Stockholder and Bondholder Reactions To Revelations of Large CEO Inside Debt Holdings: An Empirical Analysis

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September 2009

Abstract

We conduct an event study of stockholders' and bondholders' reactions to companies' initial reports of their CEOs' inside debt positions, as required by SEC disclosure regulations that became effective early in 2007. Results show that bond prices rise, equity prices fall, and the volatility of both securities drops at the time of disclosures by firms whose CEOs have sizeable pensions or deferred compensation. The results indicate a transfer of value from equity toward debt, as well as an overall destruction of enterprise value, when a CEO's inside debt holdings are large.

Keywords: deferred compensation, inside debt, executive compensation disclosure

JEL codes: G14, G32

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I. Introduction

In the spring of 2007, new Securities and Exchange Commission (SEC) regulations required U.S. companies to disclose abundant new data about executive compensation. Among other items, new variables provided information about equity compensation, perquisites, and severance packages. This paper investigates investor reactions to the first disclosures of the values of CEOs' pensions and deferred compensation. These two items together comprise managers' "inside debt" claims against their firms, since each represents an fixed liability owed by the companies to their executives at a future date.

Jensen and Meckling (1976, pp. 352-354) and subsequent authors have argued that inside debt compensation represents a potential method of reducing the agency costs of debt in a levered firm. The agency costs of debt arise from strategies in which management changes the firm's investment policy, payout policy, or capital structure in ways that reallocate wealth from debtholders to stockholders, usually through some increase in the overall risk of the firm. Because debtholders rationally anticipate these strategies, they will raise the cost of debt and the firm's overall cost of capital in situations that suggest agency costs of debt are likely to be high.

To counteract these costs, Jensen and Meckling suggest an optimal incentive structure under which the manager's personal holdings of the firm's debt and equity should occur in a ratio that mimics the firm's overall external capital structure. The authors continue that if a manager's inside debt holdings become especially large, exceeding the amount implied by the condition above, he might manage the firm too conservatively, reducing overall risk in ways that transfer wealth from stockholders to debtholders.

Our event study analysis tests whether stockholders' and bondholders' reactions to companies' initial reports of their CEOs' inside debt positions are consistent with these theories. We identify 231 companies whose CEOs have positive inside debt holdings and whose proxy statements with 2006 compensation data are filed in early 2007 during the first wave of disclosures under the SEC's new regulations. About 45% of these CEOs have excessive inside debt under the Jensen-Meckling criterion, as their personal inside debt-equity ratios exceed the external debt-equity ratios of their firms. As expected, we find evidence of transfers of value away from equity and toward debt upon revelations that top managers hold large pension and deferred compensation claims. Our results show that bond prices rise, equity prices fall, and the volatility of both securities drops at the time of disclosures by firms whose CEOs have large inside debt.

Figure 1, a tabulation of monthly regression coefficient estimates, illustrates the overall pattern of results that we observe. The figure shows the outcomes of a series of ordinary least squares regressions over a sample of 911 publicly traded bonds issued by the 231 companies in our sample. The dependent variable equals the yield spread for each bond, or the difference between the bond's yield to maturity at month-end and the yield on a U.S. Treasury bond of

equal maturity. The coefficient displayed in the figure is the estimate for the influence of the CEO's relative debt-equity ratio. We define this as the ratio of the CEO's inside debt-equity ratio over the firm's external debt-equity ratio, with the CEO's inside debt-equity ratio equal to the present value of the CEO's pension and deferred compensation holdings divided by the value of his stock and option holdings.[1] We estimate the monthly regressions in a piecewise specification, and the chart shows the estimated slope of the CEO's relative debt-equity ratio for the segment above the critical value of 1.00. As shown in the chart, the CEO's debt-equity ratio, which was unknown to investors prior to March 2007, had no significant impact on corporate bond yields up to that time. After the initial wave of CEOs' inside debt disclosures in March 2007, our cross-sectional estimates of the influence of the CEO's relative debt-equity ratio upon bond prices become consistently negative as theory would predict, with increasing strength and statistical significance month-by-month, for those observations in which the CEO's inside debt-equity ratio exceeds the firm's external debt-equity ratio.

By showing that investors take close account of managers' large inside debt positions when pricing a firm's external claims, our results extend a nascent literature that illuminates the importance of inside debt as an incentive mechanism. Cross-sectional studies of inside debt's role in management compensation have appeared in Sundaram and Yermack (2007) and Gerakos (2007), and these papers generally provide evidence consistent with the idea that firms use inside debt compensation when the potential agency costs of debt in their capital structures are high.

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[1] The regressions include a full range of other control variables: firm leverage, firm size (log of equity market capitalization), return on assets, interest coverage, equity volatility, bond time to maturity, bond coupon rate, the amount of the bond issue outstanding, and indicator variables for utility industry membership, secured status, callable status, and credit ratings Baa, Ba, B, and Ca and lower. Significance levels are determined by robust standard errors clustered by issuing firm. The R^2 goodness-of-fit measures range from .57 to .74 across the 15 months shown.

Sundaram and Yermack find that pension values are higher when leverage is higher, while Gerakos finds higher pension values in firms with strong credit quality, higher book-to-market ratios, and lower idiosyncratic risk. Sundaram and Yermack also find that when managers hold large inside debt positions, the likelihood of the firm defaulting on its external debt is reduced, consistent with a hypothesis that these managers operate the firm conservatively in order to protect debt values.

Other than Jensen and Meckling (1976), only Edmans (2008) has studied the theoretical implications of inside debt, although the role of incentive compensation in mitigating the agency costs of debt has been the subject of many papers (see Edmans, 2008, for a survey).

In many ways our empirical results are the mirror image of those reported in the classic event study by DeFusco, Johnson and Zorn (1990). In that paper the authors examine the announcement effects of executive stock option plans introduced by more than 400 firms between 1978 and 1982. On average these firms' stock prices rise, bond prices fall, and equity volatility rises around the time of the plan disclosures. The authors interpret these results as consistent with a pattern of risk shifting, in which both equity and debt investors expect firms to pursue riskier investment strategies due to the managers' option-based incentive compensation. In our study, the implication of the results is exactly the opposite: to the extent that managers have large unfunded debt claims against their firms, outside investors expect them to manage their firms conservatively, implying lower-risk investment strategies that would tend to make debt safer and equity less attractive.

Our research adds to a growing list of studies using the SEC's recent disclosure expansion to illuminate aspects of executive compensation that could not be researched

previously. Papers in this category include Grinstein, Weinbaum and Yehuda (2008) and Andrews, Linn and Yi (2009) (executive perquisites); Murphy and Sandino (2009) and Cadman, Carter and Hillegeist (2009) (the influence of compensation consultants); and Faulkender and Yang (2008) and Cadman, Carter, and Semida (2009) (peer groups used for benchmarking executive incentives). We also extend the literature on corporate bond event studies, which have had only a limited presence in empirical corporate finance research because of data availability limitations. For examples, see Masulis (1980), Warga and Welch (1993), and Maxwell and Stephens (2003).

The remaining sections of this paper are organized as follows. Section II describes the sample selection process and the resulting dataset. Section III contains the main event study analysis. Section IV presents a discussion of the results and conclusion.

II. Sample Selection and Data Description

Although not used by all companies, inside debt compensation for executives generally consists of two pieces: defined benefit pensions and deferred compensation. Pension benefits may sometimes be negotiated, but they usually accrue to managers under company-wide formulas established by each company, often based upon years of service with the firm and each executive's average level of cash compensation. When an executive retires, he can draw the pension in the form of a life annuity or as a single lump sum, equal to the actuarially calculated present value of expected lifetime benefits. Deferred compensation, in contrast, accrues if the executive makes a discretionary investment decision that involves him lending money back to his firm by foregoing cash compensation that he would otherwise be entitled to receive in the

current period. Deferred compensation may often be invested either at a fixed rate of return, or in the company's stock, or in a menu of stock or bond mutual funds chosen by the firm.

For both pension benefits and deferred compensation balances, the amounts due to executives are almost always unfunded and unsecured, so these sums are at risk like other unsecured debt if the firm became financially distressed. In addition to the incentive implications of these plans, a major motivation for executives to receive inside debt compensation is that its taxation is almost always deferred until the executive receives payouts when retired.

In some companies managers' inside debt values can be large, sometimes exceeding $100 million and occasionally amounting to a greater sum than a manager's equity investments in his firm's stock or stock options.[2] However, until 2007 managers' inside debt values were almost never disclosed under the SEC's executive compensation reporting requirements previously in effect. Companies were required to provide certain details about the pension benefits due to an executive, but calculating the expected present value of an individual manager's pension required combining the disclosed data with information from a number of external sources and making sophisticated actuarial computations, a task probably beyond the skills of most investors and even Wall Street analysts (see Sundaram and Yermack, 2007). Even less was disclosed about deferred compensation; most firms did not even have to report whether their executives even participated in a deferred compensation plan, and in the few cases in which these

[2] Seven CEOs had inside debt balances exceeding $100 million at fiscal year-end 2006 on the latest release of the ExecuComp database. More than two-thirds of the CEOs in the database had nonzero inside debt, with a mean value of $5.7 million. In general inside debt compensation is more common among larger firms in slower growth sectors of the economy such as manufacturing, utilities, and transportation.

disclosures were required,[3] the balances held by individual managers were never given. When the SEC announced a pending revision of its executive compensation disclosure rules in late 2006, providing more information about pensions and deferred compensation was a major priority.

Because the new reports of managers' pension and deferred compensation balances in early 2007 were highly anticipated by the community of executive compensation analysts, consultants, and researchers, we hypothesize that companies' stock and bond prices should have reacted significantly for companies in which these inside debt balances were revealed to be large. Our research strategy uses standard event study methodology to capture stock and bond investors' immediate reactions to companies' disclosures. Therefore, we focus upon publicly traded firms that also had publicly traded long-term debt outstanding at year-end 2006, the time at which the SEC's new disclosure regulations became effective.

We begin by identifying all non-financial Compustat firms with fiscal years ending in December 2006 or later for which Moody's provides a senior bond rating. After discarding a small number of companies with faulty or incomplete compensation disclosures, we retain all firms that file proxy statements with the SEC between January 1, 2007, and April 30, 2007 and report nonzero inside debt holdings for their CEOs. Within this group, we look at the subset that have fixed-rate publicly traded bonds listed on the Mergent Fixed Investment Security Database in the form of either non-convertible debentures, medium-term notes or zero-coupon bonds. This set of screens give us a preliminary sample of 286 firms. We then require each company to

[3] Companies had to report only those cases in which the executive received a fixed rate of interest on his deferred compensation, and only if the fixed rate exceeded the "applicable federal rate," an estimate of the risk-free rate specified by the Internal Revenue Service. In practice, very few plans had this structure, as most firms do not offer high fixed-rate interest as an investment option.

have daily bond pricing data in the Reuters database between June 2006 and August 2007, to have non-missing data for the bond rating, amount outstanding, and time to maturity as of the proxy statement filing date, to have a minimum maturity of one year, and at least 60 end-of-day bond pricing quotes in the 90-day periods before and after the filing date.[4] These screens cause us to discard 55 firms, resulting in a final sample of 231 companies which together have a total of 911 distinct bond issues.

Figure 2 shows a timeline of the proxy statement filing dates for the 231 firms that we study. We use these filing dates as the event dates in our analysis, as the SEC always posts incoming documents on its EDGAR website for public viewing within hours their receipt. In 214 cases, the information about CEOs' inside debt holdings was revealed in a definitive proxy statement filed with the SEC at some point during the month of March 2007. In 17 cases firms filed a preliminary proxy statement with full compensation data several weeks in advance of their final proxy filing, with the preliminary document available for public viewing. In these 17 cases we use the earlier date as the event date, with the first of these disclosures coming on January 18, 2007. Among other patterns, Figure 2 shows a tendency for firms to file proxy statements on Fridays, and it indicates that the first wave of compensation disclosures under the new rules began in earnest during the second week of March 2007 and began to taper off by the end of that month (regulations require firms to make compensation disclosures within 120 days of fiscal year-end, though most comply sooner). We do not extend our sample to companies that

[4] Our computations for bond returns and volatility rely on end-of-day pricing quotes provided by Reuters, which gathers the data each day based upon market quotes. Actual bond transaction prices are rare, because most corporate bonds trade infrequently. Reuters gathers quotes for corporate bonds throughout each trading day, even if those bonds do not trade. At the end of the day it posts provisional prices for individual bonds and then allows for a "market challenge" period in which clients can submit evidence to challenge Reuters' pricing, with the vendor making adjustments to its posted prices if warranted.

filed their first compensation disclosures beyond the end of April, because we are concerned about the informativeness of these later filings. We conjecture that once investors had seen the inside debt positions of managers at several hundred firms, they would have been able to estimate with some precision the holdings of CEOs at companies that had not yet filed and thus would not react as strongly to the later disclosures.

Table 1 presents descriptive statistics about the 231 firms and 911 bond issues that we study. Most of our sample companies are large, well-known firms with moderate leverage and investment grade credit ratings. Although we consider all Compustat firms for inclusion in our study, inside debt compensation plans are much more common among larger firms than smaller ones, and a large majority of our sample companies are well-known S&P 500 firms. The typical CEO in our sample is 56 years old and has held his position for a mean of five (median of three) years, although he was likely accumulating inside debt while holding junior management positions prior to becoming CEO.

To value each CEO's holdings of inside debt and equity, we use information in each proxy statement. We take the present value of pension benefits and deferred compensation balances as reported by the company. We calculate stock ownership value by multiplying shares held (including restricted shares) times the stock price on December 31, 2006. We value stock options by applying the Black-Scholes formula to each individual tranche of options held by the CEO and summing the tranche values to an aggregate total. The CEOs in our sample hold a mean (median) of $9.5 million ($5.0 million) of inside debt in their firms, according to the values reported by the companies in our sample, with the majority in the form of pension benefits. The personal inside debt-equity ratio, comparing the value of a CEO's inside debt over his inside

equity, has a mean of 0.49 and median of 0.26. In 104 cases out of the 231 firms that we study, or 45%, the CEO's personal inside debt-equity ratio exceeds the company's external debt-equity ratio, providing the apparent incentives for overly conservative management identified by Jensen and Meckling (1976).

Figure 3 shows a scatter plot of the CEO's personal inside debt-equity ratio against the external debt-equity ratio of the firm. Many observations cluster near the 45-degree line, where the ratio between the two values equals the Jensen-Meckling optimum of 1.00. Observations in the upper left part of the chart are those in which the CEO has relatively high equity incentives in a firm with a levered capital structure. In this area, one would expect the CEO to pursue very risky investments and the agency costs of debt to be high. In the lower right of the chart, the opposite situation prevails, with the CEO having a high inside debt position in a relatively unlevered firm. In this area one would expect the opposite agency problem, a CEO managing the firm very conservatively even though the external claimholders would have little reason to be concerned about risk-shifting between equity and debt.

III. Analysis

A. Univariate analysis of abnormal returns

We begin by examining the unconditional abnormal returns to debt and equity securities of all 231 firms in our sample around the dates of their proxy statement filings in early 2007. We calculate equity abnormal returns using the Fama-French-Carhart four-factor model, with a 120-day parameter estimation period ending 10 days prior to the event day and the S&P 500 index as the market index. Bond abnormal returns are based upon a two-factor model, using the

Citigroup Investment-Grade and Speculative-Grade corporate bond indexes and a 90-day parameter estimation period. These abnormal returns are calculated separately for all 911 publicly traded bond issues associated with our 231 sample firms. Finally, we combine the abnormal stock and bond returns into an overall "firm abnormal return" for each of our 231 companies. Firm abnormal returns equal weighted averages of the abnormal returns to the stock and bonds issued by each firm, with the weights equal to the total outstanding market value of each security as of the event day. If a firm also has debt that is not publicly traded, we include it in the weighted average, with the weight equal to the difference between the book value of total debt and the book value of traded debt, and the abnormal return of non-traded debt assumed to equal zero.[5]

Table 2 shows the mean cumulative abnormal returns for the samples of stocks, bonds, and firms overall, over a two-day event window that includes the SEC filing date and the subsequent trading date; we use a two-day window because some filings occur late in the day after the market has closed. The overall pattern of returns in the entire sample seems uninteresting, but we find significant differences in the returns to bondholders after partitioning the sample based upon whether the CEO's personal inside debt-equity ratio is less than or greater than the firm's external debt-equity ratio. In the former case, shown in Panel B of Table 2, we find negative and significant bondholder returns upon the disclosure of the CEOs' relatively low inside debt positions. In the latter case, shown in Table C, we find positive and significant bondholder returns when high CEO inside debt holdings are disclosed. These results are in line

[5] We test the sensitivity of our results to these assumptions by changing the abnormal return on non-traded debt to equal the abnormal return on traded debt, and also by changing the weight for non-traded debt to equal the book value of long-term debt minus the book value of traded debt. We also tested other cases assuming that the return on non-traded debt equaled the minimum, maximum, and mean return on traded debt for firms with multiple traded bond issues outstanding. In all cases the estimated firm CAR is virtually identical in size and significance, so we use the assumptions above in the analysis throughout the paper.

with our expectations, although we do not find significant results in either subsample for returns to equityholders or to the firm overall.

B. Regression analysis of abnormal returns

Table 3 presents ordinary least squares regression estimates that explore the cross-sectional determinants of the cumulative abnormal returns for stocks, bonds, and firms overall, with the dependent variables defined as in Table 2 above. The main control variable in the regressions is the CEO's relative debt-equity ratio, equal to the CEO's personal inside debt-equity ratio divided by the firm's external debt-equity ratio. In the right half of the table, we use this variable in a piecewise specification, with the estimated slope allowed to vary above the below the critical value of 1.00, where the CEO's personal leverage just equals the firm's overall leverage. In the left half of the table, the variable is used with a single slope estimated over its entire range.

In addition, we include a variety of control variables in our regressions, because the compensation disclosures that we study occur in a lengthy document, the proxy statement for the annual shareholder meeting. Due to the comprehensive nature of shareholder proxy statements, it is possible that disclosures of CEOs' inside debt holdings might systematically occur in tandem with other types of important corporate governance revelations (Brickley, 1986). A very large number of event studies over the past 20 years have used proxy statement filing dates as the basis for studying investor reactions to CEO pay, changes in the board of directors, shareholder resolutions, and numerous other topics. We therefore read each of the 231 proxy statements in our sample and identify those that report other events likely to be important to

shareholders. After tabulating these data, we use nine indicator variables as controls in our regression in Table 3. These control variables include an indicator that equals one for 23 firms that nominate of new independent directors (Rosenstein and Wyatt, 1990) and an additional indicator for three firms that disclose nominations of new grey directors who have conflicts of interest (Shivdasani and Yermack, 1999); an indicator for 25 firms that disclose personal aircraft use by the CEO as a perquisite, after never having made such disclosures in the past (Yermack, 2006); indicator variables for firms in which management proposes shareholder-friendly governance changes, including rescinding super-majority voting requirements (nine firms), introducing majority voting in director elections (11 firms), and declassifying a staggered board of directors (14 firms) (Faleye, 2007); and indicators for firms that receive shareholder resolutions related to the areas of executive compensation (45 firms), other corporate governance issues (61 firms), and social or environmental issues (38 firms) (Karpoff, Malatesta, and Walkling, 1996). Finally, we include two more control variables, an indicator for whether the firm's debt is rated as speculative grade (BB+ or below), and a further indicator for whether the firm operates primarily in the utility industry (SIC code 49), since a large number of these companies appear in our sample. We test the statistical significance of our estimates using robust standard errors, which are clustered at the firm level in the bond CAR regressions.

Estimates in the left half of Table 3 indicate that the abnormal two-day returns to bondholders are positively related to the relative debt-equity ratio of the CEO. This result is consistent with our prediction, as it implies that revelations of CEOs holding large inside debt positions (those in the lower right region of Figure 3) are welcomed by bondholders, who expect these managers to pursue conservative, low-risk operating strategies. We do not find significant

estimates for the abnormal returns to equityholders or the firm overall.

In the right half of Table 3, we decompose the CEO's relative debt-equity ratio into two pieces, with the slope allowed to change at the critical value of 1.00. We find a pattern of significant results for the upper part of the variable, when inside debt is high. When the CEO's personal inside leverage exceeds the firm's leverage, it exhibits a negative and significant association with stockholder abnormal returns and a positive and significant association with bondholder returns. For the firm overall, the abnormal returns are negatively and significantly related to the relative inside debt ratio of the CEO in its higher-valued region. Together, these results indicate that when large inside debt positions are disclosed, stock prices fall and bond prices rise, but the negative impact on equity value exceeds the positive gains to bondholders. In other words, a heavy reliance on inside debt compensation appears to reduce the overall value of the firm, apparently by providing incentives for overly conservative management.

Of the control variables, none of those displayed in Figure 3 has a significant estimate, and the large majority of the proxy statement indicator variables have insignificant estimates as well.

C. Changes in volatility for debt, equity, and the firm overall

We find a general pattern of gains to bondholders and losses to equity holders when firms disclose large inside debt holdings by their CEOs. These returns are consistent with investors expecting a more conservative, lower-risk operating strategy. In addition to the valuation changes we observe, these investor expectations should also imply lower dispersion in daily stock returns. We test this possibility by examining changes in security price volatility before

and after the proxy statement filing date when the CEO's inside debt holdings are first disclosed. Our approach is similar to that used in other papers that study volatility changes in order to infer differences in risk before and after certain events, such as the study of CEO turnover and equity volatility by Clayton, Hartzell, and Rosenberg (2005).

To study changes in volatility, we estimate the time series volatility of all stocks and bonds during the period 90 days prior to the proxy statement filing date, and again for the period 90 days after. For bonds, some of which have irregular trading histories and are more subject to data errors due to market illiquidity, we require at least 60 days of daily quote data within each 90-day window in order for the security to be in the sample. We also winsorize the bond return data, which exhibits some extreme values, by truncating all values above the 95th percentile or below the 5th percentile of the daily returns distribution over the 180-day window that we study for each bond.

After estimating the volatilities for each stock and bond in the sample, we calculate a volatility change ratio for each security by dividing its post-filing volatility into its pre-filing volatility and taking the natural log of this ratio. Finally, we estimate the asset volatility for the firm overall pre- and post-filing. Asset volatility cannot be observed directly, so we use the KMV method to estimate it by a numerical iteration algorithm.[6] We then calculate a firm volatility change ratio that is analogous to the change ratios for debt and equity volatility. Regression analysis of these volatility change ratios appears in Table 4. The control variables,

[6] The approach is very similar to that used in Sundaram and Yermack (2007). We assume that each firm has a default point equal to the face value of short-term debt plus half the face value of long-term debt. Equity is treated as a Black-Scholes call option on the assets of the firm, with maturity of one year and exercise price equal to the default point. Using the risk-free rate, the firm's market capitalization of equity, and its volatility of equity as additional inputs, it is straightforward to solve for the volatility of cash flows to the firm's assets.

standard error calculations, and other aspects of the regressions are the same as used in the models of abnormal returns that appear above in Table 3, except that we add an additional control variable to each regression, the contemporaneous volatility change ratio for either the equity or bond market index.

In our volatility analysis, we find a clear pattern of reduced volatility after those proxy statement filings that indicate large inside debt holdings by CEOs. In the left half of Table 4, we show negative and significant estimates for the relations between the relative debt-equity ratio of the CEO and the volatilities of debt, equity, and the overall firm. In the right half of the table, we again decompose the relative debt-equity ratio of the CEO into two segments, with the slope allowed to vary above and below the critical value of 1.00. We find that negative and significant relations between the CEO's personal leverage and security volatility changes are concentrated entirely in the segment that lies above 1.00 and implies large managerial inside debt holdings. In all three cases of debt volatility, equity volatility, and asset volatility, the estimated coefficients are stronger and have greater statistical significance in the top segment; all are estimated as positive but insigificant in the lower segment that lies below 1.00. Overall, these results show a clear and consistent pattern, that investors react to large inside debt disclosures not only by revaluing debt and equity claims against the firm, but also by trading these claims in a pattern that exhibits lower price variability.

D. Regression analysis of credit spreads

Many of our strongest results in Tables 3 and 4 concern the impact of CEO inside debt disclosures upon bond prices and bond volatility. We investigate whether these changes are

long-lived by studying pricing in our panel of corporate bonds before and after the dates when firms make their annual compensation disclosures. We estimate a panel regression in which the dependent variable is each bond's credit spread, or the bond's yield in excess of a U.S. Treasury bond of equivalent maturity. The sample period for the regression runs from June 2006 to August 2007, and we use month-end yields for each bond as the observations. We partition the sample into two parts based upon whether the observation occurs before or after the month of the firm's proxy statement filing that discloses the CEO's inside debt holdings. As shown in Figure 2, for most companies in the sample this partitioning will occur either in March or April 2007.

Our main explanatory variable in the panel regression is the relative CEO debt-equity ratio, defined as above, and used in both its regular and piecewise specifications. We also include a large range of control variables used in standard panel regression models of bond yields (see, e.g., Cremers, Nair, and Wei, 2007). These variables include firm leverage, the log of equity market capitalization, the log of the amount outstanding for each debt issue, return on assets, interest coverage, equity volatility, bond time to maturity, bond coupon rate, indicator variables for the issuer operating in the utility industry, secured status and callable status, and indicator variables for different rating classes.

Results of the credit spread estimation appear in Table 5. We find that the CEO's debt-equity ratio enters the model with a negative and significant effect as expected. However, the result is weaker in magnitude and lacks statistical significance in the months before a company discloses its CEO's inside debt holdings. After the disclosure, the association between the CEO's personal leverage and the credit spread becomes negative and significant. We observe this pattern both when using the regular specification of the variable and when using the

piecewise specification. In the latter case, the significant association is confined to the upper portion of the variable, the region in which the CEO's relative debt-equity ratio exceeds the critical value of 1.00. We conclude that once bondholders learn that a CEO holds an important position in the debt of his own firm, the bond will trade at a lower yield to maturity, holding all else constant.

IV. Conclusions

In this paper we examine the impact of companies' first required disclosures of their CEOs' inside debt holdings in early 2007. Although pensions and deferred compensation represent important aspects of executive compensation, very little information was available about them prior to the SEC's expansion of disclosure requirements at the end of 2006.

We find that investors react significantly when a company reports that the CEO holds a large amount of inside debt relative to his equity investment in the firm. Under these conditions, equity prices tend to fall while bond prices tend to rise. The net effect appears to destroy value overall, as the gains to bondholders appear to be more than offset by losses to stockholders. These valuation changes appear to persist in corporate bond prices for many months after the disclosure date. In addition to the valuation effects that we observe, we find that the volatility of both stocks and bonds falls when large CEO inside debt positions are revealed.

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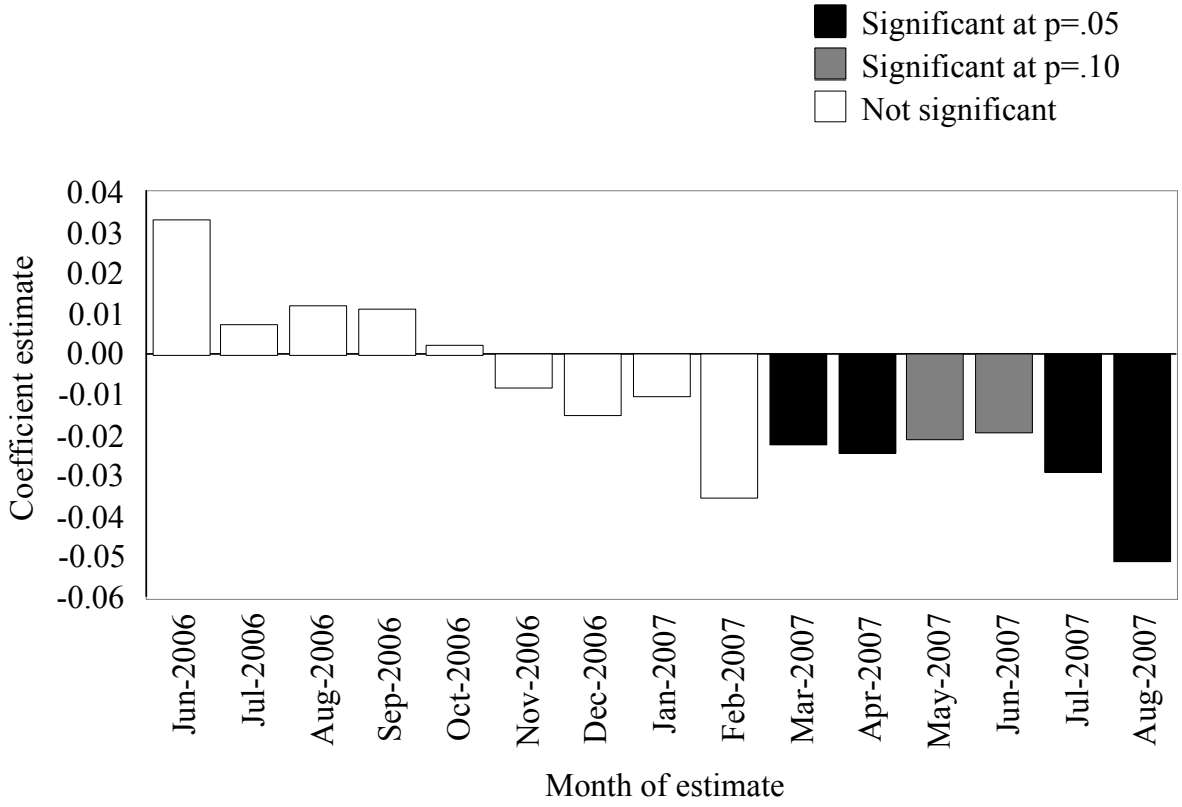

Figure 1
Influence of CEO's debt-equity ratio on corporate bond yield spreads

The figure shows monthly ordinary least squares regression coefficient estimates for the association between a CEO's debt-equity ratio and the yield to maturity of a firm's corporate bonds, measured as the spread above the yield of a U.S. Treasury bond of equal maturity at month-end. Regressions are estimated for a sample of 911 bonds issued by 231 firms, although not all observations appear in each month's sample. The CEO's debt-equity ratio equals the present value of his pension plus deferred compensation claims against his firm, divided by the value of his stock and stock option ownership. The regression uses a piecewise linear specification for this variable, with the slope permitted to change above and below the value of 1. The coefficients displayed in the graph are for the segment above 1. Pension and deferred compensation values are reported by firms in their annual proxy statements filed mostly in March 2007, and stock option values are calculated using the Black-Scholes method from data reported in the same filings. Other control variables in each regression include firm leverage, firm size (log of assets), return on assets, interest coverage, equity volatility, bond time to maturity, bond coupon rate, the amount of the bond issue outstanding, and indicator variables for secured status, callable status, and credit ratings A, Baa, Ba, B, and Ca and lower. Significance levels are determined by robust standard errors clustered by issuing firm. The R^2 goodness-of-fit measures range from .73 to .80 across the 15 months shown.

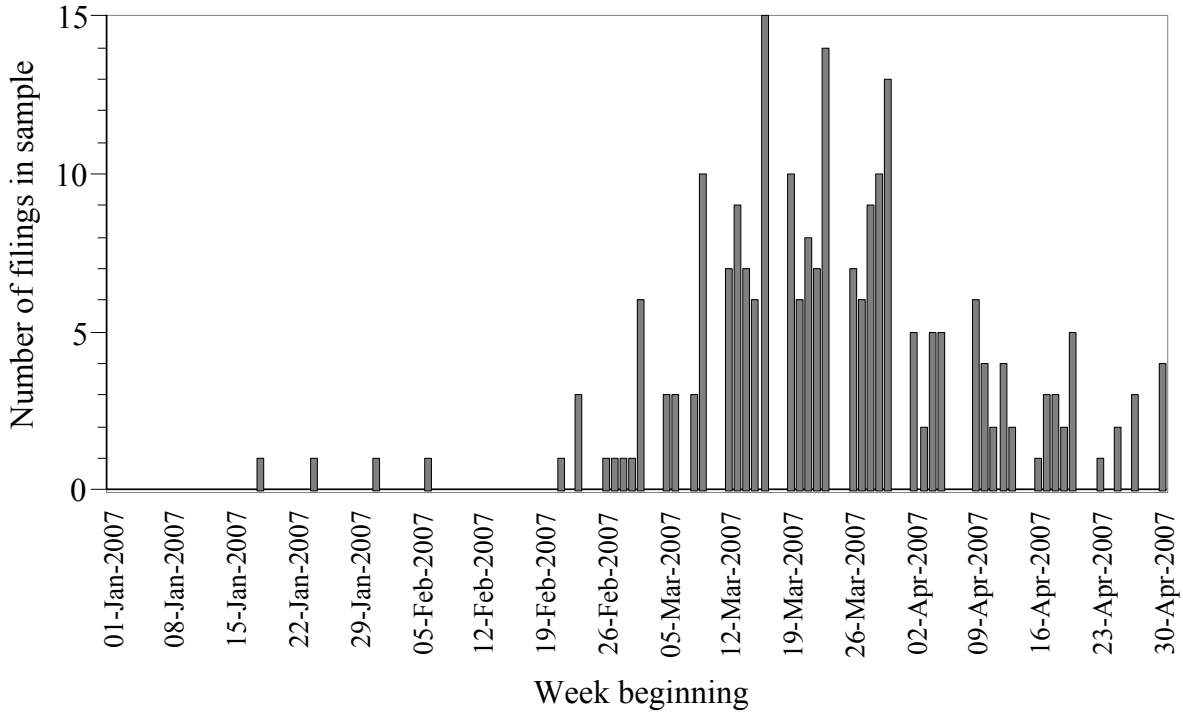

Figure 2
Event dates of sample companies

The chart shows the dates on which proxy statements were filed with the Securities and Exchange Commission by 231 firms whose CEOs held nonzero inside debt in their firms at the end of 2006. The sample includes all Compustat firms with sufficient data available about management compensation and outstanding bond issues. Of the 231 firms, 210 made their disclosures in definitive proxy statements filed beginning February 23, 2007, while the remaining 21 firms made their disclosures in preliminary proxy statements filed as early as January 18, 2007.

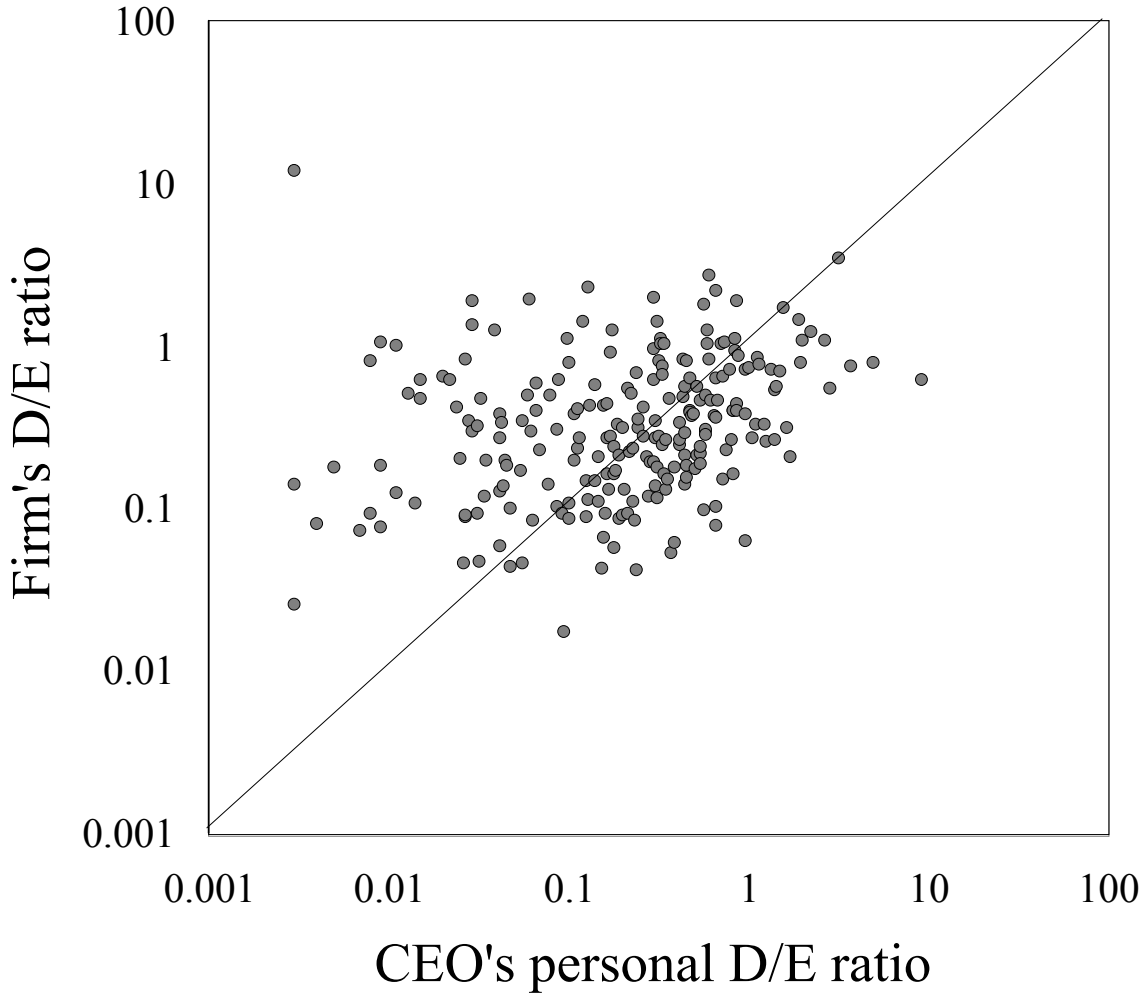

Figure 3
Firm leverage and CEO personal leverage

The figure shows a scatter plot of the CEO's personal leverage on the x-axis and the firm's external leverage on the y-axis. The sample includes 231 observations for firms that reported executive compensation data in proxy statements filed in the spring of 2007. The CEO's personal leverage equals the value of inside debt claims (pension and deferred compensation) divided by the value of equity ownership (shares and stock options). The firm's leverage equals the book value of total debt divided by the market capitalization of common stock. The value of the CEO's inside debt position is reported in proxy statement filings, while the value of CEO stock option holdings is based upon Black-Scholes calculations using characteristics of individual option holdings as disclosed in proxy statements.

Table 1
Descriptive Statistics
Descriptive statistics for a sample of 231 firms with 911 identified public debt issues outstanding at the end of 2006, in which the CEO holds a nonzero amount of inside debt. The sample includes all Compustat firms with December fiscal year-ends and bond data available on the Moody's Rating Database and the Mergent Fixed Investment Security Database. All dollar values are in millions. CEO compensation data is based upon information disclosed in proxy statements filed early in 2007, with option values based upon Black-Scholes estimates using data for each individual option tranche outstanding. The CEO's debt equity ratio equals the value of inside debt (pension + deferred compensation) divided by the value of inside equity (stock + options). Leverage equals total debt (book value) over total assets. Return on assets equals EBITDA over total assets. Equity volatility is calculated from daily return data over the 180 days prior to the proxy statement filing date. Bond volatility is calculated from daily return data over the 90 days prior to the filing date. The investment grade indicators for each bond and each firm equal 1 based the Standard & Poor's rating is BB+ or higher as of the proxy statement filing day. Each bond's time to maturity as measured at the end of March 2007.

CEO characteristics	**N**	**Mean**	**Std.Dev.**	**25th %ile**	**Median**	**75th %ile**
Age	231	56.4	5.7	52	57	60
Years as CEO	215	5.0	5.9	1	3	7
Pension indicator	231	0.83	0.38	1	1	1
Deferred comp. indicator	231	0.82	0.38	1	1	1
Pension value	231	$5.2	$7.3	$0.2	$2.8	$7.3
Deferred comp. value	231	$4.3	$11.8	$0.1	$1.1	$3.8
Total inside debt	231	$9.5	$14.9	$1.8	$5.0	$10.9
Stock value	231	$29.3	$52.3	$4.0	$11.0	$29.5
Option value	231	$10.3	$16.7	$1.9	$5.3	$12.7
Total equity	231	$39.6	$33.2	$10.0	$19.5	$41.5
CEO debt-equity ratio	231	0.49	0.86	0.08	0.26	0.58
CEO debt-equity ratio ÷ firm debt-equity ratio	231	1.45	1.97	0.29	0.89	1.93
Firm characteristics	**N**	**Mean**	**Std.Dev.**	**25th %ile**	**Median**	**75th %ile**
Total assets	231	$22,883	$57,826	$3,910	$8,588	$21,955
Net sales	231	$16,216	$34,226	$3,063	$6,447	$14,268
Return on assets	231	0.140	0.070	0.097	0.125	0.170
R&D / sales	231	0.022	0.064	0	0	0.018
PPE / total assets	231	0.388	0.243	0.168	0.364	0.585
Leverage	231	0.204	0.120	0.110	0.172	0.289
Market capitalization	231	$19,904	$40,076	$3,167	$7,776	$17,377
Equity volatility	231	0.244	0.095	0.173	0.228	0.290
Investment grade indicator	231	0.75	0.43	1	1	1
Bond characteristics		**Mean**	**Std.Dev.**	**25th %ile**	**Median**	**75th %ile**
Amount outstanding	908	$377	$439	$150	$250	$450
Coupon rate (%)	911	6.71	1.42	5.75	6.75	7.50
Time to maturity (years)	911	13.1	13.5	5	8	20
Investment grade indicator	911	0.19	0.39	0	0	0
Callable indicator	911	0.71	0.45	1	1	0
Senior indicator	911	0.91	0.29	1	1	1
Senior secured indicator	911	0.08	0.27	0	0	0
Bond volatility	911	0.063	0.027	0.044	0.063	0.080

Table 2
Abnormal Returns Around Dates of Inside Debt Disclosures

Cumulative abnormal returns to debt and equity securities issued by 231 firms upon disclosures of their CEOs' inside debt holdings in proxy statements filed in early 2007. The sample includes all Compustat firms with December fiscal year-ends and bond data available on the Moody's Rating Database and the Mergent Fixed Investment Security Database. All cumulative abnormal returns are calculated over a two-day window that includes the proxy filing date and the subsequent date. Equity abnormal returns are calculated using the Fama-French-Carhart four factor model with the S&P 500 index as the market index. Bond abnormal returns are based upon a two-factor model using the Citigroup Investment-Grade and Speculative-Grade corporate bond indexes. The Firm abnormal return is based upon a weighted average of the returns to each firm's equity and debt securities, with the weights equal to the market value of the total amount outstanding for each traded security and the book value of non-traded debt. We assume that the abnormal return to non-traded debt is zero. Panel A shows results for the entire sample. Panel B shows results for the subsample of CEOs whose personal debt-equity ratio is below the debt-equity ratio of the firm's capital structure. The CEO's debt-equity ratio equals the present value of his pension plus deferred compensation claims against his firm, divided by the value of his stock and stock option ownership. Panel C shows results for the subsample of all other observations.

Panel A: All observations

Variable	N (securities)	N(firms)	Mean	t-statistic
Equity CAR (0, 1)	231	231	0.138%	0.95
Bond CAR (0, 1)	911	231	-0.002%	-0.31
Firm CAR (0, 1)		231	0.096%	1.00

Panel B: CEO relative leverage <=1

Variable	N (securities)	N(firms)	Mean	t-statistic
Equity CAR (0, 1)	126	126	0.131%	0.54
Bond CAR (0, 1)	524	126	-0.024%	-2.10
Firm CAR (0, 1)		126	0.092%	0.61

Panel C: CEO relative leverage >1

Variable	N (securities)	N(firms)	Mean	t-statistic
Equity CAR (0, 1)	105	105	0.147%	1.10
Bond CAR (0, 1)	387	105	0.027%	5.01
Firm CAR (0, 1)		105	0.100%	0.92

Table 3

Regression Estimates of Cumulative Abnormal Returns

Ordinary least squares regression estimates of the cumulative abnormal returns to investors in 231 firms around the dates of proxy statement filings in early 2007. The Equity CAR is the cumulative abnormal stock return estimated from the market model. The Bond CAR is the cumulative abnormal return to holders of 911 publicly traded bonds, also estimated from the market model. The Firm CAR is a weighted average of the Equity and Bond CARs calculated using assumptions given in the text. All CARs are estimated over a two-day interval including the event day and subsequent trading day. The CEO's debt-equity ratio is the value of the CEO's inside debt holdings (pension plus deferred compensation) divided by the value of his inside equity holdings (stock plus stock options). The relative CEO debt-equity ratio is the CEO's debt-equity ratio divided by the firm's external debt-equity ratio. The estimate for this variable is disaggregated into two components based upon whether the ratio is greater than or less than 1. The speculative grade rating indicator equals 1 if a bond is rated BB+ or lower for the debt regressions, and if the firm's S&P long-term debt rating is BB+ or lower for the equity and firm regressions. The nine proxy statement control variables are dummy variables that equal 1 when certain corporate governance events, described more fully in the text, are reported in the proxy statement used in the analysis. Huber-White robust standard errors appear in parentheses below each estimate.

Dependent variable:	Equity CAR	Bond CAR	Firm CAR	Equity CAR	Bond CAR	Firm CAR
Intercept	0.00166	-0.00020 [c]	0.00142	0.00020	-0.00032	0.00096
	(0.73)	(1.76)	(0.92)	(0.04)	(1.56)	(0.28)
Relative CEO debt-equity ratio	-0.00025	0.00018 [a]	-0.00029			
	(0.48)	(3.69)	(0.81)			
Relative CEO debt-equity ratio up to 1.00				0.000525	0.00029	0.00210
				(0.98)	(1.21)	(0.61)
Relative CEO debt-equity ratio above 1.00				-0.00113 [b]	0.00014 [a]	-0.00074 [b]
				(2.36)	(2.83)	(2.08)
Speculative grade rating indicator	0.00031	0.00015	-0.00014	0.00219	0.00019	0.00095
	(0.08)	(0.52)	(0.06)	(0.58)	(0.64)	(0.33)
Utility industry indicator				0.00150	0.00015	0.00106
				(0.55)	(0.69)	(0.57)
Observations	231	911	231	231	911	231
Adjusted R^2	0.001	0.01	0.002	0.06	0.02	0.06
Proxy statement control variables (9)	No	No	No	Yes	Yes	Yes
Issuer-level clustering (231 firms)	n.a.	Yes	n.a.	n.a.	Yes	n.a.

Significant at 1% (a), 5% (b), and 10% (c) levels.

Table 4
Regression Estimates of Changes in Volatility
Ordinary least squares regression estimates of the changes in volatility around the dates of proxy statement filings for securities issued by 231 firms in early 2007. All volatility changes equal the log of the ratio of volatility estimated over the 90-day period after the filing date, divided by the volatility measured in the 90 prior to the filing date. Asset volatility is determined in the KMV framework using numerical solutions. The CEO's debt-equity ratio is the value of the CEO's inside debt holdings (pension plus deferred compensation) divided by the value of his inside equity holdings (stock plus stock options). The relative CEO debt-equity ratio is the CEO's debt-equity ratio divided by the firm's external debt-equity ratio. The estimate for this variable is disaggregated into two components based upon whether the ratio is greater than or less than 1. The speculative grade rating indicator equals 1 if a bond is rated BB+ or lower for the debt regressions, and if the firm's S&P long-term debt rating is BB+ or lower for the equity and firm regressions. The nine proxy statement control variables are dummy variables that equal 1 when certain corporate governance events, described more fully in the text, are reported in the proxy statement used in the analysis. Huber-White robust standard errors appear in parentheses below each estimate.

Dependent variable:	Equity volatility change	Bond volatility change	Asset volatility change	Equity volatility change	Bond volatility change	Asset volatility change
Intercept	0.131 [a]	-0.013	0.136 [a]	0.043	-0.096	0.069
	(4.99)	(0.10)	(5.24)	(0.93)	(0.86)	(1.53)
Relative CEO debt-equity ratio	-0.014 [c]	-0.040 [c]	-0.014 [c]			
	(1.68)	(1.90)	(1.75)			
Relative CEO debt-equity ratio up to 1.00				0.047	0.021	0.0001
				(0.87)	(0.22)	(0.00)
Relative CEO debt-equity ratio above 1.00				-0.025 [a]	-0.054 [b]	-0.020 [b]
				(2.67)	(2.35)	(2.32)
CRSP equal-weighted market index volatility change	0.560 [a]		0.451 [a]	0.602 [a]		0.455 [a]
	(3.99)		(3.28)	(4.49)		(3.45)
Merrill Lynch corporate bond index volatility change		0.506			0.745	
		(0.74)			(0.77)	
Speculative grade rating indicator	0.071	-0.094	0.023	0.098 [b]	-0.073	0.041
	(1.62)	(0.48)	(0.53)	(2.02)	(0.40)	(0.87)
Utility industry indicator				0.202 [a]	-0.048	0.200 [a]
				(4.46)	(0.49)	(4.51)
Observations	231	911	231	231	911	231
Adjusted R^2	0.09	0.003	0.06	0.25	0.01	0.23
Proxy statement control variables (9)	No	No	No	Yes	Yes	Yes
Issuer-level clustering (231 firms)	n.a.	Yes	n.a.	n.a.	Yes	n.a.

Significant at 1% (a), 5% (b), and 10% (c) levels.

Table 5
Regression analysis of corporate bond credit spreads
Panel regression coefficient estimates for the credit spread of a firm's corporate bonds, measured as the spread above the yield of a U.S. Treasury bond of equal maturity at month-end. Regressions are estimated for a sample of 911 bonds issued by 231 firms over the 15-month period between June 2006 and August 2007. The sample is partitioned according to whether the firm has filed its first proxy statement disclosing the value of inside debt positions held by the CEO. As shown in Figure 2, most of these filings occurred in March or April, 2007, and the filing month itself is included in the post-filing subsample. The CEO's debt-equity ratio equals the present value of his pension plus deferred compensation claims against his firm, divided by the value of his stock and stock option ownership. The regressions in the right two columns use a piecewise linear specification for this variable, with the slope permitted to change above and below the value of 1. In addition to those tabulated, other control variables in each regression include firm leverage, the log of equity market capitalization, the log of the amount outstanding for each debt issue, return on assets, interest coverage, equity volatility, bond time to maturity, bond coupon rate, and indicator variables for secured status and callable status. Financial market variables are measured at the end of the prior fiscal year, and equity market capitalization is measured at each month-end. Significance levels are determined by robust standard errors clustered by issuing firm.

Dependent variable: bond credit spread (bond yield - U.S. Treasury yield for same maturity)

	Pre-filing	Post-filing	Pre-filing	Post-filing
Constant	1.984[a]	1.719[a]	2.069[a]	1.699[a]
	(3.67)	(4.14)	(3.85)	(4.04)
Relative CEO debt-equity ratio	-0.016	-0.027[b]		
	(0.94)	(2.04)		
Relative CEO debt-equity ratio up to 1.00			-0.083	-0.012
			(0.76)	(0.14)
Relative CEO debt-equity ratio above 1.00			-0.000	-0.030[b]
			(0.00)	(2.38)
Utility industry indicator	-0.278[b]	-0.378[a]	-0.272[b]	-0.380[a]
	(2.29)	(4.72)	(2.15)	(4.78)
Baa	0.183[a]	0.080	0.181[a]	0.081
	(2.81)	(1.08)	(2.72)	(1.09)
Ba	1.013[a]	0.662[a]	0.998[a]	0.665[a]
	(5.36)	(4.35)	(5.43)	(4.39)
B	1.870[a]	1.076[a]	1.858[a]	1.077[a]
	(6.79)	(4.24)	(6.92)	(4.26)
Caa or lower	2.934[a]	2.527[a]	2.916[a]	2.532[a]
	(10.19)	(8.91)	(10.03)	(8.91)
Month fixed effects	Yes	Yes	Yes	Yes
Issuer-level clustering	Yes	Yes	Yes	Yes
Bond-month observations	7,841	5,103	7,841	7,841
Firms in sample	226	231	226	231
Adjusted R^2	0.75	0.76	0.75	0.76

Significant at 1% (a), 5% (b), and 10% (c) levels.