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Does Corporate Governance Matter to Bondholders?

Mark S. Klock, Sattar A. Mansi, and William F. Maxwell*

Abstract

We examine the relation between the cost of debt financing and a governance index that contains various antitakeover and shareholder protection provisions. Using firm-level data from the Investors Research Responsibility Center for the period 1990–2000, we find that antitakeover governance provisions lower the cost of debt financing. Segmenting the data into firms with the strongest management rights (strongest antitakeover provisions) and firms with the strongest shareholder rights (weakest antitakeover provisions), we find that strong antitakeover provisions are associated with a lower cost of debt financing while weak antitakeover provisions are associated with a higher cost of debt financing, with a difference of about 34 basis points between the two groups. Overall, the results suggest that antitakeover governance provisions, although not beneficial to stockholders, are viewed favorably in the bond market.

I. Introduction

The increase in hostile takeover activities in the late 1980s caused the management of U.S. corporations to enact several takeover defenses to protect their firms from being takeover targets. These actions impeded shareholders' ability to sell to a hostile bidder and shifted the balance of power between shareholders and managers. Gompers, Ishii, and Metrick (2003) construct a governance index as a proxy for the level of shareholder rights based on 24 antitakeover provisions and examine the relation between the index and firm value.[1] Their results suggest that portfolios of firms with strong shareholder rights (weak antitakeover provisions) earn abnormal long-run stock returns, have higher profits, have lower capital expenditures, and make fewer acquisitions relative to those with strong management

*Klock, klock@gwu.edu, School of Business, George Washington University, 2020 G Street, NW, Washington, DC 20052; Mansi, smansi@vt.edu, Pamplin College of Business, Virginia Tech, Blacksburg, VA 24061; and Maxwell, maxwell@eller.arizona.edu, Eller College of Business, University of Arizona, Tucson, AZ 85721. Special thanks to David Mauer for his valuable input throughout the manuscript. We also thank Alexandre Baptista, Matthew Billett, Ed Dyl, Kathy Kahle, Chris Lamoureux, Jim Linck, Karl Lins, Andrew Metrick (the referee), Harold Mulherin, and seminar participants at Virginia Tech, University of Arizona, and George Washington University for helpful comments and valuable suggestions. We gratefully acknowledge the research support provided by Moody's Credit Market Research Fund. Mansi acknowledges receipt of partial funding from Virginia Tech's summer support. All remaining errors are the sole responsibility of the authors.

[1] A complete description of these provisions is provided in the Gompers et al. (2003) appendix.

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rights (strong antitakeover provisions).[2] In this paper, we extend the literature and examine the relation between the Gompers et al. governance index and firm value from an alternative view, namely that of bondholders.[3] We find that antitakeover governance provisions, although not beneficial to stockholders, are viewed positively in the bond market at a level that is both statistically and economically significant.

We begin our analysis by examining the issue of how antitakeover provisions might affect the firm's cost of debt. The literature provides several explanations with mixed results. First, in the context of takeovers, the acquired firm's shareholders capture the premium associated with either a stock or a cash offering and as a result the bondholders receive a possible benefit from coinsurance (Billet, King, and Mauer (2004)). However, the firm's bondholders may also be harmed if the firm is targeted for acquisition or is acquired. The potential targeting of a firm for acquisition will frequently revoke a response from management to recapitalize the firm (the exchange of debt for equity in the capital structure), increase the payout to shareholders (dividends and repurchases), pay out the excess liquid assets, and focus the firm (divestitures and spin-offs). All of these actions potentially have a negative impact on bondholders.

Even if the firm is acquired, the effect on bondholder wealth is not unambiguous. If there is a significant probability that the firm will be in financial distress, then changes in firm value will be reflected in bond prices and yields. Billet et al. (2004) segment firms based on the acquired firm's bond rating and find that only bondholders of non-investment grade firms benefit from acquisition. Bondholders of non-investment grade firms have a significant upside potential if the bond is upgraded and less of a downside loss (as the bond already has a low bond rating). In contrast, Billet et al. find that bondholders of investment grade firms suffer statistically significant negative returns to bondholders. That is, bondholders with investment grade debt have little upside potential but considerable downside risk if the debt is downgraded.

Second, in the context of a takeover, antitakeover provisions might impact wealth transfers between stockholders and bondholders. Because bondholders have limited upside potential and significant downside risk, takeovers that cause management to change but do not cause changes in the total value of the firm's assets will likely be motivated by changes in wealth transfers from bondholders to stockholders (Shleifer and Summers (1988)). In addition, takeovers that significantly increase the financial risk of the firm by adding debt can result in wealth transfers from bondholders to stockholders (Warga and Welch (1993)). This suggests that hostile takeovers may be partially financed by expropriating bondholder wealth and that provisions which shift power from managers toward shareholders

[2]Holmstrom and Kaplan (2001), Bhagat and Romano (2001), Comment and Schwert (1995), and Karpoff and Malatesta (1989) also report on antitakeover provisions. For a review on the takeover market, see Agrawal and Jaffe (2003) and for corporate governance see Shleifer and Vishny (1997).

[3]We focus on bondholders for several reasons. First, bondholders can provide a balance between shareholders and managers (Jensen (1986)). Second, bonds have shorter durations than equity, and their valuations are well specified and less subject to the criticism that the results might be driven by misspecification of the equilibrium asset pricing model. Third, bonds could be less subject to endogeneity problems because, while a change in governance can cause yields to change immediately, it is less likely that fluctuations in yield will cause governance to change quickly.

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can result in shareholder expropriation of bondholder wealth. This also suggests that governance provisions could mitigate the agency cost of debt (Almazan and Suarez (2003)).[4]

Third, antitakeover governance provisions may have an impact on managerial actions and decision making, which in turn can affect the firm's security holders. The corporate governance literature provides two competing hypotheses: the shareholder interest hypothesis and the managerial entrenchment hypothesis. The shareholder interest hypothesis suggests that takeover defenses benefit shareholders because the target management can extract a higher offer from the bidder and therefore benefit all shareholders (DeAngelo and Rice (1983), Linn and McConnell (1983)). DeAngelo and Rice (1983) also argue that antitakeover provisions may be viewed as a long-term contract for incumbent management that may not be beneficial to shareholders ex post, but are profitable ex ante if they can convey credible levels of commitment. Stein (1988) develops a theoretical model that suggests that if managers are sheltered from takeover risk via antitakeover amendments they are more likely to engage in long-term projects similar to R&D investments. Harris (1990), based on a similar idea, shows that devices such as golden parachutes promote managerial investment in managements' specialized human capital that is not marketable to other firms and that benefits the shareholders.

The management entrenchment hypothesis suggests that antitakeover amendments are initiated at the expense of shareholders when the incumbent management wants to engage in opportunistic behavior and job protection. Jensen and Meckling (1976) argue that, because of the separation of ownership and control, managers have the propensity to engage in self-serving behavior such as perquisite consumption, empire building, and shirking of effort. Takeover defenses therefore insulate management from the labor market wherein alternative teams compete for the rights to manage corporate resources (Jensen and Ruback (1983)). Alternatively, because managers hold undiversified portfolios, they tend to engage in job protection to reduce their human capital risk (Amihud and Lev (1981)). Therefore, governance provisions that increase antitakeover protections could reduce firm risk and cash flow variability, suggesting that shareholders will experience less risk and as a result require lower yields.[5]

Given the limited upside potential from any coinsurance for bondholders relative to the possible severe negative impacts of defensive reactions and actual acquisitions, we believe that bondholders view potential or actual targeting to be detrimental. Ultimately, however, the question of the impact of antitakeover provisions on the firm's cost of debt is an empirical one, which we examine in this study.

Using a sample of 1,877 firm-year observations on 678 industrial firms from the Investor Research Responsibility Center and the Lehman Brothers Fixed Income database, we find that firms with antitakeover governance provisions have a

[4]Alternatively, in the case of a takeover, bondholders could benefit through a coinsurance effect (Billet et al. (2004)) though the upside potential is still limited.

[5]In contrast, Gompers et al. (2003) find that firms with a high degree of shareholder rights outperform firms with a low degree of shareholder rights, which can be used to suggest that bondholders should also benefit from a high degree of shareholder rights.

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lower cost of debt financing (about four basis points per provision). When we segment the data into firms with the strongest management rights (strongest takeover defenses) and firms with the strongest shareholder rights (weakest takeover defenses), we find that firms with the strongest management rights are associated with a lower cost of debt financing (about 15 basis points), while firms with the strongest shareholders rights are associated with a higher cost of debt financing (about 18 basis points) after controlling for firm- and security-specific characteristics. The results are robust to various measures of governance provisions, tests of endogeneity, and are economically and statistically significant. Overall, the results suggest that bondholders view antitakeover amendments as an effective tool that better protects their interests.

In addition, we examine how antitakeover provisions might affect the cost of debt financing when there is a significant probability of financial distress. Therefore, when we segment the full sample into firms with investment grade debt and firms with non-investment grade debt, we find that the results above hold but are more economically significant in the non-investment grade debt market (about three basis points per provision for firms with investment grade debt as compared with five basis points per provisions for firms with non-investment grade debt). Overall, the results suggest that bondholders view antitakeover amendments as an important element in the pricing of the firm's debt.[6]

Our investigation is related to studies by Cook and Easterwood (1994) and Cremers, Nair, and Wei (2004), although we differ in many respects. Cook and Easterwood (1994) explore the effect of poison put covenants on stockholder and bondholder holding period returns using event study methodology. Event study methodology is always subject to the possibility of contaminating events, and in the case of poison pill adoptions the event itself could be contaminating the sample since the adoption often conveys information beyond the change in governance (such as susceptibility to hostile acquisition). In addition, Elton and Gruber (1995) discuss why holding period returns bear little resemblance to the cost of debt financing, and that corporate decision making or capital budgeting is typically described in terms of the cost of debt financing (i.e., yield to maturity) when computing the weighted average cost of capital.

Cremers et al. (2004) examine the relation between shareholder control and bondholder wealth in a two-dimensional setting using internal (blockholders) and external (takeover defenses) governance mechanisms. In contrast to their research, we examine the relation between antitakeover provisions and yield spreads (for the full sample as well as investment and non-investment grade debt firms) using a single proxy (Gompers et al. (2003) index). This isolates the effect of antitakeover governance provisions on yield spreads. Cremers et al. (2004) examine the impact of the interaction of internal and external governance mechanisms on ex post long-run returns. This choice, although beneficial because it covers internal and external governance variables, has the limitation that the results are prone to different interpretations that could have different implications for the effectiveness of governance (see, e.g., Cremers and Nair (2005)). In addition, our control

[6]This result is in contrast to the Billet et al. (2004) study using a similar bond rating segmentation. However, our analysis also includes the potential downside risk of the defensive reactions taken before an actual takeover.

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variables cover a larger spectrum of both firm-specific variables (e.g., size, leverage, profitability, earnings volatility, institutional ownership, CEO ownership) and security-specific variables (e.g., debt age, credit ratings, duration, convexity) that are related directly to yield spreads but are omitted from the Cremer et al. study. Further, there are a number of methodological issues that differentiate our results from theirs including computations of the yield spread and the governance index, controls for the term structure of interest rates, the choice of the interpolation method for yield spreads, different categories of institutional ownership, and the use of an orthogonalized credit rating variable. Finally, we use a longer sample period that includes more variation in the underlying macroeconomic regime and changes in governance structures (1990–2000). This allows us to conduct both change and fixed effect regressions, which helps mitigate endogeneity issues.

This research contributes to the literature in several important ways. First, our analysis provides the first empirical evidence that antitakeover provisions have an economic impact on the cost of debt financing. The results suggest that bondholders are concerned about the governance mechanisms management uses to better protect their interests. Second, we provide cross-sectional evidence using market-based data that antitakeover amendments, although not beneficial to stockholders, are viewed positively in the bond market. Third, our results provide some independent verification of the utility of the Gompers et al. index.[7] Fourth, our analysis strongly suggests that it is important to look at the effects of governance provisions on all classes of securities before concluding whether certain provisions are necessarily desirable.

The remainder of the paper is organized as follows. Section II reviews the literature and discusses both the nature of the agency costs of debt and the very recent empirical research relating corporate governance to firm performance. Section III describes the data and methodology we use in this study. Section IV presents the primary empirical results based on levels as well as changes of corporate governance in a multivariate framework. Section V provides alternative specifications. Section VI concludes the paper.

II. Corporate Governance and the Agency Cost of Debt

A. The Nature of Agency Cost of Debt

The dominant model of the corporation in financial economics is the conglomeration of contractual rights and obligations. Jensen and Meckling (1976) emphasize the fact that many of the inadequacies of classical economic models applied to firm actions can be attributed to the costly nature of contracting. It is possible to minimize contracting costs, but it is not possible to eliminate them altogether. The very nature of the modern corporation—distinctly identifiable interests such as managers, stockholders, and creditors—necessitates costs. These agency costs are associated with monitoring, enforcing, credibly promising, and

[7]This contribution is important because the Gompers et al. finding could be criticized with the argument that the index is arbitrary and the relation is spurious. An independent finding that their corporate governance index is also related to the cost of debt financing reduces the power of this argument.

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constraining decisions, and result from the general situation in which the optimization problem for one constituency is suboptimal for another constituency.

In terms of the agency costs of debt, Jensen and Meckling (1976) suggest that the potential conflict between equity and debt claimants is presented primarily in terms of wealth expropriation and risk shifting. Shareholders expropriate wealth from bondholders by investing in new projects that are riskier than those presently held in the firm's portfolio. If the projects perform well, shareholders capture most of the gains, while bondholders bear most of the cost (Fama and Miller (1972)). The existence of a substantial stockholder-bondholder conflict is well documented in the literature.[8] The fact that shareholders of a corporation with outside debt have a call option on the corporate assets and can influence the underlying risk creates a moral hazard problem. Firms typically mitigate this problem by using restrictive covenants (Lehn and Poulsen (1991), Smith and Warner (1979)). Writing, monitoring, and enforcing these covenants can entail substantial costs including those associated with missed opportunities and inefficient constraints. In addition, even severe constraints still leave open opportunities to shift risks and rewards (Jensen and Meckling (1976)). The result is that bondholders charge a premium to cover costs that they anticipate will be imposed on them. The costs arising from the inescapable divergent interests of shareholders and bondholders are the agency costs of debt and lead to higher debt financing costs.

B. Corporate Governance and Firm Performance

Denis and McConnell (2003) provide a recent review of the corporate governance literature. They observe that empirical investigations focus on conflicts between shareholders and managers, but acknowledge the potential importance of the conflicting interests of bondholders. Agrawal and Jaffe (2003) provide extensive analysis of takeovers and conclude that there is little empirical support for the hypothesis that takeovers are the result of poor management. Their study continues the controversy about the role takeovers play in corporate governance, and hence provides some additional motivation for our line of research. However, since Agrawal and Jaffe are looking only at takeovers and not the wider cross section of firms, their research does not provide any insight regarding the role of takeover provisions on returns.

Gompers et al. (2003) construct a simple measure of corporate governance based on counting provisions that are deemed contrary to shareholder interests. Each of the 24 provisions examined involves a restriction on shareholder rights that makes a hostile takeover more costly. Thus, their measure is inversely related to what most commentators would call good corporate governance (a portfolio with minimal antitakeover provisions). They conclude that better governance leads to better investment performance for stockholders and better operating performance for the firm.

[8]For example, the stockholder-bondholder conflict is significant in spin-offs (Parrino (1997), Maxwell and Rao (2003)), investment decisions (Parrino and Weisbach (1999)), and repurchases (Maxwell and Stephens (2003)).

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It is important to emphasize that the Gompers et al. corporate governance construct is based on takeover defense provisions that could arguably benefit shareholders by enabling managers to negotiate larger premiums for their shareholders. By associating stronger corporate governance with weaker antitakeover provisions, one is implicitly relying on the theory that the takeover market is a disciplining device that drives out poor management. As we discuss earlier, there are less sinister reasons for antitakeover provisions. Empirically, Comment and Schwert (1995) find that firms with poison pills are not less likely to be taken over, but are likely to obtain larger takeover premiums for their shareholders. Our work does not depend critically on this theory. We assess whether the Gompers et al. (2003) governance index affects the bond market. If one believes that the measure is indeed associated with the balance of power between shareholders and managers, it is possible to argue either that creditors benefit from the controls imposed on managers or that creditors suffer from the possibility of shareholder expropriation. While there is no strong a priori theoretical reason to favor one effect over the other, it would be an unlikely coincidence if a shift in the balance of power between managers and shareholders would have a neutral effect on the creditors.

Black, Jang, and Kim (2003) find additional support for the hypothesis that stronger governance increases firm value. Their work is similar to Gompers et al. (2003) in that they investigate a relation between governance provisions and firm value. But their governance measure is based on factors related to independent outside monitoring instead of takeover defenses, and their sample is limited to Korean companies. Their findings are a valuable contribution to the corporate governance literature, but they shed no light on how corporate governance provisions might impact the cost of debt financing.

Given the abundance of empirical literature that attempts to relate corporate governance mechanisms to equity returns and firm value, extensions to the fixed income markets seem to be an obvious line of inquiry and, indeed, some preliminary research has been conducted in this area. Bhojraj and Sengupta (2003) argue that stronger governance can result in a lower cost of debt capital through both a reduction in default risk due to reduced agency problems and improved monitoring, and through reduction in information asymmetry. They find some empirical support for their proposition in that firms with higher (but not highly concentrated) institutional ownership and stronger outside control have a lower cost of debt financing. But there is contradicting empirical literature as to whether their measures of outside control are a reasonable proxy for stronger governance. Core, Holthausen, and Larcker (1999) find that outside directors are not more effective than inside directors and state that the emphasis on directors and institutional ownership has been misplaced. Another recent paper finding that governance devices (internal and external) affect the cost of debt is the Cremers et al. (2004) study discussed previously. Moreover, the Cremers et al. study focuses on the long-term ex post performance of bond portfolios differentiated by the presence or absence of an institutional blockholder and by the level of an antitakeover index based on three antitakeover provisions. They conclude that the interaction of these governance mechanisms (internal and external) are negatively related to ex post returns and that the results are instead a function of firm size and leverage.

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Anderson, Mansi, and Reeb (2003) investigate a similarly motivated relationship between ownership structure and debt costs. Ownership structure is potentially an alternative method by which efficient corporate governance can manifest itself. They find that publicly traded firms with founding family ownership enjoy lower costs of debt. Their explanation is that founding families have a stake in the reputation value of the family name, and thus they have additional incentives to monitor and minimize agency costs associated with managerial and stockholder opportunism. However, their work does not address the relationship between the costs of debt financing and other methods affecting corporate governance (e.g., antitakeover provisions).

Finally, a number of studies look at changes in bond valuation in the context of acquisitions. These present conflicting predictions about whether mergers increase debt value through coinsurance. Billet (1996) conjectures that bidders could be attracted to firms where there are opportunities to expropriate bondholder wealth. Both Warga and Welch (1993) and Asquith and Wizman (1990) find significantly negative bond returns around leveraged buyout announcements. On the other hand, Billet et al. (2004) find that bondholders typically benefit from friendly mergers. Hostile acquisitions signal change, and change is risky for securities for which value derives from a fixed cash flow. Empirical support for this position is contained in Crabbe (1991) who finds that bonds containing specialized covenants to deter hostile acquisitions have lower required yields.

C. Research Contribution

Taken as a whole, the literature suggests that different models of the role of corporate governance and takeover defenses are plausible, and that strong statistical tests of the models' predictions are extremely difficult to implement due to problems of measurement and endogeneity (Bhagat and Jefferis (2002)). Nevertheless, recent corporate scandals have set off a wave of debate regarding public policy and prescriptions for legal change. However, there is little in the way of documented empirical facts regarding corporate governance. We make important contributions to this demand. We attempt to answer the following questions: i) is there a relation between corporate governance as proxied by antitakeover provisions and the cost of debt financing, and does this relation hold for both firms with investment grade debt and firms with non-investment grade debt, ii) if so, what is the impact of the above relation when segmenting the data into measures that favor management rights and those that favor shareholder rights, and iii) how beneficial is the metric created by Gompers et al. (2003) as a measure of corporate governance in terms of explaining the cost of debt financing. This is the first paper that addresses these issues using publicly traded corporate debt. We attempt to mitigate problems of endogeneity and measurement by examining levels as well as changes using the bond market. We find that measures widely considered to be pro-shareholder require premiums to the suppliers of debt capital. We believe that the result is useful to the underlying debate.

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III. Data Description

A. Data Sources

We utilize four databases in our analysis: the Lehman Brothers Fixed Income (LBFI) database, the Investor Responsibility Research Center (IRRC) corporate governance database, the Compustat database, and the Thomson Financial Institutional Ownership database. In addition, because the Lehman Brothers bond department stopped providing data after 1998, we manually collect traded bond data from Mergent's Bond Record (formerly Moody's) for the year 2000.

The LBFI database provides month-end security-specific information, such as bid price, accrued interest, coupon, yield, credit ratings from S&P and Moody's, duration, convexity, and quote, issue, and maturity dates on nonconvertible bonds that are included in the Lehman Brothers bond indexes for the period 1973–1998. Bonds are included in the database based on firm size, liquidity, credit ratings, maturity, and trading frequency. Although the difficulty with finding accurate bond data is well known, Elton, Gruber, Agrawal, and Mann (2001) analyze bond price information in the LBFI and conclude that the LBFI is comparable in accuracy to CRSP data. The database contains observations on over 10,000 traded bonds from 1990 to 1998 and is commonly used in the fixed income literature (Anderson, Mansi, and Reeb (2003), Maxwell and Stephens (2003), and Billett et al. (2004)). Although the database does not contain the universe of traded debt, we have no reason to suspect any systematic bias within the sample.

The IRRC database provides annual data for the years 1990, 1993, 1995, 1998, and 2000 on corporate governance provisions for about 1,500 firms (primarily drawn from the S&P 500 and other large corporations) derived from proxy statements, annual reports, and SEC filings such as 10-Ks and 10-Qs. Gompers et al. (2003) construct an index based on 24 provisions from the IRRC database. The index is constructed using a point scale from zero to 24, where for every firm the index adds one point for every added provision that restricts shareholder rights (increase managerial power). It is constructed to examine the impact of balance of power between shareholders and managers. The index with the highest values has the greatest management rights, and the index with the lowest values has the strongest shareholder rights. For a complete description of the construction of the governance index, see Gompers et al. (2003).

The Compustat database for industrial firms offers comprehensive financial profiles for over 24,000 U.S. firms. These profiles include operating summaries, annual balance sheets and income statements, sources and uses of funds, growth rates, financial ratios, summary stock data, and accounting practices. Data in most categories goes back over 20 years. Market capitalization, common equity, net income, sales, and assets figures for all companies are provided in U.S. dollars. The Compustat Executive Compensation database provides data on CEO ownership, stock price volatility (using the implied Black-Scholes formula), and sales growth (for the last three- and five-year periods). Because the data starts from 1992 and continues to the present, we manually collect CEO ownership data from proxy statements for firms that are included in the governance index for the year 1990.

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Finally, the Thomson Financial database provides critical financial and holdings information on institutional ownership based on insider filings of form 13-F. Variables include: institutional name and type (bank, insurance company, investment companies and their managers, independent investment advisor, and all others), reporting date, end of quarter shares outstanding, and end of quarter share price.

For a firm-year observation to be included in our analysis, data must be provided in the Lehman Brothers database on the amount, yield, duration, price, and age of the firm's non-provisional public debt securities. Governance index data must be present in the IRRC data set. Information on the market value of equity, total assets, sales, and long-term debt must be available in the Compustat database. Additional information on institutional ownership must also be available. Merging the databases and applying these requirements yields a data set of 1,877 firm-year observations on 678 firms for the years 1990, 1993, 1995, 1998, and 2000.[9] We present descriptive statistics on the variables we use in the analysis in Section III.D.

B. Measuring the Cost of Debt Financing and Corporate Governance

The dependent variable, yield spread (Spread), is the difference between the weighted average yield to maturity on the firm's outstanding traded debt and the yield to maturity on a Treasury security with similar duration. Yield to maturity for corporate debt is defined as the discount rate that equates the present value of the future cash flows to the security price. For each individual bond, the yield to maturity is subtracted from the yield to maturity on its duration equivalent Treasury security. A weighted average yield spread for the firm is then calculated by multiplying each yield spread with its equivalent weight, computed as the amount outstanding for each debt security divided by the total amount outstanding for all publicly traded debt. In the case where we find no exact yield for certain Treasury debt duration, we use an interpolated yield based on the Nelson and Siegel (1987) model.[10]

Our primary measure for corporate governance is the governance index (GIndex). This index is computed using the Gompers et al. (2003) 24 antitakeover provisions described above. The index is constructed using a point scale from zero to 24. Higher scores indicate more restrictions on shareholders and therefore more managerial power. The opposite is true for low scores. The index is constructed to examine the impact of balance of power between shareholders and managers.

C. Control Variables

We investigate the relation between the cost of debt financing and corporate governance using two data categories in our analysis for controls: firm-specific and security-specific measures. Firm-specific measures include size, leverage,

[9] To minimize survivorship bias, we allow firms to exit and reenter the data set.

[10] Jordan and Mansi (2003) find that the Nelson and Siegel procedure produces the fewest pricing errors when compared to other interpolation functions.

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profitability, firm implied volatility, sales growth for the last three years, and institutional ownership. Security-specific measures include information relevant to the traded debt such as credit ratings, duration, convexity, and bond age.

Firm size (Size) and leverage (Leverage) are measured as the natural log of total assets, and the ratio of long-term debt to total assets, respectively.[11] Firm profitability (ROA), is computed as the ratio of earnings before interest, tax, depreciation, and amortization divided by total assets. Firm volatility (Volatility) is computed using Black-Scholes' option pricing model, and sales growth (SGrowth) is computed as the growth rate in sales for the last three years (both measures are obtained from the executive compensation database).[12] Finally, we control for institutional ownership (Inst-Own), or the ratio of shares that institutions owned for a firm divided by the number of shares outstanding, and CEO ownership, or the ratio of shares owned by a CEO divided by the numbers of shares outstanding.

Debt-related measures include: credit ratings, duration, convexity, and bond age. Firm credit rating (Credit) is the average of both Moody's and S&P bond ratings and represents the average firm credit rating at the date of the yield observation (i.e., credit ratings as the bond seasons). Mansi and Reeb (2002) suggest that using the average of both Moody's and S&P provides the most efficient measure of the default risk premium. Bond ratings are computed using a conversion process in which AAA-rated bonds are assigned a value of 22 and D-rated bonds receive a value of one. For example, a firm with an A1 rating from Moody's and an A+ from S&P would receive an average score of 18. Table 1 provides the conversion numbers for both Moody's and S&P firm bond ratings.

An alternative methodology used in the literature allows us to assume that the credit rating variable may incorporate part or all of the antitakeover provisions in the governance index. As a result, we estimate the credit rating without the governance index component. That is, we regress the credit ratings (Credit) on the governance index (the error term in this case incorporates the credit rating information without the influence or impact of governance). We label the error term from this regression as Rating, which we use as our primary measure of credit ratings in the multivariate analysis.

We also allow for a nonlinear relation between bond yield spreads and credit ratings. When examining the entire LBFI data set, we find that as firm credit ratings move from investment (debt with rating greater than 12) to non-investment grade debt (debt less than 13), the increase in yield spread for the non-investment categories becomes nonlinear. Therefore, we use both a binary variable approach (with investment grade coded as one) and a piecewise linear regression with eight breakpoints and seven dummy variables to proxy for credit ratings.[13]

[11] Our results are robust to alternative measures of firm size. Repeating the analysis using the natural log of both total market value of the firm (debt and equity) and total sales leads to similar results.

[12] For robustness, we use two alternative measures of performance and volatility. We measure firm performance as the ratio of cash flows (net income plus depreciation and amortization) to total assets, and firm risk as the standard deviation of the firm's cash flows scaled by long-term debt for the previous five years and find similar results.

[13] We also use a refinement of 22 break points and 21 dummy variables and find similar results. This ensures that our results are not driven by imposing a particular functional form on the credit risk

TABLE 1

Bond Rating Numerical Conversions

	Ratings	
Conversion No.	Moody's	S&P
22	Aaa	AAA
21	Aa1	AA+
20	Aa2	AA
19	Aa3	AA−
18	A1	A+
17	A2	A
16	A3	A−
15	Baa1	BBB+
14	Baa2	BBB
13	Baa3	BBB−
12	Ba1	BB+
11	Ba2	BB
10	Ba3	BB−
9	B1	B+
8	B2	B
7	B3	B−
6	Caa1	CCC+
5	Caa2	CCC
4	Caa3	CCC−
3	Ca	CC
2	C	C
1	D	D

Table 1 provides the bond rating conversion codes for the Moody's and S&P ratings that we use in the analysis.

Duration, or the weighted average duration of all public debt outstanding for the firm is computed as a summation of the weighted durations of all bonds for each firm, with the weight being the amount outstanding for each debt issue divided by the total amount outstanding for all publicly traded debt for the firm. For an individual security, duration (DUR) refers to Macaulay duration and represents a security's effective maturity. DUR is defined as the discounted time-weighted cash flow of the security divided by its price. That is,

$$\text{DUR} = \sum_{t=1}^{K} \frac{t \times \text{CF}_t}{P(1+Y)^t}, \tag{1}$$

where CF_t is the security cash flows at time t, t is the number of periods until the cash flow, P is the security price, Y is the yield to maturity, and K is the number of cash flows. Overall, duration measures the linearities in the price-yield relation and represents the securities' systematic risk.

An additional component of systematic risk, debt convexity (Convexity), measures the rate of change in the slope of the price-yield relation, which accounts for the nonlinearities present in the term structure of interest rates. This measure is important because of its impact on yield spreads in terms of a convexity premium.[14] That is,

$$\text{Convexity} = \sum_{t=1}^{n} \frac{t(t+1)\text{CF}_t}{(1+Y)^{t+2}} + \frac{n(n+1)M}{(1+Y)^{n+2}} \left[\frac{1}{P}\right], \tag{2}$$

yield curve. Additionally, we use a nonlinear specification using the square of the firm's credit rating. This approach also gives similar results.

[14]For more information on debt convexity, see Fabozzi (2000) in *Bond Markets, Analysis, and Strategies*.

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where CF_t is the security cash flows at time t, t is the number of periods until the cash flow, P is the security price, M is the maturity value, Y is the yield to maturity, and n is the number of cash flows. For each firm, we compute the weighted average convexity, with the weight being the amount outstanding for each debt issue divided by the total amount outstanding for all publicly traded debt for the firm.

Finally, because liquidity is positively priced in the debt market (Beim (1992)) as more recently issued bonds are more liquid than older bonds, we use the weighted age of bonds (Age) for each firm for each year as a measure of debt liquidity. Again, we compute the weight as the amount outstanding for each debt issue divided by the total amount outstanding for all publicly traded debt for the firm. The age of the bond, in this case, is the length of time (in years) that a bond has been outstanding, computed as the weighted average difference between the observation date and the date of the original bond issue. For example, a bond with an observation date of April 30, 1993 and an issue date of January 31, 1990 would have an age of 3.25 years.

D. Descriptive Statistics

Panel A of Table 2 presents the descriptive statistics for the variables we use throughout the analysis. Included are the mean, median, standard deviation, and the 75th and 25th percentile values for yield spread (Spread), governance index (GIndex), firm size (Size), firm leverage (Leverage), firm profitability (ROA), firm volatility (Volatility), sales growth for the previous three years (SGrowth), institutional ownership (Inst-Own), CEO ownership (CEO-Own), adjusted credit rating (Rating), debt duration (Duration), debt convexity (Convexity), and debt age (Age).

The GIndex in the sample has a mean of 9.7, a median of 10, a standard deviation of 2.8, and 75th and 25th percentile values of 12 and 8, respectively. A low value for the index indicates that firms have strong shareholder rights, and a high value indicates that firms have strong management rights. Firm size has a mean of \$16.1 billion, a standard deviation of \$38.7 billion, and 75th and 25th percentile values of \$13.2 billion and \$1.6 billion, respectively. The median leverage ratio is 25.5% with a standard deviation of 18.8%, which suggests that a large portion of the sample consists of firms that have significant long-term debt in their capital structure. The firms are profitable with a mean and median ROA of 12.5%. Firms in the sample have an implied volatility of 30.4% and sales growth close to 9%. Institutions, on average, owned about 52.2% of the shares outstanding with a standard deviation of 21.2%, while CEOs owned about 1.7% on average, with a standard deviation of 5.3%. The remaining variables are security specific. The mean and median bond rating variable roughly equates to Moody's ratings of Baa3 and Baa2. The mean traded debt has duration and convexity of about 5.86 years and 0.59, respectively. Debt has a maximum duration of 13.6 years, and on average, has been outstanding for 4.29 years.

In addition to the above, we have also segmented the sample based on the top and bottom quartiles of the governance index and computed descriptive statistics. Although we do not report the results, we find that firms in the top quartile of the

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index (strong management rights) are older firms that have lower yield spreads, tend to be of larger size, have slightly better credit ratings, higher profitability, lower sales growth, and largely owned by institutions when compared to firms in the bottom quartile (strongest shareholder rights). In addition, their debt has higher duration, higher convexity, and has been outstanding longer than those in the bottom quartile.

Panel B of Table 2 describes the industry distribution of the sample (in absolute number and in percentage) using the standard Security Industry Classification (SIC) codes. Industries include: agriculture, forestry, and fishing, construction, manufacturing, transportation, wholesale and retail trade, finance, insurance, real estate, services, and public administration. A large portion of the sample is concentrated in manufacturing (about 46%).

Panel C of Table 2 provides the correlation coefficients among the governance index, yield spreads, and various control variables. In general, the governance index is negatively related to yield spread, leverage, volatility, and sales growth, and positively related to profitability, institutional ownership, ratings, duration, convexity, and age. In general, the analysis indicates that firms with more

TABLE 2

Sample Description of Variable Measures, Industry Data, and Correlations ($n = 1,877$)

Panel A. Descriptive Statistics for Variable Measures

Variables	Mean	Media	Std. Dev.	75th Percentile	25th Percentile
Spread	193.197	142.833	156.180	251.194	86.836
GIndex	9.703	10.000	2.825	12.000	8.000
Size	16.088	4.261	38.652	13.216	1.624
Leverage	25.504	23.259	18.767	34.413	12.381
ROA	12.457	12.402	8.390	16.862	7.173
Volatility	30.362	28.300	11.243	35.100	22.800
SGrowth	8.949	6.759	15.834	13.169	1.177
Inst-Own	52.239	55.000	21.171	68.169	37.629
CEO-Own	1.742	0.206	5.340	0.611	0.067
Rating	14.476	15.000	3.771	17.000	12.000
Duration	5.855	5.688	2.300	7.139	4.372
Convexity	0.594	0.434	0.490	0.846	0.250
Age	4.292	3.583	3.389	5.653	2.079

Panel B. Industry Data

SIC Code	Industry Titles	Firm-Year Obs.	Obs. (%)
1	Mining and Construction	113	6.02
2	Manufacturing (Food-Petroleum)	441	23.49
3	Manufacturing (Plastics-Electronics)	422	22.48
4	Transportation	256	13.64
5	Wholesale Trade and Retail Trade	197	10.50
6	Finance Insurance and Real Estate	335	17.85
7	Services (Hotels-Recreation)	76	4.05
8	Services (Health-Private Household)	24	1.28
9	Public Administration	13	0.69

Table 2 provides summary statistics for the data that we employ in the analysis. The data set is comprised of 678 firms (1,877 firm-year observations) covering the period 1990 through 2000. Panel A includes variables we use in the analysis: yield spread (Spread), governance index (GIndex), total assets in billions (Size), firm leverage (Leverage), profitability (ROA), implied firm volatility based on the Black-Scholes model (Volatility), growth in sales for the last three years (SGrowth), institutional ownership (Inst-Own), CEO ownership (CEO-Own), adjusted credit rating (Rating), debt duration (Duration), debt convexity (Convexity), and debt age (Age). The variables Spread, Leverage, ROA, Volatility, SGrowth, Inst-Own, and CEO-Own are reported in percentages. Panel B includes the number and percentage of firm-year observations for each industry group in the sample using single-digit SIC codes.

(continued on next page)

TABLE 2 (continued)

Sample Description of Variable Measures, Industry Data, and Correlations ($n = 1,877$)

Panel C. Pearson Correlations

Variable	Spread	GIndex	Size	Leverage	ROA	Volatility	SGrowth	Inst-Own	Rating	Duration	Convexity
GIndex	−0.124 (0.00)										
Size	−0.174 (0.00)	−0.101 (0.00)									
Leverage	0.327 (0.00)	−0.073 (0.00)	−0.203 (0.00)								
ROA	−0.099 (0.00)	0.026 (0.27)	−0.197 (0.00)	0.124 (0.00)							
Volatility	0.543 (0.00)	−0.090 (0.00)	−0.035 (0.21)	0.226 (0.00)	−0.078 (0.00)						
SGrowth	−0.003 (0.90)	−0.062 (0.02)	0.068 (0.01)	0.030 (0.27)	0.002 (0.95)	0.141 (0.00)					
Inst-Own	−0.116 (0.00)	0.180 (0.00)	−0.091 (0.00)	−0.025 (0.27)	0.116 (0.00)	0.114 (0.00)	−0.50 (0.07)				
Rating	−0.574 (0.00)	0.077 (0.00)	0.250 (0.00)	−0.445 (0.00)	0.163 (0.00)	−0.457 (0.00)	−0.086 (0.00)	−0.060 (0.01)			
Duration	−0.138 (0.00)	0.043 (0.06)	−0.032 (0.17)	0.043 (0.07)	0.042 (0.07)	−0.144 (0.00)	0.021 (0.45)	0.027 (0.24)	0.184 (0.00)		
Convexity	−0.185 (0.00)	0.058 (0.01)	0.015 (0.51)	−0.009 (0.71)	0.084 (0.00)	−0.174 (0.00)	−0.017 (0.52)	0.043 (0.06)	0.255 (0.00)	0.938 (0.00)	
Age	0.068 (0.00)	0.053 (0.02)	−0.002 (0.92)	−0.132 (0.00)	0.041 (0.08)	−0.042 (0.13)	−0.145 (0.00)	0.008 (0.74)	0.191 (0.00)	−0.147 (0.00)	−0.089 (0.00)

Panel C provides data on the correlations among various variables we use in this study. The data set comprises 678 firms (1,877 firm-year observations) covering the period 1990 through 2000. The variables include: governance index (GIndex), firm size (Size), firm leverage (Leverage), profitability (ROA), firm volatility derived from the Black-Scholes model (Volatility), growth in sales for the last three years (SGrowth), institutional ownership (Inst-Own), adjusted credit ratings (Rating), debt duration (Duration), debt convexity (Convexity), and debt age (Age). Significance is provided below each coefficient in parentheses.

antitakeover defenses have a lower cost of debt financing, which is consistent with the hypothesis that shareholder protection also results in expropriation of bondholder wealth. However, because firm size has an effect on governance and debt yields, we use a multivariate framework to explore our hypotheses.

IV. Empirical Results

A. Primary Specification

We test the cross-sectional relation between various antitakeover provisions proxied by the Gompers et al. (2003) governance index and the cost of debt financing, while controlling for firm- and security-specific measures. The primary specification is

$$\begin{aligned}(3)\quad \text{Spread}_{i,t} \;=\; & A_0 + A_1(\text{GIndex}_{i,t}) + A_2(\text{Size}_{i,t}) + A_3(\text{Leverage}_{i,t}) \\ & + A_4(\text{ROA}_{i,t}) + A_5(\text{Inst-Own}_{i,t}) + A_6(\text{Rating}_{i,t}) \\ & + A_7(\text{HighYield}_{i,t}) + A_8(\text{Duration}_{i,t}) + A_9(\text{Convexity}_{i,t}) \\ & + A_{10}(\text{Age}_{i,t}) + A_{11}(\text{Time_Dum}_t) + A_{12}(\text{Ind_Dum}_{i,t}) + e_{i,t},\end{aligned}$$

where Spread is the yield spread, GIndex is the governance index, Leverage is firm leverage, ROA is firm profitability, Inst-Own is institutional ownership, Rating is

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the adjusted credit rating, HighYield is a dummy that takes a value of one if the firm has non-investment grade debt, Duration is weighted average debt duration, Convexity is weighted average debt convexity, Age is weighted average debt age, and Time_Dum and Ind_Dum represent time and industry dummies, respectively. Our principal concern in the analysis is the governance index coefficient estimate, A_1. A positive coefficient would provide support for the management entrenchment hypothesis and a negative coefficient would support the shareholder interest hypothesis.

For our firm-specific control variables, we expect firm size to be negatively related to yield spread as larger firms enjoy economies of scale and greater stability. Leverage should be positively related to the cost of debt financing, as higher debt usage is associated with an increase in the probability of default and therefore a higher cost of debt financing. We expect firm profitability to be negatively related to the cost of debt financing, as better performance indicates lower default risk and lower cost of debt financing. However, leverage, size, and performance could all be captured in credit ratings. Next, we expect institutional ownership to be negatively related to yield spreads due to reduced agency problems and increased monitoring (Bhojraj and Sengupta (2003), Cremers et al. (2004)). Finally, we include year and industry dummy variables to control for possible time and industry effects.[15]

For our security-specific control variables, rating should be negatively related to the yield spread as firms with lower ratings have a higher cost of debt financing and vice versa. We expect duration to be negatively related to yield spreads and convexity to be positively related to yield spreads, although the opposite can occur. Both variables are determined by coupon, maturity, and the initial level of interest rates. Because of our homogenous sample, we expect coupon to be the main contributor to the relation between duration and convexity and yield spreads. However, since yield spreads are computed using the duration-equivalent Treasury security, the construction of the dependent variable may mitigate this concern. Age should be positively related to yield spreads as less liquid securities (or greater age) are associated with lower prices and higher yields (Beim (1992)).

Table 3 reports the results of our primary cross-sectional time-series specification and several robustness checks that account for serial correlation and endogeneity (i.e., Fama-MacBeth, first difference, fixed effects, and instrumental variable regressions). For pooled cross-sectional regressions the reported *t*-statistics are calculated using unbiased and consistent estimates of the standard errors as described in Williams (2000) and Woolridge (2002), which control for both heteroskedasticity and clustering of errors related to the GIndex.

Our primary specification provided in Table 3, column 1 estimates the effect of an additional provision in the governance index (GIndex) on the cost of debt financing (Spread). The results suggest that the GIndex is negatively and significantly related to the cost of debt financing (coefficient estimate of -4.12 with a *t*-statistic of 3.91), with the size of about four basis points per provision. In general, the control variables all have their theoretically expected signs and are statistically significant. The explanatory power of the models is close to 60%,

[15]Gillan, Hartzell, and Starks (2003) find that the relative costs and benefits of governance provisions differ significantly among industries.

TABLE 3

Yield Spread and Corporate Governance ($n = 1,877$ in Primary Specifications)

Variable	Cross-Sectional Time Series	Fama-MacBeth	First Differences	Fixed Effects Model	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	490.245[a] (11.38)	553.151[a] (4.35)	115.377[a] (9.48)	N/A	829.495[a] (9.42)	624.557[a] (3.11)
GIndex	−4.115[a] (−3.91)	−4.648[a] (−4.68)	−8.379[b] (−2.54)	−7.623[b] (−2.07)	−38.431[a] (−3.77)	−29.592[b] (−2.06)
Size	−29.969[a] (−10.71)	−30.210[a] (−8.02)	−29.436[a] (−3.22)	−8.804 (−1.07)	−40.858[a] (−8.86)	−31.412[a] (−4.29)
Leverage	1.257[a] (5.89)	1.250[a] (7.53)	0.897[c] (1.82)	1.009[b] (2.54)	1.565[a] (5.34)	1.830[a] (4.43)
ROA	−2.711[a] (−4.61)	−3.361[a] (−4.28)	−0.583 (−0.65)	−1.279[b] (−2.03)	−2.842[a] (−4.43)	−1.832[b] (−2.26)
Inst-Own	−0.634[a] (−3.71)	−0.612[a] (−3.10)	−0.896[a] (−4.12)	−0.690[a] (−3.36)	0.023 (0.08)	−0.185 (−0.73)
Rating	−11.182[a] (−6.30)	−13.352[a] (−4.44)	−3.847[c] (−1.75)	−6.917[a] (−3.93)	−15.822[a] (−7.18)	−11.667[a] (−3.05)
HighYield	118.192[a] (9.501)	120.569[a] (9.83)			55.381[b] (2.39)	67.293[b] (2.51)
Duration	−2.607 (−0.62)	0.713 (0.08)	−7.209 (−1.52)	0.990 (0.23)	−2.249 (−0.45)	5.140 (0.91)
Convexity	11.375 (0.66)	−13.247 (0.52)	15.688 (0.69)	−24.468 (−1.15)	15.496 (0.70)	−3.185[c] (−0.13)
Age	2.275[b] (2.30)	2.524 (0.88)	6.785[a] (4.17)	10.156[a] (8.98)	2.655[b] (2.34)	9.018[a] (5.68)
Quality Spread			−1.010 (−0.03)			
Volatility						202.678[a] (3.28)
CEO-Own						−3.250[b] (−2.00)
Adjusted R^2 (%)	0.582	0.606	0.366	0.727		
No. of Obs.	1,877	1,877	1,226	1,877	1,841	1,265

Table 3 gives the estimated coefficients from regressing corporate yield spreads (or the difference between the weighted average yield on the firm's outstanding debt and the yield on a Treasury security with a similar duration) on the corporate governance index (GIndex) and various control variables. The data covers the period 1990 through 2000. Control variables include: firm size (Size), firm leverage (Leverage), firm profitability (ROA), institutional ownership (Inst-Own), adjusted credit ratings (Rating), high yield dummy (HighYield) to denote firms with non-investment grade debt, debt duration (Duration), debt convexity (Convexity), debt age (Age), quality spread (QSpread), firm volatility based on the Black-Scholes model, and CEO ownership (CEO-Own). Column 1 provides the primary regression based on the full sample. Column 2 provides regression results using the Fama-MacBeth methodology. Column 3 provides changes in the regression for the variables used in the primary results. Column 4 provides results using the fixed effects model. Columns 5 and 6 provide regression using an instrumental variable, two-stage least square approach to test for endogeneity with and without CEO ownership and firm volatility as independent variables. All models include time and industry dummies (not reported). The *t*-values are presented in parentheses below each estimate. For the cross-sectional time-series test, the *t*-values are corrected for clustering and heteroskedasticity as described by Williams (2000) and Woolridge (2002). The labels [a], [b], [c] denote significance at the 1%, 5%, and 10% levels, respectively.

which suggests that the data explains a large portion of the variation in the yield spreads. Overall, the model suggests that firms with strong management rights (weak governance) are associated with a lower cost of debt financing and vice versa, providing support for the shareholder interest hypothesis.

B. Serial Correlation

To test the sensitivity of our analysis to serial correlations, we use a number of alternative methodologies to control for this possibility. First, we estimate the

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primary model using the Fama-MacBeth (1973) procedure. That is, we repeat the tests using a year by year regression and then obtain *t*-statistics by averaging the coefficients for the five years and dividing by their normalized standard deviation. We report the results in column 2 of Table 3 and they are consistent with our primary regression.[16]

As a further check to ensure that our results are not driven by multiple observations of the same firm, we eliminate multiple observations of a firm occurring in the different years. We use the first occurrence of each firm in the sample to estimate our model, which reduces the sample size to 678 firm observations. Finally, to ensure that serial correlation is not biasing the results, we estimate the models with Newey-West (1987) standard errors, which further correct for heteroskedasticity and serial correlation. Although not reported, the governance index remains statistically significant using both of these approaches.

C. Changes Regression

Investigations of possible relationships between governance and performance are always problematic due to the potential endogenous feedback from value to governance. As a check on this potential problem, we estimate a model based on temporal changes in spreads and changes in governance and other control variables, i.e.,

$$
\begin{aligned}
(4)\quad \Delta\text{Spread}_{i,t} \;=\; & A_0 + A_1(\Delta\text{GIndex}_{i,t}) + A_2(\Delta\text{Size}_{i,t}) + A_3(\Delta\text{Leverage}_{i,t}) \\
& + A_4(\Delta\text{ROA}_{i,t}) + A_5(\Delta\text{Inst-Own}_{i,t}) + A_6(\Delta\text{Rating}_{i,t}) \\
& + A_7(\Delta\text{Duration}_{i,t}) + A_8(\Delta\text{Convexity}_{i,t}) + A_9(\Delta\text{Age}_{i,t}) \\
& + A_{10}(\Delta\text{QSpread}_{i,t}) + A_{11}(\text{Time_Dum}_{i,t}) \\
& + A_{12}(\text{Ind_Dum}_{i,t}) + e_{i,t},
\end{aligned}
$$

where ΔGIndex is the change in the governance index, ΔSize is the change in the firm size, ΔLeverage is the change in firm leverage, ΔROA is the change in firm profitability, ΔInst-Own is the change in institutional ownership, ΔRating is the change in the adjusted credit rating variable, and ΔDuration is the change in the weighted average of debt duration, ΔConvexity is the change in the weighted average of debt convexity, and ΔAge is the change in weighted average of debt age. We also include the variable ΔQSpread, or the change in quality spread between the Baa index and the Aaa index (see Chen, Roll, and Ross (1986)), as a macroeconomic control variable.[17] Fama and French (1993) use a similar variable, the spread of long-term corporate debt minus the return on long-term government debt, in explaining corporate bond returns. During economic downturns, the risk of default increases and the spread widens. We expect this variable to be positively related to credit spreads.

[16]We also run the Fama-Macbeth procedure using monthly bond data and quarterly financial data for the period 1990 through 1998 and find similar results.

[17]Information used to calculate the quality spread is taken from the Federal Board of Governors Website at www.federalreserve.gov.

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Although it is possible that the level of the spread could affect the level of corporate governance, corporate governance structures do not change overnight, and shifts in corporate governance evolve slowly over time. Thus, potential for endogeneity bias is reduced in the changes model.[18] The sample of changes includes 1,226 firm-year observations. We find that the governance index is not static in the samples as 288 (153) observations have an increase (decrease) in their corporate governance index. The results are presented in column 3 of Table 3 and confirm our finding in the primary specification that the governance index is negatively and significantly related (at the 5% level) to the cost of debt financing. The magnitude of the coefficient is about eight basis points. In the changes model, the estimated coefficient can be interpreted as the average change in spread for firms that change their governance provisions. This is different from the coefficient estimates we find in the primary specification (column 1), which can be interpreted as the change in spread for an additional provision across different firms. As such, we might also expect that firms that change their governance would be the ones for which the cost of debt capital is most sensitive. The control variables have their theoretically predicted signs and, in general, are statistically significant. We provide additional testing on the issue of endogeneity in the next section.

D. Tests of Causalities

The causalities between corporate governance and yield spreads are likely to run in one direction (changes in governance can cause yields to change immediately, but it is less likely that fluctuations in yield will cause governance to change quickly); nevertheless, the ordinary least squares (OLS) regressions may not fully account for the potential endogeneity in the sample. Bhagat and Jefferis (2002) suggest that it is difficult to adequately control for the simultaneity between valuations and structure. Estimation that employs alternative methodology can provide some enhancement to the integrity of the analysis (Coles, Meschke, and Lemmon (2003)). Therefore, to mitigate endogeneity concerns, we use a fixed effects model and employ a two-stage least squares (2SLS) approach (Harvey, Lins, and Roper (2004)).

Columns 4–6 of Table 3 provide the results from the endogeneity tests. First, we run the primary regression using a fixed effects model that relies on time-series variations to identify the relation between yield spreads and corporate governance. The results are provided in column 4, and suggest that the GIndex is negatively and significantly related at the 1% level to yield spreads (about eight basis points). We note the GIndex coefficient in the fixed effects model is consistent with the changes model in column 3. Second, we follow Klein (1998) and control for simultaneity by incorporating the yield spread from the prior period (first lag) as an independent variable in the regression. Although we do not report the results, we find that the GIndex is significantly related to a lower cost of debt financing.

Finally, if corporate governance and yields are endogenously determined, OLS models will be biased and may infer a causality that does not exist. To help control for this possibility, we estimate simultaneous equations using 2SLS.

[18] We also examine various lead-lag relations between corporate governance and bond yields and find similar results.

A problem with using 2SLS is the identification of the variables that influence corporate governance or credit spreads but not both. Hence, the 2SLS model is only as good as the choice of instrumental variables. The first-stage model contains the GIndex model. We rely on variables from Gompers et al. (2003), which include the natural log of total assets, sales growth in the last three years, firm leverage, profitability, CEO ownership, and market-to-book. We find no evidence that either market-to-book or sales growth affects credit spreads. The structural models include the primary model of credit spreads (column 5) as well as a model including CEO ownership and Black-Scholes implied volatility (column 6).

The results for both 2SLS models indicate a statistically significant relation between the GIndex and credit spreads. The only significant differences in the 2SLS results are the insignificance of the institutional ownership variable in both models and the statistical significance of CEO ownership. Overall, we find that corporate governance is negatively and significantly related to the yield spread and that the GIndex variable is robust to various accommodations for causalities.

V. Alternative Specifications

In this section, we examine whether the results in the primary specification models are robust to various alternative nonlinear specifications and control for possible omitted control variables. That is, we test the primary results with respect to outliers and influential observations, variations of firm size, variations of institutional holdings, CEO ownership, alternative measures of bankruptcy prediction scores (Ohlson (1980), Altman (1968)), nonlinearities in firm leverage, firm volatility, debt age, and firm liquidity. We also segment the sample into investment and non-investment grade debt and test our main results.

A. Nonlinearities in the GIndex

We report results using the log of the GIndex in column 1 of Table 4. The governance index continues to be negative and significant with the expected signs and similar estimates on all other variables (coefficient estimate of -32.64 with a t-statistic of 3.67).[19] In column 2, we replace the GIndex with two dummy variables, one for the top quartile (weak governance) and one for the bottom quartile (strong governance). The top quartile firms have a significantly lower cost of debt relative to the median firms (about 15 basis points), and the bottom quartile firms have a significantly higher cost of debt relative to the median firms (about 18 basis points), with a total difference of about 34 points between the two groups. The relatively symmetric relationship and comparability with the point estimate using the GIndex suggests that both the linear model and the linear construction of the governance index work well.

[19] We also test the primary regression model using the squared term of governance and find similar results.

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TABLE 4

Yield Spread and Corporate Governance: Alternative Specifications to Primary Regression

	Log GIndex	GIndex (Quartile)	Growth & Volatility	Ohlson Score	Institutional Ownership	CEO Ownership
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	520.628[a] (11.04)	452.490[a] (11.00)	174.479[a] (3.63)	387.835[a] (9.74)	444.343[a] (10.39)	466.374[a] (9.11)
GIndex			−2.471[a] (−2.27)	−3.985[a] (−3.80)	−4.460[a] (−4.03)	−3.503[a] (−3.03)
Log(GIndex)	−32.643[a] (−3.67)					
GIndex (p25)		−15.372[a] (−2.55)				
GIndex (p75)		18.162[a] (2.43)				
Size	−29.785[a] (−10.66)	−30.074[a] (−10.72)	−18.938[a] (−6.93)	−19.442[a] (−6.71)	−26.727[a] (−9.05)	−28.516[a] (−9.13)
Leverage	1.253[a] (5.88)	1.249[a] (5.85)	1.344[a] (4.63)	0.312 (1.09)	1.179[a] (5.17)	1.450[a] (5.21)
ROA	−2.705[a] (−4.59)	−2.695[a] (−4.58)	−1.496[b] (−2.11)	−1.362[c] (−1.92)	−2.849[a] (−3.91)	−2.374[a] (−3.40)
Inst-Own	−0.632[a] (−3.68)	−0.640[a] (−3.76)	−0.505[a] (−2.93)	−0.610[a] (−3.53)		−0.772[a] (−4.15)
Rating	−11.051[a] (−6.25)	−11.209[a] (−6.34)	−6.118[a] (−3.53)	−10.464[a] (−5.73)	−10.123[a] (−5.10)	−10.013[a] (−5.50)
HighYield	119.511[a] (9.58)	118.084[a] (9.57)	108.461[a] (8.68)	121.015[a] (9.59)	133.686[a] (9.83)	118.767[a] (9.01)
Duration	−2.618 (−0.60)	−2.777 (−0.66)	10.886[b] (2.54)	3.707 (0.88)	−0.346 (−0.08)	−1.733 (−0.39)
Convexity	11.596 (0.65)	11.934 (0.69)	−32.572[c] (−1.87)	−20.557 (−1.13)	−1.538 (−0.08)	9.963 (0.55)
Age	2.319[b] (2.31)	2.258[a] (2.31)	9.263[a] (5.95)	2.214[b] (2.17)	2.734[a] (2.69)	2.223[b] (2.15)
Volatility			316.120[a] (8.29)			
SGrowth			−0.080 (−0.24)			
O Score				15.784[a] (3.83)		
IOBank					−0.593 (−1.41)	
IOInsurance					−1.307[c] (−1.95)	
IOInvestment					0.709 (1.20)	
IOIndepedent					−0.256 (−0.75)	
IOOther					0.039 (0.15)	
CEO-Own						0.518 (0.69)
Adjusted R^2	0.579	0.582	0.602	0.580	0.592	0.557
No. of Obs.	1,877	1,877	1,290	1,843	1,533	1,622

Table 4 gives the estimated coefficients from regressing the yield spread on the governance index using various alternative specifications. The data covers the period 1990 through 2000. Independent variables in the primary regression include: the governance index (GIndex), the log of the GIndex (Log(GIndex)), the 1st quartile of the GIndex (GIndex (p25)), and the 4th quartile of the GIndex (GIndex (p75)), firm size (Size), firm leverage (Leverage), firm profitability (ROA), institutional ownership (Inst-Own), adjusted credit ratings (Rating), high yield indicator (HighYield), debt duration (Duration), debt Convexity (Convexity), and debt age (Age). Also included in further robustness regressions: firm volatility based on the Black-Scholes model (Volatility), sales growth for the past five years (SGrowth), Ohlson's (1980) bankruptcy score (O score), and an institutional ownership variable decomposed into: bank ownership (IOBank), insurance company ownership (IOInsurance), independent advisor ownership (IOIndependent), investment company ownership (IOInvestment), other ownership (IOOther), and CEO ownership (CEO-Own). Column 1 and 2 provide regression results using the log of the GIndex and 1st and 4th quartiles, respectively. Column 3 provides regression results when firm volatility and sales growth are added. Column 4 provides an alternative specification for the Ohlson (1980) bankruptcy score (O score). Columns 5 and 6 provide primary results for institutional ownership variables and CEO ownership, respectively. All models include time and industry dummies. The *t*-values are presented in parentheses below each estimate. For the cross-sectional time-series test, the *t*-values are corrected for clustering and heteroskedasticity as described by Williams (2000) and Woolridge (2002). The labels [a], [b], [c] denote significance at the 1%, 5%, and 10% levels, respectively.

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B. Robustness Testing

To examine whether our results are driven by model misspecification or correlated omitted variables, we examine a number of alternative models. In column 3, we include implied firm volatility based on the Black-Scholes model and sales growth for the last three years (data are available for 1,290 firm-year observations from Compustat Execucomp database) in the primary model to account for firm performance and risk. We continue to find a significant negative effect for the GIndex on yield spreads and reasonable estimates for the other parameters. [20]

Although our above analysis includes leverage, volatility, firm size, and credit ratings, we consider alternative approaches to capturing default risk. Ohlson (1980) provides a composite of bankruptcy prediction scores to model default probability for a firm. In column 4, we add Ohlson's bankruptcy prediction score as an additional control variable. We also run the same regression without the credit rating variable (only the Ohlson model). In both cases, we find similar outcomes to those reported in our primary regression. In addition, to provide a further robustness test on default we test the impact of firm liquidity on the primary results using the coverage ratio. We find that the coverage ratio coefficient estimate is insignificant and the results are consistent with those reported in the primary specification. Overall, the results are robust to various specifications of default and bankruptcy prediction models. [21]

As an additional check that our results are not driven by omitted variables, we estimate our main regression using alternative measures of institutional and CEO ownership. We follow Brickley, Lease, and Smith (1988) (see footnote 13, p. 279) and segment the institutional ownership sample by the different types of institutional investor (bank, insurance company, independent investment advisor, investment companies and their managers, and others). The results are reported in column 5 of Table 4, and suggest that insurance companies' ownership is the primary variable that influences yield spreads. Overall, the results corroborate the earlier finding that the GIndex is negatively related to yield spreads. For CEO ownership, we estimate our main regression specification controlling for the percentage of CEO ownership, log of the percentage of CEO ownership, and dummy variables for the highest and lowest quartiles of CEO ownership. Due to space constraints, we only report the percentage of the CEO ownership variable in column 6. In all cases, the *t*-statistics on the governance index are significant and the negative coefficients remain about the same (about four basis points). The variable CEO ownership remains insignificant in all of the estimated models.

In the empirical analysis, we examine the impact of corporate governance on the cost of debt financing and control for firm leverage. However, severe leverage differences may exist in the sample that may cause the cost of debt financing or

[20] In addition, recognizing that volatility may be nonlinear, we estimate a regression using the squared term of volatility. The unreported results of that regression are consistent with those originally reported and confirm the relation between the GIndex and the cost of debt financing. Variations of firm volatility including the standard deviation of the security price for the last three and five years and the standard deviation of cash flows scaled by debt for the last three and five years (see Anderson, Mansi, and Reeb (2003)) yield similar results.

[21] We also examine default risk using Altman's (1968) bankruptcy model and find similar results. Also using an interaction term between for the Ohlson (or Altman) score and GIndex yields similar results.

credit ratings to have an impact on the outcome. Therefore, we run an alternative specification for leverage using the squared term of leverage in a separate regression. Although we do not report the results, they corroborate the original findings that antitakeover provisions have a negative impact on the cost of debt financing.

C. Subsamples

We first exclude financial and regulated firms from the sample, which results in a subsample of 1,744 observations. Column 1 of Table 5 indicates that there are no appreciable changes in the results when this group is excluded. We further investigate the effect that differences in default risk might have on the relation between governance and yield spreads. As such, we segment the full sample into firms with investment grade debt and firms with non-investment grade debt (high yield bonds). If governance provisions affect the risk of corporate bonds, we should see a larger impact for bonds with the highest probability of financial distress (i.e., when the face value of the debt is greatest relative to equity). The results, provided in columns 2 and 3, concur with our earlier findings that the GIndex is negatively related to the cost of debt financing (Table 3). As expected, the value of the coefficient is larger for the non-investment grade (about five basis points) as compared to the investment grade bonds (about three basis points).

For firm size, we divide our original sample into quartiles and run subregressions of the full sample data (first quartile: smallest firms; fourth quartile: largest firms; quartiles 2 and 3: mid-size firms). The results are reported in columns 4–6, and suggest that the coefficient estimates for the governance index are negative and significant after controlling for different segments of firm size. [22]

Finally, though not reported we also perform a number of additional tests. To test the sensitivity of our results to outliers, we eliminate observations that are one, two, and three standard deviations away from the mean and rerun our primary specification regression results. We also consider alternative variations of bond liquidity. Bond liquidity may decay exponentially in which case a nonlinear relation between debt age and yield spreads may be appropriate (Beim (1992)). As such, we replace age with the natural log of age and the squared term of age. In all of these models, we find results similar to those we report in Table 3.

VI. Conclusion

In the late 1980s, the management of U.S. corporations enacted various antitakeover measures to protect them from becoming takeover targets. These actions shifted the balance of power between shareholders and managers. Commentators have debated the desirability of these antitakeover provisions with much vigor, but little definitive empirical support. Recent evidence on the equity side suggests that portfolios of firms with strong shareholder rights (weak antitakeover amendments) earn abnormal stock returns, observe higher valuations, and realize better operating performance relative to those with strong management rights (strong antitakeover amendments). We extend this literature and examine the relation between antitakeover provisions proxied by the Gompers et al. (2003) governance

[22] We also use sales as an alternative measure for firm size (i.e., firm sales) and find similar results.

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TABLE 5

Yield Spread and Corporate Governance: Alternative Specifications to Primary Regression

	Excludes Financials	Investment Grade	Non-Invest. Grade	Smallest Quartile	Largest Quartile	Mid-Size Quartiles
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	520.817[a]	388.106[a]	880.719[a]	875.967[a]	158.456[a]	361.265[a]
	(11.55)	(8.20)	(11.17)	(6.30)	(2.96)	(6.30)
GIndex	−4.364[a]	−2.787[a]	−5.239[b]	−4.126[c]	−1.717	−2.620[b]
	(−4.00)	(−2.99)	(−2.11)	(−1.68)	(−1.40)	(−2.06)
Size	−32.501[a]	−20.404[a]	−62.383[a]	−61.289[a]	−8.396[b]	−23.631[a]
	(−11.00)	(−7.91)	(−9.11)	(−3.66)	(−2.06)	(−4.23)
Leverage	1.296[a]	0.944[a]	1.006[a]	1.172[a]	0.620[c]	1.323[a]
	(5.84)	(4.83)	(2.71)	(3.10)	(1.90)	(4.76)
ROA	−2.795[a]	−2.040[a]	−2.738[a]	−2.860[a]	−0.495	−3.268[a]
	(−4.71)	(−3.75)	(−2.68)	(−3.32)	(−0.78)	(−4.97)
Inst-Own	−0.642[a]	−0.364[b]	−0.995[a]	−1.491[a]	−0.014	−0.334
	(−3.29)	(−2.15)	(−2.84)	(−3.47)	(−0.10)	(−1.52)
Rating	−12.076[a]	−13.602[a]	−10.677[a]	−20.717[a]	−5.910[a]	−8.585[a]
	(−6.58)	(−9.19)	(−3.04)	(−4.44)	(−2.59)	(−3.85)
HighYield	112.718[a]			114.276[a]	50.721[b]	109.577[a]
	(8.87)			(3.91)	(2.23)	(6.76)
Duration	−3.853	−5.203	18.845[c]	−28.680[b]	12.702[a]	8.695[c]
	(−0.83)	(−1.36)	(1.65)	(−2.43)	(3.71)	(1.70)
Convexity	14.903	24.059	−219.686[a]	99.150[c]	−39.522[b]	−33.328
	(0.79)	(1.53)	(−3.38)	(1.94)	(−2.51)	(−1.60)
Age	1.964[b]	2.346[a]	−3.252	−1.252	3.195[c]	2.427[b]
	(1.97)	(2.56)	(−1.16)	(−0.45)	(1.65)	(2.10)
Adjusted R^2	0.580	0.433	0.467	0.578	0.574	0.530
No. of Obs.	1,744	1,366	511	469	469	939

Table 5 gives the estimated coefficients from regressing the yield spread on the governance index using various additional alternative specifications based on the exclusion of financial firms, investment and non-investment grade debt, and variations of firm size. The data used covers the period 1990–2000. Independent variables include: the governance index (GIndex), firm size (Size), firm leverage (Leverage), profitability (ROA), institutional ownership (Inst-Own), adjusted credit rating (Rating), high yield indicator (HighYield), debt duration (Duration), debt Convexity (Convexity), and debt age (Age). Column 1 provides regression results when excluding financial firms. Column 2 and 3 provide regression results when segmenting the data into investment and non-investment grade debt. Columns 4–6 provide robustness checks for the governance index based on different assets sizes: quartile 1 denotes the smallest quartile of firms; quartile 4 denotes the largest quartile of firms; and quartiles 2 and 3 denote the middle quartiles. All models include time and industry dummies. The *t*-values are presented in parentheses below each estimate. For the cross-sectional time-series test, the *t*-values are corrected for clustering and heteroskedasticity as described by Williams (2000) and Woolridge (2002). The labels [a], [b], [c] denote significance at the 1%, 5%, and 10% levels, respectively.

index and the cost of debt financing. We find that there is a statistically negative and significant relation between the governance index and the cost of debt financing after controlling for firm- and security-specific factors. The magnitude of this relation is substantial in economic terms. The finding is robust with respect to alternative model specification and subsample analysis.

The results suggest two main implications. First, the negative relation between the governance index and the cost of debt financing indicates that since the governance index is larger in the presence of more takeover defenses, provisions that facilitate shareholders' ability to sell to a new management team raise the cost of debt capital. This suggests that hostile takeovers could be partially financed by expropriating bondholder wealth, and that provisions that shift power from managers toward shareholders can result in shareholder expropriation of bondholder wealth (Shleifer and Summers (1988)).

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Second, when we segment the data into firms with strong takeover defenses (top quartile) and firms with low takeover defenses (lowest quartile), we find that firms in the top quartile are associated with a lower cost of debt financing while firms in the lowest quartile are associated with a higher cost of debt financing. We interpret this evidence to suggest that firms with corporate governance provisions that favor shareholder interests over management interests are viewed unfavorably in the debt market. Overall, bondholders view antitakeover provisions as an effective tool that better protects their interests. This finding strongly suggests that it is important to look at the total effect of governance terms and not merely the impact on stockholders before drawing conclusions and changing regulatory policy. The fact that the effects of particular provisions might differ for debt and equity may help explain the rich mixture of governance provisions we observe.

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