

# Managerial Ownership, Debt Policy, and the Impact of Institutional Holdings: An Agency Perspective

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**Abstract:** This study investigates the effects of institutional ownership on the debt policy and managerial ownership of the firm. Earlier literature on the agency model of the firm widely recognizes that the use of managerial stock ownership and external debt play an important role in limiting agency conflicts and enhancing firm value. The literature also recognizes that external monitors, such as institutional investors, can serve a useful role in limiting agency problems in the firm. However, investigations into the usefulness of these agency-conflict-reducing mechanisms have tended to treat each in isolation with little attempt to study the inter-relationships among them. This study examines the impact of institutional holdings on managerial ownership and debt policy in an integrated framework utilizing a simultaneous system of equations estimation procedure. The study hypothesizes that the use of debt and managerial stock ownership are inversely related to institutional ownership in the firm. The empirical evidence provided in this study is consistent with this hypothesis.

■ Recent innovations in the theoretical literature suggest that ownership structure and the distribution of financial claims can affect firm performance and value by mitigating agency costs of the firm. A considerable body of literature exists indicating that managerial stock ownership helps in aligning managerial interests with those of the external stockholders. Debt holders and the related monitoring devices are also considered to be important mechanisms for controlling managerial behavior and mitigating the agency problems in the firm. In a similar vein, the literature indicates that institutions are important monitoring agents and exercise an active role consistent with protecting their significant stake in the firm. While efforts have been expended in examining ownership structure and firm performance, Jensen and Warner (1988) note that, "The precise effects of stock holdings by managers, outside block holders, and institutions are not well understood, however, and the inter-relationships between ownership, firm characteristics, and corporate performance require further investigation." (p. 4).

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This paper adds to the literature by examining the impact of institutional holdings of common stock on debt policy and managerial ownership in an agency framework. In spite of their commonality in providing capital and their role in reducing agency costs in the firm, no prior research has examined the effect of institutional holdings on debt financing and managerial ownership. Because they represent three alternative mechanisms for mitigating agency problems, it is hypothesized that increasing institutional ownership can offset the need for debt and managerial ownership to reduce agency costs. Thus, in equilibrium higher institutional ownership should be inversely related to the proportion of debt and managerial ownership in the firm. This proposition is investigated empirically in a two-equation simultaneous equation regression framework with debt and managerial ownership as the endogenous variables. Institutional holdings are assumed to be exogenous and beyond the control of management; however, the agency literature indicates that their presence will have an inverse effect on debt and managerial ownership. The empirical evidence provided in this study is consistent with the proposition that higher levels of institutional ownership are associated with lower levels of debt ratios and managerial ownership. Results from the simultaneous equations system

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support the view that debt policy and managerial ownership are jointly determined. The remainder of the paper is organized as follows. Section I contains a review of the literature. Section II describes the empirical design and the data used in the study. Section III provides a discussion of the results. Finally, section IV summarizes and concludes the paper.

## I. Literature Review

This section provides a brief review of the role of debt and managerial ownership in controlling agency conflicts of the firm. We then present a discussion of the significance of institutional investors as monitors of firm management. The section concludes with a discussion of the interrelationships among financial leverage, managerial ownership, and institutional investors.

### A. Role of Debt and Managerial Ownership in Controlling Agency Conflicts

According to the agency model of the firm espoused by Jensen and Meckling (JM) (1976), the modern corporation is subject to agency conflicts arising from the separation of the decision-making and risk-bearing functions of the firm. In this setting, JM show that managers have a tendency to engage in excessive perquisite consumption and other opportunistic behavior since they receive the full benefit of such activity but bear less than their full share of the costs. JM refer to this as the agency cost of equity and show that it could be mitigated by increasing managerial ownership in the firm, thus forcing managers to bear the wealth consequences of their actions. While managerial ownership in the firm serves to align managers' interests with external shareholders, the extent to which managers can invest in the residual claims of the firm is constrained by their personal wealth and diversification considerations.

The agency literature suggests that debt also may be useful in reducing agency conflicts. Jensen (1986) argues that, because debt "bonds" the firm to make periodic payments of interest and principal, it reduces the control managers have over the firm's cash flow and the incentive to engage in non-optimal activities. Grossman and Hart (1982) similarly argue that the existence of debt forces managers to consume fewer perquisites and become more efficient as this lessens the probability of bankruptcy and the loss of control and reputation. However, too high a level of debt subjects the firm to agency costs of debt, especially in the form of a risk shifting incentive. Essentially, risk shifting means that as debt is increased shareholders will have a tendency to prefer riskier projects. By accepting riskier projects, they can pay off the debt holders at the contracted rate and capture the

residual gain if the projects are successful. However, if the projects fail, the bond holders bear the cost of the higher risk. The trade-off between the agency costs of external equity and debt results in an optimal amount of debt and managerial ownership in the firm. In sum, the agency framework indicates that both debt and managerial ownership reduce agency costs of the firm and enhance firm value.

The empirical evidence is generally favorable to the agency model implications for the use of debt and managerial ownership in the firm. Harris and Raviv (1991) provide a comprehensive survey of the theories and related empirical evidence on the use of debt to mitigate agency conflicts and asymmetric information. They conclude that the evidence is broadly consistent with the theory. Also, the empirical evidence relating managerial ownership with firm value and performance is limited but generally supports the agency model implications (see, for example, Morck, Shleifer, and Vishny (1988) and McConnell and Servaes (1990)).

While debt and managerial ownership serve to mitigate agency problems, the literature also recognizes that the extent to which these devices are utilized is determined by the existence of other internal and external monitoring mechanisms that hold managerial behavior in check. Fama and Jensen (1983) and JM discuss some of these mechanisms and their role in controlling agency conflicts. Internal monitoring mechanisms include competition among managers within the firm, auditors, and the board of directors. External monitoring mechanisms include the stock market and the takeover market. The literature recognizes that institutional investors serve a significant role as external monitors in the stock market (Agrawal and Mandelker (1990)). Other external monitors include rating agencies, analysts (Moyer, Chatfield, and Sisneros (1989)), and investment bankers (Easterbrook (1984)).

### B. Institutional Investors as Monitoring Agents

From a theoretical perspective, Shleifer and Vishny (1986) argue that large shareholders, in view of their significant economic stakes, have an incentive to monitor managers. Specifically, they relate the large shareholder's behavior to takeover related monitoring and contend that the presence of a large stockholder is necessary for value increasing takeovers to occur. In their model "...the large shareholder has a large enough stake that it pays for him to do some monitoring of incumbent management. If higher profits justify a change, he attempts to implement it." (p. 463).

The significance of institutional investors as monitoring agents is underscored by their sizable equity investments in the stock market. As of 1990, institutional investors are

estimated to own 45% of all outstanding equity. This is in contrast to 33% in 1980 and only 8% in 1950 (Taylor (1990)). Historically, institutional investors dissatisfied with managerial or stock performance simply sold their holdings, i.e., followed an "exit" policy. However, this has become increasingly difficult for many institutions. Coffee (1991) provides an insight into the changing behavior of institutional investors from being passive investors to active monitors. He suggests that the trend toward increased activism on the part of institutional investors can be explained by the fact that exercising "voice" has become less costly because of the significant ownership of equity by institutions and the "resulting increased capacity for collective action;" at the same time, following an "exit" policy has become increasingly more expensive because they must accept substantial discounts in order to liquidate their significant holdings.<sup>1</sup>

The increased activism of institutional investors is supported by their attempts to enhance managerial accountability through various means. Institutions have made increasing use of proxy contests to bring about fundamental changes in management behavior (see, for example, U.S. Senate Hearing 101-497 (1990) and O'Barr and Conley (1992)).<sup>2</sup> These corporate governance proposals cover issues such as the repeal of classified boards, poison pills and other anti-takeover measures (for related empirical evidence see, for example, Bhagat and Jefferis (1988) and Agrawal and Mandelker (1990)), rescinding of golden parachutes, implementing confidential voting, changing the composition of boards, and executive compensation. Institutions also have pressured management into making the boards more independent through greater outside

representation. The press has reported several instances of institutions applying pressure on corporations to revamp their boards to include more independent (outside) board members and even to suggest specific candidates (see, for example, the *Wall Street Journal* (1991a, 1991b, 1992a, 1992b) and the *Washington Post* (1992)). In some instances, institutional investors sought a special "institutional investor seat" on the board to protect their interests. Finally, institutions have sought to increase their oversight on companies through the formation of shareholder advisory committees that serve to review operating and financial results of the company and seek to enhance dialog and the flow of information between major shareholders and management. According to the *Wall Street Journal* (1993), the California Public Employees Retirement System (CalPERS), for example, recently pressured Pennzoil and Champion International to set up shareholder committees to monitor their financial performance. In other cases, institutions sought informal meetings to discuss business developments on a periodic basis. (See, for example, the *Wall Street Journal* (1993).)

### C. Interrelationship Between Debt, Managerial Ownership, and Institutional Ownership

The above discussion implies that debt policy, managerial ownership, and institutional ownership of the stock are all useful in mitigating agency costs in the firm. However, these mechanisms are not without cost. Excessive managerial ownership of common stock may lead to entrenchment problems. Voting and takeover mechanisms can fail if managers possess the controlling interest in the firm. Also managers may be unwilling to invest too much of their personal wealth in the firm in order to avoid the increasing costs of non-diversification of their personal wealth. Significant use of debt financing may result in a substantial increase in the firm's bankruptcy risk and an increase in the non-diversifiable risk of bankruptcy to managers themselves. Additionally, agency problems, such as asset substitution or risk shifting and under-investment, may be exacerbated with high levels of debt financing. Even too much institutional ownership may have costs associated with it. Some have argued that institutional ownership increases stock price volatility, while others suggest that it induces short term myopia in management.

Given the costs and benefits of the different agency-cost-reducing mechanisms, managers are expected to optimize their usage such that the total agency costs in the firm are minimized. While managers have little control over institutional holdings of the common stock, they have the ability to manage the levels of inside equity ownership and

<sup>1</sup>A related reason is that many institutions, especially pension funds, are heavily invested in index funds, which means that an "exit" policy may not be a feasible alternative. The index funds became popular primarily because these institutions wanted to minimize trading costs and reduce volatility. Greater use of indexation means that pension fund performance will be increasingly dependent on the performance of the companies making up the index. This suggests that it is in the interest of pension funds to actively monitor the companies in the index, especially those carrying a significant weight in the index (Millstein (1991)).

<sup>2</sup>The impetus for the active role institutions have taken in proxy contests and in bringing shareholder proposals to a vote is in no small measure due to the support of the Department of Labor. The Department of Labor made it very clear in a letter of opinion, commonly referred to as the Avon Letter, that the exercise of proxy is considered a fiduciary responsibility under the Employee Retirement Income Security Act. (See, for example, Krikorian (1991), Brancato (1991), and Eppler and Scheuermann (1990).) In a related matter, institutions have also prompted the Securities and Exchange Commission to study the feasibility of improving the proxy voting process so that shareholders can more easily communicate and bring to a vote shareholder originated proposals. As it currently stands, the proxy solicitation and voting process are stacked in favor of the management. For a discussion of this aspect, see Pound (1991) and Rosenbaum and Korens (1990).

debt financing. The substitutability arguments proposed above suggest that, as institutional ownership and the attendant monitoring increases, firms may find it optimal to utilize lower levels of debt and managerial ownership to control agency conflicts in the firm.

## II. Empirical Design

On the basis of the interrelationships among the agency-cost-reducing mechanisms discussed above, it is deemed that a simultaneous equations approach is the appropriate methodology to use. A two-equation model with managerial ownership of equity and debt ratio as the dependent variables is proposed. Additionally, the debt ratio appears as a regressor in the managerial ownership equation and vice-versa. Thus, the debt ratio and managerial ownership are simultaneously determined. The methodology is in keeping with the view that debt and managerial ownership are integral aspects of managerial decision making in the agency framework.

The proportion of institutional holdings of common stock is included as an explanatory variable in both equations, in addition to several other control variables. Institutional holdings are specified as an exogenous variable since they are external to the firm—not a management decision variable. Managers are assumed to have control over the levels of debt and managerial ownership of equity in the firm; however, it is unlikely that managers can decide on a “target” level of institutional ownership in the firm’s equity. The substitutability arguments suggest that institutional ownership should have a negative coefficient in the debt and managerial ownership equations. This would be consistent with the hypothesis that firms with greater institutional monitoring require less debt leverage and managerial ownership concentration to control agency costs of the firm.

The simultaneous equations model is estimated using two-stage least squares (2-SLS) methodology. In a system comprising of interdependent endogenous variables, the 2-SLS method is preferred over the ordinary least squares (OLS) method as the latter would lead to biased and inconsistent parameter estimates. (See, for example, Dhrymes (1974) and Dutta (1975).) An important assumption of the OLS method is that the error term is uncorrelated with each of the regressors. This implies that the explanatory variables are all pre-determined or are determined outside the system. This is clearly not the case here, where debt ratio and managerial ownership are endogenous to the system. Thus, it would not be appropriate to assume that the error term in the debt (managerial ownership) equation is uncorrelated with the managerial

ownership (debt) variable appearing as a regressor. Under these conditions, using the OLS method will produce estimates that are biased and inconsistent (Dutta (1975), p. 279). The 2-SLS method, unlike the OLS method, allows us to see how the managerial ownership decision affects leverage separately from how the leverage decision affects managerial ownership by separating the results into two different decision variables.

The approach taken here is an improvement over the single equation models employed in some recent studies that examine the agency implications of debt structure (see, for example, Titman and Wessels (1988) and Friend and Hasbrouck (1988)), and managerial ownership (Friend and Lang (1988)). Friend and Hasbrouck note the potential bias in the interpretation of their results as a result of possible simultaneous bias in their empirical model. A recent exception is the study by Jensen, Solberg, and Zorn (1992) who employ a simultaneous equations approach with debt, managerial ownership, and dividend policy as the endogenous variables. However, they do not examine the impact of institutional ownership on debt and managerial ownership.<sup>3</sup>

The specification of the simultaneous equations system along with the expected signs for the coefficients is given below:

$$DR = a_0 + a_1 \text{ERNVOL} + a_2 \text{DEPR} + a_3 \text{RDAD} + a_4 \text{GROWTH} + a_5 \text{INSTL} + a_6 \text{MGROWN} + u \quad (1)$$

$$\text{MGROWN} = b_0 + b_1 \text{STKVOL} + b_2 \text{RDAD} + b_3 \text{GROWTH} + b_4 \text{TA} + b_5 \text{INSTL} + b_6 \text{DR} + v \quad (2)$$

For the debt equation, the regressors include measures of earnings volatility (ERNVOL), non-debt tax shields (DEPR), expenditures in non-tangible assets (RDAD), asset growth (GROWTH), institutional ownership (INSTL), and managerial stock ownership (MGROWN). The primary

<sup>3</sup>The Jensen, Solberg, and Zorn (1992) paper finds limited evidence that debt, inside ownership, and dividends are interdependent. However, we do not include a dividend equation in our investigation for several reasons. The agency literature recognizes the existence of multiple devices to control agency costs of the firm including the ones covered in this study and dividends. Other mechanisms include the market for takeovers (Fama and Jensen (1983)), capital and product markets (Diamond (1984), Campbell and Kracaw (1980), Watts and Zimmerman (1983), and Booth and Smith (1986)), incentive contracts (Harris and Raviv (1979) and Baker, Jensen, and Murphy (1988)), and investment policy of the firm, among others. However, from an empirical standpoint including more endogenous variables would make the model unwieldy. In the interest of keeping the model relatively simple, the “system” is confined to the capital ownership structure of the firm, i.e., debt policy, managerial ownership, and institutional ownership.

variable of interest is institutional ownership, which is hypothesized to have a negative coefficient. The managerial ownership variable is a jointly determined endogenous variable, while the other variables are included as control variables. The control variables are selected on the basis of previous theoretical and empirical studies that explore the debt structure issue. For the managerial ownership equation, the explanatory variables include stock return volatility (STKVOL), expenditures in non-tangible assets (RDAD), asset growth (GROWTH), size of the firm (TA), institutional ownership (INSTL), and debt ratio (DR), which is the jointly endogenous variable. Consistent with our hypothesis, the institutional ownership variable is expected to have a negative coefficient. Unlike the debt equation, few studies have explicitly modeled the managerial ownership equation (Friend and Lang (1988), Crutchley and Hansen (1989), and Jensen, Solberg, and Zorn (1992)). Important theoretical and empirical implications are kept in mind in selecting variables for the empirical model. A more detailed discussion of the variables, their measurement, and hypothesized signs for the explanatory variables follows.

#### A. Debt Equation

The dependent variable, DR, is defined as the ratio of the book value of long-term debt to market value of equity. It is measured as the average of year-end values over a five-year period. The first four explanatory variables are included as control variables on the basis of prior studies that investigate the determinants of corporate debt structures (see, for example, Bradley, Jarrell, and Kim (BJK) (1984), Titman and Wessels (1988), and Friend and Hasbrouck (1988)). We attempt to include only those variables that have commonly appeared in these studies and to indicate where there is some general agreement as to their theoretical and empirical significance, while at the same time ensuring a parsimonious specification. The control variables used here are most similar to the debt structure model estimated by BJK with the exception that an asset growth variable is also included. BJK also do not examine the effects of institutional holdings and managerial ownership on the debt ratio.

Earnings volatility, ERNVOL, is calculated as the standard deviation of earnings before interest and taxes scaled by total assets over a five-year period. ERNVOL proxies for the business risk and the potential for bankruptcy inherent in the firm. (See, for example, BJK.) If, as is commonly argued, firms subject to higher business risk tend to have lower debt ratios, a negative coefficient is expected for the ERNVOL variable. DEPR is defined as the ratio of annual depreciation to the earnings before depreciation, interest, and taxes averaged over a five-year period. This

variable is a proxy for non-debt-related tax shields available to the firm. In their theoretical model, DeAngelo and Masulis (1980) show that firms having non-debt-related sources of tax shields, i.e., depreciation and investment tax credits, would utilize less debt. Consequently, a negative coefficient for DEPR should be hypothesized. However, previous studies generally find this variable to have a positive coefficient (see, for example, BJK). One frequently offered explanation is that a positive sign is consistent with Scott's (1977) secured debt hypothesis. According to this view, firms can obtain favorable debt terms when secured by tangible assets that are usually associated with higher levels of depreciation. In view of this ambiguity, our priors about this variable are indeterminate.

RDAD is defined as the ratio of R&D and advertising expense to sales and is employed to capture the firm's discretionary investment opportunities. The variable is calculated as the average over a five-year period. Myers (1977) argues that agency costs associated with intangible assets are higher than those associated with tangible assets. Thus, RDAD should be inversely related to the debt ratio. GROWTH measures past growth in total assets over a ten-year period. Titman and Wessels (1988) argue that a high growth rate indicates greater flexibility in future investments and offers greater opportunities for expropriating wealth from debt holders. Therefore, we expect GROWTH to be negatively related to the debt ratio. Alternatively, a high growth rate is indicative of the profitability and success of the firm in plowing more resources into the firm. This in turn could be associated with lower information asymmetry costs of equity (Myers and Majluf (1984)) and, hence, a preference for equity over debt financing. This argument would also suggest a negative coefficient for the GROWTH variable.

The INSTL variable is defined as the proportion of shares owned by institutions at the end of the year. As argued earlier, larger institutional holdings engender greater monitoring efforts, thereby restraining the opportunistic behavior by managers. This serves to mitigate the agency costs of the firm, permitting the firm to utilize less debt. A negative coefficient for INSTL is, therefore, hypothesized. MGROWN represents managerial ownership of equity in the firm. It is defined as the number of shares owned by managers and directors divided by total number of shares outstanding as of year-end. According to the agency framework, increased managerial ownership aligns interests of managers with the interests of outside shareholders and reduces the role of debt as an agency-conflict-mitigating device. Additionally, Friend and Hasbrouck (1988) and Friend and Lang (1988) suggest that corporate insiders have a much greater vested interest in ensuring the continued

viability of the firm because of the greater non-diversifiable risk of debt to management than to public investors. Therefore, the larger the stock holding of insiders in the firm, the greater the desire of insiders to minimize capital structure risks. Accordingly, a negative coefficient for MGROWN is expected. With the notable exceptions of Friend and Hasbrouck (1988) and Jensen, Solberg, and Zorn (1992), the managerial ownership variable has not been used in previous empirical investigations as a determinant of the debt structure despite the importance of the variable in the agency framework.

### B. Managerial Ownership Equation

The explanatory variables for the managerial ownership equation include stock return volatility (STKVOL), R&D and advertising expenses (RDAD), asset growth (GROWTH), firm size (TA), institutional holdings (INSTL), and debt ratio (DR). STKVOL is the stock return volatility measured as the standard deviation of monthly stock returns of the firm over a five-year period. The point has been argued in the literature (see, for example, Crutchley and Hansen (1989) and Friend and Lang (1988)) that, because their human capital is tied to the firm, managers would be reluctant to commit their personal wealth to the firm as this greatly diminishes their diversification opportunities. Further, this non-diversification problem becomes more severe as the stock return volatility of the firm increases. To capture this effect, the standard deviation of monthly stock returns estimated over five years is used to proxy for total risk. Based on the argument put forth, a negative coefficient for STKVOL is hypothesized.

The RDAD variable is defined as before and captures the discretionary investments of the firm. Since these investments are characterized by greater agency costs (Myers (1977)), RDAD-intensive firms should be associated with greater insider ownership in equilibrium. Alternatively, the work of Leland and Pyle (1977) suggests that high-RDAD firms are likely to have comparatively more positive private information and therefore higher managerial ownership. Consequently, a positive coefficient is hypothesized for the RDAD variable. GROWTH represents total asset growth and is anticipated to have a positive influence on managerial ownership. To the extent that past asset growth reflects future profitability and growth potential, managers would be less reluctant to invest in the firm's equity. The positive relationship between growth and managerial ownership could stem from informational advantages to insiders about growth prospects of the firm. Managers, because of their better knowledge of projects being undertaken by the firm, would be more inclined than the average investor to bet on the growth prospects.

A size variable, TA, is also included as a control variable. TA is measured as the log of total assets of the firm at the end of the year. Previous studies have documented that managerial ownership is much greater in smaller firms than in larger firms. As the firm gets larger, a relatively smaller proportion of shares is owned by managers owing to their limited personal wealth, constraints on personal borrowing, and the diversification problem. Therefore, a negative coefficient for TA is expected. Consistent with our hypothesis, a negative coefficient is expected for INSTL. As argued before, the optimal proportion of managerial ownership should decline with increasing institutional monitoring. DR is the debt ratio as previously defined. For reasons explained in the discussion of the debt equation, the substitutability argument in the agency framework suggests an inverse relationship between managerial ownership and the debt ratio; hence, a negative coefficient for DR is anticipated.

### C. Sample Description and Data Sources

The proposed simultaneous equations model is estimated cross-sectionally using a sample of firms from the New York Stock Exchange (NYSE), the American Stock Exchange (ASE), and the over-the-counter (OTC) market in existence at the end of 1988. All variables, except INSTL and MGROWN, are computed from data available in the 1988 *Compustat Industrial and Price-Dividends-Earnings* tapes. Data on institutional holdings are taken from 1988 year-end issue of the *Standard and Poor's Stock Guide*. Standard and Poor's defines institutional investors to include investment companies, banks, insurance companies, college endowments, and 13-F money managers. The data on managerial holdings (shares owned by officers and directors) are taken from the May 1989 edition of the *Disclosure CD-ROM* containing data for 1988. The sample of firms initially consisted of 1,000 firms randomly selected from the *Compustat Price-Dividends-Earnings* tapes. The final sample after screening for data availability consists of 516 firms of which 135 are OTC firms. Summary statistics of the variables used in the model are presented in Table 1. Panel A contains descriptive statistics for the variables used in the model, while panel B shows the pair-wise correlation matrix for all the variables. The average debt ratio for the sample of firms is 20.2%, the average total asset size is \$1.479 billion, the average proportion of shares held by insiders is 16.1%, and the average proportion of shares held by institutions is 38.8%. The correlation matrix does not suggest any serious concern for multicollinearity problems. This is further confirmed by the low variance inflation factors reported in Table 3.

**Table 1. Summary Statistics**

	Mean	Std.	Min.	Max.
DR	0.202	0.162	0.000	0.817
MGROWN	0.161	0.178	0.000	0.881
ERNVOL	0.064	0.050	0.006	0.455
DEPR	0.609	0.834	0.008	13.899
RDAD	0.035	0.051	0.000	0.495
GROWTH	1.116	0.094	0.874	1.552
INSTL	0.388	0.210	0.009	0.920
STKVOL	0.103	0.035	0.037	0.358
ASSET SIZE	1,479.718	4,644.345	3.071	73,037.000

*Panel B. Correlation Matrix for Variables Used in Model*

	DR	MGROWN	ERNVOL	DEPR	RDAD	GROWTH	INSTL	STKVOL
MGROWN	0.0173							
ERNVOL	-0.0803	0.1386						
DEPR	0.1105	0.0897	0.1985					
RDAD	-0.1534	0.0017	0.1759	-0.0357				
GROWTH	-0.1260	-0.0717	0.0103	0.1370	0.0836			
INSTL	-0.0812	-0.3642	-0.3061	-0.0372	0.0365	0.1756		
STKVOL	0.1999	0.2087	0.5207	0.1991	0.0782	-0.0668	-0.4178	
TA	0.0554	-0.3638	-0.4314	-0.0001	0.0255	0.2221	0.6071	-0.4915

DR is the debt ratio defined as the ratio of long-term debt to market value of equity; ERNVOL is earnings volatility measured as the standard deviation of earnings before depreciation, interest, and taxes scaled by total assets; GROWTH is the annual compounded growth rate  $(1 + \text{rate})$  in total assets; DEPR is the ratio of annual depreciation to earnings before depreciation, interest, and taxes; RDAD is the ratio of R&D and advertising expenses to earnings before depreciation, interest, and taxes; INSTL is the proportion of common stock held by institutions; MGROWN is the proportion of common stock held by officers and directors of the firm; STKVOL is the standard deviation of monthly stock returns for the firm; ASSET SIZE is the total asset size in millions of dollars; and TA is the log of the total asset size of the firm.

### III. Discussion of Results

In this section, we first discuss the 2-stage least squares results and then discuss the ordinary least squares methodology. Also, we examine possible differential effects for OTC firms.

#### A. 2-SLS Results

Table 2 presents the 2-SLS estimates of the simultaneous equations system. The model F-values are significant for both equations at the 0.01 level. The institutional ownership variable (INSTL) has the negative predicted sign in both the debt and managerial ownership equations and is statistically significant at the 0.01 level. This implies that firms with greater monitoring by institutional investors may find it optimal to use lower levels of debt and managerial ownership

to control agency conflicts in the firm. These findings are also consistent with the findings of Bhagat and Jefferis (1988) and Agrawal and Mandelker (1990) that institutional investors provide valuable monitoring services and act as a restraint to opportunistic behavior by managers.

Turning to the individual equations, estimates for the debt equation reveal that all of the independent variables are statistically significant with signs as predicted. The coefficient for ERNVOL is negative. Recall that ERNVOL proxied for inherent bankruptcy risk and was expected to be negatively related to the debt ratio. The negative coefficient for ERNVOL is consistent with previous studies that document an inverse relationship between debt and earnings volatility (see, for example, BJK (1984), Titman and Wessels (1988), and Friend and Hasbrouck (1988)). The DEPR

**Table 2. Estimated Coefficients for the Debt and Managerial Ownership Equations Using Two-Stage Least Squares Methodology**

<i>EQUATION 1: <math>DR = a_0 + a_1ERNVOL + a_2DEPR + a_3RDAD + a_4GROWTH + a_5INSTL + a_6MGROWN + u</math></i>						
Ind. Variables	ERNVOL	DEPR	RDAD	GROWTH	INSTL	MGROWN
Coeff. Estimates	-0.3416	0.0369	-0.3309	-0.2273	-0.2346	-0.5634
t-values	(-1.95)**	(3.46)*	(-2.06)**	(-2.06)*	(-2.86)*	(-2.38)*
	F-statistic		5.346*			
<i>EQUATION 2: <math>MGROWN = b_0 + b_1STKVOL + b_2RDAD + b_3GROWTH + b_4TA + b_5INSTL + b_6DR + v</math></i>						
Ind. Variables	STKVOL	RDAD	GROWTH	TA	INSTL	DR
Coeff. Estimates	-0.7998	0.3523	0.1694	-0.0381	-0.1465	0.5625
t-values	(-1.53)**	(1.52)**	(1.46)**	(-3.60)*	(-2.63)*	(1.79)
	F-statistic		13.968*			

DR is the debt ratio defined as the ratio of long-term debt to market value of equity; ERNVOL is earnings volatility measured as the standard deviation of earnings before depreciation, interest, and taxes scaled by total assets; GROWTH is the annual compounded growth rate  $(1 + \text{rate})$  in total assets; DEPR is the ratio of annual depreciation to earnings before depreciation, interest, and taxes; RDAD is the ratio of R&D and advertising expenses to earnings before depreciation, interest, and taxes; INSTL is the proportion of common stock held by institutions; MGROWN is the proportion of common stock held by officers and directors of the firm; STKVOL is the standard deviation of monthly stock returns for the firm; and TA is the log of the total asset size of the firm. The sample size is 516 firms. The significance levels of the estimated coefficients are for the one-tailed test based on *a priori* predictions, with the exception of the coefficient for the DEPR variable for which a two-tailed test was used; the expected signs for the coefficients are shown above each variable.

\*Significant at the 0.01 level.

\*\*Significant at the 0.05 level.

\*\*\*Significant at the 0.10 level.

variable reflecting non-debt tax shields is significant with a positive sign. This is contrary to the non-debt tax shield hypothesis of DeAngelo and Masulis (1980). However, as noted earlier, some previous studies also document a similar positive relationship (see, for example, BJK). This has been attributed to the possibility that the depreciation variable captures collateral value of assets that, according to Scott (1977), enables firms to raise debt on attractive terms. The significant negative coefficient for RDAD supports Myers' (1977) hypothesis that RDAD-intensive firms, because of their greater discretionary investments, incur high agency costs of debt. The negative coefficient for RDAD is also consistent with BJK's finding. The negative coefficient for the GROWTH variable is consistent with the arguments of Titman and Wessels (1988) and Myers and Majluf (1984) presented earlier. The endogenous variable, MGROWN, is negative, as predicted by the agency model of JM. Cross-sectionally, it appears that firms trade off debt and managerial ownership in order to control the agency costs of the firm. The INSTL variable, as already mentioned, has a

significant negative coefficient consistent with our expectations. This supports the hypothesis that in the presence of increasing levels of institutional ownership firms can utilize lower levels of debt to control agency costs of the firm.

With regard to the managerial ownership equation, the signs of the coefficients are generally in the direction hypothesized. As predicted, the estimated equation reveals that managerial ownership is inversely related to the degree of stock market volatility of the firm. This finding is consistent with the view that because of non-diversification problems, managers may be reluctant to invest too much of their personal wealth in the firm. Their reluctance to invest in the firm increases directly with the firm's stock price volatility. This finding is consistent with that obtained by Barton, Hill, and Sundaram (1989), although they use an accounting-based measure of risk. The positive coefficient for RDAD is consistent with Myers' hypothesis that RDAD-intensive firms are associated with greater agency costs of debt making managerial ownership a relatively more



important device in controlling the agency problems of the firm. The positive coefficient for GROWTH is consistent with managers' preference to invest in the firm's equity if future prospects are good, holding everything else constant. The negative coefficient for the size variable, TA, is consistent with previous studies that document a lower proportion of managerial ownership in larger firms owing to limited personal resources. The INSTL variable has a significant negative coefficient as hypothesized. It was argued that institutional ownership fosters additional monitoring and acts as a restraint to the opportunistic behavior on the part of managers. Consequently, the need to utilize managerial ownership to control agency costs is lessened.

The weakly significant positive coefficient for DR is similar to that reported by Jensen, Solberg, and Zorn (1992). Consistent with their interpretation, the results suggest that insiders do not choose their ownership levels based on debt leverage but that the causality goes in the other direction, i.e., from insider ownership to debt choice.<sup>4</sup>

In sum, the parameter estimates of the managerial ownership and debt equations are consistent with the major hypothesis of the paper that the presence of increased institutional ownership (monitoring) reduces the need for managerial ownership concentration and debt financing to control agency problems. The coefficients for other explanatory variables are also generally consistent with the agency framework interpretations.

## B. OLS Results

The OLS estimates of the debt ratio and managerial ownership equations are presented in Table 3. The OLS results are examined in order to compare them with the simultaneous equations estimates and to illustrate the potential benefits of the latter methodology in the presence of interdependent relationships. For the debt equation, the signs and significance of the coefficients using the OLS method are similar to the 2-SLS estimates, with the exception of the managerial ownership variable (MGROWN). Notably, institutional holdings and debt ratio are inversely related as hypothesized. However, the standard errors of the coefficients for four out of the six explanatory variables are higher for OLS than for the 2-SLS estimates. The major

<sup>4</sup>One of the reviewers points out another plausible explanation for the positive debt coefficient in the managerial ownership equation due to stock repurchase activity by the firm. Managers do not participate in stock repurchase programs announced by their firms. This would cause the managerial ownership proportion to increase with debt leverage. The relationship would be accentuated if the repurchase activity was financed by debt.

difference, though, is with respect to the managerial ownership variable, MGROWN. In the OLS estimates, the coefficient for MGROWN is negative but not statistically significant. Evidently, the simultaneous bias unaccounted for in the OLS method is masking the negative relationship between managerial ownership and debt ratio implied in the agency framework and supported by the 2-SLS estimates. The 2-SLS method gives us the benefit of looking at managerial ownership and leverage decisions separately while still maintaining the endogenous relationships between them.

With respect to the MGROWN equation, the OLS results are considerably different from the simultaneous equations estimates. GROWTH, RDAD, and STKVOL, which are all significant in the hypothesized direction under the simultaneous equations method, are no longer significant. However, both size (TA) and institutional holdings (INSTL) have significantly negative coefficients as hypothesized. The debt ratio variable (DR) is not significant.

## C. OTC Firms

Since the sample consists of listed (NYSE and ASE) and unlisted (OTC) firms, an interesting extension of the study is to examine the relative effects of key agency variables on OTC firms versus listed firms. This is interesting because OTC firms are generally perceived to have greater information asymmetries, restricted access to the debt markets and, possibly, greater agency conflicts because of less monitoring. With this in mind, the simultaneous equations model is re-estimated with interaction terms between the key agency variables that are the focus of this study and a dummy variable for OTC firms. Specifically, a dummy variable (OTC) is created that takes the value of one if the firm's stock is traded in the over-the-counter market and is zero otherwise. In the debt equation, interaction variables between the OTC dummy variable and MGROWN and INSTL are included. Similarly, interactions between the OTC dummy variable and INSTL and DR are employed in the managerial ownership equation. The OTC interactions are included only with respect to DR, MGROWN, and INSTL, as these are the primary variables of the study. The 2-SLS estimates of this revised model are presented in Table 4.

In the debt equation, both INSTL and MGROWN are significantly negative as hypothesized. The OTC interaction term with INSTL is also negative and significant indicating that the substitutability hypothesis between institutional monitoring and debt is even stronger for OTC firms. The positive and statistically significant coefficient for

**Table 3. Estimated Coefficients for the Debt and Managerial Ownership Equations Using Ordinary Least Squares Methodology**

$$\text{EQUATION 1: } DR = a_0 + a_1ERNVOL + a_2DEPR + a_3RDAD + a_4GROWTH + a_5INSTL + a_6MGROWN + u$$

Ind. Variables	ERNVOL	DEPR	RDAD	GROWTH	INSTL	MGROWN
Coeff. Estimates	-0.3645	0.0279	-0.3634	-0.2052	-0.0716	-0.0203
t-values	(-2.41)*	(3.24)*	(-2.61)*	(-2.72)*	(-1.91)**	(-0.48)
VIF	1.20	1.08	1.05	1.06	1.30	1.16
		F-statistic	5.8946*			

  

$$\text{EQUATION 2: } MGROWN = b_0 + b_1STKVOL + b_2RDAD + b_3GROWTH + b_4TA + b_5INSTL + b_6DR + v$$

Ind. Variables	STKVOL	RDAD	GROWTH	TA	INSTL	DR
Coeff. Estimates	-0.0251	0.0608	0.0390	-0.0231	-0.1917	0.0201
t-values	(-0.10)	(0.42)	(0.49)	(-4.17)*	(-4.35)*	(0.42)
VIF	1.49	1.05	1.09	1.93	1.66	1.15
		F-statistic	16.857*			

DR is the debt ratio defined as the ratio of long-term debt to market value of equity; ERNVOL is earnings volatility measured as the standard deviation of earnings before depreciation, interest, and taxes scaled by total assets; GROWTH is the annual compounded growth rate  $(1 + \text{rate})$  in total assets; DEPR is the ratio of annual depreciation to earnings before depreciation, interest, and taxes; RDAD is the ratio of R&D and advertising expenses to earnings before depreciation, interest, and taxes; INSTL is the proportion of common stock held by institutions; MGROWN is the proportion of common stock held by officers and directors of the firm; STKVOL is the standard deviation of monthly stock returns for the firm; and TA is the log of the total asset size of the firm. The sample size is 516 firms. The significance levels of the estimated coefficients are for the one-tailed test based on *a priori* predictions, with the exception of the coefficient for the DEPR variable for which a two-tailed test was used; the expected signs for the coefficients are shown above each variable. VIF refers to the variance inflation factor.

\*Significant at the 0.01 level.

\*\*Significant at the 0.05 level.

\*\*\*Significant at the 0.10 level.

MGROWN\*OTC suggests that for OTC firms the impact of MGROWN on DR is not as negative.<sup>5</sup>

In the managerial ownership equation, INSTL is negative but not significant, while its interaction with the OTC dummy variable is negative and significant. This suggests that for NYSE and ASE firms institutional monitoring is not important in explaining the variation in managerial ownership. The significance for OTC firms indicates that in the presence of significant institutional monitoring, managers do not invest as much in the firm to control agency costs. This is interesting and consistent with the notion that, in the smaller OTC firms, the personal risk to the manager of investing in the firm (non-diversification risk and

bankruptcy risk) is relatively greater than for a manager of a large (listed) firm. The coefficient for the debt ratio is significantly negative, consistent with our hypothesis that debt and managerial ownership may be substitutes in reducing agency costs of the firm. In the case of OTC firms, the net impact of this variable is much less negative but is still significant at the 0.05 level.

#### IV. Conclusions

The agency literature suggests that both debt and managerial ownership serve to control agency costs of the firm. The literature also indicates that the presence of external monitors acts as a restraint on management's opportunistic behavior. Institutional investors represent one such group of monitoring agents. This study hypothesizes that the use of debt and managerial ownership are inversely related to the extent of monitoring by institutional investors.

<sup>5</sup>The net impact of MGROWN on DR for OTC firms is given by the sum of the coefficients for MGROWN and MGROWN\*OTC ( $a_6 + a_8$ ). This is equal to -0.347, which is significantly negative at the 0.01 level. The significance of INSTL and DR for OTC firms is established in a similar manner.

**Table 4. Estimated Coefficients for the Debt and Managerial Ownership Equations with Interaction Effects for OTC Firms Using Two-Stage Least Squares Methodology**

$$EQ 1: DR = a_0 + a_1ERNVOL + a_2DEPR + a_3RDAD + a_4GROWTH + a_5INSTL + a_6MGROWN + a_7INSTL*OTC + a_8MGROWN*OTC + u$$

Ind. Variables	ERNVOL	DEPR	RDAD	GROWTH	INSTL	MGROWN	INSTL*OTC	MGROWN*OTC
Coeff. Estimates	-0.1966	0.0449	-0.5112	-0.2740	-0.2463	-1.1670	-0.3401	0.8200
t-values	(-0.87)	(3.40)*	(-2.46)*	(-2.43)*	(-3.51)*	(-4.71)*	(-4.21)*	(4.30)*
	F-statistic				5.228*			

  

$$EQ 2: MGROWN = b_0 + b_1STKVOL + b_2RDAD + b_3GROWTH + b_4TA + b_5INSTL + b_6DR + b_7INSTL*OTC + b_8DR*OTC + v$$

Ind. Variables	STKVOL	RDAD	GROWTH	TA	INSTL	DR	INSTL*OTC	DR*OTC
Coeff. Estimates	2.0321	-0.8229	-0.3010	0.0068	-0.0745	-1.5950	-0.5520	1.1768
t-values	(2.79)	(-2.38)	(-1.80)	(0.50)	(-0.90)	(-3.40)*	(-3.40)*	(3.32)
	F-statistic				6.235*			

DR is the debt ratio defined as the ratio of long-term debt to market value of equity; ERNVOL is earnings volatility measured as the standard deviation of earnings before depreciation, interest, and taxes scaled by total assets; GROWTH is the annual compounded growth rate  $(1 + \text{rate})$  in total assets; DEPR is the ratio of annual depreciation to earnings before depreciation, interest, and taxes; RDAD is the ratio of R&D and advertising expenses to earnings before depreciation, interest, and taxes; INSTL is the proportion of common stock held by institutions; MGROWN is the proportion of common stock held by officers and directors of the firm; STKVOL is the standard deviation of monthly stock returns for the firm; TA is the log of the total asset size of the firm; INSTL\*OTC is an interaction variable between institutional ownership and a dummy variable (OTC) equal to one if firm is an over-the-counter firm; DR\*OTC is an interaction variable between the debt ratio and the OTC dummy variable; and MGROWN\*OTC is an interaction variable between MGROWN and the OTC dummy variable. The sample size is 516 firms. The significance levels of the estimated coefficients are for the one-tailed test based on *a priori* predictions, with the exception of the coefficient for the DEPR, INST\*OTC, DR\*OTC, and MGROWN\*OTC variables for which a two-tailed test was used; the expected signs for the coefficients are shown above each variable.

\*Significant at the 0.01 level.

\*\*Significant at the 0.05 level.

\*\*\*Significant at the 0.10 level.

Consistent with the main hypothesis of the paper, institutional ownership is found to be negatively related to the level of debt financing and managerial equity holdings in the firm. Thus, the results obtained here support the notion that institutional investors serve as effective monitoring agents and help in mitigating agency costs.

Additionally, the study finds that the debt ratio is inversely related to managerial equity ownership, R&D expenses, and growth. The negative coefficient for managerial ownership in the debt equation supports the notion that these two variables are substitutes in the agency framework. The results are also consistent with the view that high-R&D and high-growth firms are associated with greater agency costs making debt the preferred medium for raising capital compared to external equity. The estimates for the

managerial ownership equation also provide some interesting insights consistent with the agency framework. There is weak evidence that institutional holdings are inversely related to managerial equity ownership. Further, higher managerial holdings are associated with increased levels of R&D and growth, both of which suggest the presence of high agency costs. Additional results using interaction terms between the main agency variables and a dummy variable for OTC stocks reveal that the monitoring role of institutions are especially significant for OTC firms compared to firms listed on the NYSE and ASE. Finally, the results show that utilizing a simultaneous equations estimation procedure over the ordinary least squares approach is beneficial when the dependent variables are endogenously related. ■

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