THE JOURNAL OF FINANCE • VOL. XLIX, NO. 2 • JUNE 1994

Managers, Owners, and The Pricing of Risky Debt: An Empirical Analysis

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ABSTRACT

This article examines managerial ownership structure and return premia on corporate bonds. It is argued that when managerial ownership is low, an increase in managerial ownership increases management's incentives to increase stockholder wealth at the expense of bondholder wealth. When ownership increases more, however, it is argued that management becomes more risk averse, with incentives more closely aligned with bondholders. This study finds a positive relation between managerial ownership and bond return premia in the low to medium (5 to 25 percent) ownership range. There is also weak evidence for a nonpositive relation in the large (over 25 percent) ownership range.

THE RELATION BETWEEN MANAGERIAL ownership and firm performance has been the focus of considerable attention both in the theoretical and empirical literature (e.g., Jensen and Meckling (1976) and Galai and Masulis (1976)). It is often argued that, as management holds a bigger stake in the firm's future cash flows, its interests become better aligned with those of shareholders. As management's stake becomes large, however, management's and shareholders' interests may become less well aligned for two reasons. First, as management's stake increases, its wealth becomes less well diversified, so management becomes concerned about the undiversifiable risk of its stake. Second, ownership of equity also implies control of votes; as management's stake increases, it can use its control of votes to protect its position. As a result of these conflicting forces, both theoretical models and empirical evidence indicate that greater managerial ownership tends to affect shareholder wealth

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positively at low levels of ownership and may affect shareholder wealth negatively at higher levels of ownership.

None of the existing literature has examined how bondholder wealth is related to managerial ownership. Yet, if management's equity stake makes it more willing to take risks for low levels of ownership and less willing to take risks for high levels of ownership, one would predict the expected returns required by bondholders to be a concave function of managerial ownership. Hence, the considerable literature on the relation between managerial ownership and shareholder wealth has direct implications for the relation between bondholder expected returns and managerial ownership that can be tested empirically. In this paper, we find support for the hypothesis that the relation between bondholder returns and managerial ownership is not monotonic; there is no relation between bond returns and ownership for ownership below 5 percent, a positive relation for ownership between 5 and 25 percent, and a weak negative relation for ownership in excess of 25 percent.

Although our article is inspired by the literature on the relation between shareholder wealth and managerial ownership, there is a large literature that focuses on the determinants of bondholder returns (e.g., Fisher (1959), Boardman and McEnally (1981), and Roberts and Viscione (1984)). Our article also contributes to this literature by showing that managerial ownership is a significant determinant of bond holder returns.

The remaining parts of this article are organized as follows. Section I derives our testable hypotheses. In Section II, data are described and an empirical model specified, linking corporate bond return premia to the proportion of stock owned by managers (officers and directors) and to a set of (other) control variables. Section III presents the empirical evidence for the basic model. Section IV discusses some further tests. Finally, Section V provides a summary and conclusions.

I. Testable Hypotheses

Previous research has examined the conflicts of interest between creditors and stockholders (e.g., Jensen and Meckling (1976), Myers (1977), and Haugen and Senbet (1981)). The main conclusion of these studies is that these conflicts create incentives for shareholders to make decisions that benefit them at the expense of bondholders. In particular, limited liability stockholders may have incentives to invest in riskier projects than those desired by bondholders. Rational bondholders should recognize shareholders' incentives to take actions against their best interests, so when bonds are issued their prices (and yields) should reflect the expected losses that these anticipated actions would induce. The empirical implication is that the yields on risky corporate bonds should be related to the potential agency costs of debt.

Some research has focused on the role of bond covenants in reducing the agency costs of debt. Smith and Warner (1979) document the extensive nature of protective covenants in debt contracts and argue that restrictions

on shareholders' activities imposed by bond covenants reduce required bond yields. Stulz and Johnson (1985) focus on a particular form of bond protection, secured debt, and demonstrate that it can increase the firm's value by mitigating the underinvestment problem. Roberts and Viscione (1984) analyze empirically the impact of seniority and security covenants on bond yields and provide evidence that these covenants lower them.

However, the efficacy of protective bond covenants is limited by the contracting technology, which determines the cost of writing, monitoring, and enforcing these covenants (Masulis (1988)). In addition, as reported by McDaniel (1986), large industrial firms have extremely weak protective bond covenants. Therefore, while the use of bond covenants reduces the agency costs of debt, the protection offered by these covenants cannot totally eliminate the conflict of interest between bondholders and stockholders.

In this paper, we focus on how managers affect the agency costs of debt, even in the presence of bond covenants. Risk taking is one area where managers' and shareholders' interests may conflict in a manner of particular importance to bondholders. Past arguments state that managers prefer less risky investments and lower leverage, so they can reduce the uncertainty of their undiversifiable "human capital" investment in the firm (Amihud and Lev (1981)) and lessen the probability of bankruptcy (Jensen and Meckling (1976)). The managers' interests, therefore, are closer to the interests of bondholders who, like managers, are exposed to the downside risk of negative investment return outcomes and do not share significantly in upside return outcomes. In the absence of any incentive mechanisms, managers would pursue their own interests by taking low risk projects at the expense of the stockholders and to the general benefit of bondholders.

The interests of shareholders and managers, however, may be better aligned if managers own some fraction of the firm's common stock (Jensen and Meckling (1976)) and/or executive stock options (Haugen and Senbet (1981)). Consequently, it is argued that as managerial stockholdings increase managers become more likely to make decisions consistent with the best interests of stockholders at the expense of bondholders (e.g., higher risk taking). This leads to our first hypothesis: over some range of the common stockholdings of officers and directors, larger stockholdings are associated with higher risk of outstanding debt and higher bond return premia.

This relation between managerial stockholdings and risk taking, however, may not always be positive. First, Agrawal and Mandelker (1987) and Saunders, Strock, and Travlos (1990) note that managers' increased nonhuman wealth investment in the firm may become so large as to make them increasingly sensitive to the potentially undiversifiable, nonsystematic risk of the firm. If their human wealth is also relatively job specific, this will reinforce managerial risk aversion at high managerial stake-holding levels. Second, Williams (1987) describes that if insiders get more private benefits as their stockholding share increases, they might want to limit risk to protect these benefits. To the extent that managers are sensitive to undiversifiable, nonsystematic risk and/or are protective of perquisites, the effectiveness of

managerial stock-ownership plans to align manager and stockholder interests on risk taking is mitigated. Third, managers may acquire higher stockholdings to pursue their own objectives.[1] Therefore, the second hypothesis examined in this study is that the relation between corporate bond returns and managerial stockholdings is nonmonotonic. Specifically, at large managerial stockholding levels, the positive relation between bond returns and managerial stockholdings may become weaker or, beyond a certain level, even switch.

II. Data and Methodology

A. The Sample

In this study, we examine the relation between managerial stock ownership and corporate bond return premia controlling for other factors impacting bond returns.[2] The original sample comprises all nonfinancial firms on the 1980 list of Fortune 500 companies. Financial institutions are deleted due to the unique nature of these firms (e.g., large bank bailout guarantees and deposit insurance). Firms that remain in the final sample meet the following criteria for any or all of the years in the period 1977 through 1985: (1) daily prices of nonconvertible outstanding bonds and bond characteristics (coupon rate, maturity date, and payment dates) are available in the Invest Data Corporation Tapes (formerly, Muller Data Corporation)—these data consist of transaction prices of bonds listed on the New York or American Bond Exchanges and, therefore, do not suffer from the problems of matrix bond data described by Warga and Welch (1991); (2) the bonds are traded at least 21 times within the calendar year, and the time elapsed between any 2 consecutive trades is no longer than 40 days;[3] (3) total shares outstanding, officers' and directors' common stock shares, and their common stock options are available in the firms' proxy statements.

[1]For example, Morck, Shleifer, and Vishny (1988) note that at some level of stockholdings, managers may become entrenched resulting in divergent interests between managers and shareholders.

[2]To examine the agency costs of debt, we use corporate bond return premia (over and above that of a matched Treasury bond) as our dependent variable. We also conducted this analysis on a smaller sample (due to limited data) using bond yield premia as the dependent variable. The results are generally similar in sign but differ in significance. We report only the results for the bond return premia as the return measure captures both interest (yield) and capital gain effects on bonds.

[3]This data screen is used to exclude highly illiquid bonds. We also exclude bonds in a given year if they have more than three occurrences of nontrading periods lasting 15 days or longer. In cases of multiple bonds for the same firm, the most frequently traded bond (based strictly on the number of trading days) is chosen. Thus, for each year there is at most one bond representing each sample firm, and not all firms have bond data in all years. As a result of these data screens, the sample was reduced to 175 firms with 1,038 firm-year observations. The minimum, maximum, and average annual number of trades for the sample firms are 20, 252, and 96, respectively. In addition, 75 percent of these observations have more than 47 trades in a year, 50 percent have more than 81 trades in a year, and 25 percent have more than 134 trades in a year.

The final sample consists of 140 different firms and 614 firm-year observations.[4] With the exception of 1977 (seven observations), all nine years (1977 to 1985) are well represented. The companies are drawn from a wide range of industries with 64 different four-digit SIC codes represented in the final sample. The results reported below are based on the reduced sample of 614 cases unless otherwise indicated.

B. Corporate Bond Return Premia

The corporate bond return premia, necessary for this study, are obtained by employing the Handjinicolaou and Kalay (1984) method for daily bond returns. This method addresses the problems that stem from infrequent bond trading and changes in the market interest rates. A typical corporate bond does not trade every day. Therefore, corporate bond returns are calculated using only those days on which trades actually take place. For a bond, i, traded on days $t - n$ and t, an n-day holding period return ($R_{i,tn}$) is calculated as:

$$R_{i,tn} = \ln[(F_{i,t} + C_{i,tn})/F_{i,t-n}] \tag{1}$$

where,

$F_{i,t}$ = the flat price (i.e., quoted price plus accrued interest) of bond i on day t,
$C_{i,tn}$ = coupon payment (if any) during the interval $t - n$ to t,
n = the number of business days from $t - n$ to t.

To control for changes in the general level of interest rates, $R_{i,tn}$ is reduced by the corresponding holding-period return of a Treasury bond with similar maturity and coupon rate. (The coupon rates for the matched Treasury bonds range from 3 to 16.125 percent, while the maturities range from December 31, 1978 to November 15, 2011.) The Treasury bond data are obtained from the Data Resources Inc. (DRI) tapes provided by the Federal Reserve Bank of Philadelphia. This process is applied to each bond for each year and generates daily corporate premium returns for bond i (PR_{it}) for each day t in which the bond trades:

$$PR_{it} = (R_{i,tn} - TR_{tn})/n \tag{2}$$

where,

$R_{i,tn}$ = the n-day corporate bond holding period for bond i as defined in equation (1),
TR_{tn} = the matching Treasury bond holding-period return,
n = the number of days elapsed since the previous day on which trading occurred.

[4]The reduction of the sample to 140 firms is primarily due to merger activities and to missing proxy statements.

For each corporate bond i in year j, an average daily bond return premium (hereafter $PREM_{ij}$) is obtained by averaging all PR_{it}s available in year j.[5]

C. The Model

The hypotheses of this study are tested by specifying the following general model:

$$PREM_{ij} = f(O_{ij}, FL_{ij}, BR_{ij}, S_{ij}, BC_{ij}, T_{ij}) \tag{3}$$

where:

$PREM_{ij}$ = the corporate bond return premium of issuing firm i for year j,
O_{ij} = the ownership structure of firm i for year j,
FL_{ij} = the financial leverage of firm i for year j,
BR_{ij} = the business risk of firm i for year j,
S_{ij} = the size of firm i for year j,
BC_{ij} = the characteristics of the bond (i.e., call provisions, sinking fund provisions, seniority level, bond rating, and convenant restrictions) of issuing firm i for year j,
T_{ij} = the year from which the observation is drawn.

The independent variables in equation (3) are measured as follows:

Ownership Structure (O_{ij}). We measure the degree of stockholder control by the proportion of common stock owned by the firm's officers and directors (hereafter *ALPHA*), by year for each firm (for which *PREM* exists), from the firm's proxy statement. Specifically, *ALPHA* is estimated as the number of the firm's shares beneficially held by the officers and directors, plus the number of shares related to officers' and directors' unexercised stock options, divided by the total number of shares outstanding, plus the number of shares related to officers' and directors' unexercised options. It is hypothesized that, over some *ALPHA* range, higher *ALPHA* is associated with greater managerial risk taking, implying higher risk and therefore higher *PREM* on the part of the bondholders. However, as managers' stockholdings in their (own) firm become a large proportion of their nonhuman wealth, they become overly concerned with the nonsystematic risk of the firm and/or protective of their private benefits. As a result, they may become less inclined to take on riskier

[5]To obtain an average daily bond return premium for bond i in year j ($PREM_{ij}$), we take the arithmetic mean of all daily PR_{it} available in year j. Thus, we give equal weights to all estimated daily bond return premia (PR_{it}) for bond i in year j. An alternative weighting scheme weights each PR_{it} by the length of the measurement period (n) divided by the trading days of a year (i.e., 250). The latter weighting scheme avoids giving excessive weight to daily returns obtained from short trading intervals of relatively infrequently traded bonds. The difference between the two methods of weighting decreases as the frequency of trades increases, and, as noted above, we employ a number of data screens to remove the most infrequently traded bonds from our sample. For our sample, 75 percent of the bonds traded approximately one out of every five days (47 trades per year), while 50 percent traded approximately one out of every three days (81 trades per year).

projects as their ownership stakes become large in terms of their human and nonhuman wealth levels. Thus, while it is hypothesized that for low levels of managerial stock ownership, *PREM* and *ALPHA* are positively related, this relation may weaken or even switch at higher levels of *ALPHA*.

Financial Leverage (FL_{ij}). An increase in the firm's financial leverage increases the probability of firm bankruptcy, making corporate debt more risky. To control for this leverage effect, we use a debt-to-assets ratio (hereafter *DA*) based on the book values of total assets, long term debt, and the debt in current liabilities. It is expected that the *PREM* is positively related to the debt-to-assets ratio (see also Fisher (1959)).

Business Risk (BR_{ij}). Similar to financial leverage, business risk increases the probability of bankruptcy making corporate debt more risky. Following Friend and Lang (1988), business risk is measured by the standard deviation of the ratio of a firm's earnings (before interest expenses and taxes) to assets (hereafter *STDROA*). This variable is expected to be positively related to *PREM*.

Firm Size (S_{ij}). All else being equal, the larger the firm the greater its potential to diversify its nonsystematic risk, thereby making its bonds less risky. Firm size (hereafter *SIZE*) is measured by the natural logarithm of the market value of the firm's common equity. *PREM* is expected to be negatively associated with *SIZE*.

Bond Characteristics (BC_{ij}). As suggested by Jensen and Meckling (1976) and Smith and Warner (1979), bondholders generally find it beneficial to require various covenants be included in bond indentures. These covenants can potentially reduce the agency costs of debt and lower the required return on bonds. Along these lines, our model includes coded variables that relate to bond covenants dealing with seniority, sinking fund provisions, lien restrictions, lease and sale-leaseback restrictions, additional debt restrictions, and dividend restrictions.

With respect to seniority, Ho and Singer (1982) show analytically that the risk of the senior issue is always less than the risk of the junior issue when a firm's short term debt is senior to its long term debt. On the other hand, this result does not necessarily hold when senior debt is long term and junior debt is short term. As a result, it cannot generally be argued that senior debt is less risky than subordinated debt; consequently, while *PREM* might be expected to be lower for notes than for debentures or subordinated debentures, it may not necessarily differ between debentures and subordinated debentures.

Regarding the sinking fund provision, Ho (1985) demonstrates that the yield spread between a sinking-fund bond and a nonsinking-fund bond is always positive when the bond market is competitive. (Although if the market is not competitive, the yield spread may become negative when the yield curve is steeply upward sloping.) Therefore, in general *PREM* is expected to

be higher for sinking-fund bonds relative to nonsinking-fund bonds, all else being equal.

Covenants relating to liens, leases, debt, and dividends are explained by Smith and Warner (1979) and Iskander and Emery (1992).[6] In this study, we group these four restriction categories into one variable (*ICOVSUM*) that ranges from 0 to 4 (*ICOVSUM* = 0 if the bond has no restrictions on these four categories, *ICOVSUM* = 1 if the bond has one of these four restrictions, etc.). All else being equal, we expect these covenants to control for conflicts of interest; therefore, we expect a negative relation between *PREM* and *ICOVSUM*. As is the case for sinking funds, however, covenants may be more characteristic of risky bonds and, therefore, associated with higher *PREM*.[7]

As an additional variable, we include a coded variable for the bond's rating listed by Moody's that reflects bond risk characteristics that may not be captured by the bond covenants.[8] *PREM* should be higher for low rated bonds relative to high rated bonds because of the higher default risk in the former group.

Time Factor (T_{ij}). Fisher (1959) notes that corporate bond premia may vary through time. Consequently, dummy variables for each year of our study are included to capture the potential effects of changes in the term structure and/or changes in the economic environment that may affect bond premia measured at different times. The particular period of this study (1977 to 1985) covers a time of considerable growth in merger activity that may accentuate bondholder, stockholder, and manager conflicts. Specifically, the annual dummy variables are measured relative to 1980, since acquisition activity took a significant upturn after mid-1980.[9]

[6]The lien restriction prevents the firm, in case of bankruptcy, from giving other creditors a type of claim that would have a higher priority than the debt issue. The lease and sale-leaseback covenant prevents the firm from using a lease contract to create a liability that would have a higher claim to the firm's assets. The additional debt restriction typically places limits on new debt if specific ratio level requirements are not met. The dividend restriction usually limits distributions to a specified amount.

[7]Regressions are rerun for each of the four major types of covenants (i.e., liens, leases, debt, and dividends) and the three most popular combinations for our sample (i.e., liens and leases without the other two covenants, all four covenants, and no covenants). The results are generally consistent with the signs found in the pooled regressions although significance varies. For example, the most significant results are in the debt covenant regression, and the least significant are in the dividends covenant regression.

[8]We run our models both including and excluding a bond-rating variable and find the results to be qualitatively similar. This finding is consistent with Iskander and Emery (1992) who report that bond covenants are significant determinants of bond ratings. In addition, we also consider security provisions and call provisions. With the exception of a few mortgage notes and a few guaranteed notes, all other debt issues represent unsecured debt, and all debt issues included in our sample are callable. For these reasons, we do not include these two variables in our model.

[9]*Mergers and Acquisitions*, Spring 1986, p. 1.

All the above accounting variables are obtained from the 1986 COMPUSTAT data tapes. *STDROA*, our proxy for business risk, is based on 10 annual observations (or the number available if it is at least 3) prior to the year under consideration. The bond characteristics are obtained from *Moody's Bond Record* and from *Moody's Industrial Manuals* for the required years. Table I presents summary statistics (mean, standard deviation, and range) for the variables *PREM*, *ALPHA*, *DA*, *STDROA*, and market value of equity (*MVEQ*).[10]

The correlation coefficients for the continuous variables used in this model range in values from −0.47 to 0.27, and all are statistically significant at conventional levels. Condition indexes and variance proportions are also calculated following Belsley (1991) to evaluate potential collinearity problems with the regression models we use. These diagnostics do not indicate that collinearity is a problem with the data for these models.[11]

III. Empirical Results

A. Preliminary Evidence

It is hypothesized in this paper that bond return premia, *PREM*, is nonmonotonically related to fractional equity ownership of officers and directors, *ALPHA*. Therefore, to initially examine the nature of this relation, we computed the mean and median corporate bond *PREM* for groups based on increasing ranges of *ALPHA*. As shown in Table II, the mean and median *PREM* do not increase or decrease monotonically with the increasing *ALPHA* groups. Furthermore, *t*-tests (rank sum tests) indicate that the mean (median) *PREM* of firms with *ALPHA* = 15 to 20 percent is significantly *larger* at the 0.10 level than the mean *PREM* of five (six) of the seven smaller *ALPHA* groups, and the mean *PREM* of firms with *ALPHA* > 40 percent is significantly *smaller* than three (four) of the eleven smaller *ALPHA* groups.

Table II provides some preliminary evidence of a nonmonotonic relation between corporate bond *PREM* and ownership structure *ALPHA*.[12] The

[10]As explained in Section II.B, *PREM* represents the natural logarithm of the ratio of current price plus coupon to prior price. Technically speaking, this measure is different from the conventional return measure, which is defined as the ratio of capital appreciation (or loss) plus coupon payment to prior price. To convert the reported *PREM* numbers into regular returns, it is necessary to subtract one from the antilogarithm of the former. However, it turns out that for small numbers (such as daily returns) the reported *PREM* numbers are very close to the actual returns.

[11]Specifically, the largest condition index for the variables used in any of the reported regressions is 19 and is lower than the rule of thumb of 30 to 100 (Belsley (1991), p. 56).

[12]We create *ALPHA* groups in Table II based on the level of *ALPHA*, rather than equal-size quintile or decile groups, because our hypothesis is based on the level of *ALPHA* rather than the size of *ALPHA* relative to a sample mean. We also estimate a linear regression model of *PREM* on *ALPHA*. This model does not fit the data, while a quadratic model provides significant coefficients (at the 0.05 level) for the variables *ALPHA* and $ALPHA^2$ (positive and negative, respectively). The latter result also supports a nonmonotonic relation between the variables under analysis.

Table I

Summary Statistics of Continuous Variables Used in Regression Models

The full sample consists of 614 firm-year observations covering the 1977 to 1985 time period. The variables are defined as follows: *PREM* is the average daily corporate bond return premium measured in %. *ALPHA* is the fractional ownership equity (including unexercised stock options) held by the officers and directors measured in %. *DA* is the debt to assets ratio based on the book values of long term debt, debt in current liabilities, and total assets and is measured in %. *STDROA* is the standard deviation of the annual return on assets measured in %. *MVEQ* is the market value of common equity measured in millions of dollars. The number of observations for the accounting variables is less than the full sample because some firms were missing from the COMPUSTAT tapes.

Variable	Mean	Standard Deviation	Range	No. of Observations
PREM	0.013	0.090	0.994	614
ALPHA	4.830	7.842	55.570	614
DA	25.333	9.901	83.200	531
STDROA	3.316	2.018	12.810	531
MVEQ	2870.600	6308.370	75421.260	531

Table II

Corporate Bond Return Premia (*PREM*) for Sample Firms Grouped According to Fractional Equity Ownership by Officers and Directors (*ALPHA*)

The sample consists of 614 firm-year observations covering the 1977 to 1985 time period. *PREM* is measured by the average daily corporate bond return premium. *ALPHA* is measured by the fractional ownership equity (including unexercised stock options) held by the officers and directors.

ALPHA (in %)	No. of Observations	Mean *PREM* (in %)	Median *PREM* (in %)
0–1	188	0.011	0.006
1–2	108	0.011	0.002
2–3	101	0.006	0.000
3–4	41	0.000	0.009
4–5	35	0.029	0.029
5–10	59	0.011	0.012
10–15	34	0.019	0.011
15–20	16	0.066	0.058
20–25	9	0.049	0.000
25–30	8	0.064	0.033
30–40	7	0.033	0.019
> 40 (max 55.7)	8	−0.026	−0.034

existence of a nonmonotonic relation between management ownership and market valuation of the firm's bonds is consistent with the predictions and/or findings of other studies on securities, including equities. For example, Stulz (1988) shows that an increase in the fraction of stock controlled by

management decreases the probability of a successful tender offer and increases the equity premium offered if a tender offer is made. His model implies that when managers increase their control of voting rights, stockholders' wealth increases or falls depending on whether current managerial control of voting rights is small or large. Morck, Shleifer, and Vishny (1988) use switching points in managerial ownership of 5 and 25 percent and report evidence of a significant nonmonotonic relation between managerial ownership and firm performance, as measured by the Tobin's q ratio. McConnell and Servaes (1990) find a significant curvilinear relation between managerial ownership and the Tobin's q ratio.

Table III presents bond return premia by bond seniority level, bond rating, sinking fund provisions, and the four bond covenant restrictions. Regarding seniority level, *PREM* is shown for notes, debentures, and subordinated debentures. Consistent with the predictions of Ho and Singer's (1982) model,

Table III

Corporate Bond Return Premia (*PREM*) of Sample Firms by Bond Seniority Level, Bond Rating, and Sinking Fund Provision

The full sample consists of 614 firm-year observations covering the 1977 to 1985 time period. *PREM* is the average daily corporate bond return premium. For the grouping by seniority level, the remaining 31 observations represent zero-coupon bonds, floating notes, mortgage notes, and guaranteed notes. For the grouping by bond rating, the remaining 25 observations were not rated. For the grouping by sinking fund, the remaining 11 observations had missing sinking fund information. For the grouping by bond covenants, the remaining one observation had missing bond covenant information. *ICOVSUM* is the sum of the four dummy variables that represent the four bond covenants. The four dummy variables are: *DLIEN*, *DLEAS*, *DDEBT*, and *DDIV*, respectively. *DLIEN* = 1 for restrictions on lien; = 0 otherwise. *DLEAS* = 1 for restrictions on lease and sale-leaseback; = 0 otherwise. *DDEBT* = 1 for restrictions on issuing additional debt; = 0 otherwise. *DDIV* = 1 for restrictions on dividends; = 0 otherwise.

Bond Characteristics	Mean *PREM* (in %)	No. of Observations	Standard Error of Mean
1. Seniority Level			
Notes	0.001	230	0.004
Debentures	0.018	239	0.007
Subordinated Debentures	0.028	114	0.010
2. Bond Rating			
Investment Quality (AAA to Baa)	0.010	500	0.004
Noninvestment Quality (Ba to Ca)	0.028	89	0.012
3. Sinking Fund			
Yes	0.021	333	0.006
No	0.004	270	0.004
4. Bond Covenants			
ICOVSUM = 0	0.034	78	0.013
ICOVSUM = 1	0.019	37	0.013
ICOVSUM = 2	0.007	375	0.004
ICOVSUM = 3	0.013	55	0.014
ICOVSUM = 4	0.023	68	0.009

notes appear to be associated with much lower *PREM* relative to debentures and subordinated debentures, but debentures are associated with only slightly lower *PREM* relative to subordinated debentures.

With respect to bond rating, bonds are grouped into two groups, investment quality (Aaa to Baa) and noninvestment quality (Ba to Ca). As expected, Table III shows bond premia are higher in the latter group. As far as the sinking-fund provision is concerned, we find evidence of higher *PREM*s associated with sinking-fund provisions consistent with Ho's (1985) model and contrary to the conventional wisdom that assumes sinking-fund bonds are less risky than nonsinking-fund bonds. This finding contradicts earlier evidence by Dyl and Joehnk (1979) and Boardman and McEnally (1981) that shows that the sinking fund provisions reduce the required yield on a bond. Since these studies cover a period of relatively low interest rates, their results may reflect the stronger effect of the default-risk feature of the sinking fund provision relative to its delivery-option feature. Table III also shows that the highest premium is associated with the most unprotected bonds (*ICOVSUM* = 0).[13]

B. Further Evidence

We hypothesize that corporate bond return premia are positively associated with managerial stockholdings over some range and that this relation is nonmonotonic. To test for such a pattern, we follow the approach employed by Morck, Shleifer, and Vishny (1988). Specifically, we estimate piecewise linear regressions that allow two changes in the slope coefficient on the managerial ownership variable. We use the same turning points as Morck, Shleifer, and Vishny, 5 and 25 percent. As they admit, there is no theoretical justification for these particular numbers. Nevertheless, the breakpoint at 5 percent is used widely in other studies (e.g., Barclay and Holderness (1989), Wruck (1989), and Amihud, Lev and Travlos (1990)), perhaps due to the mandatory public disclosure of large block ownership beyond this level.[14] As explained in Morck, Shleifer, and Vishny, the 25 percent switching point is motivated by Weston (1979) who suggested that the 20 to 30 percent managerial ownership range constitutes a threshold beyond which a hostile bid for the firm is unlikely to succeed. Accordingly, we use the following variables to estimate

[13] It is interesting to note that the second highest premium is for the most protected bonds (*ICOVSUM* = 4). Perhaps the effect of these covenants is to reduce differences in required returns. Using *t*-tests, the mean *PREM*s are significantly different only between the *ICOVSUM* = 0 and *ICOVSUM* = 2 groups.

[14] Ideally, *ALPHA* proxies for the (unobservable) fraction of managers' wealth tied up in their own firm. A manager in a large firm, however, may own stockholdings that are a small number of outstanding shares (resulting in a small *ALPHA*) but that are a large fraction of the manager's portfolio. As a result, *ALPHA* would serve as a poor proxy and would bias the results against our hypotheses.

the piecewise linear regressions:

$ALPHA\_0to5_{ij}$ = managerial fractional ownership ($ALPHA$) if $ALPHA_{ij} < 5$ percent for firm i in year j;
= 5 percent if $ALPHA_{ij} \geq 5$ percent.

$ALPHA\_5to25_{ij}$ = 0 if $ALPHA_{ij} < 5$ percent;
= ($ALPHA_{ij} - 5$ percent) if 5 percent $\leq ALPHA_{ij} < 25$ percent;
= 20 percent if $ALPHA \geq 25$ percent.

$ALPHA\_over25_{ij}$ = 0 if $ALPHA_{ij} < 25$ percent;
= ($ALPHA_{ij} - 25$ percent) if $ALPHA_{ij} \geq 25$ percent

The relation among corporate bond return premia, ownership structure, and other control variables is estimated using the cross-section time-series regression model specified by equation (4), for 140 different firms over the 9-year period 1977 to 1985:

$$\begin{aligned} PREM_{ij} = {} & a_0 + a_1 ALPHA\_0to5_{ij} + a_2 ALPHA\_5to25_{ij} + a_3 ALPHA\_over25_{ij} \\ & + a_4 DA_{ij} + a_5 STDROA_{ij} + a_6 SIZE_{ij} \\ & + \sum_{j=1}^{8} a_{j+6} DUMYR_{ij} + a_{15} DUMSR_{ij} \\ & + a_{16} DUMSF_{ij} + a_{17} ICOVSUM_{ij} + a_{18} DUMRA_{ij} + u_{ij} \end{aligned} \tag{4}$$

where: $PREM$, $ALPHAs$, DA, $STDROA$, and $SIZE$ are as defined earlier,

$DUMYR_{ij}$ = dummy variable for bond i in year j, $j = 1, 2, 3, 4 \ldots 8$ corresponds to years 1977, 1978, 1979, 1981, ..., 1985; each dummy equals 1 for year j, = 0 otherwise; the effect of year 1980 is included in the intercept a_0,

$DUMSR_{ij}$ = the priority status of bond i in year j; = 0 for notes and debentures, = 1 for subordinated debentures,

$DUMSF_{ij}$ = 0 if sinking fund provision exists for bond i in year j; = 1 otherwise,

$ICOVSUM_{ij}$ = 0 if bond i in year j has no restrictions on liens, leases, debt, or dividends; = 1 if it has one restriction; ...; = 4 if it has all four restrictions,

$DUMRA_{ij}$ = proxy for bond quality; = 0 if bond i in year j is investment quality (Aaa to Baa), = 1 if noninvestment quality (Ba to Ca).

The regression results are shown in Table IV. In particular, results are shown for four different versions of the general piecewise ordinary least squares regression model. Model 1 includes only the three managerial ownership variables. Model 2 adds the accounting control variables. Model 3 contains the three ownership variables, the dummy variables for the specific years, and the control variables for the bond characteristics. Model 4 represents the full model shown in equation (4) and includes all variables.

Table IV

Piecewise Linear Ordinary Least Squares Regressions of Corporate Bond Return Premia (PREM) on Fractional Managerial Ownership and Other Control Variables

The full sample consists of 614 firm-year observations covering the 1977 to 1985 time period. The number of observations is reduced in some models due to unavailable control variables. This table presents the results of the following piecewise linear ordinary least squares regression model:

$$PREM_{ij} = a_0 + a_1 ALPHA\_0to5_{ij} + a_2 ALPHA\_5to25_{ij} + a_3 ALPHA\_over25_{ij} + \text{Control Variables} + u_{ij}$$

The dependent variable, *PREM*, is the average daily corporate bond return premium. The three *ALPHA* independent variables are defined as follows:

$$ALPHA\_0to5 = \text{managerial fractional ownership } (ALPHA) \text{ if } ALPHA < 5\%; = 5\% \text{ if } ALPHA \geq 5\%.$$

$$ALPHA\_5to25 = 0 \text{ if } ALPHA < 5\%; = (ALPHA - 5\%) \text{ if } 5\% \leq ALPHA < 25\%; = 20\% \text{ if } ALPHA \geq 25\%.$$

$$ALPHA\_over25 = 0 \text{ if } ALPHA < 25\%; = (ALPHA - 25\%) \text{ if } ALPHA \geq 25\%.$$

Alternative model specifications use alternative control variables, defined as follows: *DA* is the debt-to-assets ratio based on the book values of long term debt, debt in current liabilities, and total assets. *STDROA* is the standard deviation of the annual return on assets. *SIZE* is the natural logarithm of the market value of common equity. $DUMYR_{77}$–$DUMYR_{85}$ = dummy variables for years j, j = 1977, 1978, 1979, 1981, ..., 1985. Each = 1 for year j; = 0 otherwise. The effect of year 1980 is captured in the intercept. *DUMSR* = 0 for notes and debentures; = 1 for subordinated debentures. *DUMSF* = 0 if sinking fund provisions exist; = 1 otherwise. *DUMRA* = 0 for investment quality bonds (Aaa to Baa); = 1 for noninvestment quality bonds. *ICOVSUM* is the sum of the four dummy variables representing the bond covenants on liens, leases, debt, and dividends. *ICOVSUM* takes values in the range of 0 (no protection) to 4 (complete protection). *t*-Statistics are in parentheses.

	Model Specification			
Variable	1	2	3	4
Constant	0.0096	0.0235	−0.0314	0.0153
	(1.48)	(0.65)	(−2.10)**	(0.31)
ALPHA_0to5	0.0003	−0.0024	0.0006	−0.0008
	(0.10)	(−0.80)	(0.22)	(−0.23)
ALPHA_5to25	0.0023	0.0019	0.0025	0.0027
	(2.03)**	(1.61)*	(1.97)**	(2.03)**
ALPHA_over25	−0.0028	−0.0021	−0.0030	−0.0025
	(−1.68)*	(−1.21)	(−1.76)*	(−1.40)
DA		0.0651		0.0866
		(1.41)		(1.68)*
STDROA		0.2426		0.1255
		(1.17)		(0.54)
SIZE		−0.0044		−0.0087
		(−1.21)		(−1.85)*
$DUMYR_{77}$			0.0339	0.0479
			(0.98)	(1.24)
$DUMYR_{78}$			0.0256	0.0214
			(1.95)**	(1.41)

Table IV—*Continued*

Variable	Model Specification 1	2	3	4
$DUMYR_{79}$			0.0315	0.0309
			(2.45)***	(2.14)***
$DUMYR_{81}$			0.0338	0.0354
			(2.61)***	(2.44)***
$DUMYR_{82}$			0.0605	0.0638
			(4.67)***	(4.37)***
$DUMYR_{83}$			0.0594	0.0652
			(3.70)***	(3.76)***
$DUMYR_{84}$			0.0800	0.0848
			(4.14)***	(4.08)***
$DUMYR_{85}$			0.0780	0.0846
			(4.76)***	(4.65)***
DUMSR			0.0077	−0.0206
			(0.47)	(−1.03)
DUMSF			−0.0180	−0.0172
			(−2.13)**	(−1.81)*
DUMRA			−0.0025	−0.0079
			(−0.17)	(−0.41)
ICOVSUM			0.0039	0.0015
			(0.83)	(0.26)
Adjusted R-square	0.01	0.02	0.07	0.09
F-statistic	2.15*	2.33**	3.87***	3.49***
N	614	531	558	483

***Indicates significance at the 0.01 level.
**Indicates significance at the 0.05 level.
*Indicates significance at the 0.10 level.

In all models, the coefficient of *ALPHA_0to5* is not significant at conventional levels, suggesting that as *ALPHA* increases from 0 to 5 percent there is no relation between bond return *PREM* and ownership *ALPHA*. However, there is a significant positive relation between the two variables in the 5 to 25 percent range of *ALPHA*. In the four versions of the regression model, the *t*-statistics for the coefficient of *ALPHA_5to25* lie between 1.61 and 2.03. When *ALPHA* increases above the 25 percent level, there is evidence of a weak negative relation between bond return premia and managerial ownership. For example, in models 1 and 3, the *t*-statistics for the coefficient of *ALPHA_over25* are −1.68 and −1.76, respectively, statistically significant at the 0.10 level.

Overall, the positive association between *PREM* and *ALPHA*, in the 5 to 25 percent range, is consistent with bondholders requiring higher bond returns to protect themselves against potential managerial-stockholder wealth transferring activities (especially due to risk taking) motivated by an increased alignment of interests among stockholders and managers over this ownership range. The negative coefficient for *ALPHA_over25* can be viewed

as weak evidence that, at even higher levels of managerial ownership, managers' own incentives for risk-taking wealth transfer activities are reduced. This could be due to the potential detrimental effects of such activities on their undiversifiable nonhuman wealth (i.e., relatively large amounts of nonhuman wealth may be invested in their own firm) and/or activities to protect private benefits and objectives. An additional explanation is that at high levels of *ALPHA* there is greater protection of bondholders against takeovers due to the high level of managerial entrenchment. That is, the probability of a successful takeover decreases (Stulz (1988)) and, therefore, bondholders are more protected from potential wealth transfers.[15] Consequently, bondholders may perceive managers' interests and risk preferences to be more closely aligned with their own when compared to the intermediate (5 to 25 percent) ownership range.

With respect to the other control variables listed in Table IV, the coefficient of the financial leverage proxy (*DA*) is generally positive (significant at the 0.10 level in the full model) and consistent with the view that the higher a firm's debt ratio the riskier its outstanding bonds and the higher the required return on these bonds. The coefficient of the business risk proxy (*STDROA*) is positive; however, it is not significant at conventional levels. *SIZE* is generally negatively related to *PREM*, as expected.[16]

With respect to the dummy variables representing various bond characteristics, the only significant variable is the dummy for the existence of a sinking fund (*DUMSF*) that, as expected, has a negative coefficient (significant at the 0.05 level in model 3, but insignificant in model 4). The coefficients of the dummy variables for the specific years (which are relative to 1980) are all positive, and from 1979 they are significance at the 0.01 level. The magnitude of the coefficients tend to increase following 1980, suggesting higher risk during the period in which the market for corporate control developments (e.g., mergers, leveraged buyouts) may have affected the operational environment of the large firms or increased volatility in interest rates.[17]

[15] Recent evidence shows that in some forms of takeovers (leveraged buyouts), bondholders suffer statistically significant wealth losses (Asquith and Wizman (1990), and Warga and Welch (1991)).

[16] Additional checks examine whether *SIZE* is nonmonotonically related to *PREM*, therefore indirectly driving the observed relation between *PREM* and *ALPHA*. *PREM* is modeled as a function of *SIZE* and $SIZE^2$. While this is only one possible nonlinear relation, the model does not demonstrate significant results consistent with a nonlinear relation between *SIZE* and *PREM*.

[17] We also include in our model the market-to-book value of equity ratio to proxy for intangible assets. Results are qualitatively similar to those we report in Table IV, and this variable is not significant in the various model specifications. Diagnostics do not indicate collinearity problems with the model data. Market-to-book value of equity is used as it is more readily available. In addition, Aragon and Downs (1992) report that this variable and the Tobin's q ratio are "interchangeable empirical proxies" based on correlation analysis and empirical study replications. We also include a dummy variable for high-tech firms (chemicals, machinery, electrical, and scientific instruments) in order to capture potential industry effects. The variable is not significant suggesting no evidence of industry effects.

Our findings support a nonmonotonic relation between managerial ownership and bond return premia.[18] The present results are also related to those in DeFusco, Johnson, and Zorn (1990), who find that bond prices decline when firms adopt executive stock option plans. They interpret such results as evidence that managerial stockholdings (stock options) induce executives to undertake riskier investments. The contribution of the present study is that the relation between bond values and managerial stockholdings is not a monotonic relation.

IV. Further Tests

We can obtain further insights into the role of managers in reducing (or increasing) the conflicts of interest between owners and bondholders by directly investigating the relation between managerial ownership and (a) financial leverage and (b) various measures of risk. Furthermore, we can examine the distribution of bond covenants across firms according to the level of their managerial ownership.

A. Financial Leverage and Managerial Ownership

Theoretically, the relation between capital structure and managerial ownership is not clear.[19] The higher the ownership of managerial insiders, the greater the ability (fewer constraints) and desire of managers to adjust debt ratios according to their own interests (Friend and Lang (1988)). If managers with relatively large stockholdings are more sensitive to the potentially undiversifiable, nonsystematic risk of bankruptcy, capital structure and man-

[18] Morck, Shleifer, and Vishny (1988) examine managerial ownership and Tobin's q and find that q increases in the 0 to 5 percent managerial ownership range, decreases in the 5 to 25 percent range, and then rises slightly in the above 25 percent range. By contrast, our study examines managerial ownership and *bond returns*. Our results imply that as management increases its ownership stake in the firm, it is more willing to take risks. This will only be true up to some threshold, however, because at some point risk aversion will dominate any increase in wealth from increased risk taking. We cannot directly link our results on bond returns to overall firm value without making assumptions about management objectives and actions (e.g., it could be that, over the 5 to 25 percent managerial ownership range, managers are too willing to take risks, because they are pursuing different objectives from firm value maximization). Therefore, the theoretical relation between Tobin's q, bond returns, and managerial ownership is an area for future research.

[19] On the one hand, for a given total dollar investment of managers in their own firm's equity, an increase in the firm's debt-equity ratio decreases the fraction of the stock owned by outsiders, thus making it difficult for potential raiders to obtain control (Harris and Raviv (1988), and Stulz (1988)). Furthermore, an increase in the debt-equity ratio can deter raiders because it reduces the bidder's gains from control by imposing additional restrictive bond covenants (Stulz (1988)) and by reducing the waste of the firm's free cash flow (Jensen (1986)). On the other hand, an increase in debt-equity ratio decreases the total value of equity and makes it cheaper for a raider to acquire control (Stulz (1988)). Also, more debt increases the probability of bankruptcy and makes it more likely that managers will lose control to creditors (Harris and Raviv (1988)). In addition, if managers lose their stake at bankruptcy, they may have an incentive for a suboptimal amount of debt in order to minimize their bankruptcy risk (Grossman and Hart (1982)).

agerial ownership may be related in a nonlinear way. Specifically, while the relation between debt ratios and *ALPHA* is an empirical question at moderate levels of ownership, it is expected to be negative at larger levels.

B. Risk and Managerial Ownership

If managers are given stock or stock options, their interests become more closely aligned with those of stockholders. However, if their increased nonhuman wealth investment in the firm becomes large enough to make them sensitive to the potentially undiversifiable, nonsystematic risk of the firm, then managers' and stockholders' interests on risk taking diverge. It is, therefore, hypothesized that for low levels of managerial stock ownership, risk and *ALPHA* are positively related but that this relation may weaken or even switch at higher levels of *ALPHA*. This study includes both systematic and nonsystematic risk. Both types of risk can affect bond default rates, can affect managers' job security, and can also be altered by managers. The type of risk (systematic or nonsystematic) affected by increasing *ALPHA* in the different ranges, therefore, is an empirical issue.

Table V and Table VI present the results of regression models that relate leverage and firm-risk variables to *ALPHA*. Model specifications 1, 2, 3, and 4 in Table V use as dependent variables the risk measures σ_ε, σ_s, β, and *STDROA*, respectively, while model specification 5 uses the debt-asset (leverage) ratio *DA*, where:

σ_ε = the standard error of residuals (nonsystematic risk) for firm i in year t from the market model using daily stock returns;
σ_s = the standard deviation of daily stock returns (total return risk) for firm i in year t, estimated from the daily returns; and
β = the beta coefficient (systematic risk) for firm i in year t from the market model using daily stock returns of the prior year.

STDROA and *DA* are defined earlier.

Table V reports the results of models that relate these risk and leverage measures to *ALPHA*, without including control variables. The results show a significant positive relation between all risk and leverage measures in the 0 to 5 percent range, a positive and significant relation for all but beta in the 5 to 25 percent range, and a nonsignificant relation for all in the over 25 percent range.

Table VI presents the results for the expanded model that includes other control variables. Model specifications 1, 2, 3, and 4 in Table VI use *ALPHA*, time dummy, and relevant firm-specific control variables. In model specification 5, where the debt-asset ratio (*DA*) is now a dependent variable, *DA* is replaced by the variable *STDROA* in the list of independent variables. As indicated by the *F*-statistics, all models have significant explanatory power except model 3, which uses systematic risk as the dependent variable. In models 1, 2, 4, and 5, the coefficient of *ALPHA_0to5* is either insignificant at conventional levels or marginally significant. The coefficient of

Table V

Piecewise Linear Ordinary Least Squares Regressions Among Different Risk Measures and Leverage on Fractional Managerial Ownership

The sample consists of 614 firm-year observations covering the 1977 to 1985 time period adjusted for those observations for which risk measures were unavailable. This table presents the results of the following piecewise linear ordinary least squares regression model:

$$\text{Risk or Leverage Variable}_{ij} = a_0 + a_1 ALPHA\_0to5_{ij} + a_2 ALPHA\_5to25_{ij} + a_3 ALPHA\_over25_{ij} + u_{ij}$$

Different model specifications use different risk or leverage variables as the dependent variable which are defined as follows: σ_ε = the standard error of residuals (nonsystematic risk) for firm i in year t from the market model using daily stock returns. σ_s = the standard deviation of daily stock returns (total return risk) for firm i in year t, estimated from the daily returns, β = the beta coefficient (systematic risk) for firm i in year t from the market model using daily stock returns of the prior year. *STDROA*, is the standard deviation of the annual return on assets. *DA* is the debt-to-assets ratio based on the book values of long term debt, debt in current liabilities, and total assets. The three *ALPHA* independent variables are defined as follows:

$ALPHA\_0to5$ = managerial fractional ownership (*ALPHA*) if $ALPHA < 5\%$;
= 5% if $ALPHA \geq 5\%$.

$ALPHA\_5to25$ = 0 if $ALPHA < 5\%$; = (*ALPHA* − 5%) if $5\% \leq ALPHA < 25\%$;
= 20% if $ALPHA \geq 25\%$.

$ALPHA\_over25$ = 0 if $ALPHA < 25\%$; = (*ALPHA* − 25%) if $ALPHA \geq 25\%$.

t-Statistics are in parentheses.

Variable	Model Specification				
	1	2	3	4	5
	Dependent Risk Variable				Dependent Leverage Variable *DA*
	σ_ε	σ_s	β	*STDROA*	
Constant	0.0142	1.0161	1.0699	0.0273	0.2273
	(26.90)***	(29.33)***	(32.38)***	(15.51)***	(29.66)***
ALPHA_0to5	0.0885	0.0917	3.2080	0.1764	0.6978
	(4.29)***	(4.27)***	(2.49)**	(2.58)***	(2.44)**
ALPHA_5to25	0.0226	0.0197	−0.6346	0.0789	0.4208
	(2.57)**	(2.16)**	(−1.16)	(2.75)***	(3.46)***
ALPHA_over25	−0.0053	−0.0052	−0.4978	−0.0206	−0.2867
	(−0.44)	(−0.42)	(−0.67)	(−0.53)	(−1.58)
Adjusted R-square	0.13	0.11	0.01	0.08	0.07
F-statistic	20.44***	17.79***	2.53**	12.62***	14.09***
N	405	405	405	394	531

***Indicates significance at the 0.01 level.
**Indicates significance at the 0.05 level.
*Indicates significance at the 0.10 level.

Table VI

Piecewise Linear Ordinary Least Squares Regressions Among Different Risk Measures and Leverage on Fractional Managerial Ownership and Other Control Variables

The sample consists of 614 firm-year observations covering the 1977 to 1985 time period adjusted for those observations for which risk or control variables were unavailable. This table presents the results of the following piecewise linear ordinary least squares regression model:

$$\text{Risk or Leverage Variable}_{ij} = a_0 + a_1 ALPHA\_0to5_{ij} + a_2 ALPHA\_5to25_{ij} + a_3 ALPHA\_over25_{ij} + \text{Control Variables} + u_{ij}$$

where:

$ALPHA\_0to5$ = managerial fractional ownership ($ALPHA$) if $ALPHA < 5\%$;
= 5% if $ALPHA \geq 5\%$.

$ALPHA\_5to25$ = 0 if $ALPHA < 5\%$; = ($ALPHA$ − 5%) if $5\% \leq ALPHA < 25\%$;
= 20% if $ALPHA \geq 25\%$.

$ALPHA\_over25$ = 0 if $ALPHA < 25\%$; = ($ALPHA$ − 25%) if $ALPHA \geq 25\%$.

The risk or leverage variables used as the dependent variable are: σ_ε = the standard error of residuals (nonsystematic risk) for firm i in year t from the market model using daily stock returns. σ_s = the standard deviation of daily stock returns (total return risk) form firm i in year t, estimated from the daily returns. β = the beta coefficient (systematic risk) for firm i in year t from the market model using daily stock returns of the prior year.

The Control Variables are: *STDROA* is the standard deviation of the annual return on assets. *DA* is the debt to assets ratio based on the book values of long term debt, debt in current liabilities, and total assets. *SIZE* is the natural logarithm of the market value of common equity. $DUMYR_{77}$-$DUMYR_{85}$ are dummy variables for years j, j = 1977, 1978, 1979, 1981, ..., 1985. Each = 1 for year j; = 0 otherwise. The effect of year 1980 is captured in the intercept. ***t***-Statistics are in parentheses.

	Model Specification				
	1	2	3	4	5
	Dependent Risk Variable				Dependent Leverage Variable *DA*
Variable	σ_ε	σ_s	β	*STDROA*	
Constant	0.0272	0.0290	0.9683	0.0268	0.4471
	(9.79)***	(9.93)***	(5.18)***	(2.79)***	(14.80)***
ALPHA_0to5	0.0118	0.0157	2.7575	0.1412	−0.3306
	(0.50)	(0.62)	(1.72)*	(1.71)*	(−1.10)
ALPHA_5to25	0.0333	0.0310	−0.5709	0.0902	0.3117
	(3.62)***	(3.20)***	(−0.92)	(2.84)***	(2.56)***
ALPHA_over25	−0.0204	−0.0203	−0.5118	−0.0330	−0.3284
	(−1.71)*	(−1.61)*	(−0.64)	(−0.80)	(−1.92)**
DA	0.0007	−0.0001	0.3527	0.0192	0.2678
(*STDROA* for model 5)	(0.19)	(−0.03)	(1.40)	(1.48)	(1.27)
SIZE	−0.0016	−0.0015	0.0070	−0.0006	−0.0300
	(−5.52)***	(−5.04)***	(0.37)	(−0.58)	(−8.71)***
$DUMYR_{77}$	−0.0009	−0.0022	−0.3188	−0.0091	0.0215
	(−0.33)	(−0.74)	(−1.65)*	(−0.92)	(0.59)
$DUMYR_{78}$	0.0005	0.0005	−0.0268	−0.0008	0.0259
	(0.42)	(0.44)	(−0.35)	(−0.22)	(1.81)*

Table VI—*Continued*

	Model Specification				
	1	2	3	4	5
	Dependent Risk Variable				Dependent Leverage
Variable	σ_E	σ_S	β	*STDROA*	Variable *DA*
$DUMYR_{79}$	−0.0010	−0.0012	−0.0444	−0.0009	0.0120
	(−0.98)	(−1.15)	(−0.64)	(−0.25)	(0.88)
$DUMYR_{81}$	0.0004	0.0003	−0.0024	0.0006	0.0035
	(0.43)	(0.26)	(−0.03)	(0.18)	(0.25)
$DUMYR_{82}$	−0.0008	−0.0011	−0.0394	−0.0001	0.0087
	(−0.75)	(−1.02)	(−0.58)	(−0.04)	(0.63)
$DUMYR_{83}$	−0.0005	−0.0007	−0.0149	0.0044	0.0193
	(−0.41)	(−0.52)	(−0.18)	(1.06)	(1.18)
$DUMYR_{84}$	−0.0008	−0.0014	−0.0660	0.0006	0.0463
	(−0.54)	(−0.89)	(−0.66)	(0.12)	(2.37)**
$DUMYR_{85}$	−0.0010	−0.0013	0.0007	0.0071	0.0116
	(−0.79)	(−0.94)	(0.01)	(1.53)	(0.67)
Adjusted R-square	0.21	0.18	−0.01	0.09	0.19
F-statistic	8.06***	6.85***	0.80	3.71***	9.92***
N	354	354	354	354	483

***Indicates significance at the 0.01 level.
**Indicates significance at the 0.05 level.
*Indicates significance at the 0.10 level.

ALPHA_5to25 is significantly positive (at the 0.01 level) in these four models, suggesting a positive relation between these risk and leverage measures and *ALPHA* in the 5 to 25 percent range. The coefficient of *ALPHA_over25* is negative in all four of these models; however, the significance level is lower than for the *ALPHA_5to25* coefficient.

These findings correspond well to those of the previous section, reported in Table IV. In particular, they provide further support for the view that bondholders require higher bond returns to protect themselves against potential risk taking and/or financial leverage increases motivated by a better alignment of interests among shareholders and managers in the 5 to 25 percent managerial ownership range. There is weak evidence that the incentives for such wealth-transferring activities are reduced at higher managerial ownership levels, as indicated by the negative sign on the *ALPHA_over25* coefficients and its marginal significance in several models.[20]

The findings on the risk-ownership relation are also related to those in Saunders, Strock, and Travlos (1990), who find a positive relation between

[20]One interpretation of these findings is that when ownership is low, management's claim on the firm is more like a debt claim; as ownership increases, management may gain from increased risk taking. However, a large ownership stake may reflect management's desire to keep control, but in this case management prefers to control votes rather than risky cash flows.

risk taking (by banking firms) and the proportion of stock owned by managers. The evidence in this study suggests that the relation between these variables is not positive across all levels of *ALPHA*. In addition, the findings regarding financial leverage are consistent with evidence provided in Friend and Lang (1988).[21]

C. Distribution of Bond Covenants Across Managerial Ownership Levels

As a final test of the robustness of our results, Table VII reports the distribution of bond covenant characteristics across managerial ownership levels (*ALPHA*) to examine whether the results are driven by the concentration of covenants in different *ALPHA* groups. For example, one alternative explanation for the nonmonotonic relation between *PREM* and *ALPHA* is that bonds of low and high *ALPHA* firms have more covenant protection than bonds of medium *ALPHA* firms.

It is interesting to note that Panel A of Table VII shows that a *higher* percentage of bonds of low *ALPHA* firms (*ALPHA* $\leq$ 5 percent) have lien, lease, debt, and dividend covenants than do bonds of medium *ALPHA* firms (5 percent $<$ *ALPHA* $\leq$ 25 percent). Therefore, low *ALPHA* sample firms are generally more restrictive. However, a *lower* percentage of bonds of high *ALPHA* firms (*ALPHA* $>$ 25 percent) have such covenants than do the bonds of medium *ALPHA* firms. This suggests that the negative or non-positive relation between *PREM* and *ALPHA* in the high range (*ALPHA* $>$ 25 percent) cannot be explained by covenants alone. Similarly, Panel B of Table VII shows that a lower percentage of bonds of high *ALPHA* firms (*ALPHA* $>$ 25 percent) have high values of *ICOVSUM* relative to bonds of medium *ALPHA* firms.

V. Summary and Conclusions

This article investigates the relation between managerial ownership structure and corporate bond return premia. It is argued that, at some level of concentration of managerial stock ownership, managers have increased incentives to act in the shareholders' best interests and take risks that are potentially harmful to the bondholders' best interests. Rationally, bondholders can be expected to account for such managerial risk-taking behavior by requiring higher returns on the firms' bonds. Using bond return premia and the proportion of stock owned by officers and directors as a measure of

[21] Friend and Lang (1988) find that in "closely held" corporations (defined in their paper as when *ALPHA* $>$ 13.825 percent), the level of debt decreases as the managerial ownership increases. The authors interpret this evidence as being consistent with the view that "management in closely held corporations would have higher unique risks than in publicly held firms and would have less constraints on its behavior so that a more negatively significant impact of its investment on debt ratio should be obtained" (p. 272). They also find that in "publicly held" firms (those with low *ALPHA*; *ALPHA* $<$ 13.825 percent) the debt ratio increases as the fraction of management's shareholdings in the firm increases.

Table VII

Bond Covenant Characteristics of Sample Firms

The full sample consists of 614 firm-year observations covering the 1977 to 1985 time period. For one firm-year, information on bond covenants was unavailable.

Panel A. Frequency of Restrictions by Type of Bond Covenant and *ALPHA* (fractional managerial ownership)

		ALPHA ≤ 5%		5% < *ALPHA* ≤ 25%		*ALPHA* > 25%	
		Frequency	%	Frequency	%	Frequency	%
Lien							
No Restrictions	*DLIEN* = 0	55	12	54	46	17	74
Restrictions	*DLIEN* = 1	417	88	64	54	6	26
Lease and Sale-Leaseback							
No Restrictions	*DLEAS* = 0	100	21	54	46	17	74
Restrictions	*DLEAS* = 1	372	79	64	54	6	26
Additional Debt							
No Restrictions	*DDEBT* = 0	360	76	91	77	18	78
Restrictions	*DDEBT* = 1	112	24	27	23	5	22
Dividends							
No Restrictions	*DDIV* = 0	362	77	84	71	16	70
Restrictions	*DDIV* = 1	110	23	34	29	7	30

Panel B. Degree of Bond Covenant Protection (*ICOVSUM*) by *ALPHA*
(*ICOVSUM* = *DLIEN* + *DLEAS* + *DDEBT* + *DDIV*)

		ALPHA ≤ 5%		5% < *ALPHA* ≤ 25%		*ALPHA* > 25%	
		Frequency	%	Frequency	%	Frequency	%
ICOVSUM = 0	(No Protection)	31	7	37	31	10	43
ICOVSUM = 1		25	5	10	9	2	9
ICOVSUM = 2		313	66	51	43	11	48
ICOVSUM = 3		52	11	3	3	0	0
ICOVSUM = 4	(Complete Protection)	51	11	17	14	0	0
All Firm-Years		472	100	119	100	23	100

managerial ownership, our results provide evidence of a significant positive relation between managerial ownership stake and bond return premia in the 5 to 25 percent managerial ownership range. It is also argued that when managers' stakes are large, they may become more risk averse due to their nondiversifiable, nonhuman wealth and/or their interest in protecting their private benefits and objectives. Therefore, their incentives to engage in risk-taking activities that transfer wealth from the bondholders to the stockholders is weakened. Consequently, in high ownership ranges, managers' interests become more closely aligned with those of the bondholders once again, implying lower bond return premia for high managerial ownership level firms. This study finds some weak evidence for this nonpositive relation between managerial ownership and bond return premia in the over 25 percent range.

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