments to creditors are lower under the pre-reform regime ($R_{post} > R_{pre}$) and cash flows in the high state are higher and cash flows in the low state, $C_H > C_L$, $\underline{B}_{post} = R_{post} - 2C^L - C_3 > R_{pre} - 2C^L - C_3 > R_{pre} - 2C^L - C_3 - \gamma(C^H - C^L) = \underline{B}_{pre}$. □

The participation constraint for the entrepreneur under the post-reform system becomes:

$$\begin{aligned}\theta\left[C^H + \gamma C^H + (1-\gamma)C^L + C_3 + B - R\right] + (1-\theta)\gamma\left[C^L + C^H + C_3 + B - R\right] \\ \geq \gamma C^H + (1-\gamma)C^L + C_3 + B\end{aligned} \qquad (IR^F_{post})$$

which, after plugging in R from IR^B_{post}, implies a maximum value for the private benefit of $\overline{B}_{post} = \frac{\theta C^H+(1-\theta)C^L-I}{1-\theta} \cdot \frac{1}{1-\gamma} + (L - C_3)$.

Proposition 3. *The maximum level of private benefit under which the entrepreneur is willing to finance the project with risky debt is higher under the post-reform regime:* $\overline{B}_{post} > \overline{B}_{pre}$.

Proof. From the assumption that the increase in the expected private benefit from the higher probability of the entrepreneur staying in control in the high state is larger than the efficiency loss from liquidation in the low state ($\gamma B > (1-\gamma)(C_3 - L)$), it follows that $\overline{B}_{post} = \frac{\theta C^H + (1-\theta)C^L - I}{1-\theta} \cdot \frac{1}{1-\gamma} + (L - C_3) = \overline{B}_{pre} \cdot \frac{1}{1-\gamma} - (C_3 - L) > \overline{B}_{pre}$. □

Proposition 4. *The higher the liquidation value* L *the smaller the difference between* $\underline{B}_{post}$ *and* $\underline{B}_{pre}$*, the larger the difference between* $\overline{B}_{post}$ *and* $\overline{B}_{pre}$*, and the lower the difference between* R_{post} *and* R_{pre}.

Proof. The pre-reform values R_{pre}, $\underline{B}_{pre}$, and $\overline{B}_{pre}$ are independent of L. For the post-reform period, $\frac{\partial R_{post}}{\partial L} = -\frac{(1-\theta)(1-\gamma)}{(1-\theta)\gamma+\theta} < 0$, $\frac{\partial \underline{B}_{post}}{\partial L} = -\frac{(1-\theta)(1-\gamma)}{(1-\theta)\gamma+\theta} < 0$, and $\frac{\partial \overline{B}_{post}}{\partial L} = 1 > 0$. □

3.5 Discussion

This subsection discusses the empirical implications of the theoretical framework. The shift from the pre-reform auction system to the post-reform management stay system has two main implications on the entrepreneur's incentives. First, higher expected payoffs in default states, stemming from the reduced likelihood of losing control over the firm and therefore losing her private benefit B, weakens the entrepreneur's incentives to repay creditors. This leads to a higher required minimum level of the private benefit to incentivize the entrepreneur to repay creditors and make investment feasible. Second, the possibility for the entrepreneur to stay in control of the firm through financial distress under the management stay system makes the entrepreneur more willing to undertake risky investment as the risk of losing her private benefit is mitigated. This makes it easier to fulfill the entrepreneur's participation constraint, even when private benefits are large.

Together this implies a shift of the investment region (see Figure 2). For low levels of private benefits, investment is only feasible under the pre-reform auction system. For intermediate levels of private benefits, investment is feasible both under the pre-reform auction and the post-reform management stay system. For high levels of private benefits, investment only occurs under the post-reform management stay system. This implies that firms in which private benefits are large, are more likely to invest under the management stay system. In

contrast, for firms in which private benefits are low, the weaker incentives to repay creditors under the post-reform management stay system leads to less financing being available to undertake investment projects.[20] Whether the level of investment in the economy is higher before or after the reform depends on the distribution of private benefits.

The shift from the pre-reform auction system to the post-reform management stay system has a clear prediction for the cost of credit. Before the reform when creditors experience higher recovery in default, they demand lower compensation in other states. Thus, pre-reform repayments R_{pre} are lower than after the reform R_{post}, which means that credit is cheaper under a more creditor-friendly bankruptcy regime. The effect is mitigated when liquidation values L are higher as this increases payments to creditors in default states under the post-reform regime and therefore lowers repayments in other states.

Since creditors are paid from the proceedings of selling the firm to new investors according to their claims, the liquidation value of the firm does not affect their cash flows in bankruptcy states through a bargaining channel. Thus the pre-reform values R_{pre}, $\underline{B}_{pre}$, and $\overline{B}_{pre}$ are independent of L. In contrast, a higher L increases creditors' repayments in bankruptcy states. Consequently, creditors demand lower repayments in non-bankruptcy states (i.e., $\frac{\partial R_{post}}{\partial L} < 0$), leading to an expansion of the region in which financing and investment are feasible.

4 Data

This section describes the model employed to rank firms according to their probability of default over the next twelve months and provides a brief description of the data used for the empirical analysis in this paper.

4.1 Default Risk Model

The identification strategy in this paper requires to estimate firms' sensitivity to bankruptcy law design. I estimate a default risk model that predicts the likelihood of a given firm to default within the next twelve months. To estimate the model, I obtain data on cor-

[20] For investment projects that involve a higher risk of default (i.e., low θ), the effects of the reform are magnified as default states are more likely to occur.

porate bankruptcy filings from the Korea Information Service (KIS). This data allows me to construct an indicator variable taking the value of one in years in which a firm files for bankruptcy, and zero otherwise. The data on firms' bankruptcy filings is merged with accounting data from financial statements of Korean firms submitted to the Financial Supervisory Commission and processed by KIS.

The explanatory variables for the model are taken from the most commonly used models in Altman (1968), Zmijewski (1984), and Campbell, Hilscher, and Szilagyi (2008). Since the sample consists of public and private firms, the explanatory variables are restricted to non-market-based variables. The variables comprise net income to total assets (NITA), total liabilities to total assets (TLTA), cash to total assets (CASHTA), sales to total assets (SALEA), working capital to total assets (WCA), retained earnings to total assets (RETA), and the log of total firm assets divided by total assets of all firms (RSIZE). All explanatory variables are winsorized at the one percent level to avoid the estimation to be influenced by data errors or outliers. Table 3 provides descriptive statistics of the explanatory variables for the full sample period in Panel A, and the pre-reform and post-reform periods in Panels B and C. Profitability decreases from 3.47 to 2.82 percent after the reform. Average leverage increases slightly from 64.14 to 64.47 percent, average cash to assets decreases slightly from 7.22 percent to 6.85 percent, sales to assets decrease from 1.53 to 1.31, working capital to assets decreases from 9.70 to 7.51 percent, and retained earnings to assets increases from 11.37 to 14.67 percent after the reform.

To establish the correct weights of the explanatory variables in predicting defaults, I estimate a dynamic logit model (see, for example, Shumway 2001, Campbell, Hilscher, and Szilagyi 2008). That is, the predicted probability of default in year t is given by:

$$Prob_{t-1}[D_{i,t}] \;=\; \frac{1}{1+e^{-\alpha-\beta\cdot x_{i,t-1}}}$$

where $D_{i,t}$ is an indicator variable equal to one in a year when a firm files for bankruptcy and zero otherwise, and $x_{i,t-1}$ is the vector of lagged explanatory variables.

The coefficients from the logit regression are displayed in Table 4. Column I depicts the estimates for the full sample period. The 197,590 firm-year observations include 616 bankruptcy filings, which corresponds to a default rate of 0.31%. After the enactment of the UBA, the rate increases from 0.16% (column II) to 0.45% (column III). Profitability, leverage, firm size, sales, and retained earnings are a strong indicators of default both before

and after the reform. The importance of cash holdings increases after the reform, working capital to assets is only significant for the full sample. Larger firms are more likely to file for bankruptcy both before and after the reform. Retained earnings and sales are positive predictors of bankruptcy after the inclusion of net income to assets. This suggests that net income generated from higher sales protects firms from financial distress less than lowering costs.

4.2 Descriptive Statistics

For a firm-year observation to be included in the sample, it is required that the available data allows to compute the dependent variable in the regression, and the lagged default risk measure. Descriptive statistics are gathered in Table 5. Following standard practice, I drop utility and financial firms. The average firm has total assets of 72,923 million won. Firms in the highest default risk quintile are significantly larger on average with 253,378 million won compared to firms in the safest quintile with 16,008 million won. The average debt to asset ratio in the sample is 30.73% with 42.62% for the riskiest firms and 15.08% for the safest firms. Interest rates are higher for risky firms with 8.77% compared to 6.12% for safe firms. The average cash to asset ratio is 8.53%, with 3.58% for the riskiest and 20.92% for the safest firms. Finally, firms investment divided by assets is 6.63% for the average firm. Risky firms' investment to assets ratio only 2.08%, compared with 11.67% for the safest firms. Significantly higher interest rates for riskier firms suggest that the default risk model is successful in sorting firms into safe and risky firms on average.

Data on patents is freely available from the Korea Intellectual Property Rights Information Service at www.kipris.org.kr. It includes all patent applications and lists whether a patent was granted. Panel B provides descriptive statistics. There are 28,477 firm-year observations in which a firm successfully applies for at least one patent. The average number of patent applications for the full sample is 10.33. For the safest quintile of firms the average number of patent applications is 3.48, for the riskiest firms (that are on average larger), the average number is 32.88. The high level of innovation in firms with a higher risk of default highlights the importance of the design of bankruptcy law for innovation.

KIS collects ownership data from firms' annual reports. The data is matched to accounting data by a unique KIS identifier. Panel C provides descriptive statistics on family ownership, ownership concentration, and CEO ownership. Family ownership is defined as

the total ownership of the controlling shareholder, members of her family, ownership of co-founders, and ownership of shareholders with a share of at least 50%. Ownership concentration is defined as the herfindahl index of the individual shareholders' ownership shares. CEO ownership is the fraction of the firm's shares owned by the CEO and her family. For the average firm, family ownership is 49.76%. Consistent with the literature on family firms, family ownership is negatively correlated with firm risk (Anderson, Mansi, and Reeb 2003; John, Litov, and Yeung 2008; Paligrova 2010). In the safest quintile of firms, family ownership averages to 52.28%, in the riskiest quintile average family ownership is 44.23%. The herfindahl index of ownership concentration for the average firm in the sample is 43.04%. Ownership concentration is higher for the safest quintile of firms with 45.03%, than for the riskiest firms with 39.96%. Average CEO ownership in the sample is 32.30%, with a higher CEO ownership fraction in safe firms with 31.71%, and a lower CEO ownership share in risky firms with 24.18%, which is consistent with higher CEO wealth concentration being associated with lower firm risk.

5 Empirical Strategy

This section describes the empirical strategy employed to analyze the effects of changes in managers' and shareholders' personal bankruptcy costs on firms' financing and investment decisions.

The main identification strategy examines changes in financing and investment decisions for firms that are most sensitive to bankruptcy law design (risky firms), and firms that are least sensitive to changes in bankruptcy law (safe firms). This empirical strategy implies the following regression equation:

$$\begin{aligned} DebtA_{it} &= \alpha + \alpha_{ind,t} + \gamma \cdot controls_{it-1} + \beta_1 \cdot DR_{it-1} + \beta_2 \cdot event_t \\ &\quad + \beta_3 \cdot DR_{it-1} * event_t + \epsilon_{it} \end{aligned} \tag{1}$$

where $DebtA_{it}$ is firm i's debt to asset ratio in year t. $controls_{it-1}$ denotes a set of lagged control variables that are commonly found to affect leverage, DR_{it-1} is a rank variable ranging from one for the safest quintile to five for the riskiest quintile of firms based on the default risk model described in Section 3.[21] The dummy variable $event_t$ takes the value of

[21] In robustness tests, I verify that the results are not sensitive to the choice of the default risk measure by replicating the results by sorting firms according to an alternative measure (interest coverage, Table A.3,

zero before (2001–2005), and one after the reform (2006–2010).

To assess the reform's effect on firms' investment decisions and the cost of credit, I follow the same estimation strategy replacing the dependent variable with investment scaled by assets ($InvA_{it}$) and interest payments scaled by total debt (IR_{it}), respectively. The parameter of interest is β_3, which compares real firm performance for the riskiest firms relative to safe firms before and after the election. Industry-year fixed-effects $\alpha_{ind,t}$ control for industry-specific shocks. Thus, equation (1) compares changes in leverage for risky and safe firms in the same industry. As outlined in Section 3, the predictions for β_3 depend on the relative importance of private benefits for managers and owners of the firm. If private benefits are relatively important, firms are reluctant to take on additional debt to finance investment before the reform, leading to an increase in leverage and investment after the reform. If private benefits are relatively less important, firms' incentives to repay creditors in some cases are insufficiently strong to make financing feasible under the post-reform management stay system, leading to lower leverage and investment after the reform. The cost of credit should be unambiguously higher under the post-reform regime when creditors' control in bankruptcy states is reduced.

The main concern when comparing firms in different regimes is that exposure to the regime itself endogenously affects firm behavior. This is a common concern to papers that explore the implications of different bankruptcy regimes.[22] In the specific context of this paper, firms classified as safe and risky firms before the reform may systematically differ from firms classified as safe and risky firms after the reform in terms of unobserved characteristics that are correlated with the outcome measures. The most common way to address this problem is estimate DR_i during the pre-event period and saturating the specification with firm fixed effects to absorb differences in time-invariant unobserved firm characteristics. However, this methodology implicitly assumes that either the sorting variable is very persistent, or the sorting variable is not correlated with the dependent variable. If both assumptions are violated, this type of sorting introduces an estimation bias in β_3.

To illustrate this problem, consider leverage as dependent variable. Default risk is strongly correlated with leverage and the average *surviving* firm sorted into the high default risk quintile before the reform experiences a decrease in default risk after the reform

columns VII-IX).

[22]The same concern also applies to cross-country comparisons (La Porta et al. 1997, 1998; Acharya and Subramanian 2009; Acharya, Amihud, and Litov 2011).

due to a survivorship bias.[23] Together, this implies that β_3 is biased downwards. In the same way, the estimation of β_3 is biased for investment and the cost of credit when sorting firms into default risk quintiles before the reform, with the sign of the bias depending on the correlation between default risk and the respective dependent variable.

To overcome this problem, I implement an alternative estimation strategy to control for unobservable firm characteristics that may affect the estimation of β_3 in equation (1). I sort firms into quintiles according to their default risk measure in 2001 and 2005 separately. I then estimate equation (1) separately for the 2001–2004 period and the 2005–2008 period, $event_t$ is zero in years 2001 and 2005, respectively, and one for the years 2002–2004 and 2006–2008, respectively. This provides two estimates for $\hat{\beta}_3$, one for the 2001–2004 period ($\hat{\beta}_3^{placebo}$), and one for the 2005–2008 period ($\hat{\beta}_3^{reform}$). $\hat{\beta}_3^{reform}$ is subject to the same survivorship bias as described above as default risk of the average surving firm after 2005 decreases which is associated with a drop in leverage and the cost of credit, and an increase in investment. Provided that the survivorship bias is equal both after 2005 and 2001 $\hat{\beta}_3^{placebo}$ is subject to the same bias. Then, the difference $\hat{\beta}_3^{reform} - \hat{\beta}_3^{placebo}$ cancels out the estimation bias, delivering an unbiased estimate $\beta_3^{unbiased}$. Additionally, I sort firms at the end of the sample period in 2010 and estimate equation (1) for the 2010-2013 period to obtain an alternative estimate for $\hat{\beta}_3^{placebo}$. This mitigates concerns that survivorship bias might be different before and after the reform due to differences in bankruptcy proceedings.

The estimate for $\beta_3^{unbiased}$ can be obtained directly by estimating:

$$\begin{aligned} DebtA_{it} &= \alpha + \alpha_t + \alpha_{i,UBA} + \gamma \cdot controls_{it-1} + \beta_1 \cdot DR_i + \beta_2 \cdot event_t \\ &\quad + \beta_3 \cdot DR_i * event_t + \beta_4 \cdot UBA_t + \beta_5 \cdot DR_i * UBA_t + \beta_6 \cdot event_t * UBA_t \\ &\quad + \beta_7 \cdot DR_i * event_t * UBA_t + \epsilon_{it} \end{aligned} \quad (2)$$

where UBA_t is one for the 2005–2008 period and zero for the 2001–2004 (or 2010–2013) period. Then, $\hat{\beta}_7 = \hat{\beta}_3^{reform} - \hat{\beta}_3^{placebo} = \hat{\beta}_3^{unbiased}$.

Finally, I present results from cross-sectional tests that strengthen the interpretation of the results and further reduce the set of alternative explanations in Section 6.2 and discuss remaining alternative explanations in Section 7.

[23] Firms sorted into the high default risk group before the reform either improve their financial situation by generating high profits or by restructuring their debt, or default and exit the sample. Thus, the average *surviving* firm is less risky after the reform and has lower leverage.

6 Results

This section presents and discusses the main results from estimating equations (1) and (2) and presents results from cross-sectional analysis that strenthen the interpretation of the main results and provide additional insights into the underlying channel.

6.1 Reform Effect

I begin the empirical analysis by examining changes in key variables after the reform for the riskiest (top quintile) and safest firms (bottom quintile) in Table 6. While safe firms' debt to assets ratio is virtually unchanged after the reform, risky firms who should be most sensitive to changes in bankruptcy proceedings experience an increase in their debt to assets ratio by 6.97 percentage points. This suggests that the introduction of management stay in bankruptcy is associated with higher firm leverage. Additionally, interest rates decrease by 47 basis points for safe firms, compared with a 67 basis points increase for risky firms, suggesting that the cost of credit is higher under the management stay system. Finally, while risky firms increase their investment to assets ratio by 1.95 percentage points, safe firms experience a decrease in their investment to assets ratio by 1.55 percentage points. This suggests that risky firms use some of the additional credit they take on under the management stay system for investment.

The top panel in Figure 3 complements the descriptive evidence by depicting the time series evolution of firms' debt to assets ratio for the riskiest (black line) and the safest (gray line) firms. While the UBA had no effect on the safest firms' debt to asset ratio, risky firms' debt to asset ratio increases sharply right after the reform in 2006 from about 38 percent up to 47 percent. The bottom panel of Figure 3 shows that the effect of the UBA increases monotonically with default risk. Figure 4 depicts the same plots for firms' investment to assets ratio. Risky firms' investment to asset ratio starts to increase significantly after 2006 (black line), whereas for safe firms investment decreases after the enactment of the UBA. Again, investment increases monotonically with default risk after the reform (Panel B). Figure 5 shows the same plots for firms' interest expenses to debt ratio. Interest rates of risky firms starts to increase significantly from 2006 (black line), whereas for safe firms interest rates slightly decreases after the enactment of the UBA. As for the changes in investment and the cost of credit, the change in interest rates after the reform increases monotonically

with default risk. The graphical evidence from Figures 3 to 5 suggests that changes in leverage, investment, and interest rates for risky firms coincide with the enactment of the UBA, and that the effects are monotonically increasing with firms' likelihood of default. Thus, alternative explanations need to explain the timing of the increase around 2006 and the positive correlation with default risk.

Next, I confirm the insights from the graphical analysis statistically by estimating equation (1). Control variables include profitability, asset tangibility, investment opportunities, and firm size for leverage regressions. For interest rate regressions leverage is added as a control variable. Investment regressions additionally include cash to asset as a control variable. Standard errors are clustered at the industry level.

The results are displayed in Table 7. The estimation in column I is the statistical equivalent to the graphical analysis displayed in Figure 3. After the introduction of the UBA, leverage increases by 1.76 percentage points more per risk quintile. To account for the possibility that there is a systematic change in industry composition or other observable firm characteristics in the groups of risky firms after the reform, column II adds industry fixed effects and firm-level controls. This reduces the magnitude of the reform effect only slightly to 1.47 percentage points per default risk quintile. The strictest specification in column III includes industry-year fixed effects to control for industry-specific shocks, which leaves the results almost unaffected with 1.64 percentage points per default risk quintile.[24] In columns IV to VI, I replace the dependent variable by firms' interest expenses scaled by total debt. I find that interest rates increase for risky firms after the UBA relative to safe firms by 31 basis points per risk quintile (column IV). The results are similar when adding firm controls and industry fixed effects with 23 basis points per risk quintile (column V), and after including industry-year fixed effects with 19 basis points per default risk quintile (column VI). The increase in interest rates suggests that the increase in leverage is driven by an increase in the demand for rather than the supply of credit.[25] Columns VII to IX show the results for investment. After the enactment of the UBA, firms' investment to assets ratio increases by 0.86 percentage points more per default risk quintile (column IX). Adding industry fixed effects and firm-level controls slightly reduces the effect to 0.66 percentage points (column X). With industry-year fixed effects, the reform effect is 0.73 percentage points per default

[24] I additionally control for differences in firms' reaction to the UBA due to differences in firm characteristics by interacting the control variables with the event dummy to allow for a differential effect of the control variables before and after the reform (Table A.1).

[25] Section 6.3 presents additional evidence that higher costs of credit after the reform constitute a compensation for the reduction in creditor control in corporate reorganizations.

risk quintile (column XI). These results suggest that risky firms use some of the additional credit for investment.

To ensure that the results are not driven by unobservable firm characteristics that induce differences in risky and safe firms sensitivity to the UBA or coninciding macro shocks, I examine changes in firms' leverage, investment, and the cost of credit *within the same firm* by estimating equation (2). Comparing changes in firms' financing and investment decisions for firms sorted in the year before the reform with changes for firms sorted at the beginning (or the end) of the sample period purges changes in firms' financing, investment, and interest rates after the enactment of the UBA from survivorship bias.

Figure 6 plots the time series evolution of risky (black line) and safe (gray line) firms' debt to assets ratio (top Panel), investment to assets ratio (middle Panel), and interest rates (bottom Panel) from 2005–2008. The change from one year to the next is the growth rate in the respective variable minus the growth rate for 2001 sorted firms.[26] For example the adjusted debt to assets ratio in 2006 equals: $DebtA_{2005} + [(DebtA_{2006} - DebtA_{2005}) - (DebtA_{2002} - DebtA_{2001})] = DebtA_{2006} - (DebtA_{2002} - DebtA_{2001})$. There is a clear increase in risky firms' debt to assets and investment to assets ratios, and their interest rates after 2006, whereas for safe firms there is no increase in both ratios after the enactment of the UBA. Importantly, all three plots show the same patterns as the plots in Panel A of Figures 3 to 5. Thus, the increase in leverage, investment, and interest rates for risky firms relative to safe firms is does not seem to be driven by differences in unobservable firm characteristics between risky and safe firms.

Table 8 complements the graphical analysis in Figure 6. The parameter $DR_i * event_t * treated_{it}$ is the difference in the estimate of the interaction between DR_i and the $event_t$ dummy in the 2005–2008 regression compared with the 2001–2004 regressions in columns I–VI. For example, the coefficient in column I shows that the debt to asset ratio increased by 1.02 percentage points more per default risk quintile after the UBA, relative to the increase in leverage per default risk quintile after 2001. The cost of credit increases by 49 basis points more per default risk quintile (column II), and the investment to assets ratio increases by 0.83 percentage points per default risk quintile more (column III). Columns IV–VI show the results after added firm fixed effects to track changes *within the same firm* over time. The reform effect is qualitatively unaffected by added firm fixed effects. In columns VII–IX, we

[26] All figures look similar for correcting the post 2005 changes by changes for 2010 sorted firms instead of 2001 sorted firms.

control for survivorship bias by sorting firms at the end of the sample period in 2010 instead of sorting firms at the beginning of the sample period in 2001. This eliminates concerns about differences in survivorship bias under the pre-reform and post-reform regimes. The results are similar to the corresponding results in columns IV–VI. Together these results provides strong evidence that the reform effects are not driven by unobserved firm characteristics.

To facilitate comparison to the within firm estimates in columns IV–IX, columns X–XII replicate the main findings from Table 7 for the 2005–2008 period. The estimates are similar in magnitude compared to the estimates in columns IV–IX, further strengthening the evidence that the estimates in Table 7 are not biased due to unobservable firm characteristics.[27]

Additionally, I sort firms based on the average riskiness of all firms in the industry that they operate in over the sample period. Industry-level risk is very persistent and not significantly affected by the UBA. Thus, industry-level sorting is not subject to concerns about changes in risk sorting induced by the UBA and is exogenous to individual firms' decisions that may be affected by the UBA. The results are collected in Table 9. Since the average firm in a "risky" industry is less risky than the average firm in the quintile of riskiest firms based on firm-level sorting, we should expect the results to be lower in magnitude compared to the results based on firm-level sorting in Table 7. After the enactment of the UBA, firms in riskier industries increase leverage by 0.49 percentage points per risk quintile (column I). Interest rates relatively increase for firms in risky industries by 29 basis points per risk quintile after the reform (column II). Similarly, investment to assets increases significantly more for firms in risky industries by 0.20 percentage points per quintile under the management stay system (column III).

6.2 Cross-Sectional Variation

This subsection discusses results from cross-sectional tests that strengthen the interpretation of the results and provide additional insights on the underlying channel.

[27]Sections 7.5 and 7.6 provide further tests to verify that the results are robust to different methods of sorting firms into default risk quintiles.

6.2.1 Ownership

Heterogeneity in firm ownership provides variation in shareholders' and managers' personal bankruptcy costs. Ownership transfer is particularly costly for controling shareholders that enjoy private benefits of control and whose wealth is less diversified (Anderson, Mansi, and Reeb 2003; Paligrova 2010; Faccio, Machica, and Mura 2011; Lins, Volpin, and Wagner 2013). Shareholders in family firms (firms with controlling shareholders that hold more than 50% of voting rights) and firms with high ownership concentration are thus more adversely affected by the transfer of control in bankruptcy states under the pre-reform auction system compared with diversified shareholders in widely held firms. Accordingly, I find that the relative increase in risky firms' leverage (Table 10, column I) and investment (column III) after the reform is significantly stronger for family firms. When splitting firms into quintiles according to their ownership concentration (herfindahl index), the results are similar with a higher increase in leverage (column IV) and investment (column VI) for risky firms with higher concentrated ownership.

Managers are more sensitive to forced resignation in bankruptcy under the auction system if their financial wealth is concentrated in the firm. Financial wealth of managers is more concentrated and more correlated with labor income in firms in which managers hold a larger share of the firm's stock.[28] In this case, managers have a particularly strong incentive to avoid bankruptcy states before the reform if their ownership stake in the firm is high. Consistent with this argument, I find that firms in which CEOs holds a higher fraction of stocks increase leverage (column VII) and investment (column IX) more. Taken together the results in Table 10 provide additional evidence that shareholders and managers curb risk-taking before the reform to avoid costly bankruptcy states under the auction system and that private benefits are an important determinant of firm behavior.

6.2.2 Cash Flow Volatility and Risk-Taking

Before the reform even temporary financial distress may lead to managers and shareholders losing control over the firm if it induces bankruptcy filing. Thus, shareholders and managers

[28]Theoretically, the prediction of CEO ownership is not unambiguous. On the one hand high CEO shareholdings increase the concentration of the CEO's wealth in the firm (labor and financial income depend on the prospects of the firm). On the other hand, any investment distortions that reduce firm value are more costly for the CEO if she owns a larger fraction of the firm's shares. Empirically, Friend and Lang 1988; Gormley and Matsa 2015 show that the risk-aversion motive dominates.

in firms with volatile cash flows that face a higher risk of negative cash flow shocks have an even stronger incentive to restrict leverage before the reform when default states are costly. In contrast, after the reform, temporary cash flow shocks that lead to bankruptcy are less costly for shareholders and managers as they stay in control of the firm during reorganization and retain control if the firm emerges from bankruptcy proceedings successfully. Hence, firms with volatile cashflows should be particularly risk-averse before the reform and willing to increase leverage and risky investment after the reform.

In Table 11, I split firms into quintiles according to their pre-reform cash flow volatility. Consistent with the view that risky firms with volatile cash flows follow more conservative financing and investment policies before the reform, I find that leverage increases more for risky firms with high cash flow risk (column I). Interest rates also increase more for these firms (column II). Moreover, risky firms with high cash flow risk increase investment more (colum III) after the implementation of the UBA. This strengthens the evidence that firms try to avoid bankruptcys states under the auction system when even temporary financial distress may trigger ownership transfer and forced management resignation.

6.3 Supply of Credit

In Table 7, I document an increase in interest rates for risky firms after the enactment of the UBA. This observation could be driven by a reduction in the supply of credit due to weakened creditor rights or by an increase in the demand for credit after the reform. The increase in leverage for risky firms after the reform in combination with the increase in the cost of credit suggest the presence of an increase in the demand for credit. To examine whether the supply of credit is affected by shift from the auction to the management stay system as well, I exploit cross-sectional differences in creditors' sensitivity to changes in bankruptcy proceedings. The loss of control in reorganization procedures is more costly for creditors when their claims are not well protected. One factor that protects creditors' claims in bankruptcy and mitigates the risk-shifting and strategic default problem is a higher liquidation value of the firm's assets. Higher liquidation values are often associated with collateral from tangible assets (Barro 1976; Stiglitz and Weiss 1981; Hart and Moore 1994, 1998; Lacker 2001; Jimenez, Salas, and Saurina 2006). Thus, if the increase in the cost of credit is partly driven by a negative effect on the supply of credit due to weaker creditor rights, the increase should be lower for firms with a high fraction of tangible assets. In contrast, a pure demand effect provides no differential prediction for the change in interest rates for firms with different

degrees of tangible assets.

In columns IV–VI, I sort firms according to their tangibility ratio in the year before the enactment of the UBA. I find that interest rates increase less for risky firms with a high fraction of tangible assets (column V). This is consistent with creditors demanding lower compensation for the loss of control in bankruptcy proceedings for firms in which their claims are better protected. With lower financing costs, risky firms with a higher fraction of tangible assets increase leverage slightly more after the reform (column IV), and invest more (column VI). These results point to a negative effect of the introduction of management stay on the supply of credit.

6.4 Efficiency of Additional Investment

The previous results document that the introduction of management stay is associated with more investment. Whether the documented increase in leverage and investment is economically desirable depends on the efficiency of the additional investment. The auction system may have prevented managers from engaging in overinvestment and risk-shifting (Jensen 1986; Harris and Raviv 1990; Skeel 1993; Zwiebel 1996) by increasing their personal bankruptcy costs. Alternatively, high personal bankruptcy costs may have led to underinvestment in positive NPV projects that involve risk (Donaldson 1969; Amihud and Lev 1981; Rasmussen 1994). To evaluate whether the introduction of management stay improves or distorts investment decisions relative to the auction system, I combine three separate pieces of evidence. First, I examine whether the increase in investment can be attributed to firms with good investment opportunities or is undertaken by firms without good investment opportunities. Second, I examine changes in firms' profits to analyze whether the additional investment goes to positive or negative NPV projects. Third, I explore changes in firms' cash flow volatility to examine whether firms' willingness to take risk increases after the reform.

In Table 11, columns VII–IX, I sort firms into quintiles according to their average level of investment opportunities before the enactment of the UBA. Since the sample includes many private firms, I use lagged sales growth as a proxy for investment opportunities as common in the literature (Lehn and Poulsen 1989; Shin and Stulz 1998; Badertscher, Shroff, and White 2013). I find that firms with good investment opportunities experience a higher increase in their debt to assets ratio than firms that lack good investment opportunities (column VII), and use a large fraction of the additional credit for investment (column IX).

Significantly higher investment by firms with good investment opportunities provides initial suggestive evidence that the introduction of management stay encourages investment in good investment projects, rather than overinvestment in unprofitable projects.

In Table 12, I examine changes in profits after the introduction of the UBA to evaluate the quality of new investment. Growth in profits is defined as the one year change in the level of net income scaled by firm assets at the beginning of the year.[29] I find that profits grow relatively more for risky firms under the management stay system, compared with safer firms by 0.48 percent of firm assets per default risk quintile (column I). The effect remains highly significant after controlling for industry fixed effects and firm-level controls with 0.37 percent (column II), and industry-year fixed effects with 0.38 percent per default risk quintile (column III). Column IV in Table 9 shows that the increase in profits persists when sorting firms into quintiles according to the riskiness of the industry they operate in rather than sorting firms according to individual firms' riskiness.

Consistent with the previous results, profitability increases particularly strongly for risky firms that increase investment more. In particular, risky firms with high cash flow volatility that may trade off profitability with low cash flow volatility of new investment projects before the reform to avoid unexpected cash flow shocks experience a higher increase in profits after the reform (column IV). Profits also increase more for risky firms with a higher fraction of tangible assets (column V), for firms with good investment opportunities (column VI), and for family firms (column VII) and firms with high CEO shareholdings (column VIII). These are precisely the firms that increase investment most after the reform. Thus, the results in Table 12 suggest that the additional investment goes to positive NPV projects, leading to higher profits for risky firms.

[29]Replacing net income by a simpler measure (sales - costs of sales) that abstracts from accounting effects, such as depreciation, leaves the results qualitatively unaffected and quantitatively even stronger. I examine the growth rate of the *level* of profits as it is not clear how additional investment affects profitability (ROA). It could be that firms only invest in the most profitable projects before the reform and abstain from lower (but still positive) NPV projects as they are reluctant to take on more leverage for financing those projects. Hence, even if the additional investment goes to positive NPV projects after the reform, average profitability may go down. It is further possible that risky firms do not forego the least profitable investment projects before the reform, but projects with the most volatile cash flow streams. In that case average profitability might increases after the reform when firms focus on the profitability of investment, rather than the distribution of cash flows. Thus, even with additional investment in positive investment projects, there is no clear prediction for average profitability. The level of profits, however, should on average increase if firms invest in additional positive NPV projects and decrease if they invest in negative NPV projects. That being said, I find that average profitability (ROA) also significantly increases by 0.28 percentage points (p-value: 0.001) per default risk quintile after the reform, suggesting that risky firms not only abandoned the lowest NPV projects before the reform, but highly profitable projects that were risky.

Finally, table 13 depicts information on changes in cash flow volatility around the UBA. For each firm, I estimate cash flow volatility separately for the pre-reform and the post-reform period and regress cash flow volatility on firms' average default risk measure for the respective period. Risky firms' cash flow volatility increases significantly more after the reform compared with safe firms' cash flow volatility (column I). The increase in cash flow volatility for risky firms relative to safe firms is even higher after controlling for industry-fixed effects and firm controls (column II), and industry-event fixed effects (column III). The increase in firm risk is higher for firms that already exhibit higher cash flow volatility during the pre-reform period (column IV), firms with higher levels of asset tangibility (column V), firms with good investment opportunities (column VI), family firms (coumn VII) and firms with higher CEO shareholdings (column VIII). This strengthens the view that firms are willing to take on more risk under the management stay system when managers' and shareholders' bankruptcy costs are lower.

6.5 Effects on Innovation

A sizeable fraction of innovation is undertaken by young firms that tend to be risky. Thus, the design of bankruptcy proceedings is highly relevant for innovative firms.[30] To test for the effect of the introduction of management stay on innovation, I examine changes in innovation input and output after the enactment of the UBA. Columns I–III in Table 14 study changes in firms' R&D expenses to assets ratio following the enactment of the UBA. I find that risky firms increase investment in R&D more than safer firms after the reform by 0.25 percentage points per default risk quintile (column I). The effect is similar when adding industry fixed effects and firm controls (column II) with 0.18 percentage points per default risk quintile, and industry-year fixed effects (column III) with 0.21 percentage points per default risk quintile. The same results apply when sorting firms according to the riskiness of the industry that they operate in (Table 9, column V).

In columns IV–VII, I examine changes in innovation output. For the subsample of firms that successfully apply for at least one patent during the sample period, I examine changes in the number of successful patent applications after the enactment of the UBA. To control for differences in the size of firms in the groups of risky and safe firms after the reform, I scale the number of patents by firms' book value of assets (in billon Korean won). Risky

[30] Manso (2011) shows theoretically that making failure less costly for managers may encourage innovation.

firms apply for slightly more patents after the reform, with 0.0216 patents per billion won in assets per default risk quintile (column IV). After controlling for industry-fixed effects and firm characteristics, the difference is only slightly lower with 0.0174 patents per billion won of asset (column V). Controlling for industry-year fixed effects, the effect is similar with 0.134 patents per billion won of assets per default risk quintile (column VI). In column VII, I use the full sample of firms, including firms that never successfully apply for a patent during the sample period. Risky firms apply for more patents after the reform with 0.061 patents per billion won of firm assets per default risk quintile in the full sample. I find the same results when sorting firms according to the riskiness of the industry that they operate in (Table 9, columns VI–VII). The reduction in personal bankruptcy costs and the associated increase in shareholders' and managers' willingness to take risk seems to encourage innovation after the reform. Higher patenting output suggests that the additional innovation results in verifiable output.

7 Discussion and Robustness Tests

This section discusses alternative contracting solutions under the pre-reform auction system and provides results from additional tests that verify the robustness of the results presented in Section 6.

7.1 Alternative Sources of Financing

This section dicusses different ways to finance additional investment before the reform and outlines reasons for why these alternative sources for financing were not used. One obvious alternative to financing investment with risky debt is equity. However, while issuing equity does not increase the risk of default directly, investment in risky projects still increases the risk of entering financial distress, making shareholders and managers unwilling to finance highly risky projects even with equity. Moreover, equity investment might be prohibitively costly in the presence of information asymmetry (Myers and Majluf 1984). In the context of Korean firms, where ownership and control are often not separated and private benefits of control are high, existing shareholders might be unwilling to share control rights with new shareholders. This may prevent financing with common equity making equity financing more costly. Similarly, new shareholders might demand a compensation for becoming minority

shareholders in a firm with rent-extracting controlling shareholders that exceeds the gains from additional investment. Finally, a large fraction of the firms in the sample are private firms with limited access to equity markets.

Alternatively, firms could finance new investment by selling assets. This requires that asset sales are not prohibited by debt contracts, which would lower the firm's ability to obtain secured financing. Additionally, firms are constrained to selling assets that are not vital to their current operations. Thus, while in some cases financing new investment with asset sales might be feasible, generally firms face constraints in their ability to liquidate their assets.

If investment projects are profitable, firms might be able to receive additional debt financing in distress and thereby avoid bankruptcy filing. However, given the high level of control and the option to acquire the firms' shares in pre-reform reorganization proceedings, existing creditors may prefer for the firm to default precisely when it is profitable. This is because under the auction system creditors have the option to obtain ownership of the firm which transfers their fixed claim into a residual claim on the firm. This residual claim might yields higher returns than their fixed claim (Rasmussen 1994). A competitive bidding process could reduce this type of rents. However, it is unlikely for a fully competitive auction to occur for bankrupt firms due to the limited number of potential bidders (Shleifer and Vishny 1992; Meier and Servaes 2015) and existing creditors' informational advantage. Reaching out to new creditors could overcome this incentive problem. Information asymmetry, in combination with covenants that prevent issuing new debt with equal priority is likely to make financing from new creditors costly, which may exceed the benefits of additional investment. Taken together, while some alternative forms of financing might be available before the reform, in many cases alternative sources of financing might be prohibitively costly.

7.2 Alternative Contracting Solutions

An alternative way to salvage debt financing are private workouts. Shareholders could reorganize the firm with their creditors outside the court-supervised reorganization procedure to avoid mandatory management resignation and ownership transfer. One problem with private workouts is that they suffer from free-rider problems. Creditors that refuse to participate in the workout benefit from other creditors' willingness to forgive part of their claims (Roe 1987). While the Korean system provides a work-out procedure that attempts to overcome

the free-rider problem by making agreements that are accepted by three-quarters of all and three-quarters of secured creditors binding for all creditors in large firms, this procedure is rarely used with only a handful of cases per year during the sample period. The main impediment for creditors to agree to out-of-court restructuring before the reform is their high level of control in in-court proceedings combined with their legal power to force firms into in-court proceedings. Even if shareholders are willing to make transfer to creditors in out-of-court proceedings, creditors cannot credibly commit to abstain from bringing the firm into in-court reorganization after receiving those transfers. These renegotiation frictions are confirmed by a significantly higher failure rate in private workouts under the auction system (52.29%), compared with a lower failure rate under the management stay system (28.08%). Thus, the incentive structure under the auction system seems to prevent shareholders and managers from retaining control over the firm in out-of-court workout proceedings.

Another possibility for firms' to mitigate the lower willingness of the CEO to take risk under the auction system is to change the design of the CEO's compensation contract. However, there are limits in legally feasible contracts. The Korean system does not allow for contracts that assign a higher priority to payments to the CEO above other employees and creditors.[31] One possibility to provide the CEO with payments with high priority in default states is to make her a secured creditor. The downside of this contractual arrangement is that it reduces the amout of secured debt that the firm can issue in the market. Additionally, transfers to the CEO are constraint by the funds available to the firm in default states that might be significantly lower than what is needed to compensate the CEO for the loss of future labor income and private benefits.

7.3 Efficient Resolution of Distress

Differences in the resolution of financial distress may affect the main results documented in the paper. Distressed firms tried to avoid default before the reform as this would trigger ownership transfer and forced management resignation. In this case, lower investment before the reform could be a consequence of these attempts to delay bankruptcy. Highly distressed firms could prevent default for example by selling assets or by trading off future returns for contemporaneous cash flows by cutting down on investment. While this mechanism also implies that the inefficiencies are generated by the pre-reform auction system, the channel

[31] Even if this was possible, it might significantly increase the cost of debt financing if repayments to creditors were reduced in default states due to higher priority claims of the CEO.

would be somewhat different from risk-curbing by adjusting financing and investment ex ante before distress occurs. However, while this mechanism applies to some of the firms in the high risk group that are already financially distressed, it cannot explain why investment increases more for the second, third and fourth highest quintile of risky firms that are more sensitive to the design of bankruptcy law, but are not in distress. Thus, while differences in the resolution of financial distress might contribute to the overall effect on investment for the highest default risk group, it cannot explain the monotonic increase in the reform effect with default risk for non-distressed firms.

Additionally, the pre-reform receivership system could be generally inefficient as the receiver and the new owners do not run the firm as effectively as under incumbent management and shareholders making bankruptcy states even more costly. However, this alternative explanation is not consistent with several of the results reported in this paper and thus does not seem to be a plausible explanation for all the results documented. First, the receiver could re-appoint the manager if she has superior information which is not the case in any of the pre-reform restructuring cases (the manager does not even return after the receiver exits the firm in virtually all cases), suggesting that the efficiency loss of not having the manager run the firm is rather low. Second, if receivership is generally inefficient it is not clear why creditors charge *lower* interest rates before the reform. This is rather consistent with bankruptcy states being costly to shareholders and managers, but less costly for creditors. Third, if pre-reform receivership was overall inefficient, out-of-court restructuring should frequently be used to negotiate around this inefficiency. Instead, out-of-court workouts are significantly more likely to fail before the reform and also demand the replacement of management and a change in ownership in most cases. Finally, some of the cross-sectional tests cannot be explained by inefficiencies in the receivership system, for example differences in ownership or for firms with different levels of asset tangibility should not be relevant as the inefficiencies of the receivership system should apply to all firms.

7.4 Managerial Myopia

Another alternative mechanism that could explain lower investment in long-term projects such as R&D expenditures is managerial myopia (Stein 1988, 1989; Edmans, Fang, and Lewellen 2014). Myopia might be stronger during the pre-reform regime when shareholders and managers in risky firms assign a lower weight to future states as the probability of not participating in the firm's future cashflows is higher under the auction system. In this case,

managers (and shareholders) are less inclined to invest in projects that yield high cashflows in future states, but adjust investment policies to generate high cashflows in the short-run. However, while myopic managers might reduce investment in R&D expenditure, it is not clear why they would prefer lower leverage before the reform. Additionally, firms also earn lower current profits during the pre-reform period whichis not consistent with managers trying to increase current profits at the costof long-term growth. Finally, management turnover is not actually higher before the reform. Management turnover is higher conditional on bankruptcy filing, however, due to firms being run more conservatively under the auction system, unconditional turnover is no higher than after the reform.

7.5 Risk Measure from Reorganization Filings

The UBA brought significant changes to corporate reorganization but not to liquidation. If the probability of ending up in liquidation proceedings or reorganization proceedings is not highly correlated, then sorting firms according to the probability of filing for corporate reorganization would be a more direct way to test for effects of the introduction of management stay under the UBA. In Table A.3, columns I–III, I estimate the default model for reorganization filings only. The estimated coefficients for the explanatory variables are similar to the default model that also includes liquidation filings, suggesting that filings for reorganization and liquidation are strongly correlated. Accordingly, when sorting firms according to the reorganization risk model the results from the main tests are almost identical in magnitude (Table A.4).

7.6 Period-Specific Default Risk Model

Changes in the bankruptcy code might lead to changes in the determination of default risk. To ensure that the results are not driven by incorrect sorting of firms into default risk quintile due to the application of a model that does not incorporate the period-specific determinants of default risk, I sort firms in the pre-reform period into quintiles according to the default model estimated only with pre-reform data, and firms in the post-reform period according to the default model estimated only with post-reform data. The results are depicted in Table A.3, columns IV–VI. All results are similar to the base tests that applies the same default model to all years. Except for the interest rate estimations all results are even stronger than for the base tests in Table 7.

8 Conclusion

An important aspect of bankruptcy law is how it affects firms' financing and investment decisions ex ante. While a large body of theoretical literature outlines merits and deficiencies of various bankruptcy proceedings, empirical evidence is scarce. This paper documents that making bankruptcy states costly for managers and shareholders may lead to negative effects on the demand for credit by influencing risk-taking attitudes of existing owners and managers. When private benefits of control are high, shareholders and managers may curb risk-taking in order to avoid bankruptcy states to the extent that firms give up profitable investment projects and reduce innovate activities.

Following a bankruptcy reform in Korea that abolished a reorganization regime in which management was replaced by a court-appointed receiver and ownership was transferred to new investors, replacing it with a management stay system more similar to Chapter 11 in the US, I find that risky firms, which are most sensitive to the design of bankruptcy law, increase leverage, investment, and innovation when managers and shareholders are allowed to stay in control of the firm during reorganization. The additional investment seems to go to positive NPV projects. Firms with good investment opportunities increase investment more after the reform, and risky firms' profits increase more after the reform, precisely for those firms that increase investment after the reform. Consistent with an increase in firms' willingness to take on more risk, risky firms' cash flow volatility significantly increases after the reform relative to safer firms. Large controlling shareholders and CEOs with high shareholdings incur particularly high personal bankruptcy costs before the reform when they are deprived of private benefits of control through ownership transfer. Accordingly, I find that family firms with large controlling shareholders and firms with high CEO shareholdings exhibit a higher increase in leverage and investment after the reform.

An important question is how generalizable the results are to other countries and different institutional environments. Nenova (2003) estimates private benefits of control to constitute 46% of firms' market capitalization in Korea. In addition to the high value of private benefits, concentrated ownership is pervasive. It seems very plausible that the results apply to countries with high levels of family ownership where private benefits are high. Family control is the typical ownership structure in emerging economies, but also widespread in developped countries (La Porta, Lopez-de Silanes, and Shleifer 1999; Claessens, Djankov, and Lang 2000; Faccio and Lang 2002). When looking beyond the very largest firms, concentrated ownership

is also common in the US (Anderson and Reeb 2003; Villalonga and Amit 2006; Holderness 2009). Thus, private benefits of control are an important consideration for shareholders and managers in a large fraction of firms around the world. This suggests that the documented results are relevant beyond the institutional context in this paper.

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Figure 1: **Cashflows**

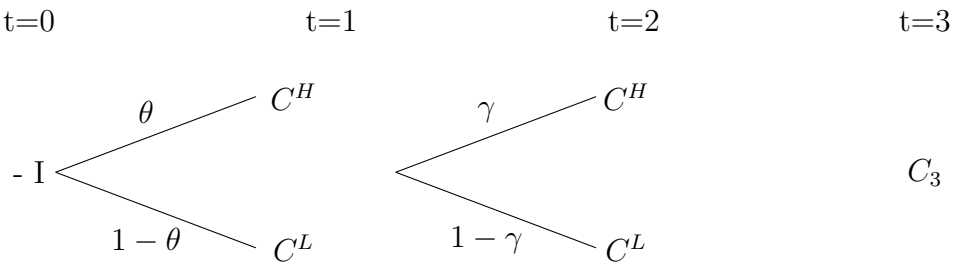
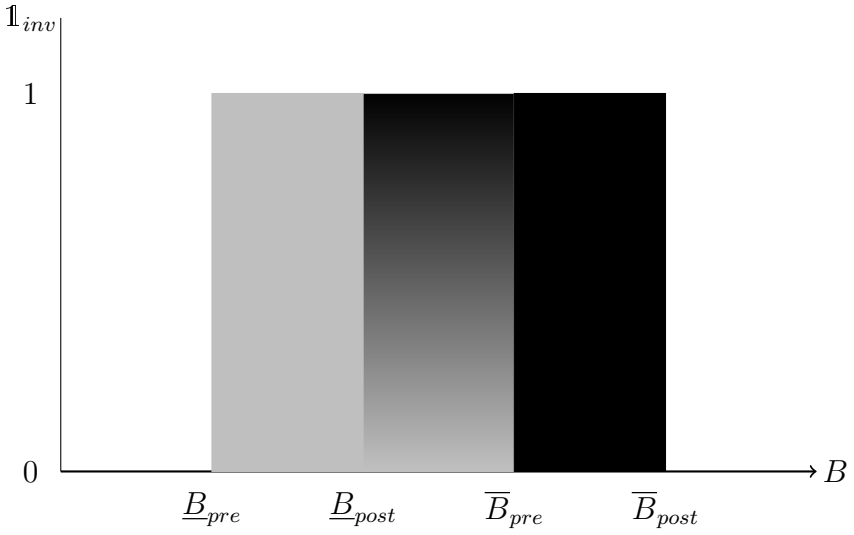
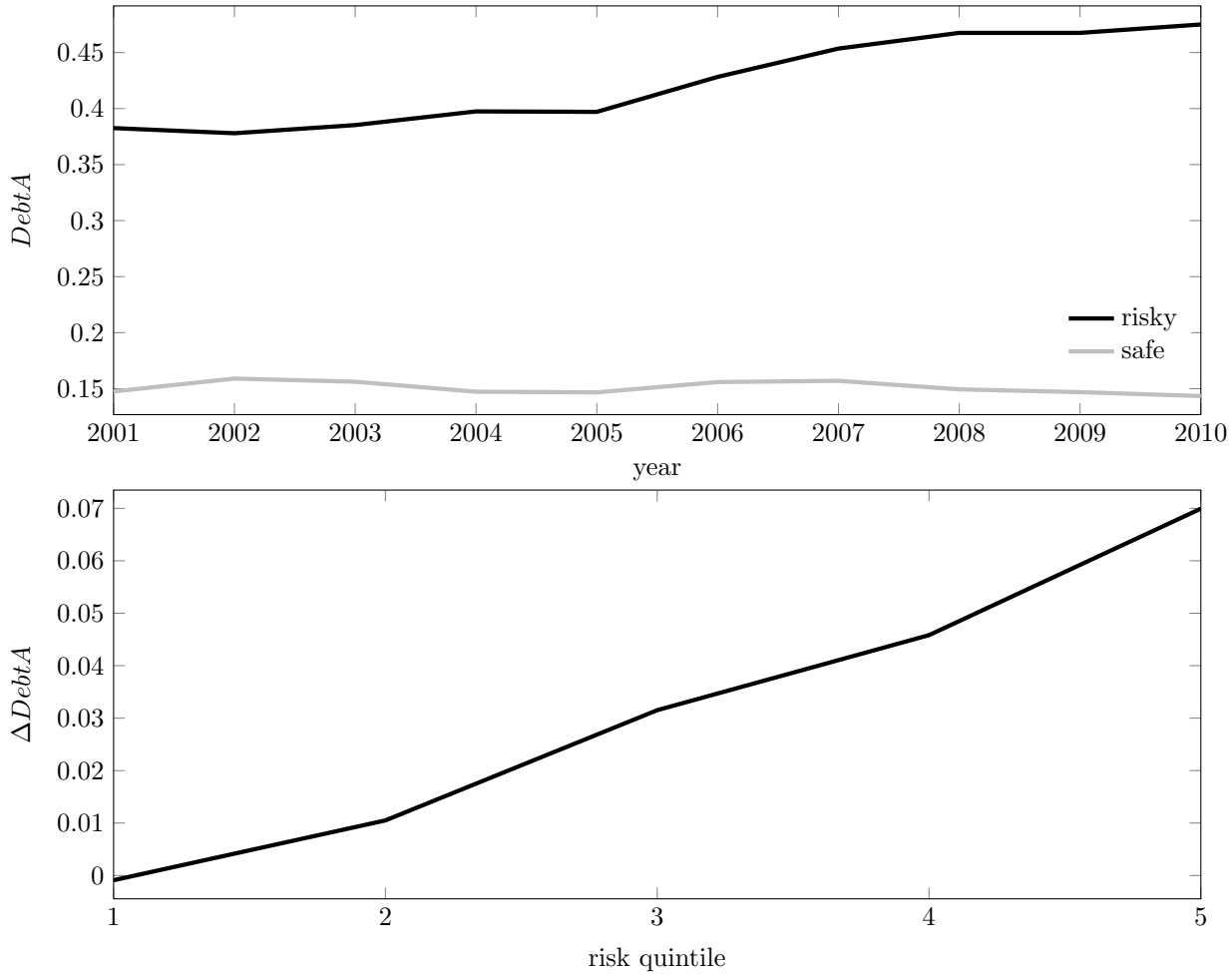


Figure 2: **Investment Regions**



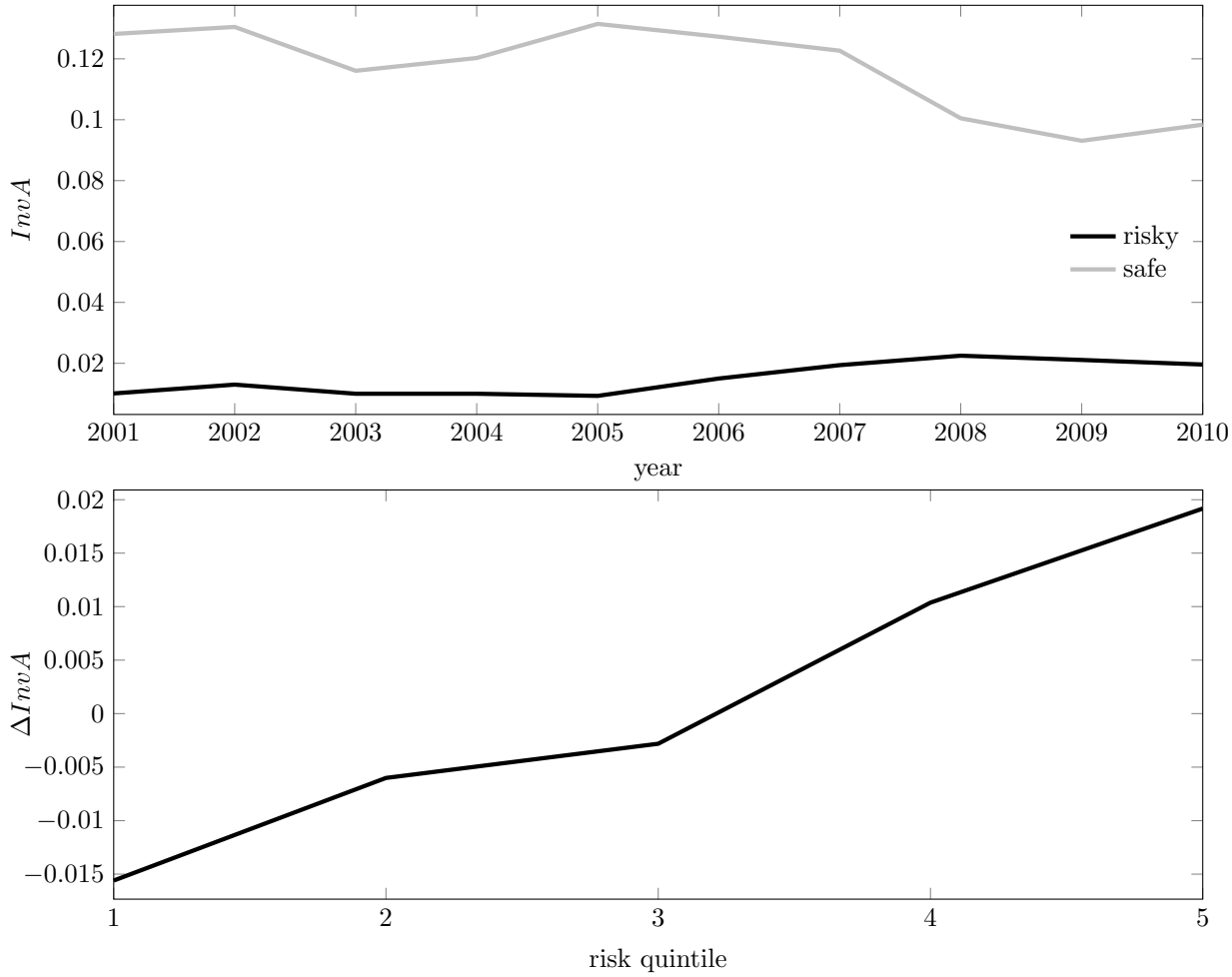
This figure illustrates the effect of the reform on firms' investment decision (y-axis) depending on the entrepreneur's private benefit (x-axis). Under the post-reform period (black) the investment region is shifted rightward between $\underline{B}_{post}$ and $\overline{B}_{post}$, compared with the pre-reform period investment region (gray) between $\underline{B}_{pre}$ and $\overline{B}_{pre}$.

Figure 3: **Leverage**



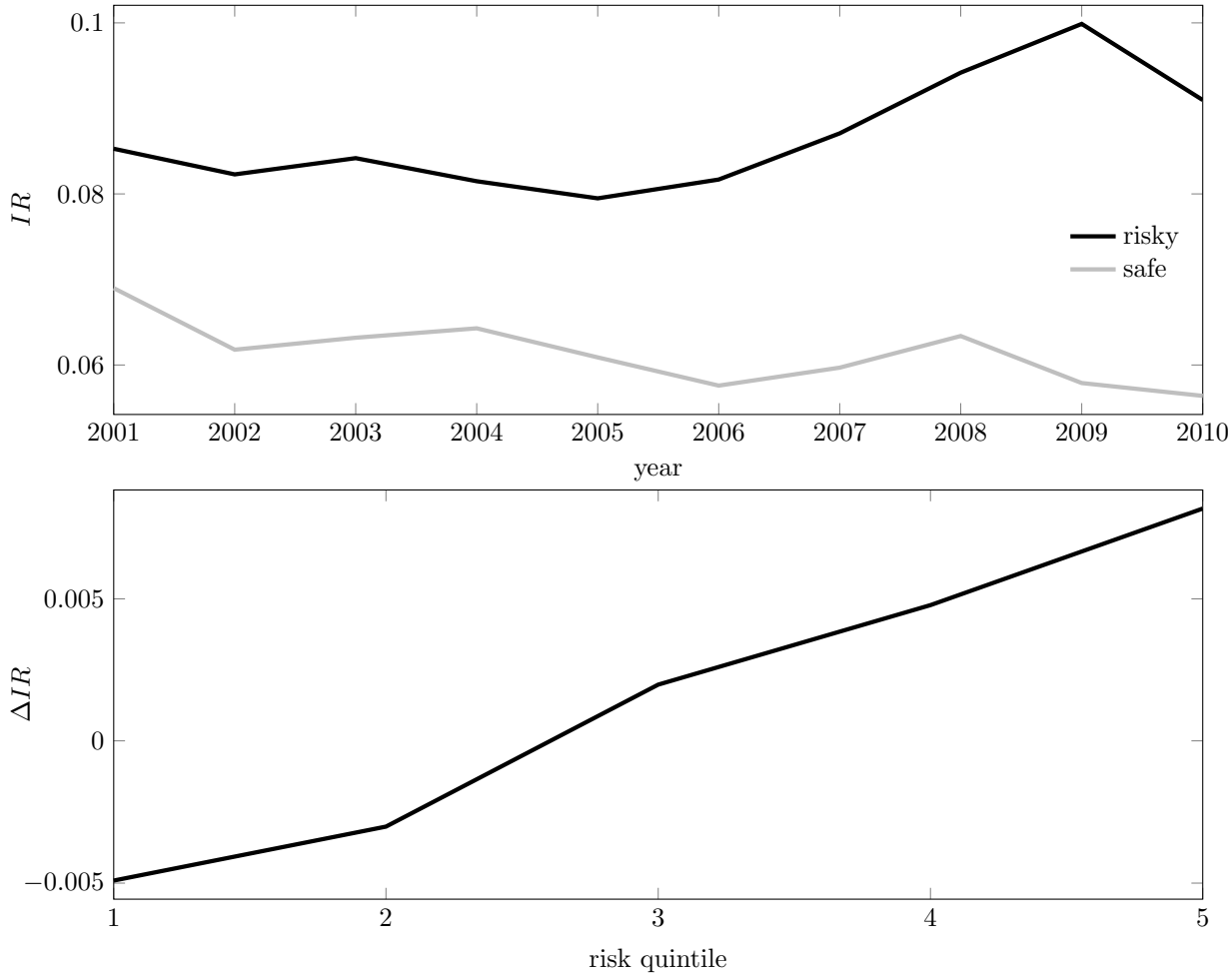
The top panel of this figure plots the time series evolution of firms' average debt to assets ratio around the enactment of the UBA in April 2006 for the quintile of riskiest firms (black line), and the quintile of safest firms (gray line). The bottom panel plots the average difference in the average debt to assets ratio between the post- and pre-reform period for firms in different default risk quintiles from one for the safest firms up to five for the riskiest firms.

Figure 4: **Investment**



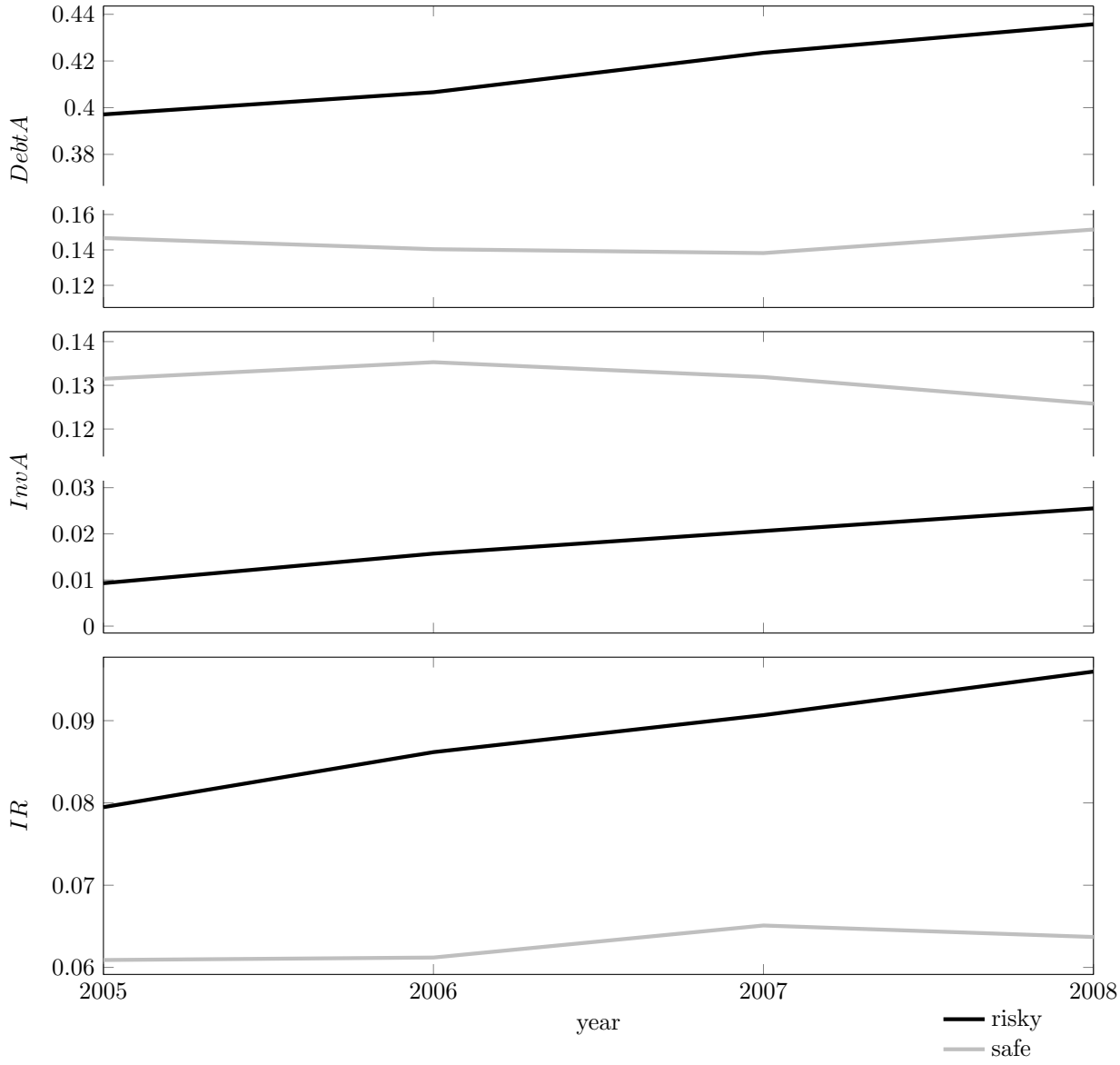
The top panel of this figure plots the time series evolution of firms' average investment to assets ratio around the enactment of the UBA in April 2006 for the quintile of riskiest firms (black line), and the quintile of safest firms (gray line). The bottom panel plots the average difference in the average investment to assets ratio between the post- and pre-reform period for firms in different default risk quintiles from one for the safest firms up to five for the riskiest firms.

Figure 5: **Cost of Credit**



The top panel of this figure plots the time series evolution of firms' average interest expenses to total debt ratio around the enactment of the UBA in April 2006 for the quintile of riskiest firms (black line), and the quintile of safest firms (gray line). The bottom panel plots the average difference in the average interest expenses to debt ratio between the post- and pre-reform period for firms in different default risk quintiles from one for the safest firms up to five for the riskiest firms.

Figure 6: **Within-Firm Changes**



The top panel of this figure plots firms' average debt to assets ratio around the enactment of the UBA in April 2006 for the riskiest quintile of firms (black line), and the safest quintile of firms (gray line). The middle panel plots firms' average investment to assets ratio, and the bottom panel plots firms' average interest expenses to debt ratio. Firms are sorted into default risk quintiles in 2005. The changes in firm characteristics are adjusted for changes in the same characteristics for firms sorted into default risk quintiles in 2001. For example, the debt to assets ratio in 2006 is the debt to asset ratio in 2005, plus the debt to assets growth rate in 2006, minus the debt to assets growth rate in 2002 for firms sorted into the respective default risk quintile in 2001.

Table 1: Bankruptcy Cases

Panel A: All filings		I All filings	II Composition	III Reorganization	IV Rehabilitation
Number filings		421	25	42	354
Share liquidation (%)		36.34	60.00	26.19	35.88
Duration (months)		41.98	56.56	34.12	41.88
CEO stay (%)		79.81	88.00	4.76	88.14
CEO stay 2015 (%)		33.81	16.00	0.00	39.27
CEO stay (months)		41.07	56.04	8.55	43.87
Ownership transfer (%)		30.71	25.00	90.91	19.09
Panel B: Filings by ownership		**I All filings**	**II Composition**	**III Reorganization**	**IV Rehabilitation**
Number filings	Family firms	126	10	6	110
	Non-family firms	169	6	27	136
Share liquidation (%)	Family firms	29.37	40.00	16.67	29.09
	Non-family firms	31.36	33.33	22.22	33.09
Duration (months)	Family firms	44.39	60.90	43.17	42.95
	Non-family firms	39.70	50.00	33.44	40.49
CEO stay (%)	Family firms	88.10	90.00	16.67	91.82
	Non-family firms	69.23	83.33	3.70	81.62
CEO stay 2015 (%)	Family firms	46.03	30.00	0.00	50.00
	Non-family firms	27.65	16.67	0.00	33.82
CEO stay (months)	Family firms	49.21	66.40	9.00	49.85
	Non-family firms	35.59	44.67	9.44	40.38
Ownership transfer (%)	Family firms	32.69	33.33	100.00	21.43
	Non-family firms	29.55	20.00	86.67	17.65

This table lists data on the reorganization cases in the sample. Composition and reorganization filings are under the pre-reform system, rehabilitation filings under the post-reform system. The top panel depicts the number of filings for composition, reorganization, and rehabilitation, the share of corporate reorganization cases resulting in liquidation, the duration of the reorganization proceedings in months, the fraction of cases in which the imcumbent CEO stays in control during the reorganization proceedings, the fraction of CEOs that are still in control of the firm on January 1, 2015, the period the CEO stayed in control of the firm after bankruptcy filing for the cases that are resolved before January 1, 2015, and the fraction of cases in which incumbent shareholders are replace during reorganizations. The data on ownership transfer comprises cases not resulting in liquidation for which ownership data is available. The bottom panel depicts the same information separately for family firms and for non-family firms.

Table 2: Bankruptcy Filings and Workouts

Panel A: Bankruptcy Filings Year	I Reorganization	II Composition	III Rehabilitation	IV Liquidation
2001	31	51		170
2002	28	29		108
2003	38	48		303
2004	35	81		162
2005	22	35		129
2006			117	132
2007			215	132
2008			582	191
2009			1192	226
2010			1227	253
Panel B: Workouts **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	1491	1161	330	0.2213
2007	1353	1010	343	0.2535
2008	1219	771	448	0.3675

This table lists the number of filings for reorganization and composition from 2001 to 2005, filings for rehabilitation from 2006 to 2010, and liquidation filings from 2001 to 2010 in Panel A (Source: Judical Yearbook (various issues)). Panel B lists data about workouts collected by the Korean Financial Supervisory Service. The table depicts for every year from 2004–2008 the number of workouts cases (column I), either successfully resolved (column II), or resulting in bankruptcy or liquidation (column III), for all firm with debt below 50 billion won that initiate a workout proceeding.

Table 3: Default Risk Model - Descriptives

Variable		I NITA	II TLTA	III CASHTA	IV SIZE	SALETA	WCTA	RETA
Panel A	Mean	0.0312	0.6431	0.0702	-11.6319	1.4130	0.0847	0.1313
Full Sample	Median	0.0342	0.6616	0.0306	-11.7776	1.1504	0.0893	0.1366
N=197,590	Std.	0.1237	0.2907	0.1003	1.3205	1.2001	0.3333	0.3428
Panel B	Mean	0.0347	0.6414	0.0722	-11.6945	1.5328	0.0970	0.1137
Pre-Reform	Median	0.0369	0.6641	0.0318	-11.7839	1.2490	0.0989	0.1192
N=92,399	Std.	0.1214	0.2775	0.1024	1.4066	1.2433	0.3182	0.3219
Panel C	Mean	0.0282	0.6447	0.0685	-11.5769	1.3077	0.0751	0.1467
Post-Reform	Median	0.0316	0.6590	0.0296	-11.7728	1.0662	0.0796	0.1553
N=105,191	Std.	0.1256	0.3019	0.0985	1.2373	1.1505	0.3456	0.3594

This table shows descriptive statistics for the explanatory variables of the default risk model including net income to assets (NITA), total leverage to assets (TLTA), cash to assets (CASHTA), and the log of total assets divided by the total size of all firms in a given year (SIZE), sales to assets (SALETA), working capital to assets (WCTA), and retained earning to assets (RETA) for the full sample and for the pre- and post-reform period separately.

Table 4: Default Risk Model

Dep var: $default_{it}$	I Full Sample	II Pre-Reform	III Post-Reform
NITA	-4.9493***	-5.2380***	-4.5573***
	(0.3027)	(0.6089)	(0.3526)
TLTA	1.2037***	1.3577***	1.0166***
	(0.1841)	(0.3769)	(0.2066)
CASHTA	-6.3858***	-2.6613*	-8.1583***
	(0.9470)	(1.4473)	(1.2129)
RSIZE	0.3597***	0.5359***	0.3137***
	(0.0290)	(0.0535)	(0.0363)
SALETA	0.1019***	0.1212*	0.1361***
	(0.0359)	(0.0727)	(0.0403)
WCTA	-0.2946**	-0.2366	-0.2460
	(0.1364)	(0.2685)	(0.1573)
RETA	0.6021***	0.5704*	0.4073**
	(0.1598)	(0.3247)	(0.1802)
Constant	-2.6102***	-1.6862***	-2.5962***
	(0.3439)	(0.6288)	(0.4258)
Observations	197,590	92,399	105,191
Failures	616	146	470
Pseudo-R2	0.112	0.145	0.103

This table shows the estimation results of the logit regression of an indicator that takes the value of one for year in which a firm filing for bankruptcy, and zero otherwise on the explanatory variables of the default risk model, separately for the full sample, the pre-reform and post-reform model.

Table 5: Descriptives

Panel A: Accounting data		obs	mean	median	std
Total assets (in million KRW)	full sample	197,154	72,923	11,988	861,015
	low risk	39,436	16,008	7,958	59,796
	high risk	39,427	253,378	30,098	1,849,933
Debt to assets	full sample	197,154	0.3073	0.2732	0.2636
	low risk	39,436	0.1508	0.0681	0.1954
	high risk	39,427	0.4262	0.3826	0.3206
Interest rates	full sample	177,870	0.0646	0.0454	0.1062
	low risk	29,797	0.0612	0.0321	0.1240
	high risk	37,582	0.0877	0.0556	0.1382
Cash to assets	full sample	196,821	0.0853	0.0330	0.1352
	low risk	39,372	0.2092	0.1472	0.2007
	high risk	39,341	0.0358	0.0113	0.0789
Invest to assets	full sample	195,282	0.0663	0.0010	0.2223
	low risk	39,006	0.1167	0.0078	0.2925
	high risk	38,733	0.0208	-0.0016	0.1634
Panel B: Patent data		obs	mean	median	std
Number of patents	full sample	28,477	10.33	2.00	136.54
	low risk	6,172	3.48	2.00	6.50
	high risk	5,236	32.88	2.00	267.91
Panel C: Ownership data		obs	mean	median	std
Family ownership share	full sample	167,212	0.4976	0.5000	0.3447
	low risk	32,054	0.5228	0.5242	0.3455
	high risk	33,882	0.4423	0.3900	0.3444
Ownership concentration	full sample	167,212	0.4304	0.3513	0.2833
	low risk	32,054	0.4503	0.3600	0.2940
	high risk	33,882	0.3996	0.3268	0.2914
CEO ownership share	full sample	167,212	0.3230	0.2925	0.2801
	low risk	32,054	0.3171	0.2909	0.2768
	high risk	33,882	0.2418	0.1732	0.2470

This table provides descriptive statistics on accounting data (Panel A), patent data (Panel B), and ownership data (Panel C), separately for the full sample, and for firms in the lowest and highest default risk quintiles.

Table 6: Difference in Firm Characteristics Around Reform by Default Risk

		pre-event	post-event	diff
Debt to assets ratio	low risk	0.1513	0.1505	-0.0008
	high risk	0.3890	0.4587	0.0697***
	dif			*0.0706****
Interest rates	low risk	0.0637	0.0590	-0.0047***
	high risk	0.0842	0.0908	0.0067***
	dif			*0.0114****
Investment to assets ratio	low risk	0.1250	0.1095	-0.0155***
	high risk	0.0104	0.0299	0.0195***
	dif			*0.0350****

This table depicts changes in some key firm characteristics around the enactment of the UBA, separately for firms in the lowest default risk quintile and firms in the highest default risk quintile. The last column shows the difference between the post-reform and pre-reform period. The difference-in-differences estimate in shows in italic. ***denotes statistical significance at the 1% level.

Table 7: Reform Effect

Dep var:	I $DebtA_{it}$	II $DebtA_{it}$	III $DebtA_{it}$	IV IR_{it}	V IR_{it}	VI IR_{it}	VII $InvA_{it}$	VIII $InvA_{it}$	IX $InvA_{it}$
DR_{it}	0.0589***	0.0536***	0.0527***	0.0047***	0.0066***	0.0066***	-0.0288***	-0.0222***	-0.0222***
	[0.0025]	[0.0022]	[0.0023]	[0.0016]	[0.0015]	[0.0015]	[0.0022]	[0.0014]	[0.0014]
$DR_{it} * event_t$	0.0176***	0.0147***	0.0164***	0.0031***	0.0023**	0.0019***	0.0086***	0.0066***	0.0073***
	[0.0024]	[0.0021]	[0.0020]	[0.0012]	[0.0009]	[0.0007]	[0.0012]	[0.0009]	[0.0010]
Observations	197,152	178,636	178,636	177,870	162,576	162,576	195,280	178,391	178,391
R-squared	0.141	0.294	0.311	0.008	0.080	0.112	0.027	0.060	0.010
Year FE	yes	yes	-	yes	yes	-	yes	yes	-
Ind FE	no	yes	-	no	yes	-	no	yes	-
Ind-Year FE	no	no	yes	no	no	yes	no	no	yes
Controls	no	yes	yes	no	yes	yes	no	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$), annual interest rates (IR_{it}), and investment to assets ratio ($InvA_{it}$) on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), and the interaction of the default risk variable with a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, and ** denote statistical significance at the 1%, and the 5% level, respectively.

Table 8: Reform Effect - Unobservable Firm Characteristics

Dep var:	I $DebtA_{it}$	II IR_{it}	III $InvA_{it}$	IV $DebtA_{it}$	V IR_{it}	VI $InvA_{it}$	VII $DebtA_{it}$	VIII IR_{it}	IX $InvA_{it}$	X $DebtA_{it}$	XI IR_{it}	XII $InvA_{it}$
UBA_t	0.0490***	-0.0035	-0.0163***	0.0415***	-0.0031	-0.0052	0.0070*	0.0133***	-0.0533***			
	[0.0037]	[0.0028]	[0.0053]	[0.0039]	[0.0029]	[0.0055]	[0.0038]	[0.0031]	[0.0052]			
$DR_i * UBA_t$	-0.0164***	-0.0041***	0.0028**	-0.0130***	-0.0037***	-0.0033**	-0.0045***	-0.0065***	0.0030**			
	[0.0012]	[0.0008]	[0.0013]	[0.0012]	[0.0008]	[0.0014]	[0.0012]	[0.0009]	[0.0014]			
$DR_i * event_t * UBA_t$	0.0102***	0.0049***	0.0083***	0.0061***	0.0045***	0.0093***	0.0055***	0.0018*	0.0168***			
	[0.0016]	[0.0011]	[0.0018]	[0.0015]	[0.0010]	[0.0019]	[0.0013]	[0.0010]	[0.0016]			
DR_{it}										0.0559***	0.0065***	-0.0233***
										[0.0033]	[0.0021]	[0.0018]
$DR_{it} * event_t$										0.0089***	0.0023**	0.0074***
										[0.0015]	[0.0009]	[0.0013]
Observations	157,784	144,474	157,609	157,784	144,248	157,609	179,600	156,473	179,342	75,566	68,503	75,469
R-squared	0.255	0.068	0.061	0.815	0.463	0.313	0.781	0.480	0.343	0.305	0.095	0.069
Firm FE	no	no	no	yes	yes	yes	yes	yes	yes	no	no	no
Ind FE	yes	yes	yes	-	-	-	-	-	-	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	firm	firm	firm	firm	firm	firm	firm	firm	firm	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$), annual interest rates (IR_{it}), and investment to asset ratio ($InvA_{it}$) on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_i), a dummy variable ($event_t$) that takes the value of zero for the years 2001 and 2005, and one for the 2002–2004 and 2006–2008 periods, a dummy variable (UBA_t), that takes the value of zero from 2001–2004, and one from 2005–2008, and the interaction of the independent variables in columns I–VI. Columns VII–IX replicate the main tests from Table 7 for the 2005–2008 period. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, and ** denote statistical significance at the 1%, and the 5% level, respectively.

Table 9: Reform Effect - Industry-Level Sorting

Dep var:	I $DebtA_{it}$	II IR_{it}	III $InvA_{it}$	IV $\Delta\ Profits_{it,t-1}/Assets_{it-1}$	V $RnDA_{it}$	VI $PatentsA_{it}$	VII $PatentsA_{it}$
$DR_{ind,t} * event_t$	0.0049**	0.0029**	0.0020**	0.0023*	0.0007*	0.0145***	0.0068***
	[0.0021]	[0.0014]	[0.0010]	[0.0013]	[0.0004]	[0.0031]	[0.0017]
Observations	179,474	163,353	179,217	168,726	31,414	70,905	179,464
R-squared	0.198	0.074	0.053	0.061	0.223	0.052	0.042
Year FE	yes	yes	yes	yes	yes	yes	yes
Ind FE	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$) interest rates (IR_{it}), investment to asset ratio ($InvA_{it}$), change in profits to assets ($\Delta\ Profits_{it,t-1}/Assets_{it-1}$), R&D spending to assets ratio ($RnDA_{it}$), and the number of patents issued to assets ($PatentsA_{it}$) on a lagged default risk measure that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms based on the average riskiness of the firms in industries the firms operate in ($DR_{ind,t}$), and the interaction of the default risk measure with a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Further details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5%, and the 10% level, respectively.

Table 10: Ownership

Dep var:	I $DebtA_{it}$	II IR_{it}	III $InvA_{it}$	IV $DebtA_{it}$	V IR_{it}	VI $InvA_{it}$	VII $DebtA_{it}$	VIII IR_{it}	IX $InvA_{it}$
DR_{it}	0.0501***	0.0053***	-0.0204***	0.0455***	0.0058***	-0.0210***	0.0706***	0.0102***	-0.0040**
	[0.0028]	[0.0013]	[0.0015]	[0.0031]	[0.0018]	[0.0019]	[0.0036]	[0.0015]	[0.0018]
$DR_{it} * event_t$	0.0147***	0.0027**	0.0078***	0.0096***	0.0035**	0.0063***	0.0123***	-0.0022	0.0056***
	[0.0019]	[0.0011]	[0.0012]	[0.0022]	[0.0017]	[0.0017]	[0.0031]	[0.0017]	[0.0016]
$family_i$	0.0005	0.0023	0.0059						
	[0.0061]	[0.0025]	[0.0053]						
$family_i * event_t$	-0.0172***	-0.0010	-0.0201***						
	[0.0064]	[0.0035]	[0.0062]						
$family_i * DR_{it}$	0.0005	-0.0025***	-0.0017						
	[0.0020]	[0.0008]	[0.0014]						
$family_i * DR_{it} * event_t$	0.0065***	0.0003	0.0054***						
	[0.0018]	[0.0011]	[0.0016]						
$herf\ owner_i$				-0.0004	0.0002	0.0007			
				[0.0023]	[0.0011]	[0.0020]			
$herf\ owner_i * event_t$				-0.0063***	0.0006	-0.0061***			
				[0.0019]	[0.0013]	[0.0021]			
$herf\ owner_i * DR_{it}$				0.00177**	-0.0006	-0.0001			
				[0.0007]	[0.0003]	[0.0005]			
$herf\ owner_i * DR_{it} * event_t$				0.0027***	-0.0002	0.0013**			
				[0.0006]	[0.0004]	[0.0006]			
$ceo\ owner_i$							0.0247***	0.0060***	0.0261***
							[0.0031]	[0.0013]	[0.0028]
$ceo\ owner_i * event_t$							-0.0028	-0.0038***	-0.0073***
							[0.0022]	[0.0013]	[0.0022]
$ceo\ owner_i * DR_{it}$							-0.0023***	-0.0020***	-0.0056***
							[0.0009]	[0.0004]	[0.0007]
$ceo\ owner_i * DR_{it} * event_t$							0.0011*	0.0018***	0.0014**
							[0.0007]	[0.0004]	[0.0006]
Observations	138,834	126,628	138,715	138,834	126,628	138,715	138,834	126,628	138,715
R-squared	0.328	0.115	0.107	0.329	0.115	0.107	0.374	0.115	0.112
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$), annual interest rates (IR_{it}), and investment to asset ratio ($InvA_{it}$) on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010, a dummy variable that takes the value of one for family firms, and zero for non-family firms ($family_i$) in columns I–III, a variable that sorts firms into quintiles according to the herfindahl index of ownership concentration ($herf\ owner_i$) in columns IV–VI, and a variable that sorts firms into quintiles according to CEOs' stock ownership share ($ceo\ owner_i$) in columns VII–IX, and the interactions of all independent variables. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5%, and the 10% level, respectively.

Table 11: Cross-Sectional Tests

	I	II	III	IV	V	VI	VII	VIII	IX
	Cash Flow Volatility			Tangibility			Investment Opportunities		
Dep var:	$DebtA_{it}$	IR_{it}	$InvA_{it}$	$DebtA_{it}$	IR_{it}	$InvA_{it}$	$DebtA_{it}$	IR_{it}	$InvA_{it}$
DR_{it}	0.0589***	0.0008	-0.0299***	0.0473***	0.0035	0.0193***	0.0659***	0.0066***	-0.0036*
	[0.0045]	[0.0015]	[0.0029]	[0.0039]	[0.0021]	[0.0023]	[0.0029]	[0.0017]	[0.0019]
$DR_{it} * event_t$	0.0115**	-0.0010	0.0045*	0.0152***	0.0069***	-0.0268***	0.0061**	0.0017	0.0037**
	[0.0055]	[0.0011]	[0.0026]	[0.0038]	[0.0016]	[0.0029]	[0.0027]	[0.0017]	[0.0019]
$CF\ vola_i$	-0.0210***	-0.0069****	-0.0058**						
	[0.0037]	[0.0009]	[0.0023]						
$CF\ vola_i * event_t$	-0.0104***	0.0006	-0.0070***						
	[0.0035]	[0.0013]	[0.0022]						
$CF\ vola_i * DR_{it}$	-0.0016	0.0016***	0.0026***						
	[0.0010]	[0.0003]	[0.0006]						
$CF\ vola_i * DR_{it} * event_t$	0.0024*	0.0008**	0.0014**						
	[0.0013]	[0.0004]	[0.0006]						
$tang_i$				0.0223***	-0.0011	0.1059***			
				[0.0052]	[0.0012]	[0.0045]			
$tang_i * event_t$				-0.0169***	0.0010	-0.0828***			
				[0.0039]	[0.0013]	[0.0044]			
$tang_i * DR_{it}$				-0.0049***	0.0004	-0.0146***			
				[0.0016]	[0.0004]	[0.0010]			
$tang_i * DR_{it} * event_t$				0.0015	-0.0012***	0.0136***			
				[0.0012]	[0.0004]	[0.0010]			
q_i							0.0370***	0.0020	0.0415***
							[0.0026]	[0.0014]	[0.0037]
$q_i * event_t$							-0.0086***	0.0015	-0.0193***
							[0.0028]	[0.0016]	[0.0030]
$q_i * DR_{it}$							-0.0051***	-0.0007*	-0.0059***
							[0.0008]	[0.0004]	[0.0009]
$q_i * DR_{it} * event_t$							0.0031***	0.0005	0.0016**
							[0.0009]	[0.0004]	[0.0007]
Observations	159,247	145,540	159,091	159,983	145,911	159,854	154,317	140,954	154,167
R-squared	0.333	0.109	0.105	0.275	0.113	0.145	0.327	0.109	0.118
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$), interest rates (IR_{it}), and investment to asset ratio ($InvA_{it}$) on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010, a variable that sorts firms into quintiles accoriding to their pre-reform level of cash flow volatility ($CF\ vola_i$) in columns I–III, a variable that sorts firms into quintiles according to their pre-reform level of asset tangibility ($tang_i$) in columns IV–VI, and a variable that sorts firms into quintiles according to their pre-reform level of investment opportunities (q_i) in columns VII–IX, and the interactions of all independent variables. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5%, and the 10% level, respectively.

Table 12: Investment - Growth in Firm Profits

Dep var:	I	II	III	IV	V	VI	VII	VIII
	$\Delta\ Profits_{it,t-1}/Assets_{it-1}$							
DR_{it}	0.0065***	0.0027***	0.0023***	0.0055***	0.0033*	0.0166***	0.0073***	0.0108***
	[0.0010]	[0.0009]	[0.0009]	[0.0013]	[0.0018]	[0.0013]	[0.0010]	[0.0017]
$DR_{it} * event_t$	0.0053***	0.0043***	0.0044***	-0.0146***	0.0013	-0.0013	0.0054***	0.0014
	[0.0007]	[0.0007]	[0.0007]	[0.0015]	[0.0023]	[0.0015]	[0.0011]	[0.0015]
$CF\ vola_i$				0.0076***				
				[0.0013]				
$CF\ vola_i * event_t$				-0.0247***				
				[0.0020]				
$CF\ vola_i * DR_{it}$				-0.0010***				
				[0.0003]				
$CF\ vola_i * DR_{it} * event_t$				0.0060***				
				[0.0005]				
$tang_i$					-0.0034*			
					[0.0018]			
$tang_i * event_t$					-0.0009			
					[0.0021]			
$tang_i * DR_{it}$					-0.0003			
					[0.0005]			
$tang_i * DR_{it} * event_t$					0.0012*			
					[0.0006]			
q_i						0.0248***		
						[0.0014]		
$q_i * event_t$						-0.0153***		
						[0.0017]		
$q_i * DR_{it}$						-0.0044***		
						[0.0004]		
$q_i * DR_{it} * event_t$						0.0017***		
						[0.0005]		
$family_i$							0.0309***	
							[0.0044]	
$family_i * event_t$							-0.0087**	
							[0.0043]	
$family_i * DR_{it}$							-0.0084***	
							[0.0013]	
$family_i * DR_{it} * event_t$							0.0025**	
							[0.0013]	
$ceo\ owner_i$								0.0094***
								[0.0014]
$ceo\ owner_i * event_t$								-0.0043***
								[0.0015]
$ceo\ owner_i * DR_{it}$								-0.0029***
								[0.0004]
$ceo\ owner_i * DR_{it} * event_t$								0.0014***
								[0.0004]
Observations	197,139	178,623	178,623	159,242	159,976	154,312	138,829	138,829
R-squared	0.012	0.064	0.112	0.121	0.118	0.127	0.125	0.125
Year FE	yes	yes	-	-	-	-	-	-
Ind FE	no	yes	-	-	-	-	-	-
Ind-Year FE	no	no	yes	yes	yes	yes	yes	yes
Controls	no	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' profits growth scaled by assets ($\Delta\ Profits_{it,t-1}/Assets_{it-1}$) on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), a dummy variable ($event_t$) that takes the value of zero in the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010, a variable that sorts firms into quintiles accoriding to their pre-reform level of cash flow volatility ($CF\ vola_i$) in column IV, a variable that sorts firms into quintiles accoriding to their pre-reform level of tangibility ($tang_i$) in column V, a variable that sorts firms into quintiles accoriding to their pre-reform level of investment opportunities (q_i) in column VI, a variable that sorts firms into quintiles according to their CEO ownership share ($ceo\ owner_i$) in column VII, and the interactions of all independent variables. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5% level, and the 10% level, respectively.

Table 13: Investment - Cash Flow Volatility

Dep var:	I	II	III	IV	V	VI	VII	VIII
				$cf\ vola_{it}$				
DR_{it}	0.3985***	-0.1001***	-0.1087***	-0.3417***	-0.0449	0.1286***	-0.1070***	0.1195***
	[0.0238]	[0.0243]	[0.0232]	[0.0369]	[0.0505]	[0.0279]	[0.0287]	[0.0372]
$DR_{it} * event_t$	0.0351	0.1677***	0.1794***	-0.1485***	0.1638***	0.0686*	0.2087***	0.1281***
	[0.0270]	[0.0189]	[0.0179]	[0.0399]	[0.0394]	[0.0372]	[0.0261]	[0.0461]
$CF\ vola_i$				-0.1161***				
				[0.0290]				
$CF\ vola_i * event_t$				0.3934***				
				[0.0418]				
$CF\ vola_i * DR_{it}$				0.1099***				
				[0.0093]				
$CF\ vola_i * DR_{it} * event_t$				0.0346**				
				[0.0150]				
$tang_i$					0.0462			
					[0.0283]			
$tang_i * event_t$					-0.0888**			
					[0.0331]			
$tang_i * DR_{it}$					-0.0322***			
					[0.0114]			
$tang_i * DR_{it} * event_t$					0.0192*			
					[0.0113]			
q_i						0.4434***		
						[0.0285]		
$q_i * event_t$						-0.2583***		
						[0.0314]		
$q_i * DR_{it}$						-0.0953***		
						[0.0092]		
$q_i * DR_{it} * event_t$						0.0505***		
						[0.0105]		
$family_i$							0.0531	
							[0.0600]	
$family_i * event_t$							-0.1522*	
							[0.0843]	
$family_i * DR_{it}$							-0.0469**	
							[0.0223]	
$family_i * DR_{it} * event_t$							0.0615*	
							[0.0318]	
$ceo\ owner_i$								0.2384***
								[0.0257]
$ceo\ owner_i * event_t$								-0.1597***
								[0.0314]
$ceo\ owner_i * DR_{it}$								-0.0825***
								[0.0089]
$ceo\ owner_i * DR_{it} * event_t$								0.0362***
								[0.0118]
Observations	46,160	45,891	45,891	37,468	37,759	36,203	31,802	31,802
R-squared	0.080	0.398	0.408	0.522	0.431	0.442	0.442	0.445
Event FE	yes	yes	-	-	-	-	-	-
Ind FE	no	yes	-	-	-	-	-	-
Ind-Event FE	no	no	yes	yes	yes	yes	yes	yes
Controls	no	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' cash flow volatility ($cf\ vola_{it}$) on a default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010, a variable that sorts firms into quintiles accoriding to their pre-reform level of cash flow volatility ($CF\ vola_i$) in column IV, a variable that sorts firms into quintiles accoriding to their pre-reform level of tangibility ($tang_i$) in column V, a variable that sorts firms into quintiles accoriding to their pre-reform level of investment opportunities (q_i) in column VI, a variable that sorts firms into quintiles according to their CEO ownership share ($ceo\ owner_i$) in column VII, and the interactions of all independent variables. For the dependent variable, cash flow volatility ($cf\ vola_{it}$) is computed separately for the pre-reform and post-reform period. The default rank variable and the control variables are the averages of the variables for the respective period. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5%, and the 10% level, respectively.

Table 14: Innovation

Dep var:	I $RnDA_{it}$	II $RnDA_{it}$	III $RnDA_{it}$	IV $PatentsA_{it}$	V $PatentsA_{it}$	VI $PatentsA_{it}$	VII $PatentsA_{it}$
DR_{it}	-0.0127***	-0.0096***	-0.0100***	-0.0527***	-0.0455***	-0.0450***	-0.0185***
	[0.0011]	[0.0008]	[0.0010]	[0.0045]	[0.0036]	[0.0036]	[0.0021]
$DR_{it} * event_t$	0.0023***	0.0013*	0.0015*	0.0207***	0.0143***	0.0119***	0.0057***
	[0.0008]	[0.0007]	[0.0008]	[0.0046]	[0.0033]	[0.0037]	[0.0016]
Observations	32,947	31,250	31,250	74,915	70,534	70,534	178,636
R-squared	0.083	0.222	0.282	0.014	0.060	0.142	0.089
Year FE	yes	yes	-	yes	yes	-	-
Ind FE	no	yes	-	no	yes	-	-
Ind-Year FE	no	no	yes	no	no	yes	yes
Controls	no	yes	yes	no	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' R&D expenditures to asset ratio ($RnDA_{it}$) and number of annual patent applications ($PatentsA_{it}$) per billion won of firms' assets on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), and the interaction of the default risk variable with a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5%, and the 10% level, respectively.

Appendix A. Unified Bankruptcy Act

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

- The UBA does not contain an automatic stay mechanism. The court may, however, 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 UBA the debtor may sell part of the firm before the confirmation of a rehabilitation plan if approved by the court and not in violation with other procedural regulations. In contrast, under the CRA any sale on account of the firm was prohibited until the confirmation of a reorganization plan.
- Under the CRA all creditors needed to file their claims before a deadline set by the court for the claims to be considered. The new act assumes all claims to be filed that appear on a list of creditors submitted by the receiver (typically debtor's management).
- Under the CRA a viability test compared the liquidation value and the value of the company as going concern. In case of the liquidation value exceeding the continuation value the court was bound to mandate liquidation of the company. Under the UBA each creditor is guaranteed to receive at least the amount she would receive under liquidation unless the creditor agrees to a lower amount. The old law did not provide such guarantee to creditors.
- Under the UBA the establishment of a creditors' committee is mandatory. The creditor committee coordinates the interest of the creditors and may demand specific information from the debtor and request an investigation of the rightfulness 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 for in Korea were recognized.

Appendix B. Additional Tables

Table A.1: Reform Effect - Time-Varying Effects of Control Variables

	I	II	III
Dep var:	$DebtA_{it}$	IR_{it}	$InvA_{it}$
DR_{it}	0.0507***	0.0051***	-0.0229***
	[0.0025]	[0.0010]	[0.0016]
$DR_{it} * event_t$	0.0202***	0.0046***	0.0088***
	[0.0022]	[0.0014]	[0.0015]
Observations	178,636	162,576	178,391
R-squared	0.311	0.114	0.100
Ind-Year FE	yes	yes	yes
Controls	yes	yes	yes
Clustered SE	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$), interest rates (IR_{it}), and investment to asset ratio ($InvA_{it}$) on a lagged default risk measure that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), and the interaction of the default risk measure with a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. All control variables are interacted with the event dummy. Further details on control variables for each regression can be found in the text. *** denotes statistical significance at the 1% level.

Table A.2: Investment - Growth in Assets

Dep var:	I	II	III	IV	V	VI	VII	VIII
				Δ $Assets_{it}$				
DR_{it}	-0.1092***	-0.0804***	-0.0806***	-0.0907***	-0.0534***	0.0185***	-0.0676***	-0.0342***
	[0.0045]	[0.0041]	[0.0047]	[0.0068]	[0.0105]	[0.0044]	[0.0043]	[0.0058]
$DR_{it} * event_t$	0.0367***	0.0226***	0.0261***	0.0134**	-0.0084	-0.0199***	0.0278***	0.0217***
	[0.0031]	[0.0022]	[0.0035]	[0.0057]	[0.0102]	[0.0049]	[0.0038]	[0.0047]
$CF\ vola_i$				0.0137**				
				[0.0064]				
$CF\ vola_i * event_t$				-0.0249***				
				[0.0077]				
$CF\ vola_i * DR_{it}$				0.0029**				
				[0.0015]				
$CF\ vola_i * DR_{it} * event_t$				0.0055***				
				[0.0020]				
$tang_i$					0.0324***			
					[0.0119]			
$tang_i * event_t$					-0.0471			
					[0.0136]			
$tang_i * DR_{it}$					-0.0075***			
					[0.0027]			
$tang_i * DR_{it} * event_t$					0.0129***			
					[0.0028]			
q_i						0.1814***		
						[0.0081]		
$q_i * event_t$						-0.1181***		
						[0.0083]		
$q_i * DR_{it}$						-0.0289***		
						[0.0022]		
$q_i * DR_{it} * event_t$						0.0156***		
						[0.0022]		
$family_i$							-0.0032	
							[0.0141]	
$family_i * event_t$							-0.0319*	
							[0.0163]	
$family_i * DR_{it}$							0.0008	
							[0.0039]	
$family_i * DR_{it} * event_t$							0.0079*	
							[0.0041]	
$ceo\ owner_i$								0.0530***
								[0.0066]
$ceo\ owner_i * event_t$								-0.0236***
								[0.0052]
$ceo\ owner_i * DR_{it}$								-0.0113***
								[0.0017]
$ceo\ owner_i * DR_{it} * event_t$								0.0036**
								[0.0014]
Observations	197,152	178,636	178,636	159,569	159,983	154,317	138,834	138,834
R-squared	0.056	0.084	0.124	0.130	0.130	0.164	0.140	0.136
Year FE	yes	yes	-	-	-	-	-	-
Ind FE	no	yes	-	-	-	-	-	-
Ind-Year FE	no	no	yes	yes	yes	yes	yes	yes
Controls	no	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' asset growth rate (Δ $Assets_{it}$) on a lagged default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}), a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010, a variable that sorts firms into quintiles accoriding to their pre-reform level of cash flow volatility ($CF\ vola_i$) in column IV, a variable that sorts firms into quintiles accoriding to their pre-reform level of tangibility ($tang_i$) in column V, a variable that sorts firms into quintiles accoriding to their pre-reform level of investment opportunities (q_i) in column VI, a variable that sorts firms into quintiles according to their CEO ownership share ($ceo\ owner_i$) in column VII, and the interactions of all independent variables. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5% level, and the 10% level, respectively.

Table A.3: Default Risk Model - Reorganization Model

Dep var: $default_{it}$	I Full Sample	II Pre-Reform	III Post-Reform
NITA	-5.1166***	-5.1663***	-4.6836***
	(0.3654)	(1.1981)	(0.3907)
TLTA	1.4096***	0.8605	1.2762***
	(0.2324)	(0.6504)	(0.2383)
CASHTA	-10.2968***	-3.2020	11.6206***
	(1.5044)	(3.0725)	(1.6763)
RSIZE	0.3035***	0.4945***	0.3263***
	(0.0365)	(0.1086)	(0.0410)
SALETA	0.0709	0.0205	0.1357***
	(0.0451)	(0.1632)	(0.0452)
WCTA	-0.3013*	0.0773	-0.2509
	(0.1652)	(0.4980)	(0.1737)
RETA	0.7775***	-0.2297	0.5521***
	(0.1989)	(0.5664)	(0.2065)
Constant	-3.6991***	-3.2382***	-2.8362***
	(0.4396)	(1.3060)	(0.4846)
Observations	197,590	92,399	105,191
Failures	405	33	372
Pseudo-R2	0.119	0.161	0.118

This table shows the estimation results of the logit regression of an indicator that takes the value of one for year in which a firm filing for reorganization, and zero otherwise on the explanatory variables of the default risk model, separately for the full sample, the pre-reform and post-reform model.

Table A.4: Reform Effect - Robustness Tests

	I	II	III	IV	V	VI	VII	VIII	IX
	Reorganization Model			Period-Specific Model			Interest Coverage		
Dep var:	$DebtA_{it}$	IR_{it}	$InvA_{it}$	$DebtA_{it}$	IR_{it}	$InvA_{it}$	$DebtA_{it}$	IR_{it}	$InvA_{it}$
DR_{it}	0.0578***	0.0072***	-0.0176***	0.0399***	0.0052***	-0.0263***	0.0696***	0.0189***	-0.0099***
	[0.0021]	[0.0013]	[0.0012]	[0.0026]	[0.0015]	[0.0016]	[0.0019]	[0.0015]	[0.0010]
$DR_{it} * event_t$	0.0159***	0.0016***	0.0066***	0.0272***	0.0030***	0.0131***	0.0127***	0.0026***	0.0072***
	[0.0019]	[0.0007]	[0.0009]	[0.0020]	[0.0008]	[0.0013]	[0.0020]	[0.0009]	[0.0010]
Observations	178,636	162,576	178,391	178,636	162,576	178,391	180,595	164,405	180,351
R-squared	0.326	0.113	0.096	0.302	0.111	0.102	0.359	0.144	0.094
Ind-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clustered SE	ind	ind	ind	ind	ind	ind	ind	ind	ind

This table shows the results of regressing firms' debt to asset ratio ($DebtA_{it}$), interest rates (IR_{it}), and investment to asset ratio ($InvA_{it}$) on a lagged reorganization risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}) in columns I–III, a default risk variable computed from period-specific default risk models that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms (DR_{it}) in columns IV–VI, and a default risk variable that takes the value of one for the safest quintile of firms, up to five for the riskiest quintile of firms based of firms interest coverage ratio (DR_{it}) in columns VII–IX , and the interaction of the default risk variable with a dummy variable ($event_t$) that takes the value of zero for the pre-reform period from 2001–2005, and one for the post-reform period from 2006–2010. Standard errors are reported in brackets. The bottom of the table provides information on fixed effects and the clustering of standard errors. Details on control variables for each regression can be found in the text. ***, **, and * denote statistical significance at the 1%, the 5%, and the 10% level, respectively.