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Corporate Governance and Risk of Default

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Abstract: Using 201 bankrupt and 2,751 non-bankrupt firms from the Investor Responsibility Research Center (IRRC) U.S. dataset for the period 1990-2006, we show that the rules of governance have a significant nonlinear impact on bankruptcy risk. In general, the likelihood of default is negatively related to the number of governance provisions, which allow managers to fend off challenges from shareholders. This finding supports the view that risk-averse managers prefer conservative policy choices. In addition, we find that as a greater number of governance provisions are put into place, the probability of default is decreasing but at a decreasing rate, suggesting that the larger managerial private benefits of control will reduce firm value and eventually increase the risk of default. Our findings imply that for firms with the strongest governance, a weakening of shareholder rights will decrease the probability of distress, but for firms with the weakest governance, a further weakening of shareholder rights will increase the probability of distress.

1. Introduction

Corporate governance has received considerable attention in recent years. Regulatory reforms in response to Enron-like governance failures concentrate heavily on board independence. However, academic research generally suggests that board structures should not be a matter of one-size-fits-all and thus mandating changes are likely ineffective and cost inefficient [see Linck, Netter and Yang (2008); Gillan and Martin (2007), and Coles, Daniel and Naveen (2008)]. The existence of a corporate board, in theory, is to solve the agency problem between diffused shareholders and management. Accordingly, the economic function of the board depends on the organizational problem it helps to address.

For example, the level of optimal board monitoring increases with the firm's operating complexity since the managerial private benefits are greater in such firms. As the benefits relative to the costs of monitoring increase, it is in the interest of shareholders to bring more independent outsiders to the board. The argument that boards evolve as an efficient response to a firm's operating environment is based on the presumption that the directors are delegates and the ultimate authority rests with the shareholders. However, whether shareholders can easily and quickly replace the directors who do not optimize shareholders' value so as to have effective control over management is largely restricted by the specific rules of corporate charter provisions, some of which might even be put in place before a broad public float of shares. Existing directors can protect themselves and the management team from shareholder demands and the challenges in the open market for corporate control by using a variety of tactics, such as antitakeover provisions as well as other devices that restrict shareholder ability to change charter and/or bylaws or to call for a shareholder meeting. Therefore, the set of governance rules and procedures under which each firm operates determines the balance of power between shareholders and managers and as a result, greatly influences managerial incentives and decision-making.

In this paper we examine the impact of the power of managers relative to shareholders on the risk of default. Business failures may have many parents, such as poor judgment of the decision makers and ineffectively developed internal and external control systems. The objective of this paper is to investigate whether the rules and procedures governing the power-sharing relationship between shareholders and management [1] are an important factor that contributes to inefficient governance, leading to company failure.

Prior empirical research generally shows that firms with strong shareholder rights are associated with higher equity value. Gompers, Ishii and Metrick (2003) construct a governance index based on 24 corporate provisions that reduce shareholder rights. The authors show that a portfolio buying stocks with the highest level of shareholder rights and selling stocks with the lowest level of shareholder rights generates an annualized abnormal return of 8.5% from 1990 to 1999. However, it is less clear whether strong governance that reserves little management power would increase or decrease the risk of distress. Shareholders in levered firms

[1] For the remainder of this paper, we refer to "management" as comprising both management and current directors and we refer interchangeably to corporate governance "rules" and "provisions," and interchangeably "shareholder rights" and "shareholder power."

have incentives to undertake risky investment projects at the expense of creditors. The reason is that shareholders capture most of the gains if the project is successful but have limited loss if the project fails. The pressure on the management to pursue riskier investment and financing policies is expected to be higher at companies where shareholders can easily discipline the management through changes in the boards or hostile takeovers. From this view, firms with governance tilting towards the strongest shareholder control would be more likely to experience financial distress. However, the governance rules that reserve much of the power for management do not necessarily establish long-term stability for the company. Poor governance implies the presence of a management entrenchment problem. At firms with the highest level of management power, the costs associated with self-interested managerial behaviors such as empire building, shirking or even fraud can significantly reduce firm value and increase the risk of distress. Therefore, the net impact of shareholder power over management on the probability of default is ambiguous and ultimately an empirical issue.

This paper relies on realized corporate default data to investigate whether the risk of default is systematically correlated with the balance of power between managers and shareholders in terms of the number of corporate provisions that reduce shareholder rights. Using data on U.S. companies covered by the Investor Responsibility Research Center for the period 1990-2006, we identify 201 bankruptcies out of 2,952 public traded firms with required information. We begin our analysis by examining how the common measures of distress risk vary with the governance index that proxy the power of management relative to shareholders. We find that the level of management power first increases and then decreases across the bankruptcy score ranked portfolios, implying that the relationship between distress risk and the strength of shareholder rights is not monotonic. We also find that the insolvent firms have a larger fraction of extreme governance than do the solvent firms placed into the lowest bankruptcy score portfolio. The results suggest that given the similarly poor profitability and financial state of these firms, default is more likely when governance is either too strong or too weak. Finally, controlling for industry, leverage, profitability and other financial variables shown to be predictive in insolvency in prior bankruptcy research [e.g. Altman (1968) and Ohlson (1980)], we find evidence that the balance of power between managers and shareholders influences the risk of financial distress. Specifically, the probability of default is strongly negatively related to the governance index that proxies for management power but weakly positively related to the squared term of the governance index. The results are robust to

alternative measures of governance and model specifications. Our findings provide support for the hypothesis that more corporate provisions that allow managers to fend off the constant pressure from shareholders will lead to a lower risk-taking incentive and result in a lower probability of default. However, the managerial private benefits of control and the resulting loss of firm value also increases with the number of corporate provisions put into place. Accordingly, the net impact of governance rules on the risk of financial distress is nonlinear. Our results suggest that for firms with strong governance, a weakening of shareholder rights will decrease the probability of distress, but for firms with the weakest level of governance, a further weakening of shareholder rights will increase the probability of distress.

Our paper contributes to the literature in several ways. First, we provide the first direct evidence that financial distress is systematically correlated with the balance of power between managers and shareholders. In fact, our results suggest that the power "imbalance" in corporate governance, either tiling toward strongest shareholder rights or strongest management rights, can motivate inappropriate managerial behaviors and lead to higher risk of default. Several prior empirical studies examine the influence of corporate governance on the cost of debt financing in terms of bond yield or rating [see Klock, Mansi and Maxwell (2005), and Ashbaugh-Skaife, Collins and Lafond (2006), and Cremers, Nair and Wei (2007)]. Their results show the effect of governance rules on the assessed risk of default by the credit market. Our paper extends the literature by showing the direct link between governance and realized corporate default instead of the perception of credit risk extracted from corporate bond ratings and spreads. Second, our analysis provides a possible explanation for the seemly contradictory results from earlier studies. Klock, Mansi and Maxwell (2005) and Ashbaugh-Skaife, Collins and Lafond (2006) suggest that antitakeover measures and other provisions that reduce shareholder rights are viewed positively in the credit market. However, Bradley, Chen, Dallas and Snyderwine (2007) find just the opposite and argue that mergers provide the co-insurance effect for corporate debt (Kim and McConnell 1977), and thus reduce credit risk of the merged firms. While it is unclear whether there is significant difference in the distribution of the sample firms in these studies, our empirical evidence of the non-monotonic relation between the rules of governance and the probability of default provides a possible resolution to their findings.

The remainder of the paper is organized as follows. Section 2 discusses the related literature and the development of our hypothesis. Section 3 describes the data and methodology we use in this study. Section 4 presents the primary empirical results and Section 5 concludes.

2. Literature Review

2.1 Bankruptcy prediction models

While there can be a variety of events such as layoffs and plummeting share prices befalling failing firms, financial distress must involve a situation where a firm's cash flow is not sufficient to meet its indebtedness obligations. Accordingly, firms on the verge of bankruptcy may be identified systematically by their financial profiles. A large literature on assessing distress risk evolves around the pioneering work by Altman (1968). Using financial statements ratios and multiple discriminant analysis, Altman identifies five out of the initial twenty-two variables to be predictive in financial distress for public traded manufacturing firms. The five variables selected to calculate his famous Z score include the working capital ratio to measure the liquidity, the retained earnings ratio to measure the cumulative profitability, the earnings before interest and taxes to measure cash flow from operations, the market capitalization to debt ratio to assess the market belief in firm's financial position and the asset turnover ratio to evaluate the asset management efficiency. Altman's Z score, as a linear combination of the five critical financial ratios, provides information about the firm's financial health. Specifically, the greater the firm's financial distress, the lower the Z score. For his sample of 66 firms, Altman finds that the Z score can forecast a corporate default as far as two years in advance.

Ohlson (1980) argues that certain statistical requirements such as distributional properties and normality are hard to be satisfied when using discriminant analysis as used in Altman's model. To avoid these problems, he uses the logistic regression to model bankruptcy. Ohlson proposes that the likelihood that a firm will be in financial distress depends on firm's operating performance and financial state. In Ohlson's model, the financial state is measure by size, liquidity, short-term debt and total leverage position, and the operating performance is measured by profitability, operating cash flow and whether the firm has consecutive losses in recent two years or is in stock-based insolvency (total liabilities exceeding total assets). The researcher finds that the two sets of

variables contribute independently of each other to the likelihood function, suggesting that both the operating performance and the financial state variables are important in predicting financial distress.

The models proposed by Altman and Ohlson constitute the static approach to default estimation. Shumway (2001) on the other hand, introduces the dynamic approach to model the default event, known as multi-period logic model. Compared with prior research on bankruptcy prediction, Shumway uses a much larger data size and the data lies over a much longer period[2]. The dependent variable in his model is the time that a firm stays solvent and his independent variables include the variables used in calculating Altman's Z score plus size and some market-based variables such as stock return and standard deviation. Chava and Jarrow (2004) extend Shumway's model to include industry effects, financial companies and monthly stock return and standard deviation and they use an even larger data set over even longer period[3] than Shumway (2001) does. Chava and Jarrow claim that when market variables are included in their model, the accounting variables add little power in forecasting firm failure.

2.2 Corporate governance rules, firm performance and default risk

Shareholders elect board of directors who delegate most decisions to top managers. While on the surface shareholders have the ultimate authority, the actual balance of power between shareholders and management depends on the specific governance provisions. Thus, the rules of governance should have influence on managerial incentive and firm performance. Gompers, Ishii and Metrick (GIM, 2003) create a governance index (G index) using twenty-four corporate charter provisions of approximate 1,500 U.S. firms traced by the Investor Responsibility Research Center (IRRC) Institute since 1990[4]. The twenty-four provisions can be classified into five groups. The *States* group contains six state laws related to acquisitions. The *Delay* groups include four provisions that slow down the takeover process such as classified boards and limitations for calling special meeting. The *Voting* group contains six provisions related elections and charter amendments. The

[2] Shumway's data contains 300 bankruptcies out of 3,182 non-financial companies for the period 1962-1992. In comparison, Ohlson's data contains 105 bankrupt firms and 2,058 nonbankrupt firms for the period 1970-1976.

[3] Chava and Jarrow (2004) use a simpler definition of Chapter 7 and Chapter 11 filing of the company. Their data contains 1,197 bankruptcies out of 17,460 companies for the period 1962-1999.

[4] The IRRC tracks 22 charter provisions, bylaw provisions and other firm-level rules plus coverage under state takeover laws to yield 24 unique provisions (for details see Gompers, Ishii and Metrick 2003)

Protection groups contain six provisions regarding protections and compensations provided to managers and directors, and the *Other* group contains other devices intended to increase the cost of a takeover. GIM's G index is constructed like a scoring system, increasing by one for every manager-friendly provision that a firm has. Thus, the higher the G index value, the larger the power of management relative to shareholders. GIM find that firms with lower G index exhibit better operating performance and have higher market-to-book ratios than firms with high G index. Their result suggests that weak shareholder rights cause additional agency costs and hence depress firm performance.

Bebchuk, Cohen, and Ferrell (BIF, 2004) argue that six of the twenty-four IRRC provisions play a more significant role than do other eighteen provisions in driving the correlation between governance and firm value.[5] To test this hypothesis, they use the six provisions to create an alternative governance index (E index), with a minimum value of zero and a maximum value of six. Their results show that decrease in firm value is monotonically correlated with increase in E index (weaker shareholder rights) but uncorrelated with the other eighteen provisions.

Several studies look into the causal relation between governance and firm performance. Lehn, Patro and Zhao (2007) argue that the positive relation between firm value (market-to-book ratio) and governance indices is caused by the fact that high-growth firms are less likely to become targets of unsolicited bids and thus these firms are less likely to adopt antitakeover provisions. After controlling for market-to-book ratios during 1980s, the researchers do not find significant relation between governance indices and contemporaneous market-to-book ratios during the 1990s. Additionally, Bhagat and Bolton (2008) show that both GIM's G index and BIF's E index are positively correlated with both contemporaneous and subsequent profitability, suggesting causation runs from governance to operating performance.

The implication of strong governance associated with better operating performance is that firms with strong shareholder governance should be less likely to fail. Bhojraj and Sengupta (2003) suggest that strong governance alleviates the agency problem between managers and all outside stakeholders. However, stronger shareholder control while better align management to shareholders also

[5] The six provisions are: staggered boards, limits to bylaw and charter amendments, poison pills, golden parachutes, and supermajority requirements.

push for more risky policy choices. The conflicts of interest in investment and financing decisions between shareholders and creditors have been well documented in literature [e.g. Jensen and Meckling (1976) and Perrino and Weisbach (1999)]. For example, shareholders may treat takeovers as market discipline for poor management, but bondholders are concerned with takeover vulnerability, because increased leverage is often accompanied with takeovers, and such an increase in debt can significantly increase the likelihood of bankruptcy in the future (Warga and Welch 1993). Consistent with this view, Klock, Mansi and Maxwell (2005) and Ashbaugh-Skaife, Collins and Lafond (2006) show that creditors are in favor of antitakeover devices and other provisions that reduce shareholder rights. Conversely, entrenched managers tend to choose safer investment projects and financing policy since managers are undiversified with respect to firm-specific wealth compared with diversified shareholders. For example, entrenched managers would prefer equity to debt [Berger, Ofek and Yermack (1997)]. Thus, as more restrictions are placed on shareholder rights, the firm's policy choices tend to be less risky, and hence the likelihood that the firm will be in distress is smaller. However, weaker governance causes additional agency costs. When managers are more entrenched, the managerial private benefits of control also increase and result in loss of firm value. By this reasoning, we hypothesize that the risk of default decreases but at a decreasing rate as the balance of power shifts from shareholders toward management. As governance tilts toward dictatorship, a further weakening of shareholder rights is expected to increase the risk of default.

3. Data and Methodology

Our objective is to investigate whether the likelihood of corporate default is systematically correlated with governance provisions that determine the balance of power between shareholders and managers. We begin our empirical analysis by examining how the rules of governance, which proxy for the power of management relative to shareholders, are associated with two common measures of distress risk: Altman's Z score and Ohlson's O score. Next, we examine the effect of the governance rules on the probability of corporate default using a general logistic regression model that represents firm default as a function of governance, operating performance, financial state and asset characteristics. Our logistic function is given as follows

$$p(X)=P(Y=1;X)= e^{\beta' X}/(1+e^{\beta' X}) \quad (1)$$

where the dichotomous dependent variable Y =1 if the company defaults in the period in which the data is taken and Y=0 if the company survives, X is the set of risk factors that have influence on the event of default and β is the vector of regression coefficients.

3.1 Variables

The risk factors used in our analysis include governance index that proxy for the power-sharing relationship between shareholders and managers, firm's asset characteristics and accounting measures of operating performance and financial state that are considered in conventional bankruptcy forecasting models.

Governance index: We use two alternative governance index: Gompers, Ishii and Metrick's (2003) governance index (G index), which is scored by twenty-four IRRC corporate provisions related to takeover defenses and shareholder rights, and Bebchuk, Cohen, and Ferrell's (2005) governance index (E index), which is scored by six corporate provisions related to shareholder voting and takeover defenses.

Operating Performance: As shown in prior research on bankruptcy, the accounting ratios that measure firm's operating performance and financial structure are important predictors for corporate default. Thus, we consider two sets of accounting variables used alternatively by Altman (1968) and Ohlson (1980) as proxies for firm's profitability, efficiency and financial state. The variables employed by Altman (1968) are the ratio of retained earnings over total assets (*reta*), which exhibits firm's ability to accumulate earnings, the earnings before interest and taxes over total assets (*ebitta)*, which approximates the cash from operations, the total asset turnover ratio (*sata*), which measures firm's efficiency in generating sales by utilizing its assets, the ratio of working capital (*wcta*) to total assets, which shows firm's liquidity position and market value of equity over total liabilities (*mvliab*), which indicates the market's belief in firm's financial position.

The variables employed by Ohlson (1980) include the ratio of net income to total assets (*nita*), which measures the current profit, the change in net income (*chin*), which indicates the change in profit from last period, the dummy variable equal to one if the book value of equity is negative (*oeneg*) and the dummy variable equal to one if the firm has net loss in the past two consecutive years (*intwo*) to capture the effect of the prolonged financial distress, the pretax income plus depreciation over total liabilities (*ffotl*) to approximate the cash flow coverage to total debt burden, the working capital ratio (*wcta*) and the ratio of current liabilities

to current assets (*clca*), which assess the proximity of the debt payments through available liquid assets, and the ratio of total liability to total assets to capture the size of debt burden.

Asset characteristics: In addition to the accounting variables that measure the profitability and debt burden of the firm, several recent studies suggest that growth opportunities and industry frailty reflect firm's operating environment and thus influence the risk of default [see Chava and Jarrow (2004), Shumway (2001) and Saretto (2006)]. To account for the contracting environment, we include size, the market-to-book ratio, R&D spending scaled by total assets and industry indicators as our additional explanatory variables.

3.2 Data

Since our empirical design is to relate governance and financial distress, firms will be selected only if they have valid corporate governance data and essential accounting information. The data employed in this paper include Gompers, Ishii and Metrick's (2003) governance index 1990-2006, Bebchuk, Cohen, and Ferrell's (2005) entrenchment index [6], accounting information from Compustat and bankruptcy lists from Lexis Nexis. As stated in previous section, G index and E index are derived from IRRC (Investor Responsibility Research Center Institute) publications on corporate charter provisions. As the IRRC tracks mainly S&P 1500 companies over the years[7], our final sample will more likely be larger firms.

Our sample selection process starts with identifying a preliminary sample of bankruptcies that span the period from 1990 to 2007 so G index data can be available prior to bankruptcy. Using Bankruptcy DataSource of Lexis Nexis, we first identify 1,236 chapter 11 bankruptcies during this period of time. 17 bankruptcies that are filed by the same companies for the second or the third time in less than 5 years are dropped since corporate governance structure of these firms may be affected by the event of bankruptcy itself. We then merge the preliminary bankruptcy list with the G index data through company names and verify by their industry codes. Out of the 1,219 bankruptcy filings, only 240 firms appear on the

[6] The data on Governance index and Entrenchment index can be downloaded from Professor Metrick's and Professor Bebchuk's websites. We thank the researchers for sharing their data.

[7] The IRRC's sample expanded to about 1,900 firms by adding several hundred firms with high institutional ownership after 1998. The IRRC's governance provisions data and thus G index data are provided every two or three years: 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2006.

list of companies with G index. The result of a small sample of bankruptcies is not surprising given that the firms traced by IRRC tend to be larger while failed firms are likely to be smaller. Because the objective of this study is to examine the impact of corporate governance on financial distress, firms must have valid governance index available prior to bankruptcy. We compare the bankruptcy year with the years when G/E index are available for each bankrupt firm and remove 34 firms that have no G index reported in three years prior to the bankruptcy year. Finally, the firms with G index data and do not declare bankruptcy will be used as the group of healthy firms.

The next step is to collect financial data and the objective is for each bankrupt firm to obtain three years of financial data prior to the date of bankruptcy. According to Ohlson (1980), distressed firms may be delayed in releasing their financial reports. To account for the time lag, we assume that financial statements for the bankrupt firms are released by the fifth month following the fiscal year-end. We check whether the company entered bankruptcy prior to or after the date of financial release. In case a company filed for bankruptcy at some point in time after the fiscal year date but prior to releasing the financial statements, we use the data one fiscal year earlier to avoid "back-casting" the default.

We then merge the data on G and E index with Compustat data. As the G and E index are not available on continuous year basis, for the years where G index is not available, we follow the common practice of filling in the missing years with the next available data or the average value of the G index in the previous year and next year (that is, we assume that the firm's G/E index value in 1997 has same value as in 1998, and the 1996 index value is equal to the average of 1997's and 1995's index values). Our final sample with required data consists of 201 bankruptcies and 2,751 healthy firms. Table 1 reports the number of bankruptcy filings in each year from 1990 through 2007. The highest level of bankruptcy filings is observed in 2001, consistent with the finding in Topaloglu and Yildirim (2009). Table 2 presents the industry distribution of our sample firms across nine different industry groups. While manufacturing firms account for the largest number of bankruptcy filings in the sample (76 out of 201), the percentage of bankruptcy filing within the manufacturing industry (5.9%) is lower than the overall percentage of bankruptcy filing among all sample firms (6.8%). We also observe higher percentages of bankruptcy filings within constructions (21.1%), trade (11.3%) and communications (10.7%).

Table 1

Frequency distribution of sample firms over time

This table reports the frequency distribution of sample firms. Column 2 contains the number of firms in the intersection of Compustat and IRRC universe with required data. Column 3 contains the number of firms that file for bankruptcy (total 201) and column 4 contains the percentage.

Filing year	Firms with required data	# of Firms that file for Bankruptcy	% of Firms that file for Bankruptcy
1990	924	9	0.97%
1991	931	16	1.72%
1992	1,001	7	0.70%
1993	1,007	8	0.79%
1994	1,090	2	0.18%
1995	1,052	4	0.38%
1996	1,022	4	0.39%
1997	1,378	4	0.29%
1998	1,383	9	0.65%
1999	1,399	13	0.93%
2000	1,280	22	1.72%
2001	1,522	25	1.64%
2002	1,436	24	1.67%
2003	1,593	23	1.44%
2004	1,467	11	0.75%
2005	1,329	9	0.68%
2006	1,209	5	0.41%
2007	1,182	6	0.51%

Table 2

Industry distribution of sample firms

This table reports the industry distribution of the sample firms.

SIC Code	Industry Classification	Failed firms	(%)	Healthy firms	(%)
01-14	Agriculture, Fishing, Mining	7	5.9%	111	94.1%
15-17	Constructions	4	21.1%	15	78.9%
20-39	Manufacturing	76	5.9%	1,220	94.1%
40-47	Transportation	7	9.6%	66	90.4%
48	Communication	13	10.7%	109	89.3%
49	Utilities	8	4.7%	162	95.3%
50-59	Trade	37	11.3%	291	88.7%
60-67	Finance	15	4.9%	292	95.1%
70-99	Services	34	6.7%	485	93.3%
Total		201	6.6%	2,751	93.2%

Table 3 presents the values of mean, median, standard deviation and the correlation coefficients between G index and all other key variables for the groups of bankrupt firms and healthy firms separately. For the bankrupt group the statistics summarize the observations over three years prior to bankruptcy. Overall, the means of the key variables between the two groups are significantly different (except R&D intensity). Unsurprisingly, the firms near bankruptcy exhibited deteriorated operating performance and struggled under strained liquidity and heavy debt burden. The market-based measures also reflect the difference between the two groups of firms: the distressed group has a mean (median) market-to-book of 1.4 (1.12) and a mean market-to-debt of 1.56 (0.45), while for the healthy group the comparable are 1.99 (1.52) and 4.75 (1.89), respectively. We note that the market-to-book ratios of the two groups are significantly different, but the distance is not striking. One possible reason for this is that while a firm's market-to-book ratio falls with its stock price, some of the distressed firms have book value approaching to zero and thus their market-to-book ratios can be very high [Franzen, Rodgers and Simin (2007)].

Regarding the governance index, the distressed group has a mean (median) G index of 8.46 (8) and a mean E index of 2.09 (2), while the healthy group has a mean (median) G index of 8.86 (9) and a mean E index of 2.23 (2), suggesting that healthy firms appear to have slightly weaker governance. Panel B of Table 3 provides more detailed information on the distribution of the G index for the two groups. More than a quarter of the distressed firms have governance rules leaning toward "democracy," with six or less provisions that reduce shareholder rights, while only 20% of the healthy sample firms can be classified as "democracy." On the other hand, 14.2% of the healthy firms have more than thirteen IRRC provisions, while only 10.7% of the distressed firms tilt toward "dictatorship." The last column of Panel A presents the sample correlations between G index and other risk factors. The G index is positively correlated with profit and cash flow from operations, suggesting that high-G firms are associated with better operating performance. However, the G index is also positively correlated with the leverage ratio and negatively correlated with the market-to-book ratio and the market-to-debt ratio, implying that high-G firms are associated with heavy debt and low market valuation. The simple correlations thus do not give a consistent indication whether stronger management power (that is, high governance index value) is associated with higher or lower risk of distress.

Table 3

Summary of Statistics

Panel A reports the descriptive statistics for the healthy sample firms and the sample firms that file for bankruptcy in three years. The key variables are *G index*: Gompers, Ishii and Metrick's (2003) governance index, *E index*: Bebchuk, Cohen, and Ferrell's entrenchment index (2005), *nita*: net income/ total assets, reta: retained earnings/ total assets, ffotl: funds from operations / total liabilities, ebitta: (earnings before interest and taxes)/ total assets, sata: sales/total assets, intwo: the dummy=1 if net income is negative in the past two years, oeneg: the dummy=1 if the book equity is negative, chin: (net income$_t$-net income$_{t-1}$)/(| net income$_t$ |+|net income$_{t-1}$ |), wcta: working capital / total assets, clca: current liability /current assets, tlta: total liabilities over total assets, mvliab: market value of equity /total assets, size: log of total assets, mtb: (total assets− book value of equity + market value of equity)/total assets, R&D: R&D/total assets. * indicates significance at the 1% level.

Panel A: Descriptive Statistics

	Healthy Companies				Companies that file for bankruptcy in three years			
	Mean	Median	Std. dev.	Correlation with G index	Mean	Median	Std. dev.	Correlation with G index
Governance								
G index	8.86	9.00	2.70	1.00	8.46	8	2.78	
E index	2.23	2.00	1.34	0.74*	2.09	2	1.37	0.78*
Operating performance:								
Nita	0.02	0.04	0.21	0.03*	-0.15	-0.03	0.48	0.06
Reta	0.12	0.22	1.34	0.04*	-0.52	0.01	5.06	0.03
Ffotl	0.26	0.20	0.82	-0.03*	-0.10	0.02	0.82	0.05
Ebitta	0.07	0.09	0.21	0.03*	-0.10	0.01	0.47	0.08*
Sata	1.11	0.97	0.78	0.03*	1.29	1.08	0.93	0.06
Intwo	0.10	0.00	0.30	-0.07*	0.26	0	0.44	-0.10*
Chin	0.02	0.05	0.52	0.00	-0.20	-0.18	0.66	0.01
Oeneg	0.03	0.00	0.17	-0.03*	0.15	0	0.37	-0.04
Financial state:								
Wcta	0.21	0.19	0.22	-0.16*	0.10	0.14	0.31	-0.01
Clca	0.67	0.56	0.58	0.09*	0.98	0.67	1.71	-0.02
Tlta	0.55	0.56	0.24	0.13*	0.75	0.73	0.33	0.05
Size	7.09	6.93	1.50	0.17*	6.57	6.51	1.43	0.15*
Market-based measure								
Mvliab	4.60	1.80	11.28	-0.11*	1.56	0.45	4.47	-0.13*
Mtb	1.99	1.52	1.67	-0.11*	1.40	1.12	1.03	-0.14*

Table 3 (Continued)

Panel B provides summary on the distribution of Gompers, Ishii and Metrick's G index for the groups of healthy companies and the companies that file for bankruptcy in three years.

Panel B: Distribution of G index				
	Healthy Companies		Companies that file for bankruptcy within three years	
G index	Number of Observations	percentage	Number of Observations	percentage
<=6	4,550	20.1%	157	26%
7	2,778	12.3%	77	12.7%
8	3,030	13.4%	80	13.2%
9	3,041	13.4%	72	11.9%
10	2,945	13.0%	65	10.7%
11	2,444	10.8%	65	10.7%
12	1,643	7.3%	46	7.6%
13	1,195	9.8%	21	7.1%
14	619	2.7%	9	1.5%
>=15	395	1.7%	13	2.1%
Total	22,640	100%	605	100%

4. Governance rules and bankruptcy risk

In this section we examine whether the balance of power between shareholders and management is systematically correlated with bankruptcy risk. We first sort the sample firms based on the rankings of two common bankruptcy predictors: Altman's Z-score and Ohlson's O-score. The firms in the lowest O-score/Z-score decile have the highest estimated probability of bankruptcy in the following years. Table 4 displays the mean G index level and the mean earnings and cash flow for each O-score and Z-score decile. The distribution of the earnings and cash flow across O-score/Z-score deciles are in line with our expectation: the mean earnings/cash flow increase with the ranking of the bankruptcy scores. However, the balance of power between shareholders and management appears to vary not monotonically across O-score/Z-score deciles. Both the G index and E index first increase with the ranking of the decile (until decile 6) and then decrease with the ranking of the decile. The results show that while firms in the O-score/Z-score decile 1 have a lower G/E index (stronger shareholder rights) than firms in O-score/Z-score decile 2 to decile 8, the firms in deciles 9 and 10, which are considered as financially healthiest, actually have even stronger shareholder rights (the lowest G/E index) than all other deciles. The finding thus suggests that the effect of shareholder power on distress risk may be nonlinear.

Table 4

Governance index across bankruptcy predictors

This table reports the mean values of governance index across the bankruptcy predictor O-score and Z-score, where

Z score = 1.4×*reta* + 3.3× *ebitta*+1.0× *sata*+1.2× *wcta*+0.6× *mvliab*

Oscore =1.32 + 2.37× *nita* + 0.521× *chin* - 0.285× *intwo* + 1.72× *oeneg* + 1.83× *ffotl* + 1.43× *wcta* - 0.0757× *clca* - 6.03× *tlta* + 0.407× *size*

G index: Gompers, Ishii and Metrick's (2003) governance index, *E index*: Bebchuk, Cohen, and Ferrell's entrenchment index (2005), *nita*: net income/ total assets, reta: retained earnings/ total assets, ffotl: funds from operations / total liabilities, ebitta: (earnings before interest and taxes)/ total assets.

Panel C reports the distribution of Gompers, Ishii and Metrick's (2003) G index for the sample firms that file for bankruptcy within three years and the firms that are placed into Z-score decile 1 but do not become bankrupt during the sample period.

	Score	Gindex	Eindex	nita	ffotl	ebitta
O-score decile	Panel A: Mean values for each O-score decile					
1	-2.50	8.48	2.15	-0.25	-0.49	-0.19
2	-0.03	8.98	2.38	-0.01	0.04	0.04
3	0.58	9.20	2.43	0.01	0.10	0.06
4	1.03	9.36	2.40	0.03	0.13	0.07
5	1.44	9.14	2.33	0.04	0.17	0.08
6	1.87	9.31	2.41	0.05	0.22	0.09
7	2.36	9.13	2.31	0.06	0.28	0.11
8	2.96	8.74	2.16	0.07	0.37	0.12
9	3.85	8.43	1.99	0.09	0.55	0.14
10	6.13	7.88	1.77	0.13	1.31	0.20
Z-score decile	Panel B: mean values for each Z-score decile					
1	-0.73	8.54	2.17	-0.21	-0.29	-0.16
2	1.38	9.07	2.36	0.00	0.09	0.05
3	1.94	9.22	2.38	0.01	0.11	0.05
4	2.47	9.25	2.37	0.02	0.13	0.06
5	3.01	9.31	2.42	0.03	0.18	0.07
6	3.61	9.32	2.42	0.05	0.23	0.09
7	4.34	9.09	2.36	0.06	0.28	0.11
8	5.34	8.74	2.15	0.07	0.37	0.12
9	7.22	8.37	1.99	0.09	0.56	0.15
10	17.95	7.75	1.71	0.11	1.02	0.18

Panel C: Value of G index

	10th percentile	25th percentile	50th percentile	75th percentile
Firms in Z-score decile 1 that do not bankrupt	6	7	9	10
Firms that declare bankruptcy	5	6	8	11

Since more than 90% of the firms that placed into the bottom Z-score decile do not file for bankruptcy, it would be interesting to see if there is significant difference in the distribution of governance index between the non-bankrupt bottom Z-score firms and the firms that eventually declare bankruptcy. Panel C of Table 4 displays the distribution of the G index for the two types of firms. The solvent firms have a G index of 7 at the 25th percentile and 10 at the 75th percentile, while the insolvent firms have a G index of 6 at 25th percentile and 11 at 75th percentile. It appears that while all these firms are most financially challenged, a larger fraction of the insolvent firms have either the highest or the lowest level of shareholder power than the solvent firms placed into the lowest Z-score decile. The results imply that given the similarly poor profitability and financial state of these firms, default is more likely when governance is either too strong or too weak.

5. Logistic regression analysis of governance and financial distress

Our empirical evidence, to this point, shows that the firms about to go bankrupt have a different set of rules regarding the power-sharing relationship between shareholders and management from the solvent firms. In this section we investigate further how the governance rules influence the probability of default. While this paper focuses on governance as the primary explanatory variable, our model specifications include control variables that have been shown as predictive in bankruptcy in prior literature. Specifically, we approach the data by employing a general logistic regression model that represents corporate default as a function of governance provisions, asset characteristics, industry indicators and measures of financial state and operating performance. Table 5 presents our logistic regression results from six different model specifications. We use the components of Altman's Z-score as the measures of operating performance and financial state from Model 1 through Model 3 and the components of Ohlson's O-score as the alternative measures of operating performance and financial state from Model 4 through Model 6. Following Altman (1968) and Ohlson (1980), we exclude the financial industry from our logistic regressions.

Model 1 gives the profile of the firms that are about to declare bankruptcy: small firms with low market-to-book ratios and low market-to-debt ratios and short of liquidity and cash flow. The estimation results do not indicate whether a low level of retained earnings or R&D spending is related to the probability of default.

Also inconsistent with the prediction is that the ratio of sales to assets has a positive effect on the risk of default.

We then add the governance index to the model as an additional explanatory variable. As documented in Model 2 of Table 5, the estimated coefficient on the G index is negative and significant at 1% and the estimates on other variables stay roughly the same. The results indicate that given firm size, market valuation, leverage and operating performance, the probability of default increases with the strength of shareholder rights. Klock, Mansi and Maxwell (2005) and Ashbaugh-Skaife, Collins and Lafond (2006) show that stronger shareholder rights increase the credit risk in terms of bond yields and credit rating. Our results provide direct evidence consistent with the hypothesis that the governance rules that reserve little power for managers pushes for more aggressive financial policies and thus increases the likelihood that a firm will be in distress. In model 3, we use Z-score to replace the five operating performance variables. The G index is still negative and all estimated coefficients are significant at 1% and have the same sign as predicted. To further examine whether including the governance variable results in significant improvement in model fit, we compare the log likelihoods of the nested models. The p-values associated with the likelihood ratio test statistic of both model 2 and 3 are less than 0.001. The test results show that adding the G index to the model significantly improves the fit of the model, compared to a model that contains only financial ratios.

To test the robustness of our results to different model specifications, we substitute the leverage and operating performance variables used in Ohlson's O-score for those used in Altman's Z-score. Model 4 shows that the probability of default is positively related to the total debt burden and consecutive loss and negatively related to liquidity and funds from operations, consistent with prior empirical evidence. In Model 5 and 6 we include the G index, and the results again indicate that firms with governance rules that place more restrictions on shareholder rights, and thus provide more protection for managers and existing directors, are less likely to fail.

Table 5

Bankruptcy and Governance index

This table reports the logistic regression of corporate default on Gompers, Ishii and Metrick's (2003) governance index (G index) and various control variables. The data covers the period 1990 through 2006. Control variables include: *nita*: net income/ total assets, reta: retained earnings/ total assets, ffotl: funds from operations / total liabilities, ebitta: (earnings before interest and taxes)/ total assets, sata: sales/total assets, intwo: the dummy=1 if net income is negative in the past two years, oeneg: the dummy=1 if the book equity is negative, chin: (net income$_t$-net income$_{t-1}$)/(|net income$_t$ |+|net income$_{t-1}$ |), wcta: working capital / total assets, clca: current liability /current assets, tlta: total liabilities over total assets, mvliab: market value of equity /total assets, size: log of total assets, mtb: (total assets− book value of equity + market value of equity)/total assets, R&D: R&D/total assets. All models include time and industry dummies (not reported). Financial industry is excluded. The z-statistic is presented in parentheses below each estimate. The labels *, ** ,*** denote significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable	Predicted sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant		-0.194	0.186	0.053	-1.750	-1.410	-0.489
		(-0.67)	(0.62)	(0.18)	(-5.16)	(-3.99)	(-1.65)
Shareholder rights:							
G index	?		-0.065*	-0.055*		-0.052*	-0.052*
			(-4.16)	(-3.54)		(-3.25)	(-3.34)
Asset characteristics:							
R&D	–	-0.107	-0.110	-1.989*	0.687	0.687	-1.927*
		(-0.15)	(-0.16)	(-2.75)	(1.20)	(1.19)	(-2.79)
mtb	–	-0.584*	-0.581*	-0.619*	-0.934*	-0.939*	-0.723*
		(-5.97)	(-5.98)	(-8.23)	(-11.1)	(-11.2)	(-10.0)
size	–	-0.357*	-0.333*	-0.295*	-0.347*	-0.331*	-0.221*
		(-10.7)	(-9.83)	(-8.92)	(-10.1)	(-9.58)	(-6.62)
Bankruptcy score:							
Z-score	–			-0.121*			
				(-11.0)			
O-score	–						-0.219*
							(-15.4)
Financial state:							
clca	+				-0.001	-0.005	
					(-0.02)	(-0.10)	
tlta	+				2.451*	2.459*	
					(10.9)	(11.0)	
wcta	–	-2.412*	-2.415*		-0.905*	-0.936*	
		(-11.0)	(-11.0)		(-3.22)	(-3.34)	
mvliab	–	-0.108	-0.113				
		(-3.64)	(-3.80)				
Operating performance:							
reta	–	-0.013	-0.014				
		(-0.88)	(-0.97)				
ebitta	–	-0.963*	-0.940*				
		(-7.92)	(-7.79)				
sata	–	0.187*	0.196*				
		(3.98)	(4.20)				
ffotl	–				-0.082*	-0.081*	
					(-3.31)	(-3.24)	
intwo	+				0.876*	0.858*	
					(7.65)	(7.51)	
oeneg	+				0.065	0.047	
					(0.32)	(0.23)	
chin	–				-0.576*	-0.570*	
					(-7.80)	(-7.71)	
Industry effects		yes	yes	yes	yes	yes	yes
Likelihood ratio χ^2			17.43*	12.65*		10.63*	11.45*

Note: The Likelihood ratio χ^2 statistic tests whether the governance index (G index) added in model 2, 3, 5 and 6, explain a significant portion of the variation in firm's default.

Table 6

Bankruptcy and alternative governance index

This table reports the logistic regression of corporate default on Bebchuk, Cohen, and Ferrell's entrenchment index (E index) and various control variables. The data covers the period 1990 through 2006. Control variables include: *nita*: net income/ total assets, reta: retained earnings/ total assets, ffotl: funds from operations / total liabilities, ebitta: (earnings before interest and taxes)/ total assets, sata: sales/total assets, intwo: the dummy=1 if net income is negative in the past two years, oeneg: the dummy=1 if the book equity is negative, chin: (net income$_t$-net income$_{t-1}$)/(|net income$_t$ |+|net income$_{t-1}$ |), wcta: working capital / total assets, clca: current liability /current assets, tlta: total liabilities over total assets, mvliab: market value of equity /total assets, size: log of total assets, mtb: (total assets− book value of equity + market value of equity)/total assets, R&D: R&D/total assets, size: log of total assets. All models include time and industry dummies (not reported). Financial industry is excluded. The z-statistic is presented in parentheses below each estimate. The labels *, ** ,*** denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	Predicted sign	Model 1	Model 2	Model 3	Model 4
Constant		0.014	-1.537	-0.084	-0.627
		(0.05)	(-4.48)	(-0.29)	(-2.19)
Shareholder rights:					
E index	?	-0.128*	-0.114*	-0.120*	-0.111*
		(-4.11)	(-3.61)	(-3.90)	(-3.57)
Asset characteristics:					
R&D	–	-0.164	0.640	-0.305*	-0.230*
		(-0.23)	(1.11)	(-9.37)	(-7.00)
mtb	–	-0.585*	-0.939*	-2.039*	-1.947*
		(-6.01)	(-11.2)	(-2.82)	(-2.81)
size	–	-0.347*	-0.340*	-0.621*	-0.726*
		(-10.4)	(-9.94)	(-8.26)	(-10.1)
Bankruptcy score:					
Z-score	–			-0.123*	
				(-11.1)	
O-score	–				-0.219*
					(-15.4)
Financial state:					
clca	+		-0.013		
			(-0.27)		
tlta	+		2.463*		
			(11.0)		
wcta	–	-2.416*	-0.964*		
		(-11.0)	(-3.43)		
mvliab	–	-0.111*			
		(-3.76)			
Operating performance:					
reta	–	-0.014			
		(-0.99)			
ebitta	–	-0.942*			
		(-7.75)			
sata	–	0.188*			
		(3.99)			
ffotl			-0.080*		
			(-3.21)		
intwo	+		0.869*		
			(7.59)		
oeneg	+		0.035		
			(0.17)		
chin	–		-0.573*		
			(-7.75)		
Industry effects		yes	yes	yes	yes
Likelihood ratio χ^2		17.02*	13.08*	15.27*	13.23*

Note: The Likelihood ratio χ^2 statistic tests whether the governance index (E index) added into the models explains a significant portion of the variation in firm's default.

Table 6 displays the results of logistic regression using Bebchuk, Cohen, and Ferrell's E index as alternative proxy for the management power. As opposed to twenty-four provisions considered by G index, Bebchuk, Cohen, and Ferrell's E index includes only three provisions that limit shareholders' ability to gain control (classified board, bylaw and charter amendments) and three provisions that increase the cost of takeover (supermajority, poison pill and golden parachutes). The estimated coefficients on E index from Model through Model 4 are all negative and significant at 1%, consistent with the results from Table 5 using G index. Thus, we obtain evidence supporting again the hypothesis that stronger governance, which puts managers under greater pressure from shareholders and open market for corporate control has positive influence on the probability of default. The coefficients on leverage, earnings and asset characteristics also have the same sign and similar statistical significance as those in Table 5.

6. Nonlinearity in governance index

While our empirical evidence so far has suggested that the probability of financial distress is lower when governance is weaker. Weak governance implies poor monitoring and the agency costs associated with self-interested managerial behaviors will reduce firm value. Thus, the net impact of the governance rules on the default risk may be a result of two opposing forces: as the governance rules reserve more power for managers, the firm's policy choices tend to be more conservative and the managerial private benefits of control increase. To examine the potential nonlinear effect of governance rules on financial distress, we add the squared term of G index to the four models in Table 5. It can be seen from Table 7 that the estimated coefficient on G index is negative and the estimated coefficient on the squared term of G index is positive and significant at 10% in each of the four model specifications. The magnitude and statistical significance of all other variables are close to those shown in Table 5. Our findings suggest that the probability of default is not linearly decreasing in the number of governance provisions. The estimates imply that as long as G index is lower than a certain break-point, firms adopting more governance provisions are less likely to default, given all other risk factors being unchanged. However, as G index goes beyond a certain break-point, firms adopting more governance provisions are more likely to default.

Table 7

Nonlinearity in governance index

This table reports the logistic regression of corporate default on Gompers, Ishii and Metrick's (2003) G index and the squared term of G index. The data covers the period 1990 through 2006. Control variables include: *nita*: net income/ total assets, reta: retained earnings/ total assets, ffotl: funds from operations / total liabilities, ebitta: (earnings before interest and taxes)/ total assets, sata: sales/total assets, intwo: the dummy=1 if net income is negative in the past two years, oeneg: the dummy=1 if the book equity is negative, chin: (net income$_t$-net income$_{t-1}$)/(|net income$_t$ |+|net income$_{t-1}$ |), wcta: working capital / total assets, clca: current liability /current assets, tlta: total liabilities over total assets, mvliab: market value of equity /total assets, size: log of total assets, mtb: (total assets– book value of equity + market value of equity)/total assets, R&D: R&D/total assets, size: log of total assets. All models include time and industry dummies (not reported). Financial industry is excluded. The z-statistic is presented in parentheses below each estimate. The labels *, ** ,*** denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	Predicted sign	Model 1	Model 2	Model 3	Model 4
Constant		0.695	-0.875	0.734	0.169
		(1.63)	(-1.88)	(1.78)	(0.41)
Shareholder rights:					
G index	–	-0.193**	-0.188**	-0.227*	-0.219*
		(-2.50)	(-2.39)	(-3.03)	(-2.88)
G index^2	+	0.007***	0.008***	0.010**	0.009**
		(1.70)	(1.77)	(2.35)	(2.24)
Bankruptcy score:					
Z-score	–			-0.123*	
				(-11.1)	
O-score	–				-0.220*
					(-15.4)
Asset characteristics:					
R&D	–	-0.145	0.682	-2.000*	-1.913*
		(-0.21)	(1.18)	(-2.77)	(-2.77)
mtb	–	-0.580*	-0.937*	-0.616*	-0.722*
		(-5.97)	(-11.2)	(-8.19)	(-10.0)
size	–	-0.333*	-0.330*	-0.295*	-0.220*
		(-9.82)	(-9.51)	(-8.91)	(-6.60)
Financial state:					
wcta	–	-2.414*	-0.931*		
		(-11.0)	(-3.31)		
clca	–		-0.004		
			(-0.09)		
tlta	+		2.447*		
			(10.9)		
mvliab	–	-0.112*			
		(-3.78)			
Operating performance:					
reta	–	-0.015			
		(-1.02)			
ebitta	–	-0.944*			
		(-7.81)			
sata	–	0.192*			
		(4.10)			
ffotl	–		-0.081*		
			(-3.26)		
intwo	+		0.869*		
			(7.58)		
oeneg	+		0.051		
			(0.25)		
chin	–		-0.571*		
			(-7.72)		
Industry effects		yes	yes	yes	yes
Likelihood ratio χ^2		20.2*	13.65*	17.85*	16.35*

Note: The Likelihood ratio χ^2 statistic tests whether G index and G index ^{2} added into the models explain a significant portion of the variation in firm's default.

In previous section, we show that compared with firms that are ranked at bottom Z-score but do not become default, insolvent firms appear to have governance tilting toward one or the other extreme. To examine whether the governance rules have significant influence on the outcome of failure for these financially distressed firms, we re-estimate the logistic regression by using only the firms ranked at the bottom Z-score quintile.

The regression results presented in Table 8 strongly suggest that there is significant non-monotonic relation between the rules of governance and corporate failure. In fact, the estimated coefficients on both the governance index and the squared terms are larger and more statistically significant than those reported in Table 7 using full sample data. In addition, as our analysis relies on panel dataset, to examine whether our estimates are robust to the potential dependence within firm or year, we follow Petersen's (2009) method to re-estimate the standard errors by clustering both time and firm as a robust check. Our main estimates remain qualitatively the same[8].

To illustrate how the probability of default changes with governance index, we calculate the probability of bankruptcy from the estimated coefficients of Model 1 in Table 8 using the logit function given in Eq. (1). Panel B of Table 8 shows the predicted probability of default for these financially distressed sample firms under different level of G index while holding all other variables at their mean values. We find that the probability of bankruptcy falls as G index rises. However, the probability of default is declining at a decreasing rate. When the level of G index increases from 4 to 5, the probability of default decreases by 1.05 percentage point. But when the level of G index increases from 9 to 10, the probability of default decreases by only 0.3 percentage points. After the level of G index reaches beyond 13, the probability of bankruptcy gradually rises as G index gets higher. We also note that more than 90% of the sample firms adopt less than thirteen governance provisions. This implies that firms anticipate ex ante the agency costs associated with high managerial power and thus are reluctant to adopt too many governance provisions.

[8] Petersen (2009) suggests that the standard errors clustered by both firm and year while may not be necessary can be a useful robust check. Our results of the robust tests are available upon request.

Table 8

Governance index and bankruptcy for firms ranked at bottom Z-score quintile

This table reports the logistic regression of corporate default on governance index and various control variables for firms ranked at bottom Zscore quintile. The data covers the period 1990 through 2006. Control variables include reta: retained earnings/ total assets, ebitta: (earnings before interest and taxes)/ total assets, sata: sales/total assets, wcta: working capital / total assets, mvliab: market value of equity /total assets, size: log of total assets, mtb: (total assets– book value of equity + market value of equity)/total assets, R&D: R&D/total assets. All models include time and industry dummies (not reported). Financial industry is excluded. The z-statistic is presented in parentheses below each estimate. The labels *, ** ,*** denote significance at the 1%, 5%, and 10% levels, respectively.

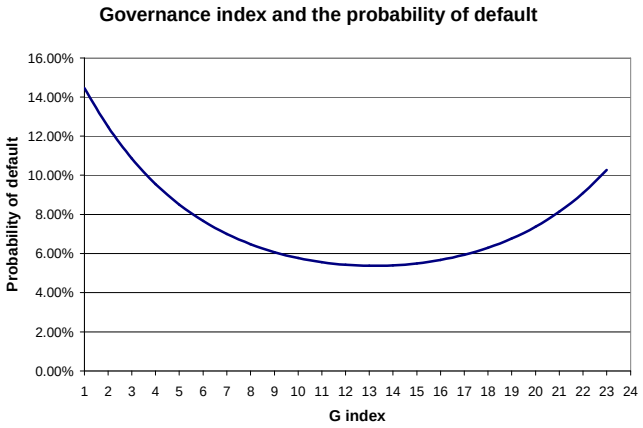
Panel A: Logistic regression		
Variable	Model 1	Model 2
Constant	-0.395	-1.388
	(-0.60)	(-3.00)
G index	-0.339*	
	(-2.88)	
G index^2	0.017*	
	(2.61)	
E index		-0.449*
		(-3.09)
E index^2		0.071**
		(2.33)
R&D	-2.192**	-2.213**
	(-2.37)	(-2.41)
mtb	-0.521*	-0.529*
	(-4.19)	(-4.29)
size	-0.248*	-0.253*
	(-5.02)	(-5.19)
wcta	-1.197*	-1.181*
	(-3.94)	(-3.93)
mvliab	0.189*	0.190*
	(5.07)	(5.14)
reta	-0.005	-0.005
	(-0.25)	(-0.25)
ebitta	-0.299**	-0.285**
	(-2.36)	(-2.25)
sata	1.331*	1.334*
	(12.1)	(12.2)
Industry effect	yes	yes
Likelihood ratio χ^2	8.93**	12.3*

Note: The Likelihood ratio χ^2 statistic tests whether G (E) index and G (E) index ^{2} added into the models explain a significant portion of the variation in firm's default.

Table 8(Continued)

Panel B : The probability of default under different level of G index

G-index	Predicted Probability of default
1	14.46%
2	12.47%
3	10.86%
4	9.55%
5	8.51%
6	7.67%
7	7.00%
8	6.48%
9	6.07%
10	5.77%
11	5.56%
12	5.43%
13	5.37%
14	5.40%
15	5.49%
16	5.67%
17	5.93%
18	6.29%
19	6.77%
20	7.37%
21	8.13%
22	9.09%
23	10.28%
24	11.75%



Notes: The probability column shows the probability of declaring bankruptcy in one or two years under different level of G index, holding all other variables constant at their mean values. Tabled probability is computed by $P(X) = e^{\beta' X}/(1+e^{\beta' X})$.

7. Conclusion

This paper analyzes the influence of corporate governance provisions on the risk of default. Governance provisions determine the power-sharing relationship between shareholders and management and thus influence firm's risk-taking incentive. Using data on companies covered by Investor Responsibility Research Center for the period 1990-2006, we identify 201 bankruptcies out of 2,952 public traded firms with required information. We consistently show that the rules of governance have significant impact on bankruptcy risk and such an impact is nonlinear. In general, the likelihood of default is negatively related to the extent to which managers are able to fend off the challenges from shareholders and open market for corporate control. This finding supports the view that managers, due

to their overexposure to firm-specific risk, often prefer more conservative policy choices. In addition, we find that as a greater number of governance provisions put into place, the probability of default is decreasing but at a decreasing rate, suggesting that as managers are more secured, the managerial private benefits of control and the resulting loss of firm value turn to increase the risk of default. Our findings suggest that for firms with strong governance, a weakening of shareholder rights will decrease the probability of distress, but for firms with weakest level of governance, a further weakening of shareholder rights will increase the probability of distress. Our results are robust to alternative governance index and different model specifications.

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