The Impact of Corporate Governance on the Performance of U.S. Small-Cap Firms

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ABSTRACT

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This paper examines the interactions between governance mechanisms and performance for US small cap firms over the period from 2000 to 2004. We perform analyses accounting for both simultaneity between the variables and a sample selection bias that may be related to the venue of listing firm's stock. The results demonstrate significant interactions between board independence, firm leverage, CEO ownership, and pay-performance sensitivity. With regard to the impact of governance mechanisms on corporate performance, leverage significantly reduces firm value while strong pay-performance compensation links are beneficial to corporate performance. We also find a weak association between board independence and firm performance. The results do not show a significant relationship between CEO ownership and performance. Another finding is that the passage of the Sarbanes-Oxley Act considerably increases the market value of small cap firms with a rate of return of around 15%, suggesting that the benefits of improved transparency outweigh their potential costs. The results are also consistent with the contention that CEOs may lack the power or will to remove insiders from the boards when firms are required to comply with independence standards.

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Introduction

Corporate governance problems have attracted much attention as a consequence of momentous corporate scandals such as Enron. Some of these problems have been addressed in the corporate governance literature over the past several decades including board of director inefficacy, executive remuneration-incentive disparity, excessive leverage, costly takeovers and distortionary government regulations.

Early empirical work (e.g. Jensen and Murphy, 1990; Rechner and Dalton, 1991) focuses on bivariate relationships - how individual mechanisms work - e.g. the link between performance and managerial compensation. However, such studies ignore the essential simultaneous relation between governance mechanisms and firm value. While it is widely accepted that better corporate control improves firm performance, Hermalin and Weisbach (1988), Fizel and Louie (1990), Agrawal and Knoeber (1996), and many others advocate that effects of corporate performance on control mechanisms need to be examined using a simultaneous equation systems approach.

More recent studies employ two- or three-stage least squares (2SLS or 3SLS) to take into account the simultaneous nature of the governance-performance relationship (Barnhart and Rosenstein, 1998; Berger and Patti, 2006). However, most of these studies examine firm performance together with a small subset of potentially important governance mechanisms. This study analyzes the governance-performance link using a fairly wide range of interacting corporate control mechanisms summarized from various papers. We also compare the results from OLS, 2SLS, and 3SLS to capture model selection differences.

The majority of the extant research focuses exclusively on large-cap firms, leaving a hiatus on our empirical knowledge about the corporate governance of small companies. In the United States, small firms represent about 99.7 percent of all employers. There are 29 million tax returns filed reporting some business income.[1] In addition, a large number of asset pricing studies (e.g. Banz, 1981; Fama and French, 1993; Houge and Loughran, 2006) have suggested that small firms as such are worthy of investigation, given their risk-return profiles. Our study attempts to extend our knowledge of the governance of small cap firms in the US.

On June 30, 2002, the US government passed the Sarbanes-Oxley Act (Sarbox) in response to recent corporate frauds. Sarbox seeks to enhance disclosure, improve auditors' independence and power, and extend regulations of insider trades. The Act is expected to impose a high corporate control standard. However, it has been claimed that the demanding compliance costs are prohibitive for many small firms.[2] In this paper, we also study the impact of compliance costs of Sarbox on corporate performance, especially for small public businesses. Though the high compliance costs of Sarbox seem to be unattainable for small companies, our results suggest that firm performance is actually higher in the post-Sarbox period. We provide two explanations: The benefits from the implementation of Sarbox turn out to be higher than the costs (Switzer and Kelly, 2006), and less successful corporations may be delisted (Giordano, 2007).

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[1] See the website of the National Federation of Independent Business.
[2] See Chris Reidy, "Study: Sarbanes-Oxley costs burden small firms", *The Boston Globe*, March 1, 2006

The paper also demonstrates significant interactions between board independence, firm leverage, CEO ownership, and pay-performance sensitivity. With regard to the impact of governance mechanisms on corporate performance, leverage significantly reduces firm value while strong pay-performance compensation links are beneficial to corporate performance. We find a weak association between board independence and firm performance. The results do not show a significant relationship between CEO ownership and performance. The results are also consistent with the contention that CEOs may lack the power or will to remove insiders from the boards when firms are required to comply with independence standards.

The paper briefly summarizes the existing research concerning governance control mechanisms and firm performance in Section 2. Section 3 deals with variable selection and establishes the empirical model. In Section 4, we introduce the data sample. Section 5 provides study results and discusses their implications. We conclude in Section 6.

I. Literature Review

Several studies have appeared that take into account the interdependence of governance mechanisms when analyzing the governance-performance nexus. Bathala et al. (1994) model institutional holdings, managerial holdings, and debt policy in a simultaneous context. The evidence shows that debt financing and managerial ownership are jointly endogenous. Chung and Pruitt (1996) use 3SLS to examine CEO holdings, CEO pay related incentives, and firm performance, and report that

improved performance raises both CEO ownership and compensation and that higher ownership in turn determines corporate performance. More recently, Weber and Dudney (2003) extend Chung and Pruitt (1996) by including indirect impacts of explanatory variables on explained variables in other equations. Dwivedi and Jain (2005) also employ a simultaneous equation and study the influence of board size and ownership structure on Tobin's q.

Though simultaneity is widely recognized, most papers look at a few governance mechanisms. Agrawal and Knoeber (1996) provide one of the most comprehensive studies in which several governance mechanisms are tied to firm performance in a simultaneous system. The authors document that the empirical results could be distorted when only a small subset of governance mechanisms is considered. The few studies that inspect the governance-performance relation with a broad range of mechanisms include Beiner et al. (2006), Sierra et al. (2006), and Switzer and Kelly (2006).

In addition, the majority of the existing research on corporate governance focuses on large companies. Eisenberg et al. (1998) study small Finnish firms to examine the link between the number of directors and firm valuation. Switzer and Kelly (2006) analyze Canadian small caps to reveal the governance-performance relationship.

Recently, the influence of Sarbox on firm value has become a hot topic in the academic world. Chhaochharia and Grinstein (2007) employ event study methodology to determine the valuation impact of the passage of Sarbox on firms that are less compliant with Sarbox provisions and are included in the Center for Research in

Security Prices (CRSP) and COMPUSTAT. databases The event window is from November 2001 to October 2002. The abnormal return is calculated as the difference between the observed return of a less compliant portfolio and the return on an extended Fama and French four-factor model or a matched sample portfolio. Less compliant firms are those that engage in insider trading, financial restatements, related party transactions, or the change of auditors in one or two years prior to the event window. Companies with fewer independence provisions are also considered as less compliant. The results show overall positive abnormal returns for firms that do not conform to provisions regarding insider trading, financial restatements, and related party transactions. Controlling for firm size effect, the authors find small firms with less independent boards earn negative abnormal returns while the large counterparts earn positive abnormal returns. In addition, large companies with replaced auditors outperform the four-factor model.

However, the event study reflects only instantaneous market reaction. Many entrepreneurs and investors may be more concerned about the long-term corporate valuation impact of Sarbox, due to their long-term investment horizon. In this paper, we follow and extend Switzer and Kelly's (2006) model to take the challenge of exploring the corporate control of the US small-cap businesses. Our study also attempts to discover whether the long-term performance of US small firms improves after the implementation of Sarbox.

II. Empirical Approach

A. Model Selection

Recent research increasingly utilizes simultaneous equations when analyzing the relation between performance and governance mechanisms, due to the existence of potential substitution and joint determination among governance variables (Jensen et al., 1992; Bathala et al., 1994; Agrawal and Knoeber, 1996; Chung and Pruitt, 1996; Barnhart and Rosenstein, 1998; Weber and Dudney, 2003; Switzer and Kelly, 2006). In order to consider these interactions, we also investigate the performance of US small-cap firms in a simultaneous systems framework.

Our approach is to extend Switzer and Kelly's two-stage least squares system. We employ three-stage least squares regression to provide efficient estimates of the model. The endogenous governance mechanisms comprise the level of board independence, the leverage ratio, the CEO share ownership, and the CEO pay-performance sensitivity. Each mechanism represents one equation in the model. To examine the influence of corporate governance on firm valuation, we introduce another equation with firm performance as the dependent variable. The structural form for each of the five equations is listed below.

$$\begin{aligned} Board\ independence = {} & \alpha_0 + \alpha_1(board\ size) + \alpha_2(CEO\ duality) + \alpha_3(CEO\ ownership) \\ & + \alpha_4(firm\ size) + \alpha_5(stock\ volatility) + \alpha_6(takeover\ activity) \\ & + \alpha_7(shareholder\ rights) + \alpha_7(post\text{-}Sarbox\ period) \\ & + \alpha_{8i}(industry)_i + \varepsilon \end{aligned}$$

$$Leverage = \beta_0 + \beta_1(board\ independence) + \beta_2(pay\text{-}performance\ sensitivity)$$
$$+ \beta_3(shareholder\ rights) + \beta_4(lagged\ performance) + \beta_5(firm\ size)$$
$$+ \beta_6(stock\ volatility) + \beta_7(takeover\ activity) + \beta_8(NYSE\ listing)$$
$$+ \beta_9(post\text{-}Sarbox\ period) + \beta_{10i}(industry)_i + \mu$$

$$CEO\ ownership = \gamma_0 + \gamma_1(board\ independence) + \gamma_2(CEO\ duality)$$
$$+ \gamma_3(shareholder\ rights) + \gamma_4(firm\ size) + \gamma_5(stock\ volatility)$$
$$+ \gamma_6(takeover\ activity) + \gamma_7(NYSE\ listing) + \gamma_8(post\text{-}Sarbox\ period)$$
$$+ \gamma_{9i}(industry)_i + \nu$$

$$Pay\text{-}performance\ sensitivity = \lambda_0 + \lambda_1(board\ independence) + \lambda_2(leverage)$$
$$+ \lambda_3(shareholder\ rights) + \lambda_4(firm\ size)$$
$$+ \lambda_5(stock\ volatility) + \lambda_6(takeover\ activity)$$
$$+ \lambda_7(post\text{-}Sarbox\ period) + \lambda_{8i}(industry)_i + \eta$$

$$Performance = \phi_0 + \phi_1(board\ independence) + \phi_2(board\ size) + \phi_3(leverage)$$
$$+ \phi_4(CEO\ duality) + \phi_5(pay\text{-}performance\ sensitivity)$$
$$+ \phi_6(shareholder\ rights) + \phi_7(CEO\ ownership) + \phi_8(takeover\ activity)$$
$$+ \phi_9(R\&D\ expenses) + \phi_{10}(capital\ expenditure) + \phi_{11}(NYSE\ listing)$$
$$+ \phi_{12}(post\text{-}Sarbox\ period) + \psi$$

This study extends Switzer and Kelly's model by looking at US small caps. In addition, we also look at the choice of trading venue (NYSE vs. AMEX and Nasdaq) as endogenous variables. Third, we incorporate the firms' R&D expenses and capital

expenditures in the performance equation. These variables are expected to designate growth opportunities and to improve the model specification. Finally, we include a dummy to differentiate between the periods before and after the passage of the Sarbanes-Oxley Act of 2002, because the implementation of Sarbox is particularly challenging for small companies.

B. Endogenous Variable Interrelationships

This paper analyzes the link between firm performance and four governance variables, when we control for other factors. The major concern is to explore the factors affecting firm performance for small US companies. Firm performance (TOBIN) is proxied by Tobin's q. This section discusses the interrelationship between endogenous governance variables and firm performance, as well as the potential trade-offs among corporate control mechanisms.

a. Board Independence (BINDA and BINDB)

Fama and Jensen (1983) are among the earliest authors who consider agency problems arising from the separation of ownership and control. They argue that an independent board helps fill the gap between shareholders and management. According to Hermalin and Weisbach (1998), insiders are less likely to remove their CEOs, since their careers are highly connected to the CEOs. At the same time, outsiders on the board tend to be more interested in protecting their reputation by making fair decisions.

Wagner et al. (1998) find a strong significant trend of increasing representation of outside directors on the board in the U.S.A. since the 1980s. This tendency has aimed to improve board independence and to alleviate agency conflicts. Recent research also supports the importance of board independence. Chung et al. (2003) report a positive relation between outside directors and company valuation when they examine the impact of firm performance on capital expenditures and R&D expenses. Hossain et al. (2000) conclude that the board independence is positively associated with company valuation in New Zealand.

Although the value of outside directors is widely recognized, the relation is mixed between CEO/outsider relative tenure and firm performance. On one hand, a positive link may exist if veteran CEOs are superior in managing the company, but a negative link could hold if veteran CEOs are increasingly conservative and reluctant to explore risky projects (Weber and Dudney, 2003). On the other hand, if outsiders serve the boards longer, they tend to have stronger influence on their organizations (Singh and Harianto, 1989), but they also may be resistant to changes (Goodstein and Boeker, 1991).

In order to capture any possible board impact on performance, we construct both relative CEO tenure (BINDA) and proportion of outsiders (BINDB) as proxies for board independence (Mishra and Nielsen, 2000; Ghosh and Sirmans, 2003; Switzer and Kelly, 2006). Both variables are used separately in each equation.

b. Leverage (DBVAL)

Modigliani and Miller (1958) state that capital structure is independent of firm value, based on the assumptions of (1) a perfect capital market, (2) identical expectations, and (3) no taxes or transaction costs. However, in the less restricted real world, the use of debt forces creditors to evaluate and monitor the managers, which transfers part of the manager-owner agency problems to bondholders. In addition, Grossman and Hart (1982) suggest that greater probability of bankruptcy caused by higher financial leverage compels top management to carefully choose value-added projects. Jensen (1986) also argues that leverage has a positive impact on firm value, because the fixed interest payment reduces free cash flow under CEO's control. As a result, debt financing may raise the value of firms by reducing agency costs of stockholders.

However, many researchers show that leverage actually induces another agency problem, the conflict between shareholders and bondholders. The underinvestment theory (Myers, 1977) suggests that equity holders are unwilling to accept projects with a low level of profitability, since equity only has a residual claim and these projects will be only beneficial to debt holders. On the contrary, Ang (1991) proposes another theory about overinvestment, which is also caused by debt financing. Ang (1991) states that firms tend to hold existing investments too long and miss the best buyers when the investment returns are close to promised yields on debt. The underlying reason is similar to the underinvestment theory. Jensen and Meckling (1976) and Parrino and Weisbach (1999) find that top managers even pick high-risk projects with negative expected returns to benefit shareholders and to decrease bonds

value, if the CEO's wealth is highly aligned with the profitability of his/her firm. Nonetheless, rational lenders include the costs of underinvestment, overinvestment and the implementation of negative NPV projects when they issue their debt to the borrowers. Consequently, only shareholders bear agency costs and equity value declines.

Recently, an increasing number of empirical studies report the above negative relation between the use of debt and a firm's market performance. Hovakimian et al. (2004) demonstrate that high market-to-book ratios are associated with low debt ratios. Furthermore, when additional funds are necessary for new investments, firms with higher performance continuously seek equity financing, but their target leverage remains unchanged. Majumdar and Chhibber (1999) and Switzer and Kelly (2006) also find a strongly significant negative relationship between leverage and performance for Indian and Canadian firms, respectively.

Agrawal and Knoeber (1996), Renneboog (2000), Prevost and Rao (2002), and many other researchers observe a positive relationship between the proportion of outside directors and the use of debt in their studies. Anderson et al. (2004) also document that lower cost of debt is associated with more independent board of directors. All of these studies imply that lenders are more confident of highly independent boards and that internal and external governance mechanisms complement each other. Accordingly, we anticipate that leverage (DBVAL) is directly related to the level of board independence (BINDA and BINDB).

c. CEO Ownership (OWN)

Jensen and Meckling (1976) examine the link between management ownership and firm performance and propose a convergence-of-interest hypothesis. This theory postulates that greater managerial shareholdings align the interests of management and outside equity holders. This implies that managers have more incentives to maximize the value of their companies as their ownership increases. Morck et al. (1988) find that higher managerial shareholdings are followed by improved company performance when inside ownership is at a low level. However, Morck et al. (1988) also document that the valuation of a firm decreases if a CEO has a greater level of control over the board. This higher level of control originates from higher CEO ownership. Morck et al. (1988) propose an entrenchment hypothesis to explain this phenomenon. This theory postulates that CEOs tend to pursue more for their own interests rather than maximize the firm value when the equity shares they own exceed a certain point. In our study, we follow Ang et al. (2000) who show that small businesses - also the focus of this study - are much closer to companies stylized by Jensen and Meckling (1976). Managers prefer perquisite consumption to the maximization of shareholder wealth if they earn only a fraction from their performance. The higher the preference is, the larger the agency costs are. Thus, we predict a positive relation between CEO ownership (OWN) and firm value (TOBIN). Switzer and Kelly (2006) indicate that CEOs may hold highly undiversified portfolios, as they invest heavily in their own firms. Only strong control over the firms or weak board independence may foster such a high level of confidence. For example, CEOs

have more power in deciding amongst board candidates as equity position in the firm increases. Many studies (e.g. Lasfer, 2006) demonstrate a negative impact of managerial ownership on the level of board independence, since greater CEO equity holdings converge the interests of inside and outside shareholders. Hence, we hypothesize that CEO ownership (OWN) and level of board independence (BINDA and BINDB) are substitutes.

d. CEO Pay-performance Sensitivity (PAY)

The seminal Jensen and Meckling (1976) paper addresses the impact of compensation design on firm value. A vast majority of researchers conclude a positive relation between the two. Coughlan and Schmidt (1985) report that stock price performance is directly related to the change in managerial compensation in their internal control study. Hall and Liebman (1998) investigate the CEO pay-performance link using a fifteen-year US data set, and they also find that the market valuation of a firm is strongly and significantly associated with CEO compensation plans. However, these studies do not account for the natural increase of CEO compensation and market value of most firms that need not be moderated by a causal relationship between them.

To remedy this, Mishra and Nielsen (2000) use Jensen-Murphy pay-performance sensitivity as a proxy for CEO compensation. The sensitivity variable is comprised of the coefficients of stockholder wealth which are obtained by regressing the change in total CEO pay on the change in shareholders' wealth for each firm over a certain

period of time. As measured by the CEO pay-performance sensitivity, a tighter link of the change in CEOs' and outside equity holders' fortune may induce CEOs to act in stockholders' interests by maximizing the profit of their firms (Switzer and Kelly, 2006). Therefore, higher firm valuation is assumed to be associated with the convergence in the managers' and outside equity holders' returns. Accordingly, we predict that the valuation of a firm (TOBIN) increases with the level of CEO pay-performance sensitivity (PAY).

Tosi and Gomez-Mejia (1989) argue that CEOs and external shareholders tend to have different preferences in choosing the size and the type of CEO compensation plans. Equity holders attempt to restrict the CEO pay from being too high. More importantly, shareholders favor managerial incentives directly related to firm performance. Conversely, CEOs prefer large compensation with a low level of uncertainty (Harris and Raviv, 1978). Board members are presumed to arbitrate between parties. Westphal and Zajac (1995) suggest that highly independent boards should enforce managerial compensation plans in which CEOs receive high rewards only if firms perform well. Boyd (1994) and Westphal (1998) also find evidence to support the contention that CEO pay increases are strongly and directly related to firm performance in various industries if the boards have stronger power. Hence, we hypothesize a positive relation between board independence (BINDA and BINDB) and CEO pay-performance sensitivity (PAY).

As mentioned above, the finance literature introduces shareholder-manager and shareholder-bondholder agency conflicts to explain the relationship between leverage

and firm performance. Highly leveraged firms may voluntarily reduce the pay-performance sensitivity to alleviate debt issuers' concerns about underinvestment, overinvestment, and acceptance of high-risk projects. John and John (1993) and Ortiz-Molina (2007) further suggests that monetary incentives are less important if high debt ratios reduce the manager-owner agency costs. Thus, both theories yield the same conclusion that the use of debt (DBVAL) has an inverse impact on CEO pay-performance sensitivity (PAY). These results also have empirical support (Garvey, 1997; Ortiz-Molina, 2007).

C. Exogenous Variables

Our choice of exogenous variables to identify the system is as follows:

a. Board Size (BSIZE)

The board of directors is pressured to represent stockholders' interests in regulating and disciplining a firm's top management. A large board may have a better control over the CEO, but may not be an effective one. For example, group decision making involving many parties typically induces coordination problems (Lipton and Lorsch, 1992). Yermack (1996) finds a negative link between the number of board members and firm performance in large US listed firms. On the other hand, a small board may not be able to monitor the CEOs properly. We control for this variable in both the board independence and firm performance equations. Given its potentially offsetting effects, we do not specify an *a priori* sign for it in either equation.

b. CEO Duality (DUAL)

Jensen (1993) suggests that an effective board should separate the chairman from the CEO position. Finkelstein and D'aveni (1994) also state that duality reduces board effectiveness and cultivates CEO entrenchment. Shareholders establish a CEO position to initiate and implement investments for their own interests. When a CEO also serves as the chairman of the board, the CEO can decrease the board's control over investment decisions. At the same time, if the CEO's interests do not align with those of the firm's shareholders, the valuation of the firm's shares should decline since the CEO is more likely to pursue consumption of perks at shareholders' cost.

c. Shareholder Rights (SHRRTS)

Firms with restricted shareholder rights are more prone to suffer severe agency problems and, in turn, low firm value (Jiraporn and Gleason, 2007). We use classes of shares to proxy for shareholder rights, and assume that shareholder rights are weak if a company has more than one class of shares. Firms with multiple classes of shares may employ stricter governance standards to compensate for agency costs induced by the weak shareholder rights. Alternatively, Switzer and Kelly (2006) suggest that board independence should be higher in firms with a single class of equity because the shareholder rights are better protected. Consequently, the impact of multiclass equity shares on governance mechanisms and firm performance could be mixed.

d. Lagged Performance (TOBINLAG)

The pecking order theory postulates that firms favor internal channels when investment opportunities desire additional funds. Past performance provides information about the availability of internal capital. Following Switzer and Kelly (2006), we anticipate that one-year lagged performance (TOBINLAG) has an inverse impact on the use of debt (DBVAL).

e. Firm Size (ASSET)

In larger organizations, complicated bureaucracy and hierarchy cause additional agency costs, and hence lower growth opportunities and Tobin's q. Therefore, in order to migrate the extra agency conflicts, corporate controls should be directly related to firm size, as measured by the logarithm of total assets (LOGASSET). Jensen (1986), for example, argues that mature firms should increase leverage as a means to monitor top management.

f. Stock Volatility (RISK)

The optimal use of governance mechanisms should migrate agency problems, but may also cause some direct or indirect costs. These costs should, in turn, have a negative impact on the choice of governance control level. For example, Agrawal and Knoeber (1996) suggest that reduced portfolio diversification due to large inside holdings may actually entail an additional risk bearing, thus forcing firms to reduce managerial ownership. Recent empirical work does not support this position, however (see e.g.

Brick et al., 2005). We still add stock volatility (RISK) as a measure of equity risk in each of the mechanism equations to control for this potential impact on our data sample.

g. Takeover Activity (PACQ)

Jensen (1986) introduces the free cash flow hypothesis, which links hostile takeover activities to agency costs and firm performance. According to this theory, agency problems arise and firm value declines, when managers invest excessive free cash flow in projects with negative NPV. Speculators may earn substantial returns through taking over and restructuring these undervalued firms. Top mangers will be more likely to pursue activities consistent with shareholder wealth maximization, the greater the threat of outside hostile takeovers. Thus, we expect the corporate takeover activities over the past five-year period (PACQ) to be positively related to firm performance and governance mechanisms.

h. R&D Expenses (RD) and Capital Expenditures (CPTL)

Growth opportunities are also included as a control variable. Higher growth requires more frequent external financing. In order to reduce the average cost of capital, firms may voluntarily choose to apply austere governance rules. Following Chung et al. (2003), we use R&D (RD) and capital investments (CPTL) as proxies for growth opportunities.

i. NYSE listing (NYSE)

Gilchrist et al. (2005) argue and document that the dispersion of investor beliefs induces bubbles in stock markets. The higher the level of dispersion is, the larger the bubbles are. Gilchrist et al. (2005) find that from 1990 to 2002 the mean of Tobin's q on the NYSE is significantly smaller than on the Nasdaq, in that the variance of earnings forecasts from analysts is lower on the NYSE in this period. Consequently, we add a dummy, NYSE, to control for the difference in firm valuation induced by market effects. We expect a negative effect of NYSE on Tobin's q.

j. Post-Sarbox Period (SOXLEY)

As a response to major corporate scandals, such as Enron and WorldCom, Sarbox was designed to enhance corporate governance standards and to regain public trust in accounting practices, fiduciary responsibility of managers, and financial markets in general. The implementation of Sarbox, however, is challenging, particularly for smaller firms, due to the extremely high cost of compliance. We add a dummy variable, SOXLEY, in every equation to differentiate periods before and after the passage of Sarbox. Sarbox is expected to have a positive impact on performance to the extent that the improved disclosure standards more than offset the higher costs of compliance.

k. Industry (IND)

We also control for industry effects using two-digit SIC codes as dummy variables. Collins et al. (1995) and Lippert and Moore (1995) document that industry factors lead to substantial variation in the use of corporate control mechanisms among companies.

III. Data Description

The data sample used in this paper comprises a balanced panel of 1,225 firm-year observations in fiscal years from 2000 to 2004. The initial sample is the S&P 600 Small Cap Index as of August 31, 2006. Accounting data and basic corporate information are obtained from Research Insight (COMPUSTAT). COMPUSTAT data are available for 289 firms over the entire 5-year period examined. Corporate governance data are collected from definitive proxy statements (DEF 14A) in EDGAR (SEC Filings and Forms). In addition, a small number of data are gathered from annual reports (10-K), when the proxy statements are incomplete or unavailable. The sample is further reduced to 277 firms. After that, stock market data and acquisition data are collected from CRSP and SDC, respectively. The final data sample contains 245 firms per year from 2000 to 2004.

Next, the calculations of all variables are introduced in detail. BINDA, the directors' tenure relative to the CEO, is the proportion of board members elected prior to the CEO. BINDB is the percentage of outsiders serving on the board. The chief executive officer is excluded in both BINDA and BINDB calculations. BSIZE, board size, is the

number of directors serving on the board. DBVAL is the long-term debt-to-total assets ratio. DUAL, CEO duality, is a dummy variable equal to 1 if the CEO also serves as the chairman of the board, and 0 otherwise. PAY is the CEO pay-performance sensitivity. Following Jensen and Murphy (1990), we obtain the sensitivity variable by regressing the change in CEO compensation on the change in shareholders' wealth for each sample firm over the period from 2000 to 2004. The coefficients of the change in stockholder wealth constitute the pay-performance sensitivity, PAY. The CEO compensation is the sum of salary, bonuses, and the value of stock options generated from the Black-Scholes pricing model. The shareholder wealth change is computed as the rate of return realized on the current year's common stock multiplied by the firm value at the previous fiscal year end. Both CEO pay and equity holders' wealth are adjusted for inflation. SHRRTS, Shareholder rights, is a dummy equal to 1 if the firm has one simple class of shares, and 0 otherwise. OWN, CEO ownership, is the fraction of a firm's outstanding stocks held by the CEO or close family members. TOBIN is approximated by the simple Tobin' q introduced by Chung and Pruitt (1994). ASSET represents the total assets at the fiscal year end. RISK is the monthly volatility of stock prices. PACQ, the frequency of acquisition activities in a firm's corresponding industry, is computed as the number of completed takeovers in a two-digit SIC industry over the past five years divided by the number of firms in that industry. RD is the fraction of research and development expenses to net sales, and CPTL is the ratio of capital expenditures over net sales. NYSE is a dummy variable equal to 1 if the firm is listed on the New York Stock Exchange, and

0 otherwise. SOXLEY is a dummy variable equal to 1 for fiscal years after the implementation of the Sarbanes-Oxley Act, and 0 otherwise. A dummy group from IND01 to IND80 is equal to 1 for each two-digit SIC industry, and 0 otherwise.

Table 1 displays descriptive statistics for each of the variables in our data sample. In Panel A, the median of BINDA illustrates that only one-fourth of the directors start to serve their firms earlier than their CEOs. This number suggests that most CEOs have a long tenure relative to the rest of the board, which may lead to a fairly sturdy control over their firms. On the other hand, another measure of board independence, BINDB shows that more than 85% of the board members are independent. The outsider-dominated boards are signs of strong board independence. The number of board members ranges from 4 to 15, and an average corporation would expect 7 or 8 directors represented on the board. This figure is the widely accepted number of directors in an effective board. The long-term debt-to-total assets ratio has a mean of 14.3%, and a median of 7.8% and, accordingly, the small-cap companies are not highly leveraged in our sample. One potential reason is that on average large firms can more easily obtain funds through corporate bonds and loans with lower rates. For approximately two-thirds of the sample firms, the CEOs also serve as the chairpersons of the boards. In these firms, CEOs are expected to have more power in enforcing their decisions. The mean of Jensen-Murphy pay sensitivity is 0.1108, showing that the market value of a company increases by $1,000,000 on average if the CEO's total compensation rises by $110,800. Only a small portion (8.6%) of the sample has more than one class of shares. The mean of CEO ownership is 7.61%, and the median is

2.67%. The extreme value of ownership is as high as 85.71%, which may exist only in small firms. The average Tobin's q is around 1.667, which means that the market value is 66.7% higher than the book value in a typical small firm examined in this study. On average, the publicly traded stocks of a firm fluctuate 16.7% in a month during the study period. The 5-year takeover activities in two-digit SIC industries vary from 5.98% to 300%, depending on the stability of the sectors. A takeover rate as high as 58% is common for an industry in a 5-year period. A representative sample firm invests 8.74% of the total sales in research and development, and 5.37% of the sales in capital expenditures. Approximately 42% of the sample companies are listed on the New York Stock Exchange.

Due to various returns and growth opportunities among industries, we also control for industry differences in this study. Panel B of Table 1 reports the components of each sector based on 8 SIC industry categories. Almost 90% of the sample firms are from manufacturing, retail trade, and services. The biggest division is manufacturing, in which 158 companies constitute 64.49% of the sample.

Table 2 presents the pairwise correlation coefficients among the variables used in this study. The correlation between BINDA and BINDB is a mild 0.1281, ostensibly suggesting no strong relationship between these two commonly used measures of board independence. An alternative explanation is that regulators and investors greatly encourage outsider participation on the boards, resulting in prevalent high outsider representation and low variation (Switzer and Kelly, 2006). We observe a fairly strong and negative link of leverage and Tobin's q, which suggests that the

shareholder-bondholder agency costs outweigh improved shareholder-manager agency conflicts when firms increase their leverage. The negative correlation between CEO ownership and board independence illustrates that CEOs' control over the board increases with their equity positions within the firm. Though we predict that board size has a mixed impact on firm value, the strong negative correlation seems to show that smaller boards of directors are more effective for the sample firms, consistent with Eisenberg et al. (1998). Another related observation is the divergence of the correlations between the number of directors and the two board independence variables. The findings appear to imply that, in order to impress the investors or to comply with modified requirements concerning larger outsider representation, some firms deliberately add independent directors without removing enough existing insiders, causing large and inefficient boards. In these firms, the longer directors' tenures relative to the CEO, the lower the probability that the existing inside directors are removed to maintain an effective board size. While most investors perceive CEO duality as a source of agency problems and regulators actively encourage delegation, firms with split chairman and CEO positions are not associated with higher performance in our study. This result seems to suggest that influential CEOs have their means to control the firms, whether or not they are chairmen of the boards. We find the expected inverse relationship between relative director tenure and CEO duality, which means that more seasoned CEOs have an increasing possibility of obtaining the chair positions. In addition, CEO equity ownership is directly related to CEO duality. CEOs may have large equity holdings and hence stronger influence, or

may enlarge their equity shares after acquiring more power. Debt financing is negatively related to past firm performance, consistent with the pecking order theory. Firm size is negatively associated with performance suggestive of growth opportunity differences and bureaucracy strains. The positive correlation between firm valuation and R&D/capital expense ratio may reflect the premium associated with growth opportunities. As correlation analysis considers only pairwise links, the results are not persuasive, thus calling for further regression analysis.

IV. Results

A. Ordinary Least Squares

In this section, we utilize OLS to estimate our model, and each equation is run twice with the two alternative board independence variables. Table 3 reports the OLS regression results. Similar to the results of the correlation analyses, BSIZE is positive and significant in the BINDA equation, and is negative and significant in the BINDB equation. This implies that CEOs are less seasoned than board members in larger boards, and outsider representation is higher in larger boards. Another significant variable in both equations is OWN. As expected, CEO ownership has an inverse impact on board independence. The finding shows that higher CEO equity holdings alleviate agency problems, and therefore high level of board independence may not be necessary. In the BINDA equation, DUAL is negative and significant showing that duality decreases directors' relative tenure dramatically. This suggests that a CEO/chairman prefer boards that are less independent and easier to control. However,

the reverse causality sounds more reasonable, i.e. that long tenure CEOs are more likely to acquire the chairman positions. Another significant finding is the positive impact of SHRRTS on BINDB. Contrary to the predictions of Jiraporn and Gleason (2007) that firms with worse shareholder voting rights rely more on CEO compensation as a control mechanism, our OLS model shows that outsiders dominate boards since the shareholder rights are better protected. Firm size is also positively related to outsider representation, showing that larger companies employ more stricter corporate governance standards to compensate for a higher level of bureaucracy and structural complexity.

The results are consistent in the two leverage equations with different board independence variables. TOBINLAG and PAY have a negative impact on DBVAL; on the other hand, SHRRTS, LOGASSET, and PACQ positively affect DBVAL. These results are mainly in accordance with our predictions. Weak lagged performance reduces available internal funds and therefore firms rely more on outside financing from the capital market. The negative relation between PAY and DBVAL demonstrates that firms reduce pay sensitivity to mitigate shareholder-bondholder agency conflicts. Firms with multi-class shares use less debt financing, since their restricted shareholder rights raise their cost of debt. Larger firm size tends to be associated with higher leverage, perhaps owing to greater collateral value effects. Finally, firms employ more debt in their capital structure to ward off takeover threats.

In the OWN equation, as expected, there is a negative relationship between board independence and CEO ownership. In order to consolidate their power, CEOs increase

their equity stakes in firms with boards that are less independent and easier to control. Second, CEO duality greatly magnifies the probability of larger CEO equity holdings, as CEOs might have more influence on the board, especially the compensation committees. However, the causality could be reversed; larger CEO ownership may lead to stronger control over the board which would permit CEOs to acquire the positions of both CEO and chairman. Finally, SHRRTS is inversely related to CEO equity holdings.

Similar to the results reported by Switzer and Kelly (2006) in their Canadian small cap sample, DBVAL has a negative and significant impact on CEO pay-performance sensitivity, suggesting that debt and managerial compensation are substitute governance mechanisms. When BINDB is used in the PAY equation, we find a positive and significant relation between outsider representation and pay-for-performance. On the other hand, when BINDA is employed, our model reports a negative but insignificant connection between the two. These results appear to show that outsiders are more concerned about their reputation, and therefore compel the firms to tighten the pay-performance sensitivity (Hermalin and Weisbach, 1998). Nevertheless, as directors stay longer on the board, they become less "independent" (Goodstein and Boeker, 1991).

In the performance equation, the findings are also consistent when we use two alternative board independence variables. Tobin's q is independent of both board structure variables. This finding, together with the fact that outsider representation is high in the entire sample, might imply that regulations concerning director

independence greatly change the board composition and induce low variance in related variables. That is, most firms are forced to share similar board structure, and therefore the low variation leads board independence to be seemingly irrelevant to firm performance. Among the four endogenous variables that we propose, the only significant variable demonstrates that DBVAL has a negative effect on TOBIN. This suggests that the actual costs from agency conflicts of debt overweigh the potential benefit from the improved agency problems of equity. Debt financing reduces firm value, since borrowing firms tend to ignore some valuable investment opportunities or even take on risky projects with negative expected returns (Parrino and Weisbach, 1999). In accordance with the finding of Eisenberg et al. (1998) and our correlation matrix analysis, the performance of companies with larger boards is inferior to their counterparts with smaller boards. We also find that R&D activities enhance Tobin's q, consistent with growth opportunity effects. The results demonstrate that the value of firms listed on the NYSE is actually lower than other firms in our sample, suggesting that the bubble impact introduced by Gilchrist et al. (2005) also exists in our sample. One interesting observation in the TOBIN equation is the positive coefficient on the SOXLEY dummy, which is significant at the 5% level. Consistent with some speculations[3], this demonstrates that firm performance improves in the post-Sarbox period. On the other hand, according to Giordano (2007), many small companies choose to delist from exchanges, due to the high compliance costs of Sarbox. This fact, together with the continual review of the S&P small cap index, might cause our

[3] See, for example, Jonathan Awner and Teddy Klinghoffer, "Sarbanes-Oxley can benefit small firms", *Daily Business Review*, August 30, 2005

sample to be biased by those small firms successfully adopting Sarbox.

As we mentioned, we argue that the causality relations in our model may not be fully captured in OLS equations, due to the existence of interactions among variables. The estimates of coefficients could be misleading, if variables just happen to move in the same or reverse direction without causality. In order to consider the simultaneous nature of our model, a 2SLS or 3SLS procedure may be necessary.

B. Two-Stage Least Squares

Before continuing with the 2SLS model, we firstly conduct a series of Hausman tests to confirm our assumption about a potential simultaneity bias in OLS regression models. Suppose we suspect that Variable X is endogenous in Variable Y's equation. The tests contain two stages: First, Variable X is regressed on all its determinants; Then, Variable Y is regressed on all the determinants of Y as well as the residual vector generated from X's equation. If the residual vector is significant at a 10% level, we regard Variable X as an endogenous variable in Y's equation. We perform Hausman tests on every pair of potential endogenous variables proposed. The results are presented in Table 4. Hausman tests verify the majority of the simultaneous relations among corporate governance mechanisms and firm performance. The few remaining pairs with no simultaneity equation bias are examined as endogenous variables in the estimation of the 2SLS model.

Table 5 shows the estimated coefficients and the corresponding p-values of the 2SLS model. In the board independence equations, the 2SLS model enlarges the difference

between the uses of two alternative independence measures. The inverse link between CEO ownership and board independence disappears, suggesting that this relation revealed in OLS is mainly due to the simultaneity bias. The negative impact of board size on outsider representation also becomes insignificant, which implies that these two variables occur in a reverse direction coincidently. Other connections persist, such as board size with directors' relative tenure, CEO duality with directors' relative tenure, and shareholder rights with percentage of outside directors served on the board.

In the leverage equation, the 2SLS estimates are generally consistent with the OLS results, except for pay-performance sensitivity. The negative impact of the sensitivity variable on debt financing in the OLS equation no longer exists in the 2SLS model, while the significance of shareholder rights, lagged Tobin's q, firm size, and industrial takeover activities remains.

CEO duality in the relative board tenure equation ceases to have an influence on CEO ownership in the 2SLS equation. Contrary to the OLS findings and our expectation, the percentage of outsiders is positively related to CEO ownership. The rest of the coefficients are similar to those in the OLS model.

As for the pay-for-performance equation, all significant relations we observed in our OLS estimation persist. In addition, we find two more determinants for CEO pay-performance sensitivity. In accordance with Switzer and Kelly's (2006) prediction, a higher level of shareholder rights induces greater alignment of the link between CEO compensation and firm performance. Our 2SLS model also provide evidence for

the expected direct relation between firm size and pay-performance sensitivity, because larger firms rely more on stricter governance mechanisms to reduce problems caused by complicated bureaucracy and hierarchy.

In the performance equation of the 2SLS model, we find that Jensen-Murphy pay-performance sensitivity becomes significantly and directly related to Tobin's q, suggesting that convergence of the CEO pay and performance maximizes shareholder wealth by increasing firm value. However, R&D expenditures stop to have a beneficial impact on Tobin's q when we consider simultaneity among variables. The results show that the 2SLS system also eliminates the difference of firm valuations arising from listing on alternative stock market or the passage of Sarbox.

Although the comparison of our OSL and 2SLS results provides an inspection of the variation of coefficients caused by endogeneities, a 3SLS system is necessary to take into account the reverse causality of the relations among corporate governance mechanisms and firm performance in a simultaneous framework.

C. Three-Stage Least Squares

Before continuing with the 3SLS model, we report the correlation matrix of 2SLS residuals in Table 6. Significant correlations between residuals suggest the use of 3SLS. The 3SLS results are shown in Table 7. When we consider possible reverse causality, most findings are consistent with the OLS and 2SLS results.

In addition to those variables that were significant in our 2SLS, CEO equity holdings are found to be positively related to relative board tenure in our 3SLS estimation. We

argue that board independence and CEO ownership are substitutes, because larger equity shares reduce the diversification of CEO wealth and only a higher level of control over the investment compensates for the loss of diversification. However, directors' relative tenure may not be a good proxy for board independence in some occasions. Though investors might be more confident of seasoned directors, Goodstein and Boeker (1991) state that independent outside directors tend to yield to CEOs' decisions with the increase of their tenure. This should actually be one reason why some directors serve their boards longer. We also find that shareholder rights have a beneficial impact on both measures of board independence, and that smaller firm size is always associated with longer relative board tenure.

The negative relation between pay-performance sensitivity and leverage is again significant in our 3SLS model, showing that firms purposely reduce the link of pay and performance to reduce the cost of debt when they are highly leveraged. Unlike in 2SLS model, takeover activities no longer have an impact on the use of debt. Our results also show that firms use less debt financing in the post-Sarbox period. As shown in the 2SLS model, high leverage is a value-destroying strategy for our sample of small-cap companies. After the passage of the Sarbanes-Oxley Act, firms seem to significantly reduce debt financing to improve firm performance and to pay off the huge compliance costs.

The estimated 3SLS coefficients of the CEO ownership equation are similar to those of the 2SLS model, but the relative board tenure loses its marginally significant impact on CEO equity holdings.

In the pay-related incentives equation, most variables lose their significance. When using directors' relative tenure as a measure of board independence, we find that only the influence of shareholder voting rights persists. If we employ outsider representation as a measure of board independence, the only remaining significant variable is the percentage of outside directors.

As expected, we find that board independence and pay-performance sensitivity are directly associated with higher Tobin's q. Similar to the 2SLS results, another mechanism, leverage, still negatively affects firm value. In our sample and according to our 3SLS model, larger boards are relatively inefficient. We also find the expected inverse relation between CEO duality and firm performance, which suggests that CEOs should not serve in the chairperson position if firms attempt to maximize company value. Finally, the R&D-expenses-to-total-sales ratio, a measure of growth opportunities, is again positively related to firm valuation.

To summarize, we observe most of the expected relationships in our model, such as the negative link between pay related incentives and debt financing and the connections between board independence, leverage, pay-performance sensitivity, and Tobin's q. However, some findings are surprising, such as the positive impact of outsider representation on CEO ownership. Therefore, we continue with two tests to analyze the robustness of our model.

D. Robustness Tests

a. Heckman (1979) Two-step Correction for Self-selection Bias

Doidge et al. (2004) consider and examine the potential self-selection bias when analyzing the cross-listing premium. We argue that the selection of listing on NYSE might be biased as well. Following Doidge et al. (2004), we utilize a Heckman selection model to evaluate the bias. Given by

$$NYSE^* = \delta_0 + \delta_1(board\ independence) + \delta_2(CEO\ ownership) + \delta_3(board\ size)$$
$$+\delta_4(CEO\ duality) + \delta_5(shareholder\ rights) + \delta_6(firm\ size)$$
$$+\delta_7(stock\ volatility) + \delta_8(takeover\ activities) + \upsilon\ ,$$

a firm's decision to list on NYSE is

$NYSE = 1$ if $NYSE^* > 0$, and $NYSE = 0$ if $NYSE^* < 0$.

First, we employ a probit model to estimate the $NYSE^*$ equation. Then, lambda is computed as $\lambda = \theta_1(\widehat{NYSE^*})(NYSE) + \theta_2(\widehat{NYSE^*})(1 - NYSE)$, where θ_1, the inverse Mill's ratio, is calculated as $\theta_1 = DN(\widehat{NYSE^*}) / CN(\widehat{NYSE^*})$, and θ_2 is calculated as $\theta_2 = -DN(\widehat{NYSE^*}) / \left[1 - CN(\widehat{NYSE^*})\right]$. $DN(\cdot)$ is the standard normal density function, and $CN(\cdot)$ is the standard normal cumulative distribution function. Finally, we regress Tobin's q on all its determinants as well as lambda.

Table 8 reports the results of the Heckman correction for our possible selection bias. The probit model suggests that the decision of listing on the NYSE is considerably influenced by board size, shareholder voting rights, firm size, performance volatility, and industrial takeover activities. According to the results of the estimation of the Heckman selection model, strong NYSE listing biases exist in our sample of small

firms.

As suggested by the Heckman test, our basic model may be inaccurate for our sample, due to the endogenous decision of listing on the NYSE. In order to correct the self-selection bias in our model, we use the fitted NYSE choice generated in the Heckman model rather than the real listing variable in the firm performance equation. We present the estimates of the adjusted 3SLS system in Table 9. The estimates of the BINDA equation are similar to those in the basic 3SLS model. The CEO equity ownership and board's relative tenure remain positively related. Larger boards and better shareholder voting rights are associated with longer director tenure. Board tenure is longer if the CEO is also the chairman. On the other hand, an interesting finding is that the significant determinants of directors' tenure have exactly the opposite influence on outsider representation. The analysis of independent directors provides evidence to support the substitution hypothesis. In the BINDB equation, we find the expected substitutional link between CEO ownership and outside board representation. Consistent with the bivariate condition and the OLS estimate, outsiders are less represented in larger boards, which implies that firms with large boards have more severe Sarbox compliance problems with the baseline of the regulations concerning independent directors. If the CEO also serves as the chairperson or the shareholder voting rights are restricted, agency problems are believed to be more severe. Firms need a higher percentage of independent directors to control the potential agency conflicts. Our empirical results support this prediction. Both of our board independence variables yield the same conclusion regarding the

relations between pay related incentives, shareholder rights, lagged Tobin's q, firm size, takeover activities, the passage of Sarbox, and leverage. We find that the alignment of the interests between owners and managers reduces the use of debt as a source of financing, which is consistent with John and John (1993). Although we argue that multiclass shares may have a mixed link with debt financing, the results show that firms rely more on the monitoring from capital markets when shareholder voting rights are well protected. As expected, firms are forced to use more debt financing, due to poor past performance, larger firm size, higher industrial takeover frequency, and pre-Sarbox period. Finally, we see higher leverage in firms in which independent directors dominate the board. This finding seems to imply that boards with high outsider representation improve the creditors' willingness to lend funds.

In accordance with our expectation, CEO equity holdings are higher when the CEO also serves as chairman. Ownership and control power are self-reinforcing. When the board of directors is highly independent, shareholders reduce the use of CEO ownership as a means of incentive. Our results support the hypothesis that firms increase CEO ownership to compensate for the restricted stockholder voting rights, since larger CEO holdings mitigate owner-manager agency costs. The adjusted 3SLS model also demonstrates that the logarithm of firm assets is positively related to shares owned by CEOs, showing that complicated organizations require more strict governance mechanisms to remain competitive.

The pay-for-performance equation is still disappointing. If we measure the level of board independence using directors' tenure relative to CEO, only voting rights are

positively related to pay-performance sensitivity. If the alternative independence proxy is employed, the percentage of outside directors, leverage, and firm size are determinants of pay related incentives.

The negative impact of debt financing on Tobin's q is negative and significant in every model, including the 3SLS model adjusted for the NYSE listing bias. The result implies that the use of debt is truly costly for our sample of small-cap firms. Firms that operate with higher leverage tend to underperform less leveraged companies. As suggested by the literature (Mashra and Nielson, 2000) and experience, the convergence of shareholder wealth and CEO compensation improves firm performance by alleviating agency problems. However, the board independence loses its significant impact on Tobin's q. Our model also documents that corporate performance is consistently independent of CEO equity holdings, which is similar to the findings of Demsetz and Villalonga (2001). This may suggest that ordinary transactions in the stock market ensure the optimization of ownership structures. The negative relationship between board size and Tobin's q might imply the inability or disinclination of some CEOs to remove inside directors when laws and regulations force public corporations to increase outsider representation. In order to comply with Sarbox, some CEOs have to greatly increase outsiders on the board to dilute the percentage of insiders, which result in large and inefficient boards. Our study also provides some evidence of CEOs' weak control over the nomination of the board and firms' difficulty to meet the base line on larger boards, as we find that a greater number of directors is always associated with directors' longer relative tenure and a

lower percentage of outsiders, respectively. Consistent with Finkelstein and D'aveni (1994), our model demonstrates that CEO duality provides an incentive for CEOs to pursue their own interests and hence reduce firm value, when board independence is measured by directors' tenure relative to CEOs'. There is a weak link between capital expenditures and firm value, suggesting that growth opportunities are a determinant of performance. We also find a downward valuation effect of listing on the NYSE, which is similar to Gilchrist et al. (2005). As in our OLS and 2SLS models, our examined firms significantly improve their performance after the passage of Sarbox, contrary to the prediction of a huge burden that arises from compliance costs. One reason is that the benefits of improved transparency outweigh its costs.

b. Robustness tests with financial firms excluded

Agrawal and Knoeber (1996) suggest that financial firms are not comparable to other firms in terms of Tobin's q, owing to the distorted relation between equity and assets. Following Agrawal and Knoeber (1996) and Switzer and Kelly (2006), we exclude financial firms (defined as SIC codes starting with H) and examine each of the models again.

The results of our robustness tests are shown in Tables 10 to 18. We find that the test results are largely unchanged. Our sample now consists of 233 companies with 1165 year-firm observations, after excluding 12 financial institutions. Sample statistics are generally the same. For example, the mean of total assets is reduced by less than 5%.

In OLS equations, we find an additional connection that larger firms seem to deliberately reduce pay-performance sensitivity, because loose alignment of the interests of owners and managers reduces debt costs by mitigating agency costs between bondholders and shareholders. This is especially important for larger firms, due to the fact that they are more dependent on debt financing. In addition, for the non-financial firm subsample, pay related incentives are positively linked to firm performance in the Tobin's q equation.

Similar to the previous tests, the Hausman tests for the subsample demonstrate the existence of most predicted endogeneities. Non-simultaneous variables are also treated as exogenous in the 2SLS and 3SLS models.

The exclusion of financial firms has almost no impact on the 2SLS model, except that firm size loses its significant influence on Jensen-Murphy pay-performance sensitivity.

In the 3SLS model, board size becomes an additional determinant of outsider representation. Shareholder rights no longer affect the link between CEO pay and firm valuation. If outsider board representation proxies for board independence, our model reports the hypothesized positive relation between CEO equity holdings and firm performance, while the marginal impact of R&D expenses on the value of a firm is transferred to another measure of growth opportunities, capital expenditure.

The Heckman tests confirm the NYSE listing bias when we do not include financial firms in our study. In the 3SLS system that is adjusted for this listing bias, the relationship between firm size and outsider representation becomes significant. The

link between shareholder voting rights and pay related incentives is no longer significant. Finally, board size and CEO duality do not have a significant relation with firm valuation in the Tobin's q equation of the adjusted 3SLS.

V. Conclusion

Much of the previous literature on the relationship between one or more corporate governance mechanisms and firm performance ignores the simultaneous nature of the governance structure. In addition, most studies are limited to only a small group of the governance mechanisms. This study extends the literature by looking at the link between corporate governance and firm value, using a wide range of interrelated mechanisms concluded from various studies, taking into account the potential for a simultaneous equation bias. In addition, our paper provides new evidence for a large sample of US small cap firms.

The models document interactions among endogenous governance mechanisms. CEO ownership is a determinant of both board independence variables but with opposite directions. Board independence has an influence on each of the remaining endogenous variables. We also find a weak substitutional relation between pay-performance sensitivity and firm leverage.

Regarding the link between endogenous governance mechanisms and firm performance, leverage has a stable and negative impact on Tobin's q, suggesting that some firms rely too much on debt financing. We also find that monetary incentives provided to the CEO consistently increase firm valuation. After we adjust the NYSE

listing variable for listing bias, the marginally significant relation between board independence variables and performance disappears. According to our results, CEO ownership is generally unrelated to firm value.

We also quantify the influence of the passage of Sarbox on firm value, since it is believed that the high compliance costs are unattainable, especially for small companies. Our results suggest that the long-term valuation is actually higher in the post-Sarbox period, which is contrary to the instantaneous effect documented by Chhaochharia and Grinstein (2007). According to the results of our 3SLS model that is adjusted for a potential listing bias, compliance with Sarbox leads to a return of around 15% or $60 million on average. We argue that investors value the benefits from the implementation of Sarbox over the costs (Switzer and Kelly, 2006). An alternative explanation is that our sample may be biased, due to the fact that less successful corporations are delisted (Giordano, 2007).

Another important result is that firm value declines when board size increases. We suspect that this may be connected with another finding. The number of board members is found to be positively related to relative board tenure and to be negatively related to the percentage of outside directors. When regulations require firms to meet new outsider representation standards, some CEOs with restricted powers (as shown by the long directors' relative tenure) are not able to remove inside directors. In order to reach the baseline, these CEOs have to significantly increase outside directors, resulting in large and inefficient boards.

Our study provides an overall insight of the governance-performance link in a sample

of US small-cap firms. Future research may be needed to control the potential non-linear characteristic of CEO ownership, since Morck et al. (1988) and some other researchers find that the relationship between managerial ownership and Tobin's q is not linear. The inclusion of institutional holdings, block holdings, and family holdings should also help shed light on the link between the ownership of different parties and firm performance for small firms. This modification may also help confirm the validity of Demsetz and Villalonga's (2001) work which demonstrates that transactions in the stock market guarantee efficient ownership structures. Finally, analyzing the influence of Sarbox on a small-cap index collected during the pre-Sarbox period may be necessary to account for the possible impact of delisting.

References

Agrawal, Anup and Charles R. Knoeber, 1996. Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders, *Journal of Financial and Quantitative Analysis*, Vol. 31, Iss. 3, pp. 377-397.

Anderson, Urton, Kathryn Kadous, and Lisa Koonce, 2004. The Role of Incentives to Manage Earnings and Quantification in Auditors' Evaluations of Management-Provided Information, *Auditing*, Vol. 23, Iss. 1, pp. 11-27.

Ang, James S., 1991. Debt, Lock-in Assets and Corporate Restructuring, *Managerial and Decision Economics*, Vol. 12, Iss. 6, pp. 473-480.

Ang, James S., Rebel A. Cole, and James Wuh Lin, 2000. Agency Costs and Ownership Structure, *The Journal of Finance*, Vol. 55, Iss. 1, pp. 81-106.

Banz, Rolf W., 1981. The Relationship Between Return and Market Value of Common Stocks, *Journal of Financial Economics*, Vol. 9, Iss. 1, pp. 3-18.

Barnhart, Scott W. and Stuart Rosenstein, 1998. Board Composition, Managerial Ownership, and Firm Performance: An Empirical Analysis, *The Financial Review*, Vol. 33, Iss. 4, p. 1-16.

Bathala, Chenchuramaiah T., Kenneth P. Moon, and Ramesh P. Rao, 1994. Managerial Ownership, Debt Policy, and the Impact of Institutional Holdings: An Agency Perspective, *Financial Management*, Vol. 23, Iss. 3, pp. 38-50.

Beiner, Stefan, Wolfgang Drobetz, Markus M. Schmid, and Heinz Zimmermann, 2006. An Integrated Framework of Corporate Governance and Firm Valuation, *European Financial Management*, Vol. 12, Iss. 2, pp. 249-284.

Berger, Allen N. and Emilia Bonaccorsi di Patti, 2006. Capital Structure and Firm Performance: A New Approach to Testing Agency Theory and an Application to the Banking Industry, *Journal of Banking and Finance*, Vol. 30, Iss. 4, pp. 1065-1102.

Boeker, Warren and Jerry Goodstein, 1991. Organizational Performance and Adaptation: Effects of Environment and Performance on Changes in Board Composition, *Academy of Management Journal*, Vol. 34, Iss. 4, pp. 805-826.

Boyd, Brian K., 1994. Board Control and CEO Compensation, *Strategic Management Journal*, Vol. 15, Iss. 5, pp. 335-344.

Brick, Ivan E., Darius Palia, and Chia-Jane Wang, 2005. Simultaneous Estimation of CEO Compensation, Leverage, and Board Characteristics on Firm Value, *Working*

Paper, Rutgers Business School.

Chhaochharia, Vidhi and Yaniv Grinstein, 2007. Corporate Governance and Firm Value: The Impact of the 2002 Governance Rules, *Working Paper, Cornell University.*

Chung, Kee H. and Stephen W. Pruitt, 1994. A Simple Approximation of Tobin's q, *Financial Management*, Vol. 23, Iss. 3, pp. 70-74.

Chung, Kee H. and Stephen W. Pruitt, 1996. Executive Ownership, Corporate Value, and Executive Compensation: A Unifying Framework, *Journal of Banking and Finance*, Vol. 20, Iss. 7, pp. 1135-1159.

Chung, Kee H., Peter Wright, and Ben Kedia, 2003. Corporate Governance and Market Valuation of Capital and R&D Investments, *Review of Financial Economics*, Vol. 12, Iss. 2, pp. 161-172.

Collins, Pete, 1995. Growth Companies Setting New Limits, *The Journal of Business Strategy*, Vol. 16, Iss. 6, pp. 24-25.

Coughlan, Anne T. and Ronald M. Schmidt, 1985. Executive Compensation, Management Turnover, and Firm Performance: An Empirical Investigation, *Journal of Accounting and Economics*, Vol. 7, Iss. 1-3, pp. 43-66.

Demsetz, Harold and Belen Villalonga, 2001. Ownership Structure and Corporate Performance, *Journal of Corporate Finance*, Vol. 7, Iss. 3, pp. 209-233.

Doidge, Craig, G. Andrew Karolyi, and Rene M. Stulz, 2004. Why Are Foreign Firms Listed in the U.S. Worth More? *Journal of Financial Economics*, Vol. 71, Iss. 2, pp. 205-238.

Dwivedi, Neeraj and Arun Kumar Jain, 2005. Corporate Governance and Performance of Indian Firms: The Effect of Board Size and Ownership, *Employee Responsibilities and Rights Journal*, Vol. 17, Iss. 3, pp. 161-172.

Eisenberg, Theodore, Stefan Sundgren, and Martin T. Wells, 1998. Larger Board Size and Decreasing Firm Value in Small Firms, *Journal of Financial Economics*, Vol. 48, Iss. 1, pp. 35-64.

Fama, Eugene F. and Kenneth R. French, 1993. Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics*, Vol. 33, Iss. 1, pp. 3-56.

Fama, Eugene F. and Michael C. Jensen, 1983. Agency Problems and Residual Claims, *Journal of Law and Economics*, Vol. 26, Iss. 2, pp. 327-349.

Finkelstein, Sydney and Richard A. D'Aveni, 1994. CEO Duality as a Double-Edged Sword: How Boards of Directors Balance Entrenchment Avoidance and Unity of Command, *Academy of Management Journal*, Vol. 37, Iss. 5, pp. 1079-1108.

Fizel, John L. and Kenneth KT Louie. CEO Retention, Firm Performance and Corporate Governance, *Managerial and Decision Economics*, Vol. 11, Iss. 3, pp. 167-176.

Garvey, Gerald T., 1997. Marketable Incentive Contracts and Capital Structure Relevance, *The Journal of Finance*, Vol. 52, Iss. 1, p. 353-378.

Ghosh, Chinmoy and C. F. Sirmans, 2003. Board Independence, Ownership Structure and Performance: Evidence from Real Estate Investment Trusts, *Journal of Real Estate Finance and Economics*, Vol. 26, Iss. 2/3, pp. 287-318.

Gilchrist, Simon, Charles P. Himmelberg, and Gur Huberman, 2005. Do Stock Prices Bubbles Influence Corporate Investment? *Journal of Monetary Economics*, Vol. 52, Iss. 4, pp. 805-828.

Giordano, Ronald E., 2007. Enabling Efficient Small and Midcap Sarbanes-Oxley §404 Compliance -- Check the (Sar)Box, *International Journal of Disclosure and Governance*, Vol. 4, Iss. 1, pp. 42-51.

Grossman, Sanford J. and Oliver D. Hart, 1983. An Analysis of the Principal-agent Problem, *Econometrica*, Vol. 51, Iss. 1, pp. 7-45.

Hall, Brian J. and Jeffrey B. Liebman, 1998. Are CEOs Really Paid Like Bureaucrats? *The Quarterly Journal of Economics*, Vol. 113, Iss. 3, pp. 653-691.

Harris, Milton and Arthur Raviv, 1978. Some Results on Incentive Contracts with Applications to Education and Employment, Health Insurance, and Law Enforcement, *The American Economic Review*, Vol. 68, Iss. 1, pp. 20-30.

Hausman, Jerry A., 1978. Specification Tests in Econometrics, *Econometrica*, Vol. 46, Iss. 6, pp. 1251-1271.

Heckman, James J., 1979. Sample Selection Bias as a Specification Error, *Econometrica*, Vol. 47, Iss. 1, pp. 153-161.

Hermalin, Benjamin E. and Michael S. Weisbach, 1988. The Determinants of Board Composition, *The Rand Journal of Economics*, Vol. 19, Iss. 4, pp. 589-606.

Hossain, Mahmud, Steven F. Cahan, and Michael B. Adams, 2000. The Investment Opportunity Set and the Voluntary Use of Outside Directors: New Zealand Evidence,

Accounting and Business Research, Vol. 30, Iss. 4, pp. 263-273.

Houge, Todd and Tim Loughran, 2006. Do Investors Capture the Value Premium? *Financial Management*, Vol. 35, Iss. 2, pp. 5-19.

Hovakimian, Armen, Gayane Hovakimian, and Hassan Tehranian, 2004. Determinants of Target Capital Structure: The Case of Dual Debt and Equity Issues, *Journal of Financial Economics*, Vol. 71, Iss. 3, pp. 517-540.

Jensen, Gerald R., Donald P. Solberg, and Thomas S. Zorn, 1992. Simultaneous Determination of Insider Ownership, Debt, and Dividend Policies, *Journal of Financial and Quantitative Analysis*, Vol. 27, Iss. 2, pp. 247-263.

Jensen, Michael C., 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers, *The American Economic Review*, Vol. 76, Iss. 2, pp. 323-329.

Jensen, Michael C., 1993. The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems, *The Journal of Finance*, Vol. 48, Iss. 3, pp. 831-880.

Jensen, Michael C. and William H. Meckling, 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, Vol. 3, Iss. 4, pp. 305-360.

Jensen, Michael C., and Kevin J. Murphy, 1990. Performance Pay and Top-Management Incentives, *The Journal of Political Economy*, Vol. 98, Iss. 2, pp. 225-264.

Jiraporn, Pornsit and Kimberly C. Gleason, 2007. Capital Structure, Shareholder Rights, and Corporate Governance, *The Journal of Financial Research*, Vol. 30, Iss. 1, pp. 21-34.

John, Teresa A. and Kose John, 1993. Top-Management Compensation and Capital Structure, *The Journal of Finance*, Vol. 48, Iss. 3, pp. 949-974.

Lasfer, M. Ameziane, 2006. The Interrelationship Between Managerial Ownership and Board Structure, *Journal of Business Finance and Accounting*, Vol. 33, Iss. 7/8, pp. 1006-1033.

Lippert, Robert L. and William T. Moore, 1995. Monitoring versus Bonding: Shareholder Rights and Management Compensation, *Financial Management*, Vol. 24, Iss. 3, pp. 54-62.

Lipton, Martin and Jay W. Lorsch, 1992 A Modest Proposal for Improved Corporate Governance, *The Business Lawyer*, Vol. 48, Iss. 1, pp. 59 –77.

Majumdar, Sumit K. and Pradeep Chhibber, 1999. Capital Structure and Performance: Evidence from a Transition Economy on an Aspect of Corporate Governance, *Public Choice*, Vol. 98, Iss. 3/4, pp. 287-305.

Miller, Merton H. and Franco Modigliani, 1958. The Cost of Capital, Corporation Finance, and the Theory of Investment, *American Economic Review,* Vol 48, Iss. 1, pp. 261–297.

Mishra, Chandra S. and James F. Nielsen, 2000. Board Independence and Compensation Policies in Large Bank Holding Companies, *Financial Management*, Vol. 29, Iss. 3, pp. 51-69.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1988. Management Ownership and Market Valuation: An Empirical Analysis, *Journal of Financial Economics*, Vol. 20, Iss. 1/2, pp. 293-315.

Moyer, R. Charles, Ramesh P. Rao, and Phillip M. Sisneros, 1992. Substitutes for Voting Rights: Evidence from Dual Class Recapitalizations, *Financial Management*, Vol. 21, Iss. 3, pp. 35-47.

Myers, Stewart C., 1977. Determinants of Corporate Borrowing, *Journal of Financial Economics*, Vol. 4, Iss. 1, pp. 147-176.

Ortiz-Molina, Hernan, 2007. Executive Compensation and Capital Structure: The Effects of Convertible Debt and Straight Debt on CEO Pay, *Journal of Accounting and Economics*, Vol. 43, Iss. 1, pp. 69-94.

Parrino, Robert and Michael S. Weisbach, 1999. Measuring Investment Distortions Arising from Stockholder-Bondholder Conflicts, *Journal of Financial Economics*, Vol. 53, Iss. 1, pp. 3-42.

Prevost, Andrew K., Ramesh P. Rao, and Mahmud Hossain, 2002. Board Composition in New Zealand: An agency Perspective, *Journal of Business Finance and Accounting*, Vol. 29, Iss. 5/6, pp. 731-760.

Rechner, Paula L. and Dalton, Dan R., 1991. CEO Duality and Organizational Performance: A Longitudinal Analysis, *Strategic Management Journal*, Vol. 12, Iss. 2, pp. 155-160.

Renneboog, Luc, 2000. Ownership, Managerial Control and the Governance of Companies Listed on the Brussels Stock Exchange, *Journal of Banking and Finance*, Vol. 24, Iss. 12, pp. 1959-1996.

Sierra, Gregory E., Eli Talmor, and James S. Wallace, 2006. An Examination of Multiple Governance Forces within Bank Holding Companies, *Journal of Financial Services Research*, Vol. 29, Iss. 2, p. 105-123.

Singh, Harbir and Farid Harianto, 1989. Management-Board Relationships, Takeover Risk, And The Adopt, *Academy of Management Journal*, Vol. 32, Iss. 1, pp. 7-24.

Switzer, Lorne N. and Catherine Kelly, 2006. Corporate Governance Mechanisms and the Performance of Small-Cap Firms in Canada, *International Journal of Business Governance and Ethics*, Vol. 2, Iss. 3/4, pp. 294-328.

Tosi, Henry L., Jr. and Luis R. Gomez-Mejia, 1989. The Decoupling of CEO Pay and Performance: An Agency Theory, *Administrative Science Quarterly*, Vol. 34, Iss. 2, pp. 169-190.

Wagner, John A., III, J. L. Stimpert, and Edward I. Fubara, 1998. Board Composition and Organizational Performance: Two Studies of Insider/Outsider Effects, *The Journal of Management Studies*, Vol. 35, Iss. 5, pp. 655-677.

Weber, Marsha and Donna Dudney, 2003. A Reduced form Coefficients Analysis of Executive Ownership, Corporate Value, and Executive Compensation, *The Financial Review*, Vol. 38, Iss. 3, pp. 399-434.

Westphal, James D., 1998. Board Games: How CEOs Adapt to Increases in Structural Board Independence from Management, *Administrative Science Quarterly*, Vol. 43, Iss. 3, pp. 511-537.

Westphal, James D. and Edward J. Zajac, 1995. Who Shall Govern? CEO/board Power, Demographic Similarity, and New Director Selection, *Administrative Science Quarterly*, Vol. 40, Iss. 1, pp. 60-83.

Wright, Peter and Mark Kroll, 2002. Executive Discretion and Corporate Performance as Determinants of CEO Compensation, Contingent on External Monitoring Activities, *Journal of Management and Governance*, Vol. 6, Iss. 3, pp. 189-214.

Yermack, David, 1996. Higher Market Valuation of Companies with a Small Board of Directors, *Journal of Financial Economics*, Vol. 40, Iss. 1, pp. 185-211.

Table 1: Data Description

Panel A

	Mean	*Median*	*Maximum*	*Minimum*	*Std. Dev.*
BINDA	0.3351	0.2500	1.0000	0.0000	0.3472
BINDB	0.8615	0.8571	1.0000	0.3333	0.1424
BSIZE	7.5878	7.0000	15.000	4.0000	1.7943
DBVAL	0.1431	0.0781	0.8751	0.0000	0.1640
DUAL	0.6490	1.0000	1.0000	0.0000	0.4775
PAY	0.1108	0.0689	1.5449	-1.3992	0.3260
SHRRTS	0.0857	0.0000	1.0000	0.0000	0.2801
OWN	0.0761	0.0267	0.8571	0.0000	0.1433
TOBIN	1.6676	1.2704	14.851	0.0974	1.4943
ASSET (million $)	496.13	367.77	2901.6	6.5990	431.42
RISK	0.1674	0.1496	1.2978	0.0429	0.1042
PACQ	0.5803	0.5370	3.0000	0.0598	0.2757
RD	0.0874	0.0309	5.6816	0.0000	0.2494
CPTL	0.0537	0.0339	2.0153	0.0000	0.0901
NYSE	0.4204	0.0000	1.0000	0.0000	0.4938
Total observations					1225

Panel B

Industry	*Description*	*No. of Firms*	*Percentage*	*Industry*	*Description*	*No. of Firms*	*Percentage*
Division A	Agriculture	1	0.41%	Division E	Transportation and Communications	1	0.41%
IND01		1	0.41%				
Division B	Mining	2	0.82%	IND48		1	0.41%
IND14		2	0.82%	Division F	Wholesale Trade	9	3.67%
Division D	Manufacturing	158	64.49%	IND50		5	2.04%
IND20		1	0.41%	IND51		4	1.63%
IND23		1	0.41%	Division G	Retail Trade	33	13.47%
IND25		2	0.82%	IND52		1	0.41%
IND26		5	2.04%	IND53		2	0.82%
IND27		1	0.41%	IND55		3	1.22%
IND28		20	8.16%	IND56		8	3.27%
IND29		1	0.41%	IND57		3	1.22%
IND30		2	0.82%	IND58		10	4.08%
IND31		2	0.82%	IND59		6	2.45%
IND32		1	0.41%	Division H	Finance, Insurance, And Real Estate	12	4.90%
IND33		4	1.63%				
IND34		7	2.86%	IND62		2	0.82%
IND35		21	8.57%	IND67		10	4.08%
IND36		37	15.10%	Division I	Services	29	11.84%
IND37		12	4.90%	IND73		22	8.98%
IND38		36	14.69%	IND80		6	2.45%
IND39		5	2.04%	IND87		1	0.41%
Sum						**245**	**100.00%**

Table 2: Correlation Coefficient Matrix

	BINDA	*BINDB*	*DBVAL*	*OWN*	*PAY*	*TOBIN*	*BSIZE*	*DUAL*	*SHRRTS*	*ASSET*	*RISK*	*PACQ*	*RD*	*CPTL*	*NYSE*	*SOXLEY*
BINDA	1															
BINDB	0.1281[a]	1														
DBVAL	-0.0435	0.0326	1													
OWN	-0.1086[a]	-0.2173[a]	-0.0521[c]	1												
PAY	-0.0262	0.0781[a]	0.0648[b]	-0.0075	1											
TOBIN	-0.0124	0.0240	-0.4006[a]	0.0331	0.0370	1										
BSIZE	0.1541[a]	-0.1093[a]	0.2559[a]	-0.0629[b]	-0.0707[b]	-0.3071[a]	1									
DUAL	-0.4510[a]	0.0007	-0.0636[b]	0.1626[a]	0.0799[a]	0.0235	-0.0851[a]	1								
SHRRTS	0.0608	0.1733[a]	-0.0212	-0.1159[a]	0.0017	0.0614[b]	-0.1289[a]	-0.0663[b]	1							
LOGASSET	-0.0308	-0.0500[c]	0.5299[a]	-0.0411	0.0204	-0.5201[a]	0.4378[a]	-0.0060	-0.1241[a]	1						
RISK	0.0094	0.0845[a]	-0.1616[a]	0.0159	-0.0289	0.1798[a]	-0.1687[a]	0.0600[b]	0.0575[b]	-0.2691[a]	1					
PACQ	-0.0248	-0.0483[c]	-0.0772[a]	0.0145	0.0301	0.0386	-0.0573[b]	-0.0181	-0.0071	-0.1690[a]	-0.0294	1				
RD	-0.0171	0.0673[b]	-0.0367	-0.0162	0.0497[c]	0.1174[a]	-0.0230	0.0412	0.0677[b]	-0.1348[a]	0.2795[a]	-0.0293	1			
CPTL	-0.0359	0.0129	-0.0093	-0.0208	0.0144	0.0803[a]	0.0214	-0.0157	0.0174	-0.0583[b]	0.1229[a]	0.0682[b]	0.6183[a]	1		
NYSE	0.0593[b]	-0.0831[a]	0.3299[a]	-0.0246	-0.0239	-0.2774[a]	0.3645[a]	-0.0528[c]	-0.1527[a]	0.4622[a]	-0.2851[a]	-0.1925[a]	-0.2139[a]	-0.1188[a]	1	
SOXLEY	-0.0025	0.0488[c]	-0.0336	-0.0296	0.0000	0.0540[c]	0.0669[b]	0.0000	0.0000	0.1341[a]	0.0000	-0.4464[a]	-0.0404	-0.0848[a]	0.0000	1

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 3: Results from OLS Regressions

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	0.1877	0.9317	-0.3065	-0.3207	0.0805	0.2388	-0.0087	-0.2605	3.1787	3.2190
	0.2415	0.0000[a]	0.0000[a]	0.0000[a]	0.2618	0.0015[a]	0.9579	0.1343	0.0000[a]	0.0000[a]
BIND			0.0040	0.0155	-0.0379	-0.1899	-0.0116	0.2786	0.0130	-0.0408
			0.7019	0.5534	0.0031[a]	0.0000[a]	0.6556	0.0000[a]	0.9169	0.8836
DBVAL							-0.2347	-0.2240	-2.9299	-2.9310
							0.0012[a]	0.0019[a]	0.0000[a]	0.0000[a]
OWN	-0.1755	-0.1996							0.1188	0.1094
	0.0069[a]	0.0000[a]							0.6594	0.6913
PAY			-0.0405	-0.0396					0.1826	0.1840
			0.0004[a]	0.0006[a]					0.1195	0.1171
BSIZE	0.0323	-0.0099							-0.1643	-0.1642
	0.0000[a]	0.0001[a]							0.0000[a]	0.0000[a]
DUAL	-0.3193	0.0042			0.0271	0.0399			-0.0700	-0.0738
	0.0000[a]	0.6139			0.0038[a]	0.0000[a]			0.4388	0.3623
SHRRTS	0.0366	0.0602	0.0226	0.0218	-0.0471	-0.0341	0.0405	0.0188	0.0654	0.0688
	0.2769	0.0001[a]	0.0979[c]	0.0936[c]	0.0017[a]	0.0224[b]	0.2360	0.5835	0.6370	0.6221
TOBINLAG			-0.0081	-0.0081						
			0.0000[a]	0.0000[a]						
LOGASSET	-0.0229	0.0319	0.1706	0.1704	0.0042	0.0064	-0.0436	-0.0455		
	0.4038	0.0088[a]	0.0000[a]	0.0000[a]	0.7360	0.6005	0.1413	0.1225		
RISK	0.0035	0.0484	0.1118	0.1108	0.0108	0.0201	-0.0173	-0.0304		
	0.9686	0.2206	0.1025	0.1027	0.7898	0.6136	0.8500	0.7382		
PACQ	-0.0187	-0.0132	0.0733	0.0735	0.0107	0.0082	-0.0193	-0.0135	0.0903	0.0888
	0.7956	0.6791	0.0125[b]	0.0123[b]	0.7393	0.7955	0.7947	0.8547	0.5701	0.5762
RD									0.3791	0.3812
									0.0565[c]	0.0552[c]
CPTL									0.6196	0.6142
									0.2507	0.2540
NYSE			0.0135	0.0137	0.0107	0.0085			-0.2316	-0.2319
			0.1631	0.1557	0.3138	0.4142			0.0102[b]	0.0101[b]
SOXLEY	-0.0135	0.0082	-0.0141	-0.0143	-0.0065	-0.0046	0.0024	0.0001	0.2130	0.2130
	0.5875	0.4578	0.1638	0.1591	0.5595	0.6753	0.9236	0.9984	0.0150[b]	0.0150[b]
Adjusted R^2	0.3015	0.1854	0.4763	0.4830	0.1811	0.2056	0.1650	0.1775	0.2199	0.2199
p-value of F-test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 4: Results of Hausman Tests

	Residual coefficient	*Significance*
BINDA		
A. OWN in the BIND equation	23.940	0.0000[a]
B. PAY in DBVAL equation	0.0035	0.7604
C. BIND in the DBVAL equation	-0.0289	0.2347
D. DBVAL in the PAY equation	-8.6541	0.0000[a]
E. BIND in the PAY equation	0.2779	0.0000[a]
F. PAY in the TOBIN equation	-0.2619	0.3811
G. DBVAL in the TOBIN equation	4.6753	0.0000[a]
H. BIND in the TOBIN equation	-0.7297	0.0589[c]
I. OWN in the TOBIN equation	-1.7011	0.0177[a]
J. BIND in the OWN equation	1.0922	0.0000[a]
BINDB		
A. OWN in the BIND equation	5.2014	0.0000[a]
B. PAY in DBVAL equation	0.0038	0.7462
C. BIND in the DBVAL equation	0.1691	0.1595
D. DBVAL in the PAY equation	-8.4148	0.0000[a]
E. BIND in the PAY equation	-0.4929	0.0995[c]
F. PAY in the TOBIN equation	-0.1760	0.5508
G. DBVAL in the TOBIN equation	4.6266	0.0000[a]
H. BIND in the TOBIN equation	-1.1941	0.1462
I. OWN in the TOBIN equation	-1.8999	0.0111[b]
J. BIND in the OWN equation	3.8170	0.0000[a]

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 5: Results from 2SLS Regressions

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	-0.0198	0.8546	-0.3262	-0.3818	0.1004	-0.3249	-0.6691	-0.9747	3.2334	3.0944
	0.9237	0.0000[a]	0.0000[a]	0.0000[a]	0.0281[b]	0.1565	0.0228[b]	0.0032[a]	0.0000[a]	0.0000[a]
BIND			0.0034	0.0568	-0.1049	0.4413	0.0010	0.3321	-0.1266	0.1071
			0.7508	0.1607	0.0533[c]	0.0901[c]	0.9761	0.0018[a]	0.2879	0.7576
DBVAL							-1.5497	-1.5737	-5.1092	-5.0534
							0.0423[b]	0.0344[b]	0.0000[a]	0.0000[a]
OWN	2.6861	0.8636							0.0468	0.0787
	0.2766	0.4421							0.8600	0.7706
PAY			-0.0781	-0.1040					0.2800	0.2721
			0.4244	0.3343					0.0519[c]	0.0516[c]
BSIZE	0.0421	-0.0063							-0.1278	-0.1310
	0.0002[a]	0.1908							0.0000[a]	0.0000[a]
DUAL	-0.4296	-0.0368			0.0045	0.0399			-0.1422	-0.1019
	0.0000[a]	0.4250			0.8219	0.0000[a]			0.1136	0.2104
SHRRTS	0.1856	0.1155	0.0268	0.0237	-0.0446	-0.0820	0.0784	0.0538	0.1166	0.1018
	0.1800	0.0752[c]	0.0195[b]	0.0469[b]	0.0127[b]	0.0035[a]	0.0534[c]	0.1749	0.2965	0.4027
TOBINLAG			-0.0074	-0.0072						
			0.0022[a]	0.0028[a]						
LOGASSET	-0.0618	0.0174	0.1742	0.1744	0.0046	-0.0019	0.2926	0.2929		
	0.3402	0.4914	0.0000[a]	0.0000[a]	0.7549	0.9199	0.0413[b]	0.0359[b]		
RISK	-0.0033	0.0458	0.1070	0.1027	0.0122	-0.0135	0.1384	0.1227		
	0.9821	0.3542	0.1170	0.1238	0.6851	0.7602	0.2159	0.2709		
PACQ	-0.0545	-0.0265	0.0744	0.0755	0.0094	0.0190	0.1266	0.1342	0.0211	0.0306
	0.5320	0.4459	0.0019[a]	0.0019[a]	0.6144	0.4203	0.1450	0.1165	0.9272	0.8930
RD									0.4017	0.3905
									0.1510	0.1664
CPTL									0.6094	0.6494
									0.5748	0.5503
NYSE			0.0078	0.0067	0.0145	0.0086			-0.0387	-0.0417
			0.4726	0.5468	0.2127	0.4731			0.7407	0.7176
SOXLEY	0.0041	0.0147	-0.0140	-0.0144	-0.0070	-0.0099	-0.0169	-0.0200	0.1616	0.1648
	0.9068	0.3425	0.1953	0.1898	0.4455	0.3662	0.5171	0.4332	0.1076	0.1037
Wald Test χ^2	8311.1	321581	13933	14117	7789.2	2293.6	15448	14159	1864.8	1857.9
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 6: 2SLS Residual Correlation Matrix

Panel A: BINDA					
	BIND	*DBVAL*	*OWN*	*PAY*	*TOBIN*
BIND	1				
DBVAL	-0.0627[b]	1			
OWN	-0.6251[a]	0.0174	1		
PAY	0.0376	0.7266[a]	-0.0005	1	
TOBIN	0.0165	0.3346[a]	-0.0138	0.1638[a]	1
Panel B: BINDB					
	BIND	*DBVAL*	*OWN*	*PAY*	*TOBIN*
BIND	1				
DBVAL	-0.0154	1			
OWN	-0.9332[a]	0.0224	1		
PAY	-0.0098	0.7695[a]	0.0559[b]	1	
TOBIN	-0.0066	0.3255[a]	-0.0040	0.1665[a]	1

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 7: Results from 3SLS System Estimation

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	-0.3261	0.8524	-0.3532	-0.4767	0.0895	-0.3800	-0.3255	-0.6140	3.4498	1.9715
	0.2760	0.0000[a]	0.0000[a]	0.0000[a]	0.2294	0.1587	0.2892	0.0600[c]	0.0000[a]	0.0071[a]
BIND			-0.0002	0.1225	-0.0894	0.4960	-0.0075	0.3080	1.0103	1.3155
			0.9885	0.0002[a]	0.2464	0.0857[c]	0.8131	0.0002[a]	0.0169[b]	0.0910[c]
DBVAL							-0.5112	-0.5154	-6.3932	-5.8703
							0.4295	0.4203	0.0000[a]	0.0000[a]
OWN	6.6545	0.9834							-0.0324	0.3093
	0.0020[a]	0.1042							0.9118	0.3427
PAY			-0.2833	-0.3215					0.3460	0.2706
			0.0000[a]	0.0000[a]					0.0071[a]	0.0311[b]
BSIZE	0.0524	-0.0044							-0.0734	-0.0996
	0.0000[a]	0.1169							0.0088[a]	0.0001[a]
DUAL	-0.5878	-0.0403			0.0097	0.0395			-0.4693	-0.1534
	0.0000[a]	0.1325			0.7220	0.0000[a]			0.0038[a]	0.0634[c]
SHRRTS	0.3972	0.1209	0.0419	0.0337	-0.0461	-0.0862	0.0660	0.0413	0.1992	0.0439
	0.0014[a]	0.0012[a]	0.0026[a]	0.0173[b]	0.0023[a]	0.0018[a]	0.0874[c]	0.3386	0.1890	0.7755
TOBINLAG			-0.0110	-0.0104						
			0.0000[a]	0.0000[a]						
LOGASSET	-0.0887	0.0064	0.1898	0.1912	0.0087	0.0016	0.1251	0.1262		
	0.0937[a]	0.7205	0.0000[a]	0.0000[a]	0.4707	0.9086	0.3197	0.3098		
RISK	-0.0432	0.0530	0.0862	0.0836	0.0057	-0.0213	0.0092	-0.0002		
	0.7601	0.3509	0.0130	0.0197	0.8862	0.6585	0.9397	0.9987		
PACQ	-0.1446	-0.0183	0.0360	0.0430	0.0080	0.0164	-0.0121	-0.0006	-0.0474	0.0355
	0.2186	0.6940	0.2014	0.1373	0.8028	0.6618	0.9058	0.9951	0.7845	0.8323
RD									0.4743	0.3657
									0.0277[b]	0.0824[c]
CPTL									0.3929	0.7179
									0.5067	0.2059
NYSE			0.0027	0.0035	0.0066	0.0049			0.0818	0.0469
			0.7078	0.6269	0.5012	0.4229			0.4174	0.6316
SOXLEY	0.0161	0.0185	-0.0266	-0.0265	-0.0077	-0.0117	-0.0222	-0.0238	0.1125	0.1346
	0.6994	0.2571	0.0080[a]	0.0097[a]	0.4833	0.3675	0.4785	0.4465	0.2398	0.1463
Wald Test χ^2									9387.7	254846
p-value									0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 8: Heckman Two-step Tests for Selection Bias

	First Step: Selection Probit		*Second Step: OLS with Lambda*	
Independent Variables	*Dependent Variables*			
	NYSE		*Firm performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*
Constant	-4.0420	-3.6123	3.2394	3.6306
	0.0000 [a]	0.0000 [a]	0.0000 [a]	0.0000 [a]
BIND	0.1754	-0.4112	-0.0436	-0.4257
	0.1970	0.1749	0.7290	0.1369
DBVAL			-2.6373	-2.6359
			0.0000 [a]	0.0000 [a]
OWN	0.0237	-0.0404	-0.2342	-0.3026
	0.9325	0.8870	0.4056	0.2916
PAY			0.2520	0.2659
			0.0430 [b]	0.0340 [b]
BSIZE	0.1581	0.1623	-0.1427	-0.1479
	0.0000 [a]	0.0000 [a]	0.0000 [a]	0.0000 [a]
DUAL	-0.0186	-0.0768	-0.1239	-0.1020
	0.8504	0.3824	0.1761	0.2142
SHRRTS	-0.5097	-0.4665	-0.1298	-0.0983
	0.0012 [a]	0.0032 [a]	0.3760	0.5058
LOGASSET	1.5305	1.5165		
	0.0000 [a]	0.0000 [a]		
RISK	-2.5603	-2.5098		
	0.0000 [a]	0.0000 [a]		
PACQ	-0.8267	-0.8557	0.7304	0.7390
	0.0000 [a]	0.0000 [a]	0.0195 [b]	0.0184 [b]
RD			0.2820	0.2926
			0.1591	0.1450
CPTL			0.0977	0.0745
			0.8579	0.8917
NYSE			-0.4616	-0.4424
			0.0000 [a]	0.0000 [a]
SOXLEY			0.3716	0.3796
			0.0005 [a]	0.0004 [a]
LAMBDA			-0.4541	-0.4268
			0.0000 [a]	0.0000 [a]
Adjusted R^2			0.2967	0.2932
p-value of F-Stat			0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 9: 3SLS Results Adjusted for Listing Bias

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	2.4881	1.5667	-0.3582	-0.4637	0.0161	0.0786	-0.4457	-0.7761	2.3058	2.5389
	0.2664	0.0107[a]	0.0000[a]	0.0000[a]	0.8574	0.3483	0.1474	0.0141[b]	0.0000[a]	0.0000[a]
BIND			0.0005	0.1224	-0.0287	-0.1241	-0.0040	0.3189	-0.0680	-0.3068
			0.9661	0.0006[a]	0.0000[a]	0.0000[a]	0.8994	0.0001[a]	0.5759	0.2633
DBVAL							-0.9246	-1.0469	-3.4643	-3.3484
							0.1534	0.0878[c]	0.0000[a]	0.0000[a]
OWN	31.656	-8.8502							0.0275	-0.0437
	0.0000[a]	0.0000[a]							0.9137	0.8662
PAY			-0.3215	-0.3263					0.2918	0.2864
			0.0000[a]	0.0014[a]					0.0100[a]	0.0114[b]
BSIZE	0.0768	-0.0391							-0.0209	-0.0172
	0.0240[b]	0.0660[c]							0.0687[a]	0.0502[a]
DUAL	0.8994	-0.3359			0.0282	0.0358			-0.1482	-0.1239
	0.0008[a]	0.0000[a]			0.0006[a]	0.0000[a]			0.0891[c]	0.1104
SHRRTS	1.6092	-0.3922	0.0377	0.0298	-0.0587	-0.0570	0.0676	0.0456	-0.2666	-0.2549
	0.0007[a]	0.0022[a]	0.0143[b]	0.0529[c]	0.0007[a]	0.0006[a]	0.0945[c]	0.2774	0.1620	0.1725
TOBINLAG			-0.0087	-0.0083						
			0.0000[a]	0.0000[a]						
LOGASSET	0.3956	0.1452	0.1828	0.1779	0.0362	0.0577	0.1800	0.1985		
	0.3020	0.1666	0.0000[a]	0.0000[a]	0.2303	0.0459[b]	0.1531	0.0965[c]		
RISK	0.0268	0.0545	0.1184	0.1161	-0.0388	-0.0621	0.1046	0.0969		
	0.9828	0.8731	0.1246	0.1345	0.4944	0.2552	0.3925	0.4143		
PACQ	0.4193	0.1077	0.0575	0.0628	0.0005	-0.0111	0.0574	0.0748	-0.4908	-0.5044
	0.6765	0.6961	0.0697[c]	0.0505[c]	0.9875	0.7398	0.5748	0.4533	0.1027	0.1022
RD									0.0705	0.0639
									0.7149	0.7399
CPTL									0.8285	0.8699
									0.1104	0.0925[c]
NYSE			-0.0015	0.0007	-0.0155	-0.0272			-0.5802	-0.5906
			0.9144	0.9641	0.3180	0.1664			0.0000[a]	0.0000[a]
SOXLEY	-0.1937	-0.0412	-0.0190	-0.0196	-0.0061	-0.0047	-0.0152	-0.0187	0.2493	0.2578
	0.5762	0.6644	0.0663[c]	0.0597[c]	0.5760	0.6647	0.6237	0.5388	0.0035[a]	0.0025[a]
Wald Test χ^2									249045	329189
p-value									0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 10: Data Description with Financial Firms Excluded

Panel A

	Mean	*Median*	*Maximum*	*Minimum*	*Std. Dev.*
BINDA	0.3377	0.2500	1.0000	0.0000	0.3474
BINDB	0.8624	0.8571	1.0000	0.3333	0.1440
BSIZE	7.5949	7.0000	15.000	4.0000	1.8108
DBVAL	0.1307	0.0655	0.8751	0.0000	0.1541
DUAL	0.6592	1.0000	1.0000	0.0000	0.4742
PAY	0.1170	0.0723	1.5450	-1.3992	0.3248
SHRRTS	0.9099	1.0000	1.0000	0.0000	0.2865
OWN	0.0780	0.0267	0.8571	0.0000	0.1465
TOBIN	1.7038	1.3353	14.851	0.0974	1.4982
ASSET (million $)	473.64	350.08	2901.6	6.5990	407.89
RISK	0.1707	0.1579	1.2978	0.0538	0.1020
PACQ	0.5919	0.5714	3.0000	0.0598	0.2753
RD	0.0913	0.0334	5.6816	0.0000	0.2551
CPTL	0.0562	0.0355	2.0153	0.0011	0.0916
NYSE	0.3949	0.0000	1.0000	0.0000	0.4890
Total observations					1165

Panel B

Industry	*Description*	*No. of Firms*	*Percentage*	*Industry*	*Description*	*No. of Firms*	*Percentage*
Division A	Agriculture	1	0.43%		IND38	36	15.45%
	IND01	1	0.43%		IND39	5	2.15%
Division B	Mining	2	0.86%	Division E	Transportation and Communications	1	0.43%
	IND14	2	0.86%		IND48	1	0.43%
Division D	Manufacturing	158	67.81%	Division F	Wholesale Trade	9	3.86%
	IND20	1	0.43%		IND50	5	2.15%
	IND23	1	0.43%		IND51	4	1.72%
	IND25	2	0.86%	Division G	Retail Trade	33	14.16%
	IND26	5	2.15%		IND52	1	0.43%
	IND27	1	0.43%		IND53	2	0.86%
	IND28	20	8.58%		IND55	3	1.29%
	IND29	1	0.43%		IND56	8	3.43%
	IND30	2	0.86%		IND57	3	1.29%
	IND31	2	0.86%		IND58	10	4.29%
	IND32	1	0.43%		IND59	6	2.58%
	IND33	4	1.72%	Division I	Services	29	12.45%
	IND34	7	3.00%		IND73	22	9.44%
	IND35	21	9.01%		IND80	6	2.58%
	IND36	37	15.88%		IND87	1	0.43%
	IND37	12	5.15%				
Sum						**233**	**100.00%**

Table 11: Correlation Coefficient Matrix with Financial Firms Excluded

	BINDA	BINDB	DBVAL	OWN	PAY	TOBIN	BSIZE	DUAL	SHRRTS	ASSET	RISK	PACQ	RD	CPTL	NYSE	SOXLEY
BINDA	1															
BINDB	0.1229[a]	1														
DBVAL	-0.0170	0.0654[b]	1													
OWN	-0.1078[a]	-0.2194[a]	-0.0392	1												
PAY	-0.0063	0.1038[a]	0.0767[a]	-0.0159	1											
TOBIN	-0.0269	0.0065	-0.3735[a]	0.0297	0.0522[c]	1										
BSIZE	0.1671[a]	-0.1099[a]	0.2729[a]	-0.0647[b]	-0.0914[a]	-0.3125[a]	1									
DUAL	-0.4628[a]	0.0142	-0.0396	0.1563[a]	0.0560[c]	0.0177	-0.0809[a]	1								
SHRRTS	0.0648[b]	0.1783[a]	-0.0484	-0.1123[a]	0.0078	0.0706[b]	-0.1301[a]	-0.0619[b]	1							
LOGASSET	0.0072	-0.0203	0.5118[a]	-0.0369	-0.0259	-0.5153[a]	0.4484[a]	-0.0029	-0.1431[a]	1						
RISK	-0.0225	0.0628[a]	-0.0923[a]	0.0099	0.0133	0.1461[a]	-0.1650[a]	0.0662[b]	0.0707[b]	-0.1975[a]	1					
PACQ	-0.0393	-0.0673[a]	0.0039	0.0041	0.0331	0.0064	-0.0566[c]	-0.0378	0.0060	-0.1243[a]	-0.0846[a]	1				
RD	-0.0221	0.0642[b]	-0.0109	-0.0201	0.0492	0.1104[a]	-0.0237	0.0369	0.0729[b]	-0.1262[a]	0.2779[a]	-0.0461	1			
CPTL	-0.0430	0.0069	0.0404	-0.0281	0.0074	0.0660[b]	0.0208	-0.0281	0.0262	-0.0371	0.1068[a]	0.0437	0.6157[a]	1		
NYSE	0.0843[a]	-0.0704[b]	0.2735[a]	-0.0122	-0.0314	-0.2554[a]	0.3816[a]	-0.0417	-0.1750[a]	0.4326[a]	-0.2397[a]	-0.1496[a]	-0.2034[a]	-0.0931[a]	1	
SOXLEY	-0.0116	0.0514[c]	-0.0320	-0.0279	0.0000	0.0500	0.0647[b]	0.0104	0.0000	0.1382[a]	0.0000	-0.4568[a]	-0.0415	-0.0874[a]	0.0000	1

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 12: OLS Results with Financial Firms Excluded

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	0.1544	0.9182	-0.3349	-0.3401	0.0791	0.2390	0.0835	-0.1990	3.1693	3.3011
	0.3348	0.0000[a]	0.0000[a]	0.0000[a]	0.2836	0.0019[a]	0.6162	0.2564	0.0000[a]	0.0000[a]
BIND			0.0005	0.0057	-0.0383	-0.1938	0.0021	0.3155	0.0244	-0.1394
			0.9604	0.8307	0.0046[a]	0.0000[a]	0.9369	0.0000[a]	0.8518	0.6292
DBVAL							-0.3088	-0.2993	-2.9223	-2.9136
							0.0000[a]	0.0001[a]	0.0000[a]	0.0000[a]
OWN	-0.1658	-0.1998							0.1386	0.1081
	0.0104[b]	0.0000[a]							0.6127	0.6996
PAY			-0.0509	-0.0505					0.2390	0.2448
			0.0000[a]	0.0000[a]					0.0514[c]	0.0464[b]
BSIZE	0.0340	-0.0106							-0.1652	-0.1658
	0.0000[a]	0.0000[a]							0.0000[a]	0.0000[a]
DUAL	-0.3289	0.0090			0.0273	0.0414			-0.0524	-0.0588
	0.0000[a]	0.3035			0.0060[a]	0.0000[a]			0.5813	0.4869
SHRRTS	0.0396	0.0611	0.0250	0.0246	-0.0467	-0.0333	0.0309	0.0071	0.0565	0.0678
	0.2365	0.0001[a]	0.0675[c]	0.0741[c]	0.0024[a]	0.0298[b]	0.3694	0.8366	0.6889	0.6337
TOBINLAG			-0.0069	-0.0069						
			0.0002[a]	0.0002[a]						
LOGASSET	-0.0071	0.0375	0.1831	0.1830	0.0049	0.0073	-0.0904	-0.0939		
	0.7992	0.0029[a]	0.0000[a]	0.0000[a]	0.7060	0.5687	0.0035[a]	0.0022[a]		
RISK	-0.0056	0.0433	0.0844	0.0841	0.0068	0.0162	0.0558	0.0400		
	0.9504	0.2850	0.1239	0.1245	0.8717	0.6949	0.5486	0.6639		
PACQ	-0.0190	-0.0127	0.0753	0.0754	0.0108	0.0084	-0.0298	-0.0239	0.0777	0.0711
	0.7922	0.6977	0.0110[b]	0.0109[b]	0.7449	0.7969	0.6920	0.7484	0.6374	0.6660
RD									0.3682	0.3742
									0.0680[c]	0.0637[c]
CPTL									0.6762	0.6603
									0.2194	0.2293
NYSE			0.0150	0.0150	0.0110	0.0088			-0.2318	-0.2324
			0.1228	0.1214	0.3111	0.4112			0.0129[b]	0.0126[b]
SOXLEY	-0.0185	0.0087	-0.0131	-0.0131	-0.0067	-0.0044	0.0051	0.0022	0.2037	0.2038
	0.4653	0.4497	0.2096	0.2077	0.5688	0.7005	0.8451	0.9341	0.0258[b]	0.0255[b]
Adjusted R^2	0.3104	0.1841	0.4144	0.4144	0.1777	0.2030	0.1508	0.1676	0.2023	0.2024
p-value of F-Stat	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 13: Results of Hausman Tests with Financial Firms Excluded

	Residual coefficient	*Significance*
BINDA		
A. OWN in the BIND equation	25.442	0.0000[a]
B. PAY in DBVAL equation	0.0032	0.7799
C. BIND in the DBVAL equation	-0.0352	0.1409
D. DBVAL in the PAY equation	-8.7162	0.0000[a]
E. BIND in the PAY equation	0.2712	0.0000[a]
F. PAY in the TOBIN equation	-0.7692	0.0208[b]
G. DBVAL in the TOBIN equation	5.2415	0.0000[a]
H. BIND in the TOBIN equation	-0.4787	0.2450
I. OWN in the TOBIN equation	-1.4768	0.0495[b]
J. BIND in the OWN equation	1.1150	0.0000[a]
BINDB		
A. OWN in the BIND equation	5.2990	0.0000[a]
B. PAY in DBVAL equation	0.0036	0.7579
C. BIND in the DBVAL equation	0.1672	0.1541
D. DBVAL in the PAY equation	-8.4869	0.0000[a]
E. BIND in the PAY equation	-0.5736	0.0512[c]
F. PAY in the TOBIN equation	-0.6183	0.0599[c]
G. DBVAL in the TOBIN equation	5.2177	0.0000[a]
H. BIND in the TOBIN equation	-1.5418	0.0889[c]
I. OWN in the TOBIN equation	-1.7094	0.0296[b]
J. BIND in the OWN equation	3.8025	0.0000[a]

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 14: 2SLS Results with Financial Firms Excluded

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	-0.0109	0.8445	-0.3444	-0.3857	0.0988	-0.3087	-0.5809	-0.8923	3.0850	2.8703
	0.9527	0.0000[a]	0.0000[a]	0.0000[a]	0.0327[b]	0.1527	0.0820[c]	0.0139[b]	0.0000[a]	0.0000[a]
BIND			0.0013	0.0440	-0.1123	0.4302	0.0083	0.3560	-0.1126	0.1968
			0.9039	0.3526	0.0363[b]	0.0843[c]	0.8058	0.0006[a]	0.3917	0.5987
DBVAL							-1.3846	-1.3745	-6.0651	-6.0684
							0.0919[c]	0.0835[c]	0.0000[a]	0.0000[a]
OWN	2.1224	0.8194							0.0708	0.1186
	0.3358	0.4507							0.7914	0.6631
PAY			-0.0485	-0.0679					0.3943	0.3829
			0.6300	0.5785					0.0094[a]	0.0092[a]
BSIZE	0.0422	-0.0070							-0.1071	-0.1085
	0.0001[a]	0.1460							0.0003[a]	0.0004[a]
DUAL	-0.4187	-0.0310			0.0017	0.0387			-0.1120	-0.0769
	0.0000[a]	0.5001			0.9316	0.0000[a]			0.2485	0.3717
SHRRTS	0.1584	0.1140	0.0278	0.0251	-0.0439	-0.0813	0.0710	0.0441	0.0814	0.0604
	0.1944	0.0688[c]	0.0111[b]	0.0267[b]	0.0148[b]	0.0031[a]	0.0850[c]	0.2686	0.4852	0.6385
TOBINLAG			-0.0065	-0.0064						
			0.0059[a]	0.0067[a]						
LOGASSET	-0.0395	0.0231	0.1831	0.1824	0.0069	-0.0038	0.2471	0.2392		
	0.5060	0.3691	0.0000[a]	0.0000[a]	0.6518	0.8476	0.1329	0.1317		
RISK	-0.0019	0.0449	0.0879	0.0862	0.0072	-0.0148	0.1633	0.1436		
	0.9889	0.3553	0.1369	0.1436	0.8131	0.7364	0.1062	0.1545		
PACQ	-0.0479	-0.0255	0.0756	0.0764	0.0093	0.0186	0.1108	0.1157	0.1149	0.1306
	0.5485	0.4596	0.0016[a]	0.0016[a]	0.6289	0.4340	0.2231	0.1904	0.6348	0.5803
RD									0.3769	0.3637
									0.2042	0.2262
CPTL									0.8940	0.9419
									0.4800	0.4598
NYSE			0.0100	0.0092	0.0150	0.0094			-0.0237	-0.0242
			0.3492	0.4116	0.1948	0.4272			0.8451	0.8403
SOXLEY	-0.0045	0.0149	-0.0128	-0.0132	-0.0076	-0.0100	-0.0118	-0.0151	0.1704	0.1732
	0.8852	0.3409	0.1400	0.1327	0.4362	0.3858	0.6615	0.5641	0.1151	0.1104
Adjusted R^2	16432	327777	9519.8	9272.1	7683.6	2135.9	17267	18055	1684.9	1722.9
Wald Test χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 15: 2SLS Residual Correlation Matrix with Financial Firms Excluded

Panel A: BINDA					
	BIND	*DBVAL*	*OWN*	*PAY*	*TOBIN*
BIND	1				
DBVAL	-0.0132	1			
OWN	-0.5366[a]	0.0181	1		
PAY	0.0495[c]	0.6552[a]	-0.0044	1	
TOBIN	0.0175	0.3789[a]	-0.0093	0.1476[a]	1
Panel B: BINDB					
	BIND	*DBVAL*	*OWN*	*PAY*	*TOBIN*
BIND	1				
DBVAL	-0.0104	1			
OWN	-0.9227[a]	0.0199	1		
PAY	-0.0516[c]	0.688[4a]	0.0074	1	
TOBIN	-0.0285	0.3753[a]	0.0085	0.1537[a]	1

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 16: 3SLS Results with Financial Firms Excluded

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	-0.2053	0.8719	-0.3454	-0.4426	0.0922	-0.3605	-0.1957	-0.4156	3.2030	0.3571
	0.4475	0.0000[a]	0.0000[a]	0.0000[a]	0.2253	0.1645	0.5744	0.2532	0.0000[a]	0.6880
BIND			-0.0004	0.1111	-0.1032	0.4845	0.0025	0.3322	0.8749	2.8847
			0.9713	0.0034[a]	0.1812	0.0844[c]	0.9377	0.0000[a]	0.0461[b]	0.0023[a]
DBVAL							-0.3308	-0.1388	-7.2821	-7.5465
							0.6566	0.8499	0.0000[a]	0.0000[a]
OWN	4.6269	0.5460							0.0165	0.6551
	0.0215[b]	0.3818							0.9565	0.0728[c]
PAY			-0.2363	-0.2674					0.4715	0.3464
			0.0003[a]	0.0011[a]					0.0007[a]	0.0148[b]
BSIZE	0.0504	-0.0067							-0.0520	-0.0503
	0.0000[a]	0.0261[b]							0.0799[c]	0.0766[c]
DUAL	-0.5201	-0.0196			0.0049	0.0382			-0.3958	-0.1477
	0.0000[a]	0.4816			0.8607	0.0002[a]			0.0207[b]	0.0927[c]
SHRRTS	0.2910	0.0996	0.0381	0.0291	-0.0449	-0.0851	0.0514	0.0190	0.1499	-0.1101
	0.0113[b]	0.0088[a]	0.0052[a]	0.0347[b]	0.0039[a]	0.0020[a]	0.2452	0.6629	0.3419	0.5217
TOBINLAG			-0.0114	-0.0114						
			0.0000[a]	0.0000[a]						
LOGASSET	-0.0601	0.0155	0.1879	0.1866	0.0094	-0.0010	0.0569	0.0181		
	0.2197	0.3979	0.0000[a]	0.0000[a]	0.4669	0.9480	0.7070	0.9034		
RISK	-0.0220	0.0591	0.0808	0.0802	0.0028	-0.0231	0.0597	0.0294		
	0.8628	0.2972	0.0165	0.0178	0.9456	0.6386	0.6129	0.7998		
PACQ	-0.1113	-0.0052	0.0337	0.0393	0.0081	0.0127	-0.0247	-0.0332	0.0776	0.2451
	0.2928	0.9116	0.2191	0.1551	0.8064	0.7399	0.8178	0.7530	0.6734	0.1939
RD									0.4371	0.2902
									0.0503[b]	0.2065
CPTL									0.7539	1.2065
									0.2232	0.0534[c]
NYSE			0.0037	0.0060	0.0098	0.0093			0.0775	0.0940
			0.6464	0.4671	0.3539	0.1738			0.4620	0.3788
SOXLEY	0.0014	0.0185	-0.0261	-0.0262	-0.0081	-0.0127	-0.0157	-0.0169	0.1306	0.1411
	0.9713	0.2667	0.0096[a]	0.0100[a]	0.4855	0.3523	0.6217	0.5920	0.2003	0.1719
Wald Test χ^2									8793.2	238827
p-value									0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.

Table 17: Heckman Tests with Financial Firms Excluded

	First Step: Selection Probit		*Second Step: OLS with Lambda*	
Independent Variables	*Dependent Variables*			
	NYSE		*Firm performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*
Constant	-4.0234	-3.6519	3.2665	3.7205
	0.0000 [a]	0.0000 [a]	0.0000 [a]	0.0000 [a]
BIND	0.2166	-0.3289	-0.0183	-0.4824
	0.1181	0.2830	0.8896	0.1013
DBVAL			-2.6061	-2.6089
			0.0000 [a]	0.0000 [a]
OWN	0.0843	0.0350	-0.2415	-0.3180
	0.7624	0.9019	0.3985	0.2754
PAY			0.2610	0.2815
			0.0429 [b]	0.0303 [b]
BSIZE	0.1776	0.1828	-0.1434	-0.1488
	0.0000 [a]	0.0000 [a]	0.0000 [a]	0.0000 [a]
DUAL	0.0001	-0.0730	-0.1172	-0.1014
	0.9992	0.4158	0.2234	0.2370
SHRRTS	-0.5508	-0.5097	-0.1532	-0.1156
	0.0004 [a]	0.0012 [a]	0.3043	0.4416
LOGASSET	1.3987	1.3888		
	0.0000 [a]	0.0000 [a]		
RISK	-2.2283	-2.1907		
	0.0000 [a]	0.0000 [a]		
PACQ	-0.6883	-0.7227	0.7262	0.7307
	0.0000 [a]	0.0000 [a]	0.0233 [b]	0.0228 [b]
RD			0.2852	0.2960
			0.1607	0.1463
CPTL			0.0766	0.0488
			0.8902	0.9300
NYSE			-0.4891	-0.4656
			0.0000 [a]	0.0000 [a]
SOXLEY			0.3724	0.3804
			0.0009 [a]	0.0007 [a]
LAMBDA			-0.4895	-0.4631
			0.0000 [a]	0.0000 [a]
Adjusted R^2			0.2791	0.2762
p-value of F-Stat			0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

Table 18: Adjusted 3SLS Results with Financial Firms Excluded

Independent Variables	*Dependent Variables*									
	Board independence		*Debt/Value*		*CEO ownership*		*Pay*		*Performance*	
	BINDA	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*	*BINDA*	*BINDB*
Constant	-1.2748	1.1415	-0.3555	-0.4563	-0.0599	0.2178	-0.2435	-0.5813	2.0129	2.1421
	0.3745	0.0000[a]	0.0000[a]	0.0000[a]	0.5056	0.0092[a]	0.4873	0.1006	0.0000[a]	0.0000[a]
BIND			0.0022	0.1237	0.0581	-0.3189	0.0038	0.3428	0.0006	-0.1484
			0.8557	0.0061[a]	0.0000[a]	0.0000[a]	0.9021	0.0000[a]	0.9960	0.6089
DBVAL							-0.5118	-0.5994	-4.2865	-4.2251
							0.4965	0.4008	0.0000[a]	0.0000[a]
OWN	19.533	-3.2624							0.0764	0.0189
	0.0000[a]	0.0000[a]							0.7663	0.9427
PAY			-0.3033	-0.3015					0.3308	0.3223
			0.0004[a]	0.0221[b]					0.0066[a]	0.0080[a]
BSIZE	0.1078	-0.0216							0.0553	0.0541
	0.0328[b]	0.0083[a]							0.1023	0.1021
DUAL	1.1088	-0.1286			0.0569	0.0368			-0.1183	-0.1145
	0.0000[a]	0.0000[a]			0.0000[a]	0.0000[a]			0.2011	0.1630
SHRRTS	1.0649	-0.0983	0.0350	0.0273	-0.0718	-0.0487	0.0518	0.0277	-0.3518	-0.3456
	0.0004[a]	0.0425[b]	0.0256[b]	0.0879[c]	0.0001[a]	0.0043[a]	0.2338	0.5083	0.1214	0.1224
TOBINLAG			-0.0099	-0.0097						
			0.0000[a]	0.0000[a]						
LOGASSET	-0.2855	0.0796	0.1841	0.1775	0.0582	0.0748	0.0769	0.0884		
	0.2541	0.0500[b]	0.0000[a]	0.0000[a]	0.0357[b]	0.0044[a]	0.6157	0.5425		
RISK	0.0565	0.0329	0.1182	0.1177	-0.0723	-0.0694	0.1269	0.1127		
	0.9440	0.8011	0.1116	0.1156	0.1780	0.1751	0.2791	0.3185		
PACQ	-0.2954	0.0316	0.0512	0.0559	-0.0063	-0.0165	0.0187	0.0337	-0.3433	-0.3571
	0.6485	0.7636	0.0994[c]	0.0773[c]	0.8561	0.6237	0.8605	0.7431	0.1477	0.1420
RD									0.0730	0.0637
									0.7136	0.7484
CPTL									1.0513	1.0872
									0.0503[c]	0.0424[c]
NYSE			-0.0033	-0.0005	-0.0312	-0.0363			-0.6266	-0.6339
			0.8095	0.9767	0.0330[b]	0.0084[a]			0.0000[a]	0.0000[a]
SOXLEY	0.0945	-0.0086	-0.0193	-0.0203	-0.0049	-0.0026	-0.0085	-0.0120	0.2583	0.2639
	0.6782	0.8168	0.0679[c]	0.0563[c]	0.6782	0.8168	0.7852	0.6926	0.0041[a]	0.0033[a]
Wald Test χ^2									191139	118510
p-value									0.0000	0.0000

* a/b/c denotes statistical significance at the 1%/5%/10% level.

** Industry dummies are included in every mechanism equation, but not reported.