Corporate Governance Indices

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Abstract

How is corporate governance measured? What is the relation between corporate governance and performance? This paper sheds light on these questions while taking into account the endogeneity of the relations among corporate governance, management turnover, corporate performance, corporate capital structure, and corporate ownership structure. We propose corporate board ownership as a new measure of corporate governance, and find this measure more appropriate than measures used in the extant literature including those suggested by Gompers, Ishii, and Metrick (GIM, 2003) and Bebchuk, Cohen and Ferrell (BCF, 2004). While the governance indices studied here have been popular in the U.S., similar indices are being constructed for companies in many emerging economies. We caution the producers and users of such indices about their pitfalls and potential usefulness.

1. Introduction

In an important and oft-cited paper, Gompers, Ishii, and Metrick (GIM, 2003) study the impact of corporate governance on firm performance during the 1990s. They find that stock returns of firms with strong shareholder rights outperform, on a risk-adjusted basis, returns of firms with weak shareholder rights by 8.5 percent per year during this decade. Given this result, serious concerns can be raised about the efficient market hypothesis, since these portfolios could be constructed with publicly available data. On the policy domain, corporate governance proponents have prominently cited this result as evidence that good governance (as measured by GIM) has a positive impact on corporate performance.

There are three alternative ways of interpreting the superior return performance of companies with strong shareholder rights. First, these results could be sample-period specific;

hence companies with strong shareholder rights during the current decade of 2000s may not have exhibited superior return performance. In fact, in a very recent paper, Core, Guay and Rusticus (2005) carefully document that in the current decade share returns of companies with strong shareholder rights do not outperform those with weak shareholder rights. Second, the risk-adjustment might not have been done properly; in other words, the governance factor might be correlated with some unobservable risk factor(s). Third, the relation between corporate governance and performance might be endogenous raising doubts about the causality explanation. There is a significant body of theoretical and empirical literature in corporate finance that considers the relations among corporate governance, management turnover, corporate performance, corporate capital structure, and corporate ownership structure. Hence, from an econometric viewpoint, to study the relationship between any two of these variables one would need to formulate a system of simultaneous equations that specifies the relationships among these variables.

What if after accounting for sample period specificity, risk-adjustment, and endogeneity, the data indicates that share returns of companies with strong shareholder rights are similar to those with weak shareholder rights? What might we infer about the impact of corporate governance on performance from this result? It is still possible that governance might have a positive impact on performance, but that good governance, as measured by GIM, might not be the appropriate corporate governance metric.

An impressive set of recent papers have considered alternative measures of corporate governance, and studied the impact of these governance measures on firm performance. GIM's governance measure is an equally-weighted index of 24 corporate governance provisions compiled by the Investor Responsibility Research Center (IRRC), such as, poison pills, golden parachutes, classified boards, cumulative voting, and supermajority rules to approve mergers. Bebchuk, Cohen and Ferrell (BCF, 2004) recognize that some of these 24 provisions might matter more than others and that some of these provisions may be correlated. Accordingly, they create an “entrenchment index” comprising of six provisions – four provisions that limit shareholder rights and two that make potential hostile takeovers more difficult. They find that increases in this index (that is, higher entrenchment) are associated with reductions in Tobin’s Q and lower abnormal returns during 1990-2003. Further, they find that the other eighteen IRRC provisions excluded from their index are unrelated to changes in firm value or stock returns. Thus, they conclude that indices with a small number of the most relevant factors are likely to be the most appropriate measures of corporate governance.

While the above noted studies use IRRC data, Brown and Caylor (2004) use Institutional Shareholder Services (ISS) data to create their governance index. This index considers 52 corporate governance features such as board structure and processes, corporate charter issues such as poison pills, management and director compensation and stock ownership.

There is a related strand of the literature that considers corporate board characteristics as important determinants of corporate governance: board independence (see Hermalin and Weisbach (1998, 2003)), stock ownership of board members (see Bhagat, Carey, and Elson (1999)), and whether the Chairman and CEO positions are occupied by the same or two different individuals (see Brickley, Coles, and Jarrell (1997)). Can a single board characteristic be as effective a measure of corporate governance as indices that consider 52 (as in Brown and Caylor), 24 (as in GIM) or other multiple measures of corporate charter provisions, and board characteristics? While, ultimately, this is an empirical question, on both economic and econometric grounds it is possible for a single board characteristic to be as effective a measure of corporate governance. Corporate boards have the power to make, or at least, ratify all important decisions including decisions about investment policy, management compensation policy, and board governance itself. It is plausible that an independent board or board members with appropriate stock ownership will have the *incentive* to provide effective monitoring and oversight of important corporate decisions noted above; hence board independence or ownership can be a good proxy for overall good governance. Furthermore, the measurement error in measuring board independence or board ownership can be less than the total measurement error in measuring a multitude of board processes, compensation structure, and charter provisions. Finally, while board characteristics, corporate charter provisions, and management compensation features do characterize a company's governance, construction of a governance index requires that the above variables be weighted. The weights a particular index assigns to individual board characteristics, charter provisions, etc. is important. If the weights are not consistent with the weights used by informed market participants in assessing the relation between governance and firm performance, then incorrect inferences would be made regarding the relation between governance and firm performance.

Our primary contribution to the literature is a comprehensive and econometrically defensible analysis of the relation between corporate governance and performance. We take into account the endogenous nature of the relation between governance and performance. Also, with the help of a simultaneous equations framework we take into account the relations among corporate governance, performance, capital structure, and ownership structure. We make four additional contributions to the literature:

First, instead of considering just a single measure of governance (as prior studies in the literature have done), we consider seven different governance measures. We find that better governance as measured by the GIM and BCF indices, stock ownership of board members, and CEO-Chair separation is significantly positively correlated with better contemporaneous and subsequent *operating performance*. Additionally, better governance as measured by Brown and Caylor, and The Corporate Library is not significantly correlated with better contemporaneous or subsequent operating performance.[1] Also, interestingly, board independence is *negatively* correlated with contemporaneous and subsequent operating performance. This is especially relevant in light of the prominence that board independence has received in the recent NYSE and

[1] The Corporate Library (TCL) is a commercial vendor that uses a proprietary weighting scheme to include over a hundred variables concerning board characteristics, management compensation policy, and antitakeover measures in constructing a corporate governance index.

NASDAQ corporate governance listing requirements.[2] We conduct a battery of robustness checks including alternative estimates of the standard errors of our model's estimated coefficients. These robustness checks provide consistent results and increase our confidence in the performance-governance relation as noted above. Finally, and contrary to claims in GIM and BCF, none of the governance measures are correlated with future stock market performance.[3]

Second, in several instances our inferences regarding the performance-governance relation do depend on whether or not one takes into account the endogenous nature of the relation between governance and performance. For example, the OLS estimate indicates a significantly negative relation between the GIM index and next year's Tobin's Q, and the GIM index and next two years' Tobin's Q. However, after taking into account the endogenous nature of the relation between governance and performance, we find a positive but statistically insignificant relation between the GIM index and the one year Tobin's Q, and again positive but statistically insignificant relation for the two years' Tobin's Q.

Third, given poor firm performance, the probability of disciplinary management turnover is positively correlated with stock ownership of board members, and with board independence. However, given poor firm performance, the probability of disciplinary management turnover is *negatively* correlated with better governance measures as proposed by GIM and BCF. In other words, so called "better governed firms" as measured by the GIM and BCF indices are *less* likely to experience disciplinary management turnover in spite of their poor performance.

Fourth, we contribute to the growing literature on the relation between corporate governance and accounting, corporate finance and law variables. Ashbaugh-Skaife, Collins, and Lafond (2006) investigate the relation between corporate governance and credit ratings. They consider the GIM index and various board characteristics including board independence and

[2] See SEC ruling "NASD and NYSE Rulemaking Relating to Corporate Governance," in *http://www.sec.gov/rules/sro/34-48745.htm*, and *http://www.sec.gov/rules/sro/nyse/34-50625.pdf.*
[3] The BCF index has become popular with industry experts giving advice to institutional investors on investments and proxy voting; for example, see Hermes Pensions Management (2005), and www.glasslewis.com.

compensation as *separate* governance measures. Bushman, Chen, Engel and Smith (2004) focus on the relation between governance and the timeliness of accounting earnings; they consider various outside blockholder and director ownership characteristics as *separate* measures of governance. Defond, Hann and Hu (2005) consider the cross-sectional relation between the market's response to the appointment of an accounting expert on the board and its corporate governance; they construct a governance index that gives *equal* weight to six variables including board independence, the GIM index, and audit committee structure. Bowen, Rajgopal, and Venkatachalam (2005) analyze the relation between corporate governance, accounting discretion and firm performance; they consider several board characteristics and the GIM index as *separate* measures of governance.[4] Even this brief review of the literature on the relation between governance and accounting and finance variables suggests lack of an agreed upon measure of governance. This study proposes a governance measure, namely, dollar ownership of the board members, that is simple, intuitive, less prone to measurement error, and not subject to the problem of weighting a multitude of governance provisions in constructing a governance index. Consideration of this governance measure by future accounting and finance researchers would enhance the comparability of research findings.

The above findings have important implications for researchers, senior policy makers, and corporate boards: *Efforts to improve corporate governance should focus on stock ownership of board members* – since it is positively related to both future operating performance, and to the probability of disciplinary management turnover in poorly performing firms. Proponents of board independence should note with caution the negative relation between board independence and future operating performance. Hence, if the purpose of board independence is to improve

[4] Given space constraints we are unable to review the vast and growing literature on the relation between governance and accounting, finance, and corporate law variables; our apologies to the authors we have not cited here. In addition to the papers noted above, we refer the reader to Erickson, Hanlon, and Maydew (2006), Anderson, Mansi and Reeb (2004), Marquardt and Wiedman (2005), Rajan and Wulf (2006), Bergstresser and Philippon (2006), Gillan (2006), Yermack (2006), Cremers and Nair (2005), and Bebchuk and Cohen (2005).

performance, then such efforts might be misguided. However, if the purpose of board independence is to discipline management of poorly performing firms, then board independence has merit. Finally, even though the GIM and BCF good governance indices are positively related to future performance, policy makers and corporate boards should be cautious in their emphasis on the components of these indices since this might exacerbate the problem of entrenched management, especially in those situations where management should be disciplined, that is, in poorly performing firms.[5] While the governance indices studied here have been popular in the U.S., similar indices are being constructed for companies in many emerging economies. We caution the producers and users of such indices about their pitfalls and potential usefulness.

The remainder of the paper is organized as follows. The next section briefly reviews the literature on the relationship among corporate ownership structure, governance, performance and capital structure. Section 3 notes the sample and data, and discusses the estimation procedure. Section 4 presents the results on the relation between governance and performance. Section 5 focuses on the impact of governance in disciplining management in poorly performing companies. The final section concludes with a summary.

2. Corporate ownership structure, corporate governance, firm performance, and capital structure

Some governance features may be motivated by incentive-based economic models of managerial behavior. Broadly speaking, these models fall into two categories. In agency models, a divergence in the interests of managers and shareholders causes managers to take actions that are costly to shareholders. Contracts cannot preclude this activity if shareholders are unable to observe managerial behavior directly, but ownership by the manager may be used to induce

[5] There is considerable interest among senior policy makers and corporate boards in understanding the determinants of good corporate governance, for example, see *New York Times*, April 10, 2005, page 3.6, “Fundamentally;” *Wall Street Journal*, October 12, 2004, page B.8, “Career Journal;” *Financial Times* FT.com, September 21, 2003, page 1 “Virtue Rewarded.”

managers to act in a manner that is consistent with the interest of shareholders. Grossman and Hart (1983) describe this problem.

Adverse selection models are motivated by the hypothesis of differential ability that cannot be observed by shareholders. In this setting, ownership may be used to induce revelation of the manager's private information about cash flow or her ability to generate cash flow, which cannot be observed directly by shareholders. A general treatment is provided by Myerson (1987).

In the above scenarios, some features of corporate governance may be interpreted as a characteristic of the contract that governs relations between shareholders and managers. Governance is affected by the same unobservable features of managerial behavior or ability that are linked to ownership and performance.

At least since Berle and Means (1932), economists have emphasized the costs of diffused share-ownership; that is, the impact of ownership structure on performance. However, Demsetz (1983) argues that since we observe many successful public companies with diffused share-ownership, clearly there must be offsetting benefits, for example, better risk-bearing.[6] Also, for reasons related to performance-based compensation and insider information, firm performance could be a determinant of ownership. For example, superior firm performance leads to an increase in the value of stock options owned by management which, if exercised, would increase their share ownership. Also, if there are serious divergences between insider and market expectations of future firm performance then insiders have an incentive to adjust their ownership in relation to the expected future performance. Himmelberg, Hubbard and Palia (1999) argue that the ownership structure of the firm may be endogenously determined by the firm’s contracting environment which differs across firms in observable and unobservable ways. For example, if the

[6] Investors preference for liquidity would lead to smaller blockholdings given that larger blocks are less liquid in the secondary market. Also, as highlighted by Black (1990) and Roe (1994), the public policy bias in the U.S. towards protecting minority shareholder rights increases the costs of holding large blocks.

scope for perquisite consumption is low in a firm then a low level of management ownership may be the optimal incentive contract.[7]

In a seminal paper, Grossman and Hart (1983) considered the ex ante efficiency perspective to derive predictions about a firm's financing decisions in an agency setting. Novaes and Zingales (1999) show that the optimal choice of debt from the viewpoint of shareholders differs from the optimal choice of debt from the viewpoint of managers.[8] While the above focuses on capital structure and managerial entrenchment, a different strand of the literature has focused on the relation between capital structure and ownership structure; for example, see Grossman and Hart (1986) and Hart and Moore (1990).

This brief review of the inter-relationships among corporate governance, management turnover, corporate performance, corporate capital structure, and corporate ownership structure suggests that, from an econometric viewpoint, to study the relationship between corporate governance and performance, one would need to formulate a system of simultaneous equations that specifies the relationships among the abovementioned variables. We specify the following system of four simultaneous equations:

$$\text{Performance} = f_1(\text{Ownership, Governance, Capital Structure}, Z_1, \varepsilon_1), \qquad (1a)$$

$$\text{Governance} = f_2(\text{Performance, Ownership, Capital Structure}, Z_2, \varepsilon_2), \qquad (1b)$$

$$\text{Ownership} = f_3(\text{Governance, Performance, Capital Structure}, Z_3, \varepsilon_3), \qquad (1c)$$

[7] The endogeneity of management ownership has also been noted by Jensen and Warner (1988): "A caveat to the alignment/entrenchment interpretation of the cross-sectional evidence, however, is that it treats ownership as exogenous, and does not address the issue of what determines ownership concentration for a given firm or why concentration would not be chosen to maximize firm value. Managers and shareholders have incentives to avoid inside ownership stakes in the range where their interests are not aligned, although managerial wealth constraints and benefits from entrenchment could make such holdings efficient for managers."

[8] The conflict of interest between managers and shareholders over financing policy arises because of three reasons. First, shareholders are much better diversified than managers who besides having stock and stock options on the firm have their human capital tied to the firm (Fama (1980)). Second, as suggested by Jensen (1986), a larger level of debt pre-commits the manager to working harder to generate and pay off the firm's cash flows to outside investors. Third, Harris and Raviv (1988) and Stulz (1988) argue that managers may increase leverage beyond what might be implied by some "optimal capital structure" in order to increase the voting power of their equity stakes, and reduce the likelihood of a takeover and the resulting possible loss of job-tenure.

Capital Structure = f_4(Governance, Performance, Ownership, Z_4, ε_4), (1d)

where the Z_i are vectors of control variables and instruments influencing the dependent variables and the ε_i are the error terms associated with exogenous noise and the unobservable features of managerial behavior or ability that explain cross-sectional variation in performance, ownership, capital structure and governance. The estimation issues for the above equations are discussed in the next section.

3. Data and estimation issues

3.1 Data

In this section we discuss the data sources for board variables, performance, leverage and instrumental variables. All variables including governance measures are described in Table 1.

Board Variables: We obtain data on board independence, board ownership, and CEO-Chair duality from IRRC and TCL. We also obtain board size, median director ownership, median director age and median director tenure from these sources. The stock ownership variable does not include options. We consider the dollar value of stock ownership of the median director as the measure of stock ownership of board members. Our focus on the median director's ownership, instead of the average ownership, is motivated by the political economy literature on the median voter; see Shleifer and Murphy (2004), and Milavonic (2004). Also, directors, as economic agents, are more likely to focus on the impact on the dollar value of their holdings in the company rather than on the percentage ownership.

Performance Variables: We use Compustat and Center for Research in Security Prices (CRSP) data for our performance variables. We use the annual accounting data from Compustat for calculating return-on-assets ("ROA") and Tobin's Q. Following Barber and Lyon (1996), we calculate ROA as operating income before depreciation divided by total assets. For robustness, we also consider operating income after depreciation divided by total assets. Similar to GIM, we calculate Tobin's Q as (total assets + market value of equity – book value of equity – deferred taxes) divided by total assets. We use the CRSP monthly stock file to calculate monthly and annual stock returns. We calculate industry performance measures by taking the four-digit SIC code average (excluding the sample firm) performance for the specific time period.

Leverage: Consistent with Bebchuk, Cohen and Ferrell (2004), Graham, Lang, and Shackleford (2004), and Khanna and Tice (2005) we compute leverage as (long term debt + current portion of long term debt) divided by total assets. For robustness, we also consider alternative definitions of leverage as suggested by Baker and Wurgler (2002).

Instrumental Variables: The choice of instrumental variables is critical to the consistent estimation of (1a), (1b), (1c), and (1d).[9] Our choice of instrumental variables is motivated by the extant literature; additionally, *all of our analyses involving instrumental variables include tests for weak instruments as suggested by Stock and Yogo (2004), and the Hausman (1978) test for endogeneity.* This is discussed later in this section. We identify the following variables as instruments for ownership, performance, governance, and capital structure.

CEO Tenure-to-Age: A CEO that has had five years of tenure at age 65 is likely to be of different quality and have a different equity ownership than a CEO that has had five years of tenure at age 50. These CEOs likely have different incentive, reputation, and career concerns. Gibbons and Murphy (1992) provide evidence on this. Therefore, we use the ratio of CEO tenure to CEO age as a measure of CEO quality, which will serve as an instrument for CEO ownership.

Treasury Stock: Palia (2001) suggests that a firm is most likely to buy back its stock when it believes the stock to underpriced relative to where the managers think the price should be. Thus, the level of treasury stock should be correlated with firm performance and firm value.

[9] The choice of appropriate instruments while never easy, is especially challenging in the context of this study. Almost any instrument variable identified for a particular endogenous variable in equation (1) will plausibly (based on extant theory and/or empirical evidence) be related to at least another, and possibly more, endogenous variable(s) in (1). Ashbaugh-Skaife, Collins, and Lafond (2006) make a similar point.

We expect this measure to be exogenous in the governance and ownership equations. We use the ratio of the treasury stock to total assets as the instrument for performance.[10]

Currently Active CEOs on Board: Hallock (1997) and Westphal and Khanna (2003) emphasize the role of networks among CEOs that serve on boards, and the adverse impact on the governance of such firms. *Ex ante*, there is no reason to believe that this variable will be correlated with firm performance. We consider the percentage of directors who are currently active CEOs as an instrument for governance.

Capital Structure instrument: We use the modified Altman's Z-score (1968) suggested in MacKie-Mason (1990) as the instrument for leverage. This measure is a proxy for financial distress; the lower the Z-score, the greater the probability of financial distress. We expect this variable to be positively correlated with leverage.[11]

Table 2 presents the descriptive statistics and sample sizes for the variables for all available years and for just 2002. Table 3 presents the parametric and non-parametric correlation coefficients among the performance and governance variables.

3.2 Estimation issues

The instruments for performance, governance, ownership and capital structure in equations (1a), (1b), (1c) and (1d) have been discussed above. Regarding the control variables: Prior literature, for example, Core, Holthausen and Larcker (1999), Gillan, Hartzell and Starks (2003), and Core, Guay and Rusticus (2005), suggests that industry performance, return volatility, growth opportunities and firm size are important determinants of firm performance. Yermack (1996) documents a relation between board size and performance. Demsetz (1983) suggests that small firms are more-likely to be closely-held suggesting a different governance structure than

[10] We consider the sum of share repurchases during the past three years (as a fraction of total assets) as an alternative instrumental variable. The results are robust to this alternative specification.
[11] We also considered Graham's (1996) marginal tax rate as an instrument for leverage. The Stock and Yago (2004) test indicates that this is a weak instrument.

large firms. Firms with greater growth opportunities are likely to have different ownership and governance structures than firms with fewer growth opportunities; see, for example, Smith and Watts (1992), and Gillan, Hartzell and Starks (2003). Demsetz and Lehn (1985), among others, suggest a relation between information uncertainty about the firm as proxied by return volatility and its ownership and governance structures.

Given the abovementioned findings in the literature, in equation (1a), the control variables include industry performance, log of assets, R&D and advertising expenses to assets, board size, standard deviation of stock return over the prior five years, and the instrument is treasury stock to assets. In equation (1b), the control variables include R&D and advertising expenses to assets, board size, standard deviation of stock return over the prior five years, and the instruments is percentage of directors who are active CEOs. In equation (1c), the control variables include log of assets, R&D and advertising expenses to assets, board size, standard deviation of stock return over the prior five years, and the instrument is CEO tenure to CEO age. In equation (1d), the control variables include industry leverage, log of assets, R&D and advertising expenses to assets, standard deviation of stock return over the prior five years, and the instrument is Altman's modified Z-score.

We estimate this system using ordinary least squares (OLS), two-stage least squares (2SLS) to allow for potential endogeneity, and three-stage least squares (3SLS) to allow for potential endogeneity and cross-correlation between the equations. If any of the right-hand side regressors are endogenously determined, OLS estimates of (1) are inconsistent.[12] Properly specified instrumental variables (IV) estimates such as the two stage least squares (2SLS) are

[12] This point is made in most econometric textbooks; for example, Johnston and DiNardo (1997, page 153) state, "Under the classical assumptions OLS estimators are best linear unbiased. One of the major underpinning assumptions is the independence of regressors from the disturbance term. If this condition does not hold, OLS estimators are biased and inconsistent." Kennedy (2003, page 180) notes, " In a system of simultaneous equations, all the endogenous variables are random variables – a change in any disturbance term changes all the endogenous variables since they are determined simultaneously…As a consequence, the OLS estimator is biased, even asymptotically." Maddala (1992, page 383) observes, "…the simultaneity problem results in inconsistent estimators of the parameters, when the structural equations are estimated by ordinary least squares (OLS)."

consistent. The problem is which instruments to use, and how many instruments to use. Regarding the number of instruments, we know we must include at least as many instruments as we have endogenous variables. The asymptotic efficiency of the estimation improves as the number of instruments increases, but so does the finite-sample bias (Johnston and DiNardo 1997). Choosing "weak instruments" can lead to problems of inference in the estimation.

An instrument is "weak" if the correlation between the instruments and the endogenous variable is small. Nelson and Startz (1990) and Bound, Jaeger and Baker (1995) were among the first to discuss how instrumental variables estimation can perform poorly if the instruments are weak. Nelson and Startz show that the true distribution of the instrumental variables estimator may look nothing like the asymptotic distribution. Bound, Jaeger and Baker focus on two related problems. First, if the instruments and the endogenous variables are weakly correlated, then even a weak correlation between the instruments and the error in the original structural equation (which should be zero) can lead to large inconsistencies in the IV estimates; this is known as the "bias" issue related to weak instruments. Second, finite sample results can differ substantially from asymptotic theory. Specifically, IV estimates are generally biased in the same direction as OLS estimates, with the magnitude of this bias increasing as the R^2 of the first-stage regression between the instruments and the endogenous variable approaches zero; this is known as the "size" issue related to weak instruments.

More recently, Stock and Yogo (2004) formalize the definitions and provide tests to determine if instruments are weak. They introduce two alternative definitions of weak instruments. First, a set of instruments is weak if the bias of the instrumental variables estimator, relative to the bias of the OLS estimator, exceeds a certain limit b. Second, the set of instruments is weak if the conventional α -level Wald test based on instrumental variables statistics has a size that could exceed a certain threshold r. These two definitions correspond to the "bias" and "size" problems mentioned earlier, and yield a set or parameters that define a "weak instruments set." [13]

For a set of valid instruments, we need to compare the OLS estimates with the IV estimates to determine if IV estimation is necessary. To do this, we use the Hausman (1978) specification test alternatively known as the Wu-Hausman or Durbin-Wu-Hausman test. The test statistic is constructed as follows:

$$h \equiv (\hat{\beta}_{OLS} - \hat{\beta}_{IV})'(\text{var}(\hat{\beta}_{OLS}) - \text{var}(\hat{\beta}_{IV}))^{-1}(\hat{\beta}_{OLS} - \hat{\beta}_{IV}).$$

This statistic has a chi-square distribution with degrees of freedom equal to the number of potentially endogenous regressors. If the difference between the OLS and IV estimates is "large," we conclude that OLS is not adequate. We use this same test to compare OLS to 2SLS, OLS to 3SLS, and 2SLS to 3SLS. If the instruments are valid, we can use this test to determine which estimation method should be used.[14]

4. Corporate governance and performance

Table 4 summarizes our main results of the relationship between governance and performance. While previous studies have used both stock market based and accounting measures of performance, we primarily rely on accounting performance measures. Stock market based performance measures are susceptible to investor anticipation. If investors anticipate the corporate governance effect on performance, long-term stock returns will not be significantly

[13] There are two other weak instrument tests. First, Hahn and Hausman (2002) present a test similar in spirit to the Hausman (1978) specification test. Second, the Hansen-Sargan test compares the second stage residuals with the first stage instruments, testing for non-correlation among these variables; see Davidson and MacKinnon (2004). We present the Stock and Yogo test results because, in our opinion, its test statistic is easier to interpret; also, the Stock and Yogo test is consistent with the motivation of the prior research on weak instruments; for example, see Bound, Jaeger and Baker (1995) or Staiger and Stock (1997). However, we also perform the Hahn and Hausman, and the Hansen-Sargan weak instrument tests; inferences from these tests are consistent with the reported Stock and Yogo test results. Also, in addition to the instrument variables discussed above, we consider an alternate set of instrument variables; the results noted below are robust to the consideration of alternate instruments.

[14] By construction, if the IV variance is larger than the OLS variance, the test statistic will be negative. In this case, we rely on the OLS estimates because of the smaller variance.

correlated with governance even if a significant correlation between performance and governance indeed exists.[15]

In Table 4, Panels A through G, we report the results for the relationship between operating performance (ROA) and the following governance measures respectively: GIM index, BCF index, TCL index, Brown and Caylor index, stock ownership of the median board member, CEO-Chair duality, and board independence. In each panel we report the OLS, 2SLS, and 3SLS estimates of the equation in (1a); we perform Hausman (1978) tests to guide our choice of which set of estimates to consider for inference purposes. In each panel, we report three measures of operating performance: contemporaneous return-on-assets (ROA), next year's ROA, and next two years' ROA. Given that information needed to construct the various governance measures for a particular year are released to market participants some time during the first two quarters of the year, the impact of governance on performance will be observed on both the contemporaneous and subsequent operating performance. Core, Guay, and Rusticus (2005) consider just the next year's operating performance. However, it is possible that to the extent governance impacts performance, operating performance may be impacted for the next several years. For this reason, we also consider the next two years' operating performance.

Table 4, Panel A, highlights the relationship between the GIM governance index and operating performance (ROA). Consider the results under the "Next 1 Year Performance." The Hausman test suggests we consider the 2SLS estimates for inference. The Stock and Yogo (2004) test indicates that our instruments are appropriate. There is a significant negative correlation between the GIM index and next year's ROA. Given that lower GIM index numbers reflect stronger shareholder rights (better governance), the above results are consistent with a positive relation between good governance, as measured by GIM, and operating performance. Results using the contemporaneous operating performance are similar. This relation is negative but

[15] However, to aid the comparison of our results with the extant literature, in Appendix A we report results considering stock return and Tobin's Q as performance measures.

insignificant when we consider the operating performance of the next two years. These results are consistent with GIM's finding of a positive relation between good governance and performance for the period 1990-1999, and extends their findings to the most recent period, 2000-2004. However, it is important to note that GIM's finding of a positive relation between good governance and performance is based on long-term stock returns as the measure of performance, and does not take into account the endogeneity of the relationships among corporate governance, performance, capital structure, and corporate ownership structure.[16] As noted above, if investors anticipate the effect of corporate governance on performance, long-term stock returns will not be significantly correlated with governance even if a significant correlation between performance and governance exists. Indeed, as the results in Appendix A indicate, there is no significant or consistent relation between GIM's measure of governance and contemporaneous, next year's or the next two years' stock returns, or Tobin's Q.[17]

In Table 4, Panel B, we note the relationship between the BCF governance index and operating performance. Again, the Hausman test suggests we consider the 2SLS estimates for inference, and the Stock and Yogo (2004) test indicates that our instruments are appropriate. There is a significant negative correlation between the BCF index and next year's ROA. Similar to the GIM index, lower BCF index numbers reflect better governance; hence, these results are consistent with a positive relation between good governance, as measured by BCF, and operating performance. Results using the contemporaneous and next two years' operating performance are similar. However, similar to GIM, BCF's finding of a positive relation between good governance and performance is based on long-term stock returns. The results in Appendix A-2, Panel B,

[16] Consistent with the findings reported here, Core, Guay and Rusticus (2005) also find a positive relation between the GIM index and next year's ROA. However, these authors do not take into account the endogeneity of the relationships among corporate governance, performance, capital structure, and corporate ownership structure.

[17] These findings are consistent with those of Core, Holthausen and Larcker (1999) who conclude that their governance measures "more consistently predict future accounting operating performance than future stock market performance."

indicate there is no significant or consistent relation between BCF's measure of governance and contemporaneous, next year's or the next two years' stock returns, or Tobin's Q.[18] [19]

The relation between TCL's measure of good governance and operating performance is detailed in Table 4, Panel C. While this relation is negative and statistically significant for the contemporaneous year, it is not significant for next year's and the next two years' operating performance.

Table 4, Panel D notes a negative but insignificant relation between Brown and Caylor's measure of good governance and operating performance. Since this index is available only for 2002, and we have operating data only through 2003, we do not report the relation between this index and next two years' operating performance.

In Table 4, Panel E, we note the relation between the dollar value of the median director's stock ownership and operating performance. We find a significant and positive relation between the dollar value of the median director's stock ownership and contemporaneous and next year's operating performance. This relation is positive but insignificant when we consider the operating performance of the next two years.

The relation between CEO-Chair duality and operating performance is documented in Table 4, Panel F. CEO-Chair duality is negatively and significantly related to contemporaneous, next year's and next two years' operating performance.[20] This result, along with the results for

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[18] For robustness, we also estimate the performance-governance relation for each of the seven governance measures using the fixed effects estimator. Some of these results are presented in Appendix C. The results are consistent with the results reported here. One positive feature of panel data and the fixed effects estimator is that if there are firm-specific time-invariant omitted variables in the estimated equation, the coefficients are estimated consistently. However, if the omitted variables are not stationary over time, the fixed effects estimated coefficients are inconsistent; see Wooldridge (2002). When the omitted variables are non-stationary, the instrumental variable technique can yield consistent estimates if the instruments are valid. As noted above, we use the Stock and Yogo (2004) weak instruments test to ascertain the validity of the instruments used in Table 4 and Appendix A.

[19] In Appendix B we find that the relation between the GIM governance index and abnormal stock returns is not robust to either the construction of the abnormal stock return, or the sample period.

[20] Note that the governance variable CEO-Chair duality is 1 if the CEO is Chair and 0 otherwise. Hence, a negative relation between CEO-Chair duality and performance is equivalent to a positive relation between CEO-Chair separation and performance.

GIM and BCF, suggests that greater managerial control leads to worse future operating performance.

The final panel in Table 4, Panel G, details the relation between board independence and performance. Board independence is negatively and significantly related to contemporaneous, next year's and next two years' operating performance. This result is surprising, especially considering the recent emphasis that has been placed on board independence by the NYSE and NASDAQ regulations; however, it is consistent with prior literature (for example, Hermalin and Weisbach (2003)).

In summary, these results demonstrate that certain complex measures of corporate governance – GIM and BCF – and certain simple measures – director ownership and CEO-chair separation – are positively associated with current and future operating performance. Other measures seem to be less reliable indicators of performance. It is also important to note that the estimation method used does matter in certain cases. For example, consider the performance-governance relationships estimated in Appendix A-2, Panel A. The OLS estimate indicates a significantly negative relation between the GIM index and next year's Tobin's Q, and the GIM index and next two years' Tobin's Q. However, the 2SLS estimate is positive but statistically insignificant for the one year Tobin's Q, and again positive but statistically insignificant for the two years' Tobin's Q. The Hausman (1978) specification test suggests that the 2SLS are more appropriate for inferences. Similarly, as detailed in Appendix A-2, Panel B, the OLS and 2SLS estimates for the relation between the BCF index and future Tobin's Q are statistically and economically different. Again, the Hausman (1978) specification test suggests that the 2SLS are more appropriate for inferences. For this reason, we believe it is important to rely on inferences after controlling for the endogeneity between governance and performance.

4.1 Economic significance of impact of governance on performance

Table 5 notes the elasticities for G-Index, E-Index, and median director ownership with respect to operating performance. We find that a 1% improvement in governance as measured by the G-Index is associated with a 0.854% change in operating performance in the current period, a 0.763% change in next year's operating performance, and a 0.287% change in the next two years' operating performance. The economic impacts for the E-Index and for director ownership are slightly lower for contemporaneous and next year's performance, and are about the same for the next two years' operating performance.

Table 2 indicates that the G-index and median director ownership are uncorrelated. This suggests that a composite measure of governance that combines the information contained in the G-index and median director ownership has the potential of being a more powerful predictor of operating performance, than either measure by itself. To ensure robustness, we consider the non-parametric (rank) information of these two governance measures. For each year, all firms are ranked from best to worst governed with respect to each of the two governance variables. We sum these two ranks to get a composite index (Composite G-Ownership index) for each year for each sample firm.[21] We find that a 1% improvement in governance as measured by the composite index is associated with a 1.874% change in operating performance in the current period, a 1.567% change in next year's operating performance, and a 1.520% change in the next two years' operating performance.

4.2 Robustness checks

4.2.1 k-class estimators

In the case of simultaneously determined variables, 2SLS can address this problem by using instrumental variables to obtain a predicted value of the endogenous regressor (Y), then

[21] Year 2002 has 1,301 sample firms, which means the highest possible Composite G-Ownership index is 2,602. The lowest possible Composite G-Ownership index is 2. The actual composite governance index varies from a low of 40 to a high of 2,594. We consider the natural logarithm of the Composite G-Ownership index because of its better distributional properties.

using this predicted value in the structural equation ($\hat{Y}$). There are estimators other than the 2SLS estimator, such as the *k*-class estimator that can address the endogeneity problem. The *k*-class of estimators are instrumental variables estimators where the predicted values used in the second stage structural equation take a special form; see Kennedy (2003) and Guggenberger (2005):

$$Y_i^* = (1-k)Y + k\hat{Y} .$$

For consistent estimates the probability limit of *k* must equal 1.[22]

The results in Table 6 with *k*=0 and with *k*=1 are identical to the results in Table 4, for OLS and 2SLS, respectively. Recall that in Table 4, we showed that, based on the Hausman specification test, 2SLS was preferred to OLS for all governance measures except for the Brown and Caylor GovScore measure. This means that there is some bias or inconsistency in the OLS estimation that is causing the OLS and 2SLS estimations to be different. By scanning down each column in Table 6, it is apparent that the *k*-class estimators produce a very slow, non-linear progression from the OLS results to the 2SLS results. Using the Hausman (1978) specification test, we compare each sequential estimation. For every measure of governance, the Hausman specification test indicates that the *k*=1.0 results are different from the *k*=0.9 result. This suggests that only using *k*=1.0 (2SLS) produces estimates that are completely free of simultaneity bias. As long as there is any part of the actual endogenous regressor used in the second stage structural regression, which is the case for *k* less than 1.0, the simultaneity bias causes the regression results to be inconsistent.

The results for next year's operating performance, next two years' operating performance, stock return and Tobin's Q (for contemporaneous and for the two additional time

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[22] Certain maximum likelihood estimators, such as the limited information maximum likelihood (LIML) and the full information maximum likelihood can also be included in the *k*-class. The results using these estimators are qualitatively similar to the 2SLS results.

periods) as the performance measures are consistent with the results reported in Table 4 and Appendix A..

4.2.2 Estimation of standard errors

Standard econometric textbooks note that OLS standard errors are biased when the residuals are correlated. In panel data, such as the one we consider here, residuals for a particular firm may be correlated across years, or for a particular year the residuals may be correlated across the sample firms. Two recent papers, Petersen (2005) and Wooldridge (2004) provide a careful analysis of the impact of correlated residuals on the bias in standard errors in panel data. We consider the suggestions of these authors in considering the robustness of our estimated performance-governance relationship to alternative standard error estimation methods.

Petersen (2005) notes, “In the presence of a fixed firm effect both OLS and Fama-MacBeth standard error estimates are biased down significantly. Clustered standard errors which account for clustering by firm produce estimates which are unbiased.” Table 7 summarizes the performance-governance relationship using OLS and clustered (Rogers) standard errors; these results are qualitatively similar to those in Table 4.

While Petersen’s work is quite helpful in understanding the standard error estimates for a single equation model, it is unclear how his conclusions might apply to a system of simultaneous equations. Note that both the economics and econometrics of the performance-governance relationship as analyzed above strongly suggests that this relationship needs to be estimated as a system of simultaneous equations as in (1a), (1b), (1c), and (1d). Appendix C Table Panels A and B summarize the performance-governance relationship using 2SLS and heteroscedasticity adjusted White and clustered (Rogers) standard errors, respectively. Again our inferences from these tables regarding the performance-relationship are similar to those from Table 4.

Appendix C Table Panels C and D summarize the performance-governance relationship using OLS with fixed effects estimator with firm and year fixed effects, and OLS with fixed effects estimator with clustered (Rogers) standard errors, respectively. Once again these results are qualitatively similar to those in Table 4.

4.2.3. Alternative measures of leverage

It is possible that the results reported above regarding the performance-governance relation are sensitive to the construction of the leverage variable. In the capital structure literature, there does not appear to be any agreed upon measure of leverage. For our primary analyses, we use the measure that appears frequently in corporate finance studies: All long term debt divided by assets. To test the sensitivity of our results to this definition of leverage, we run the analyses in Table 4 using five alternative definitions of leverage as detailed in Appendix D. Overall, this evidence suggests that our results regarding the relation between performance and governance are robust to alternative definitions of leverage.

5. Corporate governance and management turnover

The preceding analysis focused on the relation between governance and performance generally. However, governance scholars and commentators suggest that governance is especially critical in imposing discipline and providing fresh leadership when the corporation is performing particularly poorly. It is possible that governance matters most in only certain firm events, such as the decision to change senior management. For this reason, we study the relationship between governance, performance, and CEO turnover.

Using Compustat's Execucomp database, we identify 1,923 CEO changes from 1993 to 2003. Table 8 documents the number of disciplinary and non-disciplinary CEO turnovers during this period. Our criteria for classifying a CEO turnover as disciplinary or non-disciplinary is similar to that of Weisbach (1988), Gilson (1989), Huson, Parrino, and Starks (2001), and Farrell and Whidbee (2003). CEO turnover is classified as “non-disciplinary” if the CEO died, if the CEO was older than 63, if the change was the result of an announced transition plan, or if the CEO stayed on as chairman of the board for more than a year. CEO turnover is classified as “disciplinary” if the CEO resigned to pursue other interests, if the CEO was terminated, or if no specific reason is given.

We consider a multinomial logit regression.[23] The dependent variable is equal to 0 if no turnover occurred in a firm-year, 1 if the turnover was disciplinary, and 2 if the turnover was non-disciplinary. We consider the past two years' stock return as the performance measure. We estimate the following baseline equation:

$$\text{Type of CEO Turnover} = g_1\,(\text{Past 2 years' stock return}, Z_1, \varepsilon_1). \qquad (2a)$$

The Z_1 vector of controls includes CEO ownership, CEO age, CEO tenure, firm size, industry return and year dummy variables. These control variables are motivated by a substantial extant literature on performance and CEO turnover; for example, see Huson, Parrino, and Starks (2001), Farrell and Whidbee (2003), and Engel, Hayes and Wang (2003). To determine the role that governance plays in CEO turnover, we create an interactive variable that is equal to (Past 2 years' stock return *x* Governance). The reason behind this is that if the firm is performing adequately, good governance should not lead to CEO turnover; only when performance is poor do we expect better governed firms to be more likely to replace the CEO. To measure this effect, we estimate the following modified version of equation (2a):

$$\text{Type of CEO Turnover} = g_2\,(\text{Past 2 years' stock return, Governance, } (\text{Past 2 years' stock return } x \text{ Governance}), Z_1, \varepsilon_2). \qquad (2b)$$

Table 9 highlights the relation between different measures of governance and disciplinary CEO turnover. Table 9, Panel A, details the multinomial logit regression results for the determinants of disciplinary CEO turnover. Consider first the baseline results without governance

[23] We also considered a fixed effects logit estimator model. However, there are concerns regarding the bias of such an estimator. Greene (2004) documents that when the time periods in panel data are five or less (as is the case in this study), nonlinear estimation may produce coefficients that can be biased in the range of 32% to 68%.

variables in the regression. The baseline results indicate that a firm's stock market returns during the previous two years, CEO stock ownership, and CEO tenure are significantly negatively related to disciplinary CEO turnover; these findings are consistent with the prior literature noted above. Interestingly, we find that the prior two years' returns of similar firms in the industry is significantly positively related to disciplinary CEO turnover.

Does good governance have an impact on disciplinary CEO turnover directly, or is governance related to disciplinary turnover only in poorly performing companies? The results in Table 9, Panel A, shed light on this question. Note that when the governance variables are included, the prior return variable is not significant in five of the seven cases, suggesting that bad performance alone is not enough to lead to a change in senior management. Also note that the governance variable by itself is statistically not significant in most cases.[24] This suggests that good governance *per se* is not related to disciplinary turnover. The coefficient of the interactive term (Past 2 years' stock return *x* Governance) sheds light on the question whether governance is related to disciplinary turnover only for poorly performing firms. The interactive term suggests that good governance as measured by the dollar value of the median director's stock ownership and the percentage of directors who are independent, increases the probability of disciplinary turnover for poorly performing firms.[25] [26] Both the GIM and BCF measures of good governance are *negatively* related to the probability of disciplinary turnover for poorly performing firms. This suggests that better governed firms as measured by the GIM and BCF indices are *less* likely to experience disciplinary management turnover in spite of their poor performance. Finally, when

[24] The exceptions are: the TCL governance index which is positively related to disciplinary CEO turnover. Also, when the CEO is also the Chairman, he is less likely to experience disciplinary turnover.

[25] The finding of the probability of disciplinary CEO turnover (given poor prior firm performance) increasing with greater board independence is consistent with the extant literature, for example, see Fich and Shivdasani (2005), and Weisbach (1988).

[26] The economic importance of the dollar ownership of the median director is greater than board independence. We calculate the predicted probability of disciplinary and non-disciplinary turnover, using the coefficient estimates from Table 6. When all parameters are measured at their mean values, the probability of disciplinary turnover is 2.28% with the dollar ownership of the median director as the governance variable; this increases to 12.55% when the (Past Return *x* Director $ Ownership) interaction term decreases by one standard deviation. The corresponding probabilities are 2.90% and 7.96% for board independence.

the CEO is also the Chairman, he is more likely to experience disciplinary turnover *given* poor firm performance.

Table 9, Panel B, details the multinomial logit regression results for the determinants of non-disciplinary CEO turnover. We do not expect any relation between good governance and non-disciplinary CEO turnover both unconditionally, and conditional on poor prior performance; the results in Panel B are consistent with this.

5.1 Robustness checks

Due to data limitations the sample periods and sample sizes for the various governance measures are different in Table 9, Panels A and B. It is possible that the significant relationship between a governance measure and disciplinary turnover in a poorly performing firm may be sample-period specific, or is being influenced by the different sample sizes. To address this concern, we consider disciplinary turnovers only for the period 2000 through 2002 for all governance measures. The results are consistent with the results reported above.

It is possible that the board considers industry adjusted performance instead of firm performance in deciding whether to discipline the CEO. Results considering industry adjusted performance are similar to that reported above and are detailed in Appendix E.

6. Summary and conclusions

Our primary contribution to the literature is the consistent estimation of the relationship between corporate governance and performance, by taking into account the inter-relationships among corporate governance, management turnover, corporate performance, corporate capital structure, and corporate ownership structure. We make four additional contributions to the literature:

First, instead of considering just a single measure of governance (as prior studies in the literature have done), we consider seven different governance measures. We find that better governance as measured by the GIM and BCF indices, stock ownership of board members, and CEO-Chair separation is significantly positively correlated with better contemporaneous and subsequent *operating performance*. Additionally, better governance as measured by Brown and Caylor (that considers 52 separate charter provisions and board characteristics), and The Corporate Library (that considers over a hundred variables concerning board characteristics, management compensation policy, and antitakeover measures) is not significantly correlated with better contemporaneous or subsequent operating performance. Also, interestingly, board independence is *negatively* correlated with contemporaneous and subsequent operating performance. This is especially relevant in light of the prominence that board independence has received in the recent NYSE and NASDAQ corporate governance listing requirements. Finally, contrary to the claims in the literature, none of the governance measures are correlated with future stock market performance. We consider a battery of robustness checks including alternative estimates of the standard errors of our model's estimated coefficients. These robustness checks provide consistent results and increase our confidence in the performance-governance relation as noted above.

Second, in several instances our inferences regarding the performance-governance relation do depend on whether or not one takes into account the endogenous nature of the relation between governance and performance. For example, the OLS estimate indicates a significantly negative relation between the GIM index and next year's Tobin's Q, and the GIM index and next two years' Tobin's Q. However, the 2SLS estimate is positive but statistically insignificant for the one year Tobin's Q, and again positive and statistically insignificant for the two years' Tobin's Q. The Hausman (1978) specification test suggests that the 2SLS estimates are more appropriate for inferences. Similarly, the OLS and 2SLS estimates for the relation between the BCF index and future Tobin's Q are statistically and economically different. Again, the Hausman (1978) specification test suggests that the 2SLS estimates are more appropriate for inferences. In both cases the 2SLS results suggest no relationship between the GIM index and future Tobin's Q, and the BCF index and future Tobin's Q. For this reason, we believe it is important to rely on inferences after controlling for the endogeneity between governance and performance.

Third, given poor firm performance, the probability of disciplinary management turnover is positively correlated with stock ownership of board members, and with board independence. However, better governed firms as measured by the GIM and BCF indices are *less* likely to experience disciplinary management turnover in spite of their poor performance.

Fourth, this study proposes a governance measure, namely, dollar ownership of the board members, that is simple, intuitive, less prone to measurement error, and not subject to the problem of weighting a multitude of governance provisions in constructing a governance index. Consideration of this governance measure by future accounting and finance researchers would enhance the comparability of research findings.

Can a single board characteristic be as effective a measure of corporate governance as indices that consider multiple measures of corporate charter provisions, management compensation structure, and board characteristics? Corporate boards have the power to make, or at least, ratify all important decisions including decisions about investment policy, management compensation policy, and board governance itself. It is plausible that board members with appropriate stock ownership will have the *incentive* to provide effective monitoring and oversight of important corporate decisions noted above; hence board ownership can be a good proxy for overall good governance. Furthermore, the measurement error in measuring board ownership can be less than the total measurement error in measuring a multitude of board processes, compensation structure, and charter provisions. Finally, while board characteristics, corporate charter provisions, and management compensation features do characterize a company's governance, construction of a governance index requires that the above variables be weighted. The weights a particular index assigns to individual board characteristics, etc. is important. If the weights are not consistent with the weights used by informed market participants in assessing the relation between governance and firm performance, then incorrect inferences would be made regarding the relation between governance and firm performance.

The above findings have important implications for researchers, senior policy makers, and corporate boards: *Efforts to improve corporate governance should focus on stock ownership of board members* – since it is positively related to both future operating performance, and to the probability of disciplinary management turnover in poorly performing firms.

Proponents of board independence should note with caution the negative relation between board independence and future operating performance. Hence, if the purpose of board independence is to improve performance, then such efforts might be misguided. However, if the purpose of board independence is to discipline management of poorly performing firms, then board independence has merit. Even though the GIM and BCF good governance indices are positively related to future performance, policy makers and corporate boards should be cautious in their emphasis on the components of these indices since this might exacerbate the problem of entrenched management, especially in those situations where management should be disciplined, that is, in poorly performing firms. Finally, while the governance indices studied here have been popular in the U.S., similar indices are being constructed for companies in many emerging economies. We caution the producers and users of such indices about their pitfalls and potential usefulness.

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TABLE 1

Description of Variables

This table presents descriptions of variables used in this study. It also shows the years for which we have data available and the total number of observations we have of each variable. The full sample period is from 1990 to 2004.

Panel A: Governance Variables	*Years Available*	*Sample Size*
(A) GIM G-Index		
The G-Index is constructed from data compiled by the Investor Responsibility Research Center ("IRRC"), as described in Gompers, Ishii, Metrick (2003). A firm's score is based on the number of shareholder rights-decreasing provisions a firm has. The index ranges from a feasible low of 0 to a high of 24. A high G-Score is associated with weak shareholder rights, and a low G-Score is associated with strong shareholder rights.	*1990, 1993, 1995, 1998, 2000, 2002*	*10,121*
(B) BCF E-Index		
The E-Index is constructed from IRRC data as described in Bebchuk, Cohen, Ferrell (2004). It uses a 6-provision subset of the G-Index. The index ranges from a feasible low of 0 to a high of 6; a high score is associated with weak shareholder rights and a low score is associated with strong shareholder rights.	*1990, 1993, 1995, 1998, 2000, 2002*	*10,121*
(C) TCL Benchmark Score		
The Corporate Library is an independent investment research firm providing corporate governance data, analysis & risk assessment tools. The benchmark score is based on the following criteria: whether the board is classified, whether the outside directors constitute a majority on the board, whether the board has an independent chairman or lead director, whether the audit committee consists of only independent directors, whether the board has adopted a formal governance policy, number of directors with more than fifteen years tenure, number of directors who serve on more than four boards, number of directors older than seventy years old, and CEO compensation structure. The index ranges from a feasible low of 0 to a high of 100. A high score is associated with better governance.	*2001-2003*	*4,701*
(D) BC GovScore		
The GovScore is constructed from data compiled by Institutional Shareholder Services ("ISS"), as described in Brown, Caylor (2004). Fifty-two firm characteristics and provisions are used to assign a score to each firm. The feasible range of scores is from 0 to 52. A high score is associated with better corporate governance.	*2002*	*2,538*

Panel A: Governance Variables (continued)	Years Available	Sample Size
(E) Board Independence		
The number of unaffiliated independent directors divided by the total number of board members. This measure is constructed from data provided by IRRC and TCL.	*1996-2003*	*17,980*
(F) Median Director Dollar Value Ownership		
The dollar value of the stock ownership is calculated for all directors. We take the median director's holdings as the governance measure as this individual can be viewed as having the 'swing' vote in governance related matters. This variable is calculated from data provided by IRRC and TCL.	*1998-2002*	*6,126*
(G) Median Director Percent Value Ownership		
The percentage ownership of the firm's total voting power is calculated for all directors. We take the median director's ownership as the governance measure as this individual can be viewed as having the 'swing' vote in governance related matters. This variable is calculated from data provided by IRRC and TCL.	*1998-2002*	*6,126*
(H) CEO Chair-Duality		
A dummy variable equal to 1 if the CEO is also the chairman of the board. This measure is constructed from data provided by IRRC and TCL.	*1998-2002*	*12,521*
(I) Alternative Governance Measures		
In some anslyses, we consider three alternative measures of corporate governance: (1) the percentage of directors currently serving on more than four boards, (2) the percentage of directors who have served on the sample firm's board for more than fifteen years, (3) the percentage of directors who are older than seventy years old.	*1998-2002*	*15,964 to 17,993*

Panel B: Performance Variables	*Years Available*	*Sample Size*
(A) Return on Assets		
We measure ROA as operating income divided by end of year total assets (Compustat data item 6). In general, following Barber and Lyon (1996), we use operating income before depreciation (Compustat data item 13). Unless otherwise noted, this is our measure for ROA. In some cases, we use operating income after depreciation (Compustat data item 178). These cases are pointed out explicitly.	*1990-2004*	*21,681*
(B) Stock Return		
We use the CRSP monthly stock file to calculate one-year compound returns, including dividends.	*1990-2004*	*16,936*
(C) Tobin's Q		
We use the Tobin's Q measure as in Gompers, Ishii and Metrick(2003): (Book Value of Assets + Market Value of Common Stock - Book Value of Common Stock - Deferred Taxes) / Book Value of Assets.	*1990-2004*	*17,587*
(D) Last 2 Years Performance		
For ROA and Tobin's Q, we use the average measure for years t-2 and t-1. For Stock Return, we use the one-year compound return for years t-2 and t-1.	*1990-2004*	*16,228 - 19,922*
(E) Industry Performance		
For all industry performance measures, we calculate the mean performance for each SIC four-digit classification. We do this for ROA, return, and Tobin's Q as discussed above. One-year and two-year performance is calculated as above.	*1990-2004*	*18,503 - 21,902*

Panel C: Other Endogenous Variables	*Years Available*	*Sample Size*
(A) CEO Ownership		
The percent of the firm's stock owned by the CEO. This variable is constructed from the Execucomp database.	*1992-2003*	*13,044*
(B) Leverage		
Long term debt (data item 9) / Total Assets (data item 6).	*1990-2004*	*17,438*

Panel D: Other Variables	*Years Available*	*Sample Size*
(A) Assets		
Compustat data item 6	*1990-2004*	*24,255*
(B) Expenses		
R&D and Advertising Expenses / Total Assets. R&D is Compustat data item 46 and advertising is data item 45. Similar to Palia (2001), we use a dummy variable to identify firms for which this variable is not missing.	*1990-2004*	*21,230*
(C) Board Size		
The total number of directors, obtained from IRRC and TCL.	*1996-2003*	*17,993*
(D) CEO Age		
The age of the CEO, obtained from Execucomp and TCL.	*1992-2003*	*10,990*
(E) CEO Tenure		
The number of years the CEO has been CEO, obtained from Execucomp and TCL.	*1992-2003*	*10,651*
(F) Director Age		
The median director's age, obtained from IRRC and TCL.	*1998-2003*	*15,360*
(G) Director Tenure		
The number of years the median director has been on the board, obtained from IRRC and TCL.	*1998-2003*	*15,360*
(H) Risk		
The standard deviation of the monthly stock return for the five preceding years.	*1990-2004*	*15,272*

TABLE 2
Descriptive Statistics

This table presents the mean, median and number of observations for the primary performance, governance and control variables used in this study. Statistics for all available years and for 2002 only are presented.

	All Available Firm Years			2002 Only		
	Mean	**Median**	**# of Obs.**	**Mean**	**Median**	**# of Obs.**
A. Governance Variables						
Log $ Value, Median Director	15.264	13.289	6,126	14.090	12.564	1,482
Dollar value, median director	4,257,738	590,582	6,126	1,315,517	286,109	1,482
% holdings, median director	0.19%	0.04%	6,131	0.10%	0.02%	1,481
GIM G-Index	9.015	9.000	10,121	9.030	9.000	1,894
BCF E-Index	2.070	2.000	10,121	2.224	2.000	1,894
BC GovScore	22.469	22.000	2,538	22.469	22.000	2,538
TCL benchmark score	60.147	61.000	4,701	56.750	55.000	1,534
% independent directors	60.28%	64.71%	17,980	63.84%	66.67%	1,997
CEO-Chair duality	64.82%	100.00%	12,521	66.90%	100.00%	1,994
% directors, CEOs	25.93%	20.00%	17,993	25.44%	23.08%	1,997
% directors, on 4+ boards	4.82%	0.00%	16,052	6.34%	0.00%	1,997
% directors, 15+ years tenure	16.14%	0.00%	16,298	14.61%	9.09%	1,997
% directors, over 70	9.38%	0.00%	15,964	8.02%	0.00%	1,997
% directors, women	7.65%	7.14%	16,605	8.95%	9.09%	1,997
% directors, 0 shares	11.29%	0.00%	16,529	23.83%	11.11%	1,997
B. Performance Variables						
Return, annual	17.13%	12.76%	16,936	-12.99%	-10.75%	1,485
ROA, annual	13.80%	13.54%	21,681	11.00%	10.88%	1,680
Tobin's Q, annual	2.072	1.508	17,587	1.631	1.298	1,456
C. Other Variables						
CEO holdings, %	2.92%	0.34%	13,044	2.64%	0.31%	1,598
Leverage (Debt / Assets)	42.69%	43.21%	17,438	43.00%	44.29%	1,684
Assets (x $1,000,000)	1,341	1,226	24,255	2,704	2,293	1,727
CEO Age	54.628	55.000	10,990	54.942	55.000	1,744
CEO Tenure	8.859	7.909	10,651	6.491	4.000	2,143
Director tenure, average	7.534	5.060	19,718	8.761	8.300	1,920

TABLE 3

Correlation Coefficients

This table presents the correlation coefficients for the performance and governance variables. The performance variables are in Panel A and the governance variables are in Panel B. The Pearson correlation coefficients are above the diagonal and the Spearman rank correlation coefficients are below the diagonal. Significant coefficients at the 1%, 5%, and 10% levels are noted by ***, ** and *, respectively.

Panel A:

	Return	ROA	Tobin's Q
Return		0.345***	0.475***
ROA	0.321***		0.196***
Tobin's Q	0.58***	0.251***	

Panel B:

	GIM G-Index	BCF E-Index	TCL Benchmark Score	BC GovScore	% Inde-pendent	Director Holdings	CEO-Chair Duality
GIM G-Index		0.719***	-0.327***	-0.105***	0.275***	0.005	0.088***
BCF E-Index	0.726***		-0.358***	-0.161***	0.263***	-0.083***	0.062**
TCL Benchmark Score	-0.343***	-0.377***		0.314***	0.088***	-0.116***	-0.201***
BC GovScore	-0.11***	-0.169***	0.311***		0.354***	-0.013	0.089***
% Independent	0.286***	0.263***	0.069**	0.345***		-0.147***	0.183***
Director Holdings	0.013	-0.073***	-0.125***	-0.032	-0.141***		0.043*
CEO-Chair Duality	0.09***	0.068**	-0.179***	0.078**	0.194***	0.048*	

TABLE 4

Simultaneous Equations System Estimation, Performance Measured by Return on Assets

This table presents the coefficient estimates for performance, governance, CEO ownership, and leverage as estimated in the following system:

(1a) Performance = f_1(Ownership, Governance, Leverage, Log(Assets), Industry Performance, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Treasury Stock / Assets, ε_1),

(1b) Governance = f_2 (Performance, Ownership, Leverage, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Active CEOs on Board, ε_2)

(1c) Ownership = f_3 (Performance, Governance, Log(Assets), Leverage, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, CEO Tenure / CEO Age, ε_3)

(1d) Leverage = f_4 (Performance, Governance, Ownership, Industry Leverage, Log(Assets), (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Altman's Z-Score, ε_4)

Only the coefficients for governance, CEO ownership and leverage from the first equation (1a) are presented in the table since this is the primary relationship that this study is concerned with. Performance is measured by Return on Assets ("ROA"). Ownership is measured by the percent of stock owned by the CEO at time *t* in all panels ("CEO Own"). Leverage is measured as long term debt to assets. Governance is measured by a different variable in each panel. All governance variables are as of time *t*. In Panel A, the Gompers, Ishii and Metrick (2003) *G*-Index is used as the governance variable. In Panel B, the Bebchuk, Cohen and Ferrell (2004) *E*-Index is used as the governance variable. In Panel C, TCL Benchmark score is used as the governance variable. In Panel D, the Brown and Caylor (2004) GovScore is used as the governance variable (data is available only for 2002). In Panel E, the dollar value of the median director's stock holdings is used as the governance variable. In Panel F, a dummy variable equal to 1 if the CEO is also the Chair of the board, 0 otherwise, is used as the governance variable. In Panel G, the percent of directors who are independent is used as the governance variable. Results are presented using performance in time *t*, *t+1,* and *t+1 to t+2*. Each system is estimated using OLS, 2SLS, and 3SLS. The Hausman (1978) specification test is performed on each system to determine which estimation method is most appropriate. The null hypothesis is that the methods are equivalent, so the null is rejected for high *h*-statistics. The Stock and Yogo (2004) test for weak instruments is also performed. The *F*-statistics from the first-stage regression for each of the three potentially endogenous regressors in equation (1a) – Ownership, Governance and Leverage - are presented. If the *F*-statistic exceeds the critical value (using 5% bias) from Stock and Yogo (2004), the instruments are deemed to be valid. The number of observations used in each panel-performance period varies so to maximize the sample size for the panel-performance period. Coefficient estimates are presented, with *p*-values in parentheses.

TABLE 4 Panel A: Gompers, Ishii and Metrick (2003) G-Index is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

Contemporaneous Performance

OLS		*Estimate*	*p-value*
ROA =	Gov	-0.001	*(0.10)*
	CEO Own	0.05	*(0.01)*
	Leverage	-0.061	*(0.00)*
2SLS			
ROA =	Gov	-0.013	*(0.01)*
	CEO Own	0.18	*(0.02)*
	Leverage	-0.045	*(0.00)*
3SLS			
ROA =	Gov	-0.013	*(0.01)*
	CEO Own	0.19	*(0.02)*
	Leverage	-0.045	*(0.00)*

Sample Size 4,600

Next 1 Year Performance

OLS		*Estimate*	*p-value*
ROA =	Gov	-0.001	*(0.03)*
	CEO Own	0.07	*(0.00)*
	Leverage	-0.035	*(0.00)*
2SLS			
ROA =	Gov	-0.011	*(0.03)*
	CEO Own	0.32	*(0.00)*
	Leverage	-0.014	*(0.13)*
3SLS			
ROA =	Gov	-0.011	*(0.02)*
	CEO Own	0.33	*(0.00)*
	Leverage	-0.014	*(0.13)*

Sample Size 4,561

Next 2 Years Performance

OLS		*Estimate*	*p-value*
ROA =	Gov	-0.001	*(0.02)*
	CEO Own	0.02	*(0.10)*
	Leverage	-0.040	*(0.00)*
2SLS			
ROA =	Gov	-0.004	*(0.16)*
	CEO Own	0.09	*(0.07)*
	Leverage	-0.032	*(0.00)*
3SLS			
ROA =	Gov	-0.004	*(0.15)*
	CEO Own	0.09	*(0.06)*
	Leverage	-0.032	*(0.00)*

Sample Size 3,416

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	66.8	*(0.00)*	78.6	*(0.00)*	37.6	*(0.10)*
OLS v. 3SLS	48.7	*(0.01)*	69.2	*(0.00)*	103.40	*(0.00)*
2SLS v. 3SLS	19.9	*(0.87)*	18.0	*(0.92)*	31.6	*(0.29)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	35.5	9.53	34.0	9.53	24.7	9.53
CEO Own	215.21	9.53	232.02	9.53	172.11	9.53
Leverage	98.7	9.53	106.98	9.53	87.7	9.53

TABLE 4 Panel B: Bebchuk, Cohen and Ferrel (2004) E-Index is is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

		Contemporaneous Performance		Next 1 Year Performance		Next 2 Years Performance	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
ROA =	Gov	-0.004	*(0.00)*	-0.005	*(0.00)*	-0.002	*(0.00)*
	CEO Own	0.04	*(0.03)*	0.06	*(0.00)*	0.01	*(0.22)*
	Leverage	-0.059	*(0.00)*	-0.033	*(0.00)*	-0.039	*(0.00)*
2SLS							
ROA =	Gov	-0.034	*(0.01)*	-0.031	*(0.02)*	-0.015	*(0.07)*
	CEO Own	0.06	*(0.55)*	0.21	*(0.07)*	0.02	*(0.75)*
	Leverage	-0.038	*(0.00)*	-0.008	*(0.43)*	-0.028	*(0.00)*
3SLS							
ROA =	Gov	-0.037	*(0.00)*	-0.032	*(0.01)*	-0.017	*(0.04)*
	CEO Own	0.07	*(0.49)*	0.22	*(0.05)*	0.03	*(0.67)*
	Leverage	-0.038	*(0.00)*	-0.008	*(0.43)*	-0.028	*(0.00)*
Sample Size		4,600		4,561		3,416	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	74.1	*(0.00)*	96.5	*(0.00)*	40.1	*(0.06)*
OLS v. 3SLS	174.70	*(0.00)*	244.20	*(0.00)*	92.3	*(0.00)*
2SLS v. 3SLS	132.80	*(0.00)*	138.60	*(0.00)*	152.60	*(0.00)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	35.0	9.53	32.6	9.53	23.9	9.53
CEO Own	215.21	9.53	232.05	9.53	172.11	9.53
Leverage	98.7	9.53	106.98	9.53	87.7	9.53

TABLE 4 Panel C: TCL Benchmark Score is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

			Contemporaneous Performance		Next 1 Year Performance		Next 2 Years Performance	
			Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS	ROA =	Gov	0.00	*(0.05)*	0.00	*(0.26)*	0.00	*(0.56)*
		CEO Own	0.06	*(0.03)*	0.07	*(0.02)*	0.01	*(0.60)*
		Leverage	-0.043	*(0.00)*	-0.015	*(0.23)*	-0.036	*(0.00)*
2SLS	ROA =	Gov	-0.005	*(0.05)*	-0.003	*(0.27)*	-0.002	*(0.21)*
		CEO Own	-0.089	*(0.63)*	0.13	*(0.45)*	-0.037	*(0.78)*
		Leverage	-0.038	*(0.01)*	-0.004	*(0.77)*	-0.032	*(0.00)*
3SLS	ROA =	Gov	-0.005	*(0.04)*	-0.003	*(0.26)*	-0.002	*(0.22)*
		CEO Own	-0.090	*(0.62)*	0.13	*(0.45)*	-0.049	*(0.71)*
		Leverage	-0.038	*(0.01)*	-0.004	*(0.76)*	-0.032	*(0.00)*
Sample Size			2,199		2,138		977	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	38.2	*(0.09)*	31.9	*(0.28)*	14.6	*(0.98)*
OLS v. 3SLS	-5.26	-	11.8	*(1.00)*	79.7	*(0.00)*
2SLS v. 3SLS	0.65	*(1.00)*	1.01	*(1.00)*	8.00	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	25.5	9.53	20.4	9.53	13.8	9.53
CEO Own	102.33	9.53	100.48	9.53	50.3	9.53
Leverage	37.9	9.53	48.3	9.53	27.1	9.53

TABLE 4 ~~Panel D~~: Brown and Caylor (2004) GovScore is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

		Contemporaneous Performance		Next 1 Year Performance		Next 2 Years Performance
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	
ROA =	Gov	0.00	*(0.53)*	0.00	*(0.85)*	**NA**
	CEO Own	-0.141	*(0.00)*	0.08	*(0.05)*	
	Leverage	-0.041	*(0.01)*	-0.032	*(0.08)*	
2SLS						
ROA =	Gov	-0.004	*(0.60)*	-0.005	*(0.61)*	
	CEO Own	0.21	*(0.30)*	0.05	*(0.82)*	
	Leverage	-0.032	*(0.09)*	-0.024	*(0.29)*	
3SLS						
ROA =	Gov	-0.003	*(0.70)*	-0.005	*(0.65)*	
	CEO Own	0.20	*(0.33)*	0.00	*(0.98)*	
	Leverage	-0.032	*(0.08)*	-0.024	*(0.27)*	
Sample Size		811		773		

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value
OLS v. 2SLS	14.6	*(0.98)*	10.9	*(1.00)*
OLS v. 3SLS	6.63	*(1.00)*	71.8	*(0.00)*
2SLS v. 3SLS	24.1	*(0.68)*	-1.39	-

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value
Gov	8.40	9.53	6.05	9.53
CEO Own	28.5	9.53	30.2	9.53
Leverage	17.0	9.53	19.0	9.53

TABLE 4 Panel E: Log of Dollar Value of the median director's stock ownership is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

		Contemporaneous Performance		Next 1 Year Performance		Next 2 Years Performance	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
ROA =	Gov	0.01	*(0.00)*	0.01	*(0.00)*	0.00	*(0.00)*
	CEO Own	0.04	*(0.01)*	0.05	*(0.01)*	0.01	*(0.32)*
	Leverage	-0.038	*(0.00)*	-0.018	*(0.03)*	-0.034	*(0.00)*
2SLS							
ROA =	Gov	0.00	*(0.01)*	0.00	*(0.04)*	0.00	*(0.16)*
	CEO Own	0.21	*(0.00)*	0.28	*(0.00)*	0.11	*(0.01)*
	Leverage	-0.040	*(0.00)*	-0.017	*(0.06)*	-0.032	*(0.00)*
3SLS							
ROA =	Gov	0.00	*(0.02)*	0.00	*(0.08)*	0.00	*(0.18)*
	CEO Own	0.17	*(0.00)*	0.20	*(0.00)*	0.11	*(0.01)*
	Leverage	-0.038	*(0.00)*	-0.015	*(0.09)*	-0.032	*(0.00)*
Sample Size		5,101		5,053		3,814	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	127.70	*(0.00)*	148.60	*(0.00)*	42.9	*(0.04)*
OLS v. 3SLS	-2123.00	-	1.75	*(1.00)*	17.2	*(0.94)*
2SLS v. 3SLS	1407.00	*(0.00)*	6.64	*(1.00)*	-16.70	-

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	180.22	9.53	185.11	9.53	139.53	9.53
CEO Own	250.54	9.53	257.66	9.53	197.45	9.53
Leverage	96.5	9.53	107.23	9.53	92.7	9.53

TABLE 4 Panel F: CEO-Chair Duality (1 if CEO is Chair, 0 otherwise) is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

	Contemporaneous Performance				Next 1 Year Performance				Next 2 Years Performance			
			Estimate	*p-value*			*Estimate*	*p-value*			*Estimate*	*p-value*
OLS	ROA =	Gov	0.00	*(0.47)*	ROA =	Gov	0.00	*(0.88)*	ROA =	Gov	-0.004	*(0.04)*
		CEO Own	0.07	*(0.00)*		CEO Own	0.07	*(0.00)*		CEO Own	0.02	*(0.04)*
		Leverage	-0.054	*(0.00)*		Leverage	-0.033	*(0.00)*		Leverage	-0.039	*(0.00)*
2SLS	ROA =	Gov	-0.029	*(0.00)*	ROA =	Gov	-0.029	*(0.00)*	ROA =	Gov	-0.017	*(0.00)*
		CEO Own	0.34	*(0.00)*		CEO Own	0.41	*(0.00)*		CEO Own	0.14	*(0.00)*
		Leverage	-0.043	*(0.00)*		Leverage	-0.017	*(0.06)*		Leverage	-0.034	*(0.00)*
3SLS	ROA =	Gov	-0.028	*(0.00)*	ROA =	Gov	-0.028	*(0.00)*	ROA =	Gov	-0.017	*(0.00)*
		CEO Own	0.32	*(0.00)*		CEO Own	0.39	*(0.00)*		CEO Own	0.13	*(0.00)*
		Leverage	-0.041	*(0.00)*		Leverage	-0.016	*(0.07)*		Leverage	-0.033	*(0.00)*
Sample Size	5,101				5,053				3,814			

Hausman (1978) Specification Test:

	h-statistic	*p*-value	*h*-statistic	*p*-value	*h*-statistic	*p*-value
OLS v. 2SLS	126.10	*(0.00)*	158.10	*(0.00)*	78.0	*(0.00)*
OLS v. 3SLS	-539.00	-	0.16	*(1.00)*	-64.00	-
2SLS v. 3SLS	-26.10	-	-39.30	-	6.59	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value
Gov	164.59	9.53	177.21	9.53	164.80	9.53
CEO Own	250.54	9.53	257.71	9.53	197.54	9.53
Leverage	96.5	9.53	107.47	9.53	93.3	9.53

TABLE 4 Panel G: Percentage of directors who are independent is the governance measure ("Gov")
Return on Assets is the performance measure ("ROA")

		Contemporaneous Performance		Next 1 Year Performance		Next 2 Years Performance	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
ROA =	Gov	-0.045	*(0.00)*	-0.052	*(0.00)*	-0.020	*(0.00)*
	CEO Own	0.04	*(0.01)*	0.04	*(0.02)*	0.00	*(0.49)*
	Leverage	-0.055	*(0.00)*	-0.033	*(0.00)*	-0.040	*(0.00)*
2SLS							
ROA =	Gov	-0.131	*(0.00)*	-0.121	*(0.00)*	-0.068	*(0.01)*
	CEO Own	0.08	*(0.32)*	0.16	*(542.00)*	0.02	*(0.62)*
	Leverage	-0.054	*(0.00)*	-0.027	*(0.00)*	-0.037	*(0.00)*
3SLS							
ROA =	Gov	-0.130	*(0.00)*	-0.120	*(0.00)*	-0.068	*(0.01)*
	CEO Own	0.07	*(0.34)*	0.16	*(0.06)*	0.02	*(0.64)*
	Leverage	-0.054	*(0.00)*	-0.027	*(0.00)*	-0.037	*(0.00)*
Sample Size		5,101		5,053		3,814	

Hausman (1978) Specification Test:

	h-statistic	*p*-value	*h*-statistic	*p*-value	*h*-statistic	*p*-value
OLS v. 2SLS	78.6	*(0.00)*	68.5	*(0.00)*	36.3	*(0.13)*
OLS v. 3SLS	8.34	*(1.00)*	-3.18	-	-4.41	-
2SLS v. 3SLS	9.73	*(1.00)*	4.54	*(1.00)*	2.11	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value
Gov	160.33	9.53	161.12	9.53	118.53	9.53
CEO Own	250.54	9.53	257.71	9.53	197.54	9.53
Leverage	96.5	9.53	107.47	9.53	93.3	9.53

TABLE 5

Economic Significance of Governance Measures

In this table we report the elasticity of each significant governance measure, relative to operating performance ("ROA"). We include the following four governance measures for year *t*: Gompers, Ishii and Metrick's (2003) G-Index, Bebchuk, Cohen and Ferrell's (2004) E-Index, median director stock ownership, and the Composite G-Ownership Index which is constructed as follows: For each year, all firms are ranked from best to worst governed with respect to G-Index and median stock ownership, separately; we sum these two ranks to get the composite index for each year for each sample firm. Operating performance is measured by Return on Assets ("ROA") in three time periods: *t*, *t+1*, and *t+1 to t+2*. We calculate the elasticity using the coefficients reported in Table 4, and using the means and medians for each specific estimation sample. In Panel A, we report the elasticity using the mean values for governance and performance; in Panel B, we report the elasticity using the median values.

Panel A – Elasticity measured at means:

	ROA_t	ROA_{t+1}	$ROA_{t+1\ to\ t+2}$
GIM G-Index	0.854	0.763	0.287
BCF E-Index	0.583	0.529	0.266
Director Ownership	0.588	0.500	0.236
Composite G-Ownership Index	1.874	1.567	1.520

Panel B – Elasticity measured at medians:

	ROA_t	ROA_{t+1}	$ROA_{t+1\ to\ t+2}$
GIM G-Index	0.864	0.779	0.296
BCF E-Index	0.557	0.510	0.264
Director Ownership	0.607	0.516	0.244
Composite G-Ownership Index	1.967	1.645	1.611

TABLE 6

k-Class Estimators

In this table we report the results of estimating equation (1a) using different *k*-class estimators. We estimate equation (1) using contemporaneous operating performance ("ROA") and using the seven governance variables. The following governance variables are considered: the Gompers, Ishii and Metrick (2003) *G*-Index, the Bebchuk, Cohen and Ferrell (2004) *E*-Index, TCL Benchmark score, the Brown and Caylor (2004) GovScore (data is available only for 2002), the dollar value of the median director's stock holdings, a dummy variable equal to 1 if the CEO is also the Chair of the board, 0 otherwise, and, the percent of directors who are independent. We estimate equation (1) using a different value of *k* in each iteration, ranging from *k*=0.0 (OLS) to *k*=1.0 (2SLS), in increments of 0.1. We also report the 3SLS results for comparison. Each column presents the results for a single governance measure. Only the coefficients on the governance variable from equation (1a) are presented; *p*-values are in parentheses.

Contemporaneous Performance (ROA_t):

	GIM G-Index	BCF E-Index	TCL Benchmark Score	Brown & Caylor GovScore	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
k = 0.0 (OLS)	-0.001	-0.004	0.000	0.000	0.011	0.002	-0.045
	(0.10)	*(0.00)*	*(0.05)*	*(0.53)*	*(0.00)*	*(0.47)*	*(0.00)*
k = 0.1	-0.001	-0.005	0.000	0.000	0.011	0.002	-0.045
	(0.11)	*(0.00)*	*(0.06)*	*(0.54)*	*(0.00)*	*(0.55)*	*(0.00)*
k = 0.2	-0.001	-0.005	0.000	0.000	0.011	0.002	-0.046
	(0.11)	*(0.00)*	*(0.07)*	*(0.56)*	*(0.00)*	*(0.64)*	*(0.00)*
k = 0.3	-0.001	-0.005	-0.001	0.000	0.011	0.001	-0.047
	(0.12)	*(0.00)*	*(0.08)*	*(0.57)*	*(0.00)*	*(0.75)*	*(0.00)*
k = 0.4	-0.001	-0.005	-0.001	-0.001	0.011	0.001	-0.048
	(0.12)	*(0.00)*	*(0.09)*	*(0.58)*	*(0.00)*	*(0.89)*	*(0.00)*
k = 0.5	-0.001	-0.005	-0.001	-0.001	0.011	0.000	-0.050
	(0.12)	*(0.00)*	*(0.10)*	*(0.60)*	*(0.00)*	*(0.95)*	*(0.00)*
k = 0.6	-0.001	-0.005	-0.001	-0.001	0.011	-0.001	-0.053
	(0.12)	*(0.00)*	*(0.11)*	*(0.61)*	*(0.00)*	*(0.76)*	*(0.00)*
k = 0.7	-0.001	-0.006	-0.001	-0.001	0.010	-0.003	-0.056
	(0.12)	*(0.00)*	*(0.13)*	*(0.62)*	*(0.00)*	*(0.54)*	*(0.00)*
k = 0.8	-0.002	-0.006	-0.001	-0.001	0.010	-0.006	-0.062
	(0.11)	*(0.00)*	*(0.14)*	*(0.64)*	*(0.00)*	*(0.30)*	*(0.00)*
k = 0.9	-0.002	-0.008	-0.001	-0.001	0.009	-0.012	-0.074
	(0.09)	*(0.01)*	*(0.15)*	*(0.64)*	*(0.00)*	*(0.09)*	*(0.00)*
k = 1.0 (2SLS)	-0.013	-0.034	-0.005	-0.004	0.006	-0.029	-0.131
	(0.01)	*(0.01)*	*(0.05)*	*(0.60)*	*(0.01)*	*(0.00)*	*(0.00)*
3SLS	-0.013	-0.037	-0.005	-0.003	0.005	-0.028	-0.130
	(0.01)	*(0.00)*	*(0.04)*	*(0.70)*	*(0.02)*	*(0.00)*	*(0.00)*

TABLE 7

Robustness to Serial Correlation of Errors

In this table we report the results from estimating equation (1a) using different approaches to address the possibility of serially correlated errors. We consider the full system of equations in (1), but used different estimation methods than in Table 4 as necessary for each approach. We consider five different approaches. Here we report results using OLS and clustered (Rogers) standard errors. In Appendix C, Panel A, we report results using 2SLS and White standard errors. In Appendix C, Panel B, we report results using 2SLS and clustered (Rogers) standard errors. In Appendix C, Panel C we report results using OLS with fixed effects estimator with firm and year fixed effects. In Appendix C, Panel D we report results using OLS with fixed effects estimator with clustered (Rogers) standard errors. We consider operating performance ("ROA") in three time periods: contemporaneous (ROA_t), next year (ROA_{t+1}), and next two years ($ROA_{t+1 \text{ to } t+2}$). Each panel considers the following governance variables: the Gompers, Ishii and Metrick (2003) *G*-Index, the Bebchuk, Cohen and Ferrell (2004) *E*-Index, TCL Benchmark score, the Brown and Caylor (2004) GovScore (data is available only for 2002), the dollar value of the median director's stock holdings, a dummy variable equal to 1 if the CEO is also the Chair of the board, 0 otherwise, and, the percent of directors who are independent. Only the coefficients on the governance variable from equation (1a) are presented; *p*-values are in parentheses.

OLS and clustered (Rogers) standard errors:

	Governance Variable						
	GIM G-Index	BCF E-Index	TCL Benchmark Score	Brown & Caylor GovScore (OLS)	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
ROA$_t$	-0.001	-0.004	0.000	0.000	0.011	0.002	-0.045
	(0.31)	*(0.00)*	*(0.09)*	*(0.57)*	*(0.00)*	*(0.61)*	*(0.00)*
# of Observations	4,600	4,600	2,199	811	5,101	5,101	5,101
ROA$_{t+1}$	-0.001	-0.005	0.000	0.000	0.010	0.000	-0.052
	(0.19)	*(0.00)*	*(0.31)*	*(0.84)*	*(0.00)*	*(0.92)*	*(0.00)*
# of Observations	4,561	4,561	2,138	773	5,053	5,053	5,053
ROA$_{t+1 \text{ to } t+2}$	-0.001	-0.002	0.000	-	0.004	-0.004	-0.020
	(0.12)	*(0.00)*	*(0.60)*	-	*(0.00)*	*(0.12)*	*(0.00)*
# of Observations	3,416	3,416	977	-	3,814	3,814	3,814

TABLE 8
Reasons for CEO Turnover

This table presents the classifications for reasons why CEO turnover occurred in a specific year. Lexis-Nexis archives were reviewed to determine the stated reason for why a CEO left the firm. CEO turnover data was obtained from Compustat's Execucomp database. CEO Turnover is classified as "Non-disciplinary" if the CEO died, if the CEO was older than 63, if the change was the result of an announced transition plan, or if the CEO stayed on as chairman of the board for a nontrivial length of time. CEO Turnover is classified as "Disciplinary" if the CEO resigned to pursue other interests, if the CEO was fired, or if no specific reason is given.

	Non-Disciplinary Turnover					Disciplinary Turnover				
	(1)	(2)	(3)	(4)		(5)	(6)	(7)		
	Deceased	Older Than 63	Retired / Succession Plan	CEO Stayed as Chair	Corporate Control	Resigned	Terminated	No Reason Given	No Information	Total
1993	1	2	13	4	0	12	3	0	0	35
1994	1	13	45	28	2	23	2	1	0	115
1995	5	15	52	44	4	51	4	1	0	176
1996	3	12	54	44	4	38	5	1	4	165
1997	1	13	61	38	6	47	5	2	0	173
1998	4	17	57	40	17	57	5	3	1	201
1999	1	19	66	41	4	63	1	2	1	198
2000	3	14	81	45	8	84	5	3	1	244
2001	6	23	79	54	7	76	6	4	0	255
2002	3	17	36	44	1	72	9	0	0	182
2003	2	22	34	36	1	69	10	3	2	179
Total	**30**	**167**	**578**	**418**	**54**	**592**	**55**	**20**	**9**	**1,923**
% of Total	1.6%	8.7%	30.1%	21.7%	2.8%	30.8%	2.9%	1.0%	0.5%	

TABLE 9

Multinomial Logit Models for CEO Turnover

This table presents the results from multinomial logistic regressions estimating the probability of CEO Turnover. The dependent variables are type of CEO turnover: 1 = Disciplinary turnover, 2 = Non-disciplinary turnover, 0 = no turnover. No turnover is the baseline category. Baseline results are presented in the first column; all other columns present results including Governance and (Performance *x* Governance) variables. In Panels A to D, performance is measured as the compound stock return for the two years prior to the year of observation. The governance variables are described in Table 1. The other control variables are also described in Table 1. Year dummy variables are included but are not shown. Panel A presents the results for disciplinary turnover for all available years; Panel B presents the results for non-disciplinary turnover for all available years.

Panel A: Disciplinary Turnover

		Governance Variable						
	Baseline Performance	GIM G-Index	BCF E-Index	TCL Benchmark Score	BC GovScore	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
Intercept	-11.200	-9.424	-9.646	-4.917	-2.232	-2.753	-4.124	-3.673
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.25)*	*(0.00)*	*(0.00)*	*(0.00)*
Return, Last 2 years	-2.029	-0.404	-0.860	-4.390	-2.474	0.529	-1.526	0.234
	(0.00)	*(0.74)*	*(0.18)*	*(0.02)*	*(0.57)*	*(0.66)*	*(0.00)*	*(0.72)*
Industry Return, Last 2 years	1.079	1.506	1.514	0.961	1.353	1.051	1.058	1.101
	(0.00)	*(0.00)*	*(0.00)*	*(0.03)*	*(0.21)*	*(0.00)*	*(0.00)*	*(0.00)*
Governance	-	-0.009	0.023	0.019	-0.064	-0.031	-0.760	-0.414
	-	*(0.81)*	*(0.77)*	*(0.10)*	*(0.21)*	*(0.50)*	*(0.00)*	*(0.26)*
(Return, Last 2 years x Governance)	-	-0.220	-0.700	0.041	0.038	-0.208	-0.887	-3.559
	-	*(0.11)*	*(0.01)*	*(0.16)*	*(0.84)*	*(0.03)*	*(0.07)*	*(0.00)*
CEO Own %	-10.234	-6.135	-6.064	-7.636	-16.344	-9.316	-8.715	-10.924
	(0.00)	*(0.06)*	*(0.07)*	*(0.04)*	*(0.20)*	*(0.00)*	*(0.00)*	*(0.00)*
Size (Assets)	-0.079	-0.069	-0.069	-0.086	-0.226	-0.084	-0.037	-0.088
	(0.04)	*(0.25)*	*(0.25)*	*(0.10)*	*(0.06)*	*(0.09)*	*(0.41)*	*(0.03)*
CEO Age	0.011	0.018	0.019	0.032	0.051	0.015	0.012	0.011
	(0.28)	*(0.25)*	*(0.23)*	*(0.02)*	*(0.08)*	*(0.24)*	*(0.27)*	*(0.27)*
CEO Tenure	-0.029	-0.049	-0.048	-0.046	-0.042	-0.027	-0.031	-0.030
	(0.02)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.27)*	*(0.07)*	*(0.02)*	*(0.02)*
Years Included	1993-2003	1993 , '95, '98, '00, '02	1993 , '95, '98, '00, '02	2001-2003	2002	1998-2002	1996-2003	1996-2003
Sample Size	8,965	3,329	3,329	3,488	788	4,766	6,871	7,278

Panel B: Non-disciplinary Turnover

	Governance Variable							
	Baseline Performance	GIM G-Index	BCF E-Index	TCL Benchmark Score	BC GovScore	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
Intercept	-13.696	-11.506	-11.589	-10.011	-7.577	-9.809	-12.053	-11.665
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Return, Last 2 years	-0.333	0.327	0.113	-0.048	-1.744	-1.507	-0.268	0.229
	(0.05)	*(0.70)*	*(0.80)*	*(0.97)*	*(0.66)*	*(0.12)*	*(0.33)*	*(0.63)*
Industry Return, Last 2 years	0.187	0.562	0.564	-0.134	0.353	0.375	0.150	0.245
	(0.43)	*(0.12)*	*(0.12)*	*(0.71)*	*(0.70)*	*(0.18)*	*(0.57)*	*(0.32)*
Governance	-	0.014	0.070	0.005	-0.067	-0.016	-1.071	-0.071
	-	*(0.65)*	*(0.25)*	*(0.60)*	*(0.13)*	*(0.67)*	*(0.00)*	*(0.81)*
(Return, Last 2 years x Governance)	-	-0.064	-0.164	-0.004	0.045	0.081	0.040	-0.824
	-	*(0.50)*	*(0.38)*	*(0.82)*	*(0.79)*	*(0.22)*	*(0.90)*	*(0.27)*
CEO Own %	-19.271	-17.296	-17.090	-15.420	-8.386	-15.350	-18.282	-19.644
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.07)*	*(0.00)*	*(0.00)*	*(0.00)*
Size (Assets)	-0.015	-0.065	-0.062	-0.012	-0.073	0.001	0.059	-0.020
	(0.60)	*(0.15)*	*(0.17)*	*(0.77)*	*(0.43)*	*(0.97)*	*(0.06)*	*(0.51)*
CEO Age	0.133	0.133	0.133	0.130	0.123	0.129	0.136	0.136
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
CEO Tenure	0.018	0.016	0.017	0.028	0.022	0.010	0.011	0.013
	(0.00)	*(0.10)*	*(0.09)*	*(0.00)*	*(0.26)*	*(0.19)*	*(0.14)*	*(0.06)*
Years Included	1993-2003	1993 , '95, '98, '00, '02	1993 , '95, '98, '00, '02	2001-2003	2002	1998-2002	1996-2003	1996-2003
Sample Size	8,965	3,329	3,329	3,488	788	4,766	6,871	7,278

Appendices A - E

Not intended for publication. Will be made available to the interested reader from the authors and/or from the **Journal** website.

Appendix A.. Governance, stock returns and Tobin's Q

Appendix Table A-1 is similar to Table 4, except that the appendix table considers stock returns as the performance measure. As noted earlier, if investors anticipate the corporate governance effect on performance, long-term stock returns will not be significantly correlated with governance even if a significant correlation between performance and governance indeed exists. (In Table 4, the performance measure was based on accounting data: return on assets.)

Appendix Table A-1, Panel A indicates there is no consistent or significant relation between GIM's measure of governance and contemporaneous, next year's or the next two years' stock returns. Appendix Table A-1, Panels B through G indicate there is no consistent or significant relation between the other measures of governance considered in this study (BCF index, TCL index, Brown and Caylor index, director stock ownership, CEO/Chair duality, and board independence) and contemporaneous, next year's or the next two years' stock returns.

Appendix Table A-2 is similar to Table 4, except that this appendix table considers Tobin's Q as the performance measure. The results in Appendix Table A-2, Panels A through G indicate there is no consistent or significant relation between the measures of governance considered in this study (GIM index, BCF index, TCL index, Brown and Caylor index, director stock ownership, CEO/Chair duality, and board independence) and contemporaneous, next year's or the next two years' Tobin's Q.

We note that the method for estimating the system of simultaneous equations does matter. For example, in Appendix Table A-2, Panel A, the OLS estimates suggest a significant relationship between the GIM index and Tobin's Q, whereas the 2SLS estimates indicate no significant relationship between the GIM index and Tobin's Q. The Hausman test indicates that the 2SLS estimates are better specified. Again, in Appendix Table A-2, Panel B, the OLS estimates suggest a significant relationship between the BCF index and Tobin's Q, whereas the 2SLS estimates indicate no significant relationship between the BCF index and Tobin's Q. Once again, the Hausman test indicates that the 2SLS estimates are better specified.

Appendix A-1 Table

Simultaneous Equations System Estimation, Performance Measured by Stock Return

This table presents the coefficient estimates for performance, governance CEO ownership, and leverage as estimated in the following system:

(1a) Performance = f_1(Ownership, Governance, Leverage, Log(Assets), Industry Performance, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Treasury Stock / Assets, ε_1),

(1b) Governance = f_2 (Performance, Ownership, Leverage, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Active CEOs on Board, ε_2)

(1c) Ownership = f_3 (Performance, Governance, Log(Assets), Leverage, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, CEO Tenure / CEO Age, ε_3)

(1d) Leverage = f_4 (Performance, Governance, Ownership, Industry Leverage, Log(Assets), (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Altman's Z-Score, ε_4)

Only the coefficients for governance, CEO ownership and leverage from the first equation (1a) are presented in the table since this is the primary relationship that this study is concerned with. Performance is measured by stock return ("Return"). Ownership is measured by the percent of stock owned by the CEO at time *t* in all panels ("CEO Own"). Leverage is measured as long term debt to assets. Governance is measured by a different variable in each panel. All governance variables are as of time *t*. In Panel A, the Gompers, Ishii and Metrick (2003) *G*-Index is used as the governance variable. In Panel B, the Bebchuk, Cohen and Ferrell (2004) *E*-Index is used as the governance variable. In Panel C, TCL Benchmark score is used as the governance variable. In Panel D, the Brown and Caylor (2004) GovScore is used as the governance variable (data is available only for 2002). In Panel E, the dollar value of the median director's stock holdings is used as the governance variable. In Panel F, a dummy variable equal to 1 if the CEO is also the Chair of the board, 0 otherwise, is used as the governance variable. In Panel G, the percent of directors who are independent is used as the governance variable. Results are presented using performance in time *t*, *t+1,* and *t+1 to t+2*. Each system is estimated using OLS, 2SLS, and 3SLS. The Hausman (1978) specification test is performed on each system to determine which estimation method is most appropriate. The null hypothesis is that the methods are equivalent, so we reject the null for high *h*-statistics. The Stock and Yogo (2004) test for weak instruments is also performed. The *F*-statistics from the first-stage regression for each of the three potentially endogenous regressors in equation (1a) – Ownership, Governance and Leverage - are presented. If the *F*-statistic exceeds the critical value (using 5% bias) from Stock and Yogo (2004), the instruments are deemed to be valid. The number of observations used in each panel-performance period varies so to maximize the sample size for the panel-performance period. Coefficient estimates are presented, with *p*-values in parentheses.

Appendix A-1 Panel A: Gompers, Ishii and Metrick (2003) G-Index is the governance measure ("Gov")

Stock return is the performance measure ("Return")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
Return =	Gov	-0.003	*(0.37)*	-0.003	*(0.44)*	-0.002	*(0.26)*
	CEO Own	0.215	*(0.13)*	-0.054	*(0.71)*	-0.072	*(0.23)*
	Leverage	-0.091	*(0.12)*	0.023	*(0.70)*	-0.105	*(0.00)*
2SLS							
Return =	Gov	-0.010	*(0.75)*	-0.013	*(0.71)*	-0.007	*(0.64)*
	CEO Own	0.436	*(0.42)*	0.195	*(0.73)*	0.599	*(0.02)*
	Leverage	-0.075	*(0.22)*	0.044	*(0.49)*	-0.065	*(0.17)*
3SLS							
Return =	Gov	-0.012	*(0.72)*	-0.014	*(0.69)*	-0.007	*(0.64)*
	CEO Own	0.459	*(0.39)*	0.211	*(0.71)*	0.615	*(0.02)*
	Leverage	-0.075	*(0.22)*	0.044	*(0.49)*	-0.065	*(0.02)*
Sample Size		4,631		4,596		3,439	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	27.86	*(0.47)*	25.49	*(0.60)*	41.57	*(0.05)*
OLS v. 3SLS	134.40	*(0.00)*	39.88	*(0.07)*	52.33	*(0.00)*
2SLS v. 3SLS	42.94	*(0.04)*	54.24	*(0.00)*	17.03	*(0.95)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	35.52	9.53	34.20	9.53	24.97	9.53
CEO Own	214.90	9.53	232.24	9.53	172.70	9.53
Leverage	98.46	9.53	107.72	9.53	87.53	9.53

Appendix A-1 Panel B: Bebchuk, Cohen and Ferrel (2004) E-Index is is the governance measure ("Gov")

Stock return is the performance measure ("Return")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
Return =	Gov	-0.003	*(0.66)*	0.001	*(0.89)*	-0.001	*(0.70)*
	CEO Own	0.218	*(0.12)*	-0.038	*(0.80)*	-0.068	*(0.25)*
	Leverage	-0.091	*(0.11)*	0.020	*(0.73)*	-0.106	*(0.00)*
2SLS							
Return =	Gov	-0.044	*(0.59)*	-0.021	*(0.81)*	-0.001	*(0.97)*
	CEO Own	0.210	*(0.78)*	0.177	*(0.83)*	0.674	*(0.08)*
	Leverage	-0.063	*(0.35)*	0.046	*(0.52)*	-0.068	*(0.02)*
3SLS							
Return =	Gov	-0.053	*(0.52)*	-0.022	*(0.81)*	0.000	*(0.99)*
	CEO Own	0.271	*(0.72)*	0.183	*(0.82)*	0.669	*(0.08)*
	Leverage	-0.062	*(0.36)*	0.046	*(0.52)*	-0.069	*(0.02)*
Sample Size		4,631		4,596		3,439	

Hausman (1978) Specification Test:

	h-statistic	*p*-value	*h*-statistic	*p*-value	*h*-statistic	*p*-value
OLS v. 2SLS	29.51	*(0.39)*	26.03	*(0.57)*	42.78	*(0.04)*
OLS v. 3SLS	425.20	*(0.00)*	395.40	*(0.00)*	99.97	*(0.00)*
2SLS v. 3SLS	174.00	*(0.00)*	245.80	*(0.00)*	-52.20	-

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value
Gov	35.29	9.53	32.89	9.53	24.41	9.53
CEO Own	214.90	9.53	232.24	9.53	172.70	9.53
Leverage	98.46	9.53	107.72	9.53	87.53	9.53

Appendix A-1 Panel C: TCL Benchmark Score is the governance measure ("Gov")

Stock return is the performance measure ("Return")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
Return =	Gov	0.001	*(0.65)*	0.002	*(0.14)*	0.001	*(0.47)*
	CEO Own	-0.062	*(0.67)*	0.038	*(0.81)*	-0.043	*(0.67)*
	Leverage	0.075	*(0.18)*	0.174	*(0.01)*	-0.098	*(0.01)*
2SLS							
Return =	Gov	-0.018	*(0.12)*	0.000	*(0.97)*	0.003	*(0.64)*
	CEO Own	-1.308	*(0.12)*	-0.948	*(0.30)*	0.564	*(0.28)*
	Leverage	0.075	*(0.22)*	0.152	*(0.03)*	-0.081	*(0.05)*
3SLS							
Return =	Gov	-0.020	*(0.09)*	0.000	*(0.97)*	0.003	*(0.66)*
	CEO Own	-1.326	*(0.12)*	-0.951	*(0.30)*	0.580	*(0.26)*
	Leverage	0.070	*(0.26)*	0.152	*(0.03)*	-0.081	*(0.04)*
Sample Size		2,218		2,159		984	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	56.71	*(0.00)*	51.10	*(0.00)*	17.39	*(0.94)*
OLS v. 3SLS	-2.36	-	11.68	*(1.00)*	-10.50	-
2SLS v. 3SLS	4.94	*(1.00)*	0.35	*(1.00)*	-15.30	-

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	25.56	9.53	20.23	9.53	13.79	9.53
CEO Own	102.33	9.53	100.62	9.53	50.53	9.53
Leverage	37.84	9.53	48.49	9.53	27.36	9.53

Appendix A-1 Panel D: Brown and Caylor (2004) GovScore is the governance measure ("Gov")

Stock return is the performance measure ("Return")

Contemporaneous Performance				**Next 1 Year Performance**			
OLS		*Estimate*	*p-value*	**OLS**		*Estimate*	*p-value*
Return =	Gov	0.001	*(0.76)*	Return =	Gov	0.007	*(0.09)*
	CEO Own	0.037	*(0.79)*		CEO Own	-0.294	*(0.23)*
	Leverage	-0.072	*(0.21)*		Leverage	0.189	*(0.05)*
2SLS				**2SLS**			
Return =	Gov	0.011	*(0.73)*	Return =	Gov	-0.049	*(0.41)*
	CEO Own	1.190	*(0.11)*		CEO Own	-2.552	*(0.07)*
	Leverage	-0.024	*(0.71)*		Leverage	0.166	*(0.17)*
3SLS				**3SLS**			
Return =	Gov	0.025	*(0.40)*	Return =	Gov	-0.099	*(0.04)*
	CEO Own	1.600	*(0.03)*		CEO Own	-4.831	*(0.00)*
	Leverage	-0.018	*(0.78)*		Leverage	0.167	*(0.16)*
Sample Size	842			Sample Size	806		

Hausman (1978) Specification Test:

	h-statistic	*p*-value		*h*-statistic	*p*-value
OLS v. 2SLS	26.83	*(0.53)*	OLS v. 2SLS	14.91	*(0.98)*
OLS v. 3SLS	2.73	*(1.00)*	OLS v. 3SLS	-147.00	-
2SLS v. 3SLS	6.77	*(1.00)*	2SLS v. 3SLS	81.75	*(0.00)*

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value		First-Stage *F*-Statistic	Critical Value
Gov	8.70	9.53	Gov	5.90	9.53
CEO Own	28.91	9.53	CEO Own	30.43	9.53
Leverage	19.22	9.53	Leverage	18.80	9.53

Appendix A-1 Panel E: Log of Dollar Value of the median director's stock ownership is the governance measure ("Gov")

Stock return is the performance measure ("Return")

		Contemporaneous Performance		Next 1 Year Performance		Next 2 Years Performance	
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
Return =	Gov	0.058	*(0.00)*	-0.020	*(0.00)*	-0.008	*(0.00)*
	CEO Own	0.024	*(0.86)*	0.009	*(0.95)*	-0.005	*(0.92)*
	Leverage	-0.035	*(0.52)*	0.020	*(0.71)*	-0.103	*(0.00)*
2SLS							
Return =	Gov	0.012	*(0.44)*	0.008	*(0.64)*	0.003	*(0.72)*
	CEO Own	0.271	*(0.54)*	0.125	*(0.79)*	0.597	*(0.00)*
	Leverage	-0.084	*(0.14)*	0.068	*(0.25)*	-0.056	*(0.03)*
3SLS							
Return =	Gov	0.014	*(0.37)*	0.005	*(0.77)*	0.002	*(0.76)*
	CEO Own	0.512	*(0.24)*	-0.309	*(0.51)*	0.592	*(0.00)*
	Leverage	-0.091	*(0.11)*	0.075	*(0.20)*	-0.056	*(0.03)*
Sample Size		5,163		5,117		3,839	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	78.76	*(0.00)*	140.00	*(0.00)*	59.70	*(0.00)*
OLS v. 3SLS	1905.00	*(0.00)*	1099.00	*(0.00)*	34.95	*(0.17)*
2SLS v. 3SLS	490.60	*(0.00)*	664.90	*(0.00)*	-32.10	-

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	181.03	9.53	185.81	9.53	142.46	9.53
CEO Own	250.32	9.53	257.80	9.53	198.01	9.53
Leverage	97.07	9.53	107.89	9.53	92.88	9.53

Appendix A-1 Panel F: CEO / Chair Duality (1 if CEO is Chair, 0 otherwise) is the governance measure ("Gov")

Stock return is the performance measure ("Return")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
Return =	Gov	0.011	*(0.59)*	-0.007	*(0.75)*	-0.003	*(0.75)*
	CEO Own	0.180	*(0.18)*	-0.048	*(0.72)*	-0.032	*(0.57)*
	Leverage	-0.103	*(0.06)*	0.049	*(0.37)*	-0.090	*(0.00)*
2SLS							
Return =	Gov	-0.024	*(0.70)*	-0.064	*(0.29)*	-0.025	*(0.30)*
	CEO Own	0.502	*(0.18)*	0.371	*(0.34)*	0.632	*(0.00)*
	Leverage	-0.092	*(0.11)*	0.068	*(0.24)*	-0.058	*(0.02)*
3SLS							
Return =	Gov	-0.025	*(0.69)*	-0.058	*(0.34)*	-0.024	*(0.32)*
	CEO Own	0.522	*(0.16)*	0.200	*(0.60)*	-0.632	*(0.00)*
	Leverage	-0.091	*(0.11)*	0.068	*(0.23)*	-0.057	*(0.02)*
Sample Size		5,163		5,117		3,839	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	98.65	*(0.00)*	137.40	*(0.00)*	81.80	*(0.00)*
OLS v. 3SLS	-89.00	-	-578.00	-	-21.90	-
2SLS v. 3SLS	30.69	*(0.33)*	82.09	*(0.00)*	3.20	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	164.62	9.53	176.18	9.53	165.89	9.53
CEO Own	250.32	9.53	257.84	9.53	198.10	9.53
Leverage	97.07	9.53	108.13	9.53	93.50	9.53

Appendix A-1 Panel G: Percentage of directors who are independent is the governance measure ("Gov")

Stock return is the performance measure ("Return")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
Return =	Gov	-0.036	*(0.44)*	-0.038	*(0.42)*	-0.038	*(0.04)*
	CEO Own	0.162	*(0.23)*	-0.076	*(0.57)*	-0.062	*(0.28)*
	Leverage	-0.104	*(0.06)*	0.048	*(0.38)*	-0.091	*(0.00)*
2SLS							
Return =	Gov	-0.157	*(0.53)*	-0.250	*(0.33)*	-0.092	*(0.40)*
	CEO Own	0.197	*(0.73)*	-0.172	*(0.76)*	0.474	*(0.07)*
	Leverage	-0.105	*(0.08)*	0.047	*(0.43)*	-0.063	*(0.01)*
3SLS							
Return =	Gov	-0.154	*(0.54)*	-0.249	*(0.33)*	-0.092	*(0.40)*
	CEO Own	0.179	*(0.75)*	-0.181	*(0.75)*	0.474	*(0.07)*
	Leverage	-0.104	*(0.08)*	0.047	*(0.43)*	-0.063	*(0.01)*
Sample Size		5,163		5,117		3,839	

Hausman (1978) Specification Test:

	h-statistic	*p*-value	*h*-statistic	*p*-value	*h*-statistic	*p*-value
OLS v. 2SLS	63.84	*(0.00)*	49.73	*(0.01)*	43.91	*(0.03)*
OLS v. 3SLS	14.17	*(0.99)*	-6.08	-	-16.60	-
2SLS v. 3SLS	16.00	*(0.97)*	9.94	*(1.00)*	0.48	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value
Gov	163.69	9.53	160.48	9.53	119.29	9.53
CEO Own	250.32	9.53	257.84	9.53	198.10	9.53
Leverage	97.07	9.53	108.13	9.53	93.50	9.53

Appendix A-2 Table

Simultaneous Equations System Estimation, Performance Measured by Tobin's Q

This table presents the coefficient estimates for performance, governance CEO ownership, and leverage as estimated in the following system:

(1a) Performance = f_1(Ownership, Governance, Leverage, Log(Assets), Industry Performance, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Treasury Stock / Assets, ε_1),

(1b) Governance = f_2 (Performance, Ownership, Leverage, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Active CEOs on Board, ε_2)

(1c) Ownership = f_3 (Performance, Governance, Log(Assets), Leverage, (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, CEO Tenure / CEO Age, ε_3)

(1d) Leverage = f_4 (Performance, Governance, Ownership, Industry Leverage, Log(Assets), (R&D and Advertising Expenses) / Assets, Board Size, Stock Volatility, Altman's Z-Score, ε_4)

Only the coefficients for governance, CEO ownership and leverage from the first equation (1a) are presented in the table since this is the primary relationship that this study is concerned with. Performance is measured by Tobin's Q ("Q"). Ownership is measured by the percent of stock owned by the CEO at time *t* in all panels ("CEO Own"). Leverage is measured as long term debt to assets. Governance is measured by a different variable in each panel. All governance variables are as of time *t*. In Panel A, the Gompers, Ishii and Metrick (2003) *G*-Index is used as the governance variable. In Panel B, the Bebchuk, Cohen and Ferrell (2004) *E*-Index is used as the governance variable. In Panel C, TCL Benchmark score is used as the governance variable. In Panel D, the Brown and Caylor (2004) GovScore is used as the governance variable (data is available only for 2002). In Panel E, the dollar value of the median director's stock holdings is used as the governance variable. In Panel F, a dummy variable equal to 1 if the CEO is also the Chair of the board, 0 otherwise, is used as the governance variable. In Panel G, the percent of directors who are independent is used as the governance variable. Results are presented using performance in time *t*, *t+1,* and *t+1 to t+2*. Each system is estimated using OLS, 2SLS, and 3SLS. The Hausman (1978) specification test is performed on each system to determine which estimation method is most appropriate. The null hypothesis is that the methods are equivalent, so we reject the null for high *h*-statistics. The Stock and Yogo (2004) test for weak instruments is also performed. The *F*-statistics from the first-stage regression for each of the three potentially endogenous regressors in equation (1a) – Ownership, Governance and Leverage - are presented. If the *F*-statistic exceeds the critical value (using 5% bias) from Stock and Yogo (2004), the instruments are deemed to be valid. The number of observations used in each panel-performance period varies so to maximize the sample size for the panel-performance period. Coefficient estimates are presented, with *p*-values in parentheses.

Appendix A-2 Panel A: Gompers, Ishii and Metrick (2003) G-Index is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
Q =	Gov	-0.063	*(0.00)*	-0.045	*(0.00)*	-0.034	*(0.00)*
	CEO Own	0.865	*(0.07)*	0.487	*(0.24)*	0.694	*(0.13)*
	Leverage	-2.938	*(0.00)*	-2.656	*(0.00)*	-2.656	*(0.00)*
2SLS							
Q =	Gov	0.118	*(0.27)*	0.156	*(0.11)*	0.112	*(0.29)*
	CEO Own	9.164	*(0.00)*	10.163	*(0.00)*	11.801	*(0.00)*
	Leverage	-2.776	*(0.00)*	-2.415	*(0.00)*	-2.232	*(0.00)*
3SLS							
Q =	Gov	0.155	*(0.14)*	0.164	*(0.10)*	0.124	*(0.24)*
	CEO Own	9.466	*(0.00)*	10.208	*(0.00)*	12.080	*(0.00)*
	Leverage	-2.779	*(0.00)*	-2.410	*(0.00)*	-2.225	*(0.00)*
Sample Size		3,974		3,941		2,913	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	43.95	*(0.03)*	57.51	*(0.00)*	61.74	*(0.00)*
OLS v. 3SLS	-20.20	-	-10.20	-	-4.71	-
2SLS v. 3SLS	-20.20	-	-4.10	-	4.01	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	31.37	9.53	29.40	9.53	20.66	9.53
CEO Own	188.40	9.53	202.11	9.53	145.53	9.53
Leverage	132.73	9.53	138.85	9.53	107.18	9.53

Appendix A-2 Panel B: Bebchuk, Cohen and Ferrel (2004) E-Index is is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

Contemporaneous Performance				**Next 1 Year Performance**				**Next 2 Years Performance**			
OLS		*Estimate*	*p-value*	**OLS**		*Estimate*	*p-value*	**OLS**		*Estimate*	*p-value*
Q =	Gov	-0.186	*(0.00)*	Q =	Gov	-0.143	*(0.00)*	Q =	Gov	-0.124	*(0.00)*
	CEO Own	0.493	*(0.30)*		CEO Own	0.177	*(0.67)*		CEO Own	0.378	*(0.42)*
	Leverage	-2.849	*(0.00)*		Leverage	-2.588	*0.00*		Leverage	-2.589	*(0.00)*
2SLS				**2SLS**				**2SLS**			
Q =	Gov	0.007	*(0.98)*	Q =	Gov	0.242	*(0.33)*	Q =	Gov	0.230	*(0.42)*
	CEO Own	0.658	*(0.00)*		CEO Own	10.244	*(0.00)*		CEO Own	12.438	*(0.00)*
	Leverage	-2.728	*(0.00)*		Leverage	-2.474	*(0.00)*		Leverage	-2.304	*(0.00)*
3SLS				**3SLS**				**3SLS**			
Q =	Gov	0.012	*(0.96)*	Q =	Gov	0.227	*(0.36)*	Q =	Gov	0.251	*(0.37)*
	CEO Own	7.785	*(0.00)*		CEO Own	9.986	*(0.00)*		CEO Own	12.680	*(0.00)*
	Leverage	-2.736	*(0.00)*		Leverage	-2.469	*(0.00)*		Leverage	-2.318	*(0.00)*
Sample Size	3,974			Sample Size	3,941			Sample Size	2,913		

Hausman (1978) Specification Test:

	h-statistic	*p*-value		*h*-statistic	*p*-value		*h*-statistic	*p*-value
OLS v. 2SLS	140.61	*(0.00)*	OLS v. 2SLS	53.86	*(0.00)*	OLS v. 2SLS	62.13	*(0.00)*
OLS v. 3SLS	40.94	*(0.05)*	OLS v. 3SLS	27.95	*(0.47)*	OLS v. 3SLS	41.17	*(0.05)*
2SLS v. 3SLS	8.63	*(1.00)*	2SLS v. 3SLS	-9.38	-	2SLS v. 3SLS	5.71	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value		First-Stage *F*-Statistic	Critical Value		First-Stage *F*-Statistic	Critical Value
Gov	30.93	9.53	Gov	29.39	9.53	Gov	21.45	9.53
CEO Own	188.40	9.53	CEO Own	202.11	9.53	CEO Own	145.53	9.53
Leverage	132.73	9.53	Leverage	138.85	9.53	Leverage	107.18	9.53

Appendix A-2 Panel C: TCL Benchmark Score is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
OLS		*Estimate*	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
Q =	Gov	-0.012	*(0.00)*	0.003	*(0.38)*	-0.004	*(0.33)*
	CEO Own	-0.717	*(0.10)*	0.631	*(0.10)*	0.297	*(0.59)*
	Leverage	-1.876	*(0.00)*	-1.548	*(0.00)*	-1.743	*(0.00)*
2SLS							
Q =	Gov	0.001	*(0.99)*	0.037	*(0.20)*	0.015	*(0.62)*
	CEO Own	6.497	*(0.01)*	6.852	*(0.00)*	5.341	*(0.05)*
	Leverage	-1.725	*(0.00)*	-1.468	*(0.00)*	-1.565	*(0.00)*
3SLS							
Q =	Gov	0.011	*(0.71)*	0.048	*(0.09)*	0.023	*(0.43)*
	CEO Own	7.196	*(0.00)*	7.485	*(0.00)*	6.160	*(0.02)*
	Leverage	-1.727	*(0.00)*	-1.481	*(0.00)*	-1.575	*(0.00)*
Sample Size		1,887		1,838		836	

Hausman (1978) Specification Test:

	h-statistic	*p*-value	*h*-statistic	*p*-value	*h*-statistic	*p*-value
OLS v. 2SLS	47.34	*(0.01)*	40.74	*(0.06)*	16.72	*(0.95)*
OLS v. 3SLS	17.14	*(0.95)*	10.45	*(1.00)*	-15.90	-
2SLS v. 3SLS	2.60	-	-40.20	-	-48.70	-

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value	First-Stage *F*-Statistic	Critical Value
Gov	24.07	9.53	19.65	9.53	13.25	9.53
CEO Own	86.42	9.53	89.45	9.53	50.35	9.53
Leverage	51.44	9.53	68.30	9.53	39.24	9.53

Appendix A-2 Panel D: Brown and Caylor (2004) GovScore is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

Contemporaneous Performance

OLS		*Estimate*	*p-value*
Q =	Gov	-0.008	*(0.37)*
	CEO Own	1.040	*(0.02)*
	Leverage	-1.152	*(0.00)*
2SLS			
Q =	Gov	0.085	*(0.48)*
	CEO Own	7.368	*(0.01)*
	Leverage	-0.870	*(0.00)*
3SLS			
Q =	Gov	0.174	*(0.11)*
	CEO Own	11.173	*(0.00)*
	Leverage	-0.807	*(0.00)*

Sample Size 717

Hausman (1978) Specification Test:

	h-statistic	*p*-value
OLS v. 2SLS	19.56	*(0.88)*
OLS v. 3SLS	-923.00	-
2SLS v. 3SLS	44.17	*(0.03)*

Stock and Yogo (2004) Weak Instruments Test:

	First-Stage *F*-Statistic	Critical Value
Gov	8.41	9.53
CEO Own	22.34	9.53
Leverage	26.88	9.53

Next 1 Year Performance

OLS		*Estimate*	*p-value*
Q =	Gov	-0.003	*(0.76)*
	CEO Own	0.541	*(0.33)*
	Leverage	-1.387	*(0.00)*
2SLS			
Q =	Gov	0.034	*(0.81)*
	CEO Own	3.676	*(0.29)*
	Leverage	-1.310	*(0.00)*
3SLS			
Q =	Gov	0.125	*(0.35)*
	CEO Own	6.785	*(0.04)*
	Leverage	-1.329	*(0.00)*

Sample Size 691

	h-statistic	*p*-value
OLS v. 2SLS	13.77	*(0.99)*
OLS v. 3SLS	-760.00	-
2SLS v. 3SLS	56.78	*(0.00)*

	First-Stage *F*-Statistic	Critical Value
Gov	6.13	9.53
CEO Own	27.42	9.53
Leverage	29.40	9.53

Appendix A-2 Panel E: Log of Dollar Value of the median director's stock ownership is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
Q =	Gov	0.389	*(0.00)*	0.235	*(0.00)*	0.233	*(0.00)*
	CEO Own	-0.050	*(0.91)*	0.019	*(0.96)*	-0.045	*(0.91)*
	Leverage	-2.690	*(0.00)*	-2.349	*(0.00)*	-2.326	*(0.00)*
2SLS							
Q =	Gov	0.013	*(0.81)*	0.000	*(1.00)*	-0.001	*(0.98)*
	CEO Own	6.317	*(0.00)*	7.272	*(0.00)*	8.592	*(0.00)*
	Leverage	-2.909	*(0.00)*	-2.355	*(0.00)*	-2.273	*(0.00)*
3SLS							
Q =	Gov	0.013	*(0.81)*	-0.003	*(0.96)*	-0.007	*(0.89)*
	CEO Own	7.630	*(0.00)*	9.341	*(0.00)*	10.827	*(0.00)*
	Leverage	-2.951	*(0.00)*	-2.398	*(0.00)*	-2.316	*(0.00)*
Sample Size		4,424		4,390		3,266	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	Contemporaneous *p*-value	Next 1 Year *h*-statistic	Next 1 Year *p*-value	Next 2 Years *h*-statistic	Next 2 Years *p*-value
OLS v. 2SLS	83.16	*(0.00)*	70.42	*(0.00)*	75.62	*(0.00)*
OLS v. 3SLS	99.69	*(0.00)*	129.10	*(0.00)*	17.67	*(0.93)*
2SLS v. 3SLS	110.30	*(0.00)*	104.40	*(0.00)*	20.61	*(0.84)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Contemporaneous Critical Value	Next 1 Year First-Stage *F*-Statistic	Next 1 Year Critical Value	Next 2 Years First-Stage *F*-Statistic	Next 2 Years Critical Value
Gov	162.65	9.53	163.80	9.53	127.00	9.53
CEO Own	216.96	9.53	220.74	9.53	167.21	9.53
Leverage	134.52	9.53	147.07	9.53	118.84	9.53

Appendix A-2 Panel F: CEO / Chair Duality (1 if CEO is Chair, 0 otherwise) is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

		Contemporaneous Performance			Next 1 Year Performance			Next 2 Years Performance	
OLS		*Estimate*	*p-value*		*Estimate*	*p-value*		*Estimate*	*p-value*
Q =	Gov	0.141	*(0.05)*	Gov	-0.005	*(0.94)*	Gov	-0.006	*(0.93)*
	CEO Own	1.173	*(0.01)*	CEO Own	0.852	*(0.03)*	CEO Own	0.958	*(0.02)*
	Leverage	-3.114	*(0.00)*	Leverage	-2.632	*(0.00)*	Leverage	-2.648	*(0.00)*
2SLS									
Q =	Gov	0.324	*(0.14)*	Gov	0.209	*(0.23)*	Gov	0.051	*(0.77)*
	CEO Own	6.096	*(0.00)*	CEO Own	6.889	*(0.00)*	CEO Own	8.590	*(0.00)*
	Leverage	-2.924	*(0.00)*	Leverage	-2.373	*(0.00)*	Leverage	-2.272	*(0.00)*
3SLS									
Q =	Gov	0.296	*(0.18)*	Gov	0.189	*(0.28)*	Gov	0.056	*(0.75)*
	CEO Own	7.970	*(0.00)*	CEO Own	8.398	*(0.00)*	CEO Own	9.279	*(0.00)*
	Leverage	-2.944	*(0.00)*	Leverage	-2.372	*(0.00)*	Leverage	-2.254	*(0.00)*
Sample Size		4,424			4,390			3,266	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	97.24	*(0.00)*	148.50	*(0.00)*	95.71	*(0.00)*
OLS v. 3SLS	154.60	*(0.00)*	604.10	*(0.00)*	-62.20	-
2SLS v. 3SLS	-27.10	-	1.36	*(1.00)*	-0.90	-

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	142.00	9.53	153.66	9.53	143.83	9.53
CEO Own	216.96	9.53	220.78	9.53	167.25	9.53
Leverage	134.52	9.53	147.41	9.53	119.32	9.53

Appendix A-2 Panel G: Percentage of directors who are independent is the governance measure ("Gov")

Tobin's Q is the performance measure ("Q")

		Contemporaneous Performance		**Next 1 Year Performance**		**Next 2 Years Performance**	
		Estimate	*p-value*	*Estimate*	*p-value*	*Estimate*	*p-value*
OLS							
Q =	Gov	-0.808	*(0.00)*	-0.666	*(0.00)*	-0.620	*(0.00)*
	CEO Own	0.719	*(0.14)*	0.396	*(0.32)*	0.436	*(0.31)*
	Leverage	-3.136	*(0.00)*	-2.634	*(0.00)*	-2.652	*(0.00)*
2SLS							
Q =	Gov	0.901	*(0.32)*	0.634	*(0.40)*	0.145	*(0.86)*
	CEO Own	8.113	*(0.00)*	8.371	*(0.00)*	8.840	*(0.00)*
	Leverage	-2.857	*(0.00)*	-2.324	*(0.00)*	-2.264	*(0.00)*
3SLS							
Q =	Gov	0.937	*(0.30)*	0.662	*(0.38)*	0.137	*(0.86)*
	CEO Own	8.450	*(0.00)*	8.539	*(0.00)*	8.817	*(0.00)*
	Leverage	-2.865	*(0.00)*	-2.324	*(0.00)*	-2.265	*(0.00)*
Sample Size		4,424		4,390		3,266	

Hausman (1978) Specification Test:

	Contemporaneous *h*-statistic	*p*-value	Next 1 Year *h*-statistic	*p*-value	Next 2 Years *h*-statistic	*p*-value
OLS v. 2SLS	63.79	*(0.00)*	66.91	*(0.00)*	51.90	*(0.00)*
OLS v. 3SLS	-101.00	-	88.31	*(0.00)*	18.00	-
2SLS v. 3SLS	31.53	*(0.29)*	-0.90	-	2.16	*(1.00)*

Stock and Yogo (2004) Weak Instruments Test:

	Contemporaneous First-Stage *F*-Statistic	Critical Value	Next 1 Year First-Stage *F*-Statistic	Critical Value	Next 2 Years First-Stage *F*-Statistic	Critical Value
Gov	128.37	9.53	122.91	9.53	86.86	9.53
CEO Own	216.96	9.53	220.78	9.53	167.25	9.53
Leverage	134.52	9.53	147.41	9.53	119.32	9.53

Appendix B. Robustness of GIM G-index relation to abnormal returns

Gompers, Ishii and Metrick (2003) show that a trading strategy long firms with high shareholders rights ("Democracy") and short firms with low shareholder rights ("Dictatorship") generated an abnormal return of 8.4% per year during their sample period of September 1990 to December 1999. They estimate a four-factor model as in Carhart (1997). The four factors include a market factor ("RMRF"), a size factor ("SMB"), a book-to-market factor ("HML"), and a momentum factor ("Momentum"). They obtain the first three factors from Professor Ken French's website and they replicate Carhart's methodology to obtain the momentum factor.[27] In this model, the intercept represents the abnormal monthly return. Their main results from their Table VI are as follows (standard errors in parentheses, significance at the 5% and 1% levels is indicated by * and **, respectively):

Original GIM Results: 9/1990 - 12/1999					
	α	***RMRF***	***SMB***	***HML***	***Momentum***
Democracy - Dictatorship	**0.71****	**-0.04**	**-0.22***	**-0.55****	**-0.01**
	(0.26)	(0.07)	(0.09)	(0.10)	(0.07)

The α of 0.71% represents the monthly abnormal return, equivalent to an annual abnormal return of 8.4%. In their Table VII, they show that this result is robust using equal-weighted portfolios rather than value-weighted, to industry adjustments, to alternate definitions of democracy and dictatorship portfolios and other tests.

We reproduce this analysis during the GIM sample period and find similar results. We then replicate the above analysis for the five years following the initial GIM period –January 2000 to December 2004. We find that the GIM results do not hold during this time period, nor do they hold for the full period of available data – September 1990 to December 2004.[28] In fact, the abnormal return becomes negative (though insignificant) for the five years immediately following the GIM period as noted below (standard errors in parentheses, significance at the 5% and 1% levels is indicated by * and **, respectively):

Out-of-Sample Results: 1/2000 - 12/2004					
	α	***RMRF***	***SMB***	***HML***	***Momentum***
Democracy - Dictatorship	**-0.35**	**0.12**	**-0.01**	**-0.54****	**0.09**
	(0.46)	(0.11)	(0.10)	(0.13)	(0.05)

[27] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/
[28] Core, Guay and Rusticus (2005) find similar results through December 2003.

Full Sample Results: 9/1990 - 12/2004					
	α	***RMRF***	***SMB***	***HML***	***Momentum***
Democracy - Dictatorship	**0.31**	**0.03**	**-0.12**	**-0.60****	**0.07**
	(0.23)	(0.06)	(0.06)	(0.08)	(0.04)

Also, we find that the estimation of this model is sensitive to the construction of the momentum factor. CRSP publishes a momentum factor that is similar to the Carhart factor, but it allows for small firms and large firms having different momentum characteristics.[29] All firms are sorted based on size. The momentum factor, *UMD,* is the average return on the two top portfolios minus the average return on the two bottom portfolios:

UMD = ½ (Small Winners + Big Winners) – ½ (Small Losers + Big Losers).

When we use the *UMD* momentum factor in the GIM analysis instead of the Carhart-based momentum factor, the 0.71% monthly abnormal return declines to an insignificant 0.48% (t-statistic of 1.89). For the full sample period of more than 14 years, the abnormal return falls even further to an insignificant 0.19% per month as shown below (standard errors in parentheses, significance at the 5% and 1% levels is indicated by * and **, respectively):

Results with CRSP Momentum Factor: 9/1990 - 12/1999					
	α	***RMRF***	***SMB***	***HML***	***UMD***
Democracy - Dictatorship	**0.48**	**-0.02**	**-0.21****	**-0.49****	**0.19**
	(0.26)	(0.07)	(0.08)	(0.10)	(0.07)

Full Sample Results, CRSP Momentum Factor: 9/1990 - 12/2004					
	α	***RMRF***	***SMB***	***HML***	***UMD***
Democracy - Dictatorship	**0.19**	**0.05**	**-0.15**	**-0.58****	**0.15****
	(0.22)	(0.06)	(0.06)	(0.08)	(0.04)

These robustness tests demonstrate the sensitivity of the GIM results to the sample period, and the momentum factor used in the construction of abnormal stock returns.

[29] This factor is also available on Professor Ken French's website.

Appendix C Table

Robustness to Serial Correlation of Errors

In this table we report the results from estimating equation (1a) using different approaches to address the possibility of serially correlated errors. We consider the full system of equations in (1), but used different estimation methods than in Table 4 as necessary for each approach. We consider four different approaches. In Panel A, we report results using 2SLS and White standard errors. In Panel B, we report results using 2SLS and clustered (Rogers) standard errors. In Panel C, we report results using OLS with fixed effects estimator with firm and year fixed effects. In Panel D, we report results using OLS with fixed effects estimator with clustered (Rogers) standard errors. In Panels A-D, we consider operating performance ("ROA") in three time periods: contemporaneous (ROA_t), next year (ROA_{t+1}), and next two years ($ROA_{t+1 \text{ to } t+2}$). In Panel E, we use stock return as the performance measure. We report results using 2SLS with clustered (Rogers) standard errors (same as Panel B with stock return instead of ROA). In Panel F, we use Tobin's Q as the performance measure. We report results using 2SLS with clustered (Rogers) standard errors (same as Panel B with Tobin's Q instead of ROA). Each panel considers the following governance variables: the Gompers, Ishii and Metrick (2003) *G*-Index, the Bebchuk, Cohen and Ferrell (2004) *E*-Index, TCL Benchmark score, the Brown and Caylor (2004) GovScore (data is available only for 2002), the dollar value of the median director's stock holdings, a dummy variable equal to 1 if the CEO is also the Chair of the board, 0 otherwise, and, the percent of directors who are independent (Panels C and D do not include the Brown and Caylor GovScore because those approaches require more than one year of data). Only the coefficients on the governance variable from equation (1a) are presented; *p*-values are in parentheses.

Panel A – ROA, 2SLS and White standard errors:

	Governance Variable						
	GIM G-Index	BCF E-Index	TCL Benchmark Score	Brown & Caylor GovScore (OLS)	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
ROA_t	-0.013	-0.034	-0.049	0.000	0.006	-0.029	-0.131
	(0.00)	*(0.02)*	*(0.05)*	*(0.57)*	*(0.08)*	*(0.01)*	*(0.00)*
# of Observations	4,600	4,600	2,199	811	5,101	5,101	5,101
ROA_{t+1}	-0.011	-0.031	-0.003	0.000	0.005	-0.031	-0.124
	(0.05)	*(0.10)*	*(0.09)*	*(0.84)*	*(0.06)*	*(0.02)*	*(0.04)*
# of Observations	4,561	4,561	2,138	773	5,053	5,053	5,053
$ROA_{t+1 \text{ to } t+2}$	-0.004	-0.015	-0.002	-	0.002	-0.017	-0.068
	(0.02)	*(0.09)*	*(0.17)*	-	*(0.03)*	*(0.02)*	*(0.06)*
# of Observations	3,416	3,416	977	-	3,814	3,814	3,814

Panel B – ROA, 2SLS and clustered (Rogers) standard errors:

	Governance Variable						
	GIM G-Index	BCF E-Index	TCL Benchmark Score	Brown & Caylor GovScore (OLS)	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
ROA_t	-0.013	-0.034	-0.005	0.000	0.006	-0.029	-0.131
	(0.05)	*(0.08)*	*(0.04)*	*(0.57)*	*(0.12)*	*(0.02)*	*(0.01)*
# of Observations	4,600	4,600	2,199	811	5,101	5,101	5,101
ROA_{t+1}	-0.011	-0.031	-0.003	0.000	0.005	-0.031	-0.124
	(0.07)	*(0.09)*	*(0.23)*	*(0.84)*	*(0.14)*	*(0.01)*	*(0.01)*
# of Observations	4,561	4,561	2,138	773	5,053	5,053	5,053
$ROA_{t+1 \text{ to } t+2}$	-0.004	-0.015	-0.002	-	0.002	-0.017	-0.068
	(0.31)	*(0.20)*	*(0.17)*	-	*(0.28)*	*(0.07)*	*(0.06)*
# of Observations	3,416	3,416	977	-	3,814	3,814	3,814

Panel C – ROA, OLS with fixed effects estimator with firm and year fixed effects:

	Governance Variable					
	GIM G-Index	BCF E-Index	TCL Benchmark Score	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
ROA$_t$	-0.002	-0.005	0.000	0.007	-0.008	0.008
	(0.03)	*(0.02)*	*(0.98)*	*(0.00)*	*(0.00)*	*(0.35)*
# of Observations	4,323	4,323	1,946	4,892	4,892	4,892
ROA$_{t+1}$	-0.005	-0.004	0.000	0.003	0.002	-0.017
	(0.00)	*(0.02)*	*(0.25)*	*(0.00)*	*(0.42)*	*(0.02)*
# of Observations	4,396	4,396	1,882	5,004	5,005	5,005
ROA$_{t+1 \text{ to } t+2}$	-0.005	-0.004	-	0.000	0.000	-0.006
	(0.00)	*(0.01)*	-	*(0.58)*	*(0.94)*	*(0.30)*
# of Observations	3,507	3,507	-	3,874	3,877	3,877

Panel D – ROA, OLS with fixed effects estimator with clustered (Rogers) standard errors:

	Governance Variable					
	GIM G-Index	BCF E-Index	TCL Benchmark Score	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
ROA_t	-0.002	-0.005	0.000	0.007	-0.008	0.008
	(0.08)	*(0.05)*	*(0.90)*	*(0.03)*	*(0.01)*	*(0.42)*
# of Observations	4,323	4,323	1,946	4,892	4,892	4,892
ROA_{t+1}	-0.005	-0.004	0.000	0.003	0.002	-0.017
	(0.01)	*(0.08)*	*(0.30)*	*(0.03)*	*(0.50)*	*(0.06)*
# of Observations	4,396	4,396	1,882	5,004	5,005	5,005
$ROA_{t+1 \text{ to } t+2}$	-0.005	-0.004	-	0.000	0.000	-0.006
	(0.01)	*(0.01)*	-	*(0.50)*	*(0.82)*	*(0.32)*
# of Observations	3,507	3,507	-	3,874	3,877	3,877

Appendix D. Sensitivity of results to alternative measures of leverage

It is possible that the results reported in section 4 regarding the performance-governance relation are sensitive to the construction of the leverage variable. In the capital structure literature, there does not appear to be any agreed upon 'best' measure of leverage. For our primary analyses, we use the measure that appears frequently in corporate finance studies: All long term debt divided by assets.

To test the sensitivity of our results to this definition of leverage, we run the analyses in Table 4 using the following six definitions of leverage:

(1) $$\frac{LongTermDebt}{TotalAssets}$$ (This is used in Table 4 – includes current portion of long term debt.)

(2) $$\frac{LongTermDebt}{TotalAssets}$$ (Excluding current portion of long term debt.)

(3) $$\frac{TotalAssets - BookEquity}{TotalAssets}$$

(4) $$\frac{TotalBookLiabilities}{TotalAssets}$$

(5) $$\frac{TotalAssets - BookEquity}{TotalAssets}$$ (Per, Baker & Wurgler (2002).[30])

(6) $$\frac{BookDebt}{TotalAssets - BookEquity + MarketEquity}$$ (Per, Baker & Wurgler (2002).)

Again, we run the three-equation system allowing for potential endogeneity between performance, governance and ownership. We estimate each system using OLS, 2SLS, and 3SLS.

[30] Definitions (3) and (5) differ in the Compustat variables used, specifically for Book Equity. Definition (3) uses Compustat data item #216, "Stockholders' Equity." Definition (5) defines Book Equity as total assets less total liabilities (item 181) and preferred stock (item 10) plus deferred taxes (item 35) and convertible debt (item 79). The correlation between the leverage variables based on the two definitions is 0.90.

We use the Stock and Yogo (2004) weak instrument test and the Hausman (1978) specification test to determine which estimation method is most appropriate.

In the following table, we only present the coefficients and *p*-values (in parentheses) for the governance variable in the performance equation (equation 1A), with return on assets as the performance variable. Only the results from the estimation method deemed most appropriate by the specification tests are presented. We present the results for all three different time periods (contemporaneous, next year's ROA, and next two years' ROA) and for all seven different governance variables. The results are qualitatively very similar across the different definitions of leverage. Both the coefficients and *p*-values vary little with the first five definitions of leverage; in a few cases, using the Baker and Wurgler (2002) market leverage variable does impact the statistical significance levels. Overall, this evidence suggests that our results regarding the relation between performance and governance are robust to alternative definitions of leverage.

Appendix D Table

Sensitivity of results to Alternative Measures of Leverage

Results from estimating the performance governance model similar to Table 4 using six different measures of leverage: (Baseline) Long term debt / assets (same as in Table IV); (Debt 1) Long term debt, including current portion / assets; (Debt 2) (Assets – book equity) / assets; (Debt 3) Book liabilities / assets; (Debt 4) (Assets – book equity) / assets, as in Baker and Wurgler (2002); and, (Debt 5) Book debt / (Assets – book equity + market equity), as in Baker and Wurgler. We estimate the complete system of equations – 1a, 1b, and 1c – using each of these six definitions of leverage. In this table we focus on equation 1a, and on the coefficient on the governance parameter. We estimate each system with each leverage variable for each of the seven measures of governance. Finally, We estimate each version for return on assets ("ROA") in three time periods: Panel A uses contemporaneous ROA, Panel B uses next year's ROA, and Panel C uses next two years' ROA. We present only the coefficient on the governance parameter; *p*-values are in parentheses. The sample size for each is comparable, though not exactly the same as, to the sample sizes in Table 4. All systems are estimated using OLS, 2SLS and 3SLS. We perform the Hausman (1978) specification test and the Stock and Yogo (2003) weak instrument tests. We only present the result from the estimation method (OLS, 2SLS or 3SLS) that is determined to be most appropriate. Noted below are the estimated coefficients and significance levels for the governance variable in equation (1a).

Panel A – Contemporaneous performance:

	Leverage Variable:					
	Baseline	***Debt 1***	***Debt 2***	***Debt 3***	***Debt 4***	***Debt 5***
GIM G-Index	-0.013	-0.012	-0.012	-0.008	-0.008	-0.008
	(0.01)	*(0.01)*	*(0.01)*	*(0.08)*	*(0.10)*	*(0.05)*
BCF E-Index	-0.034	-0.033	-0.035	-0.032	-0.033	-0.035
	(0.01)	*(0.01)*	*(0.00)*	*(0.02)*	*(0.03)*	*(0.01)*
TCL Benchmark Score	-0.005	-0.005	-0.005	-0.006	-0.006	-0.006
	(0.05)	*(0.05)*	*(0.06)*	*(0.05)*	*(0.05)*	*(0.04)*
BC GovScore	0.000	-0.004	-0.003	0.006	0.006	0.007
	(0.53)	*(0.64)*	*(0.77)*	*(0.67)*	*(0.63)*	*(0.61)*
Director $ Ownership	0.006	0.006	0.007	0.007	0.006	0.008
	(0.01)	*(0.01)*	*(0.00)*	*(0.00)*	*(0.02)*	*(0.00)*
CEO - Chair duality	-0.029	-0.028	-0.027	-0.022	-0.025	-0.022
	(0.00)	*(0.00)*	*(0.00)*	*(0.03)*	*(0.02)*	*(0.02)*
Board Independence	-0.131	-0.127	-0.128	-0.132	-0.136	-0.138
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*

Panel B – Next year's performance:

	Leverage Variable:					
	Baseline	***Debt 1***	***Debt 2***	***Debt 3***	***Debt 4***	***Debt 5***
GIM G-Index	-0.011	-0.010	-0.010	-0.006	-0.007	-0.007
	(0.03)	*(0.03)*	*(0.04)*	*(0.16)*	*(0.15)*	*(0.10)*
BCF E-Index	-0.031	-0.030	-0.032	-0.030	-0.031	-0.035
	(0.02)	*(0.02)*	*(0.01)*	*(0.02)*	*(0.03)*	*(0.01)*
TCL Benchmark Score	0.000	-0.003	-0.002	-0.004	-0.004	-0.005
	(0.26)	*(0.27)*	*(0.34)*	*(0.18)*	*(0.16)*	*(0.11)*
BC GovScore	0.000	-0.004	0.001	0.013	0.015	-0.012
	(0.85)	*(0.69)*	*(0.95)*	*(0.55)*	*(0.47)*	*(0.55)*
Director $ Ownership	0.005	0.005	0.005	0.007	0.006	0.008
	(0.04)	*(0.05)*	*(0.02)*	*(0.01)*	*(0.02)*	*(0.00)*
CEO - Chair duality	-0.029	-0.028	-0.026	-0.023	-0.027	-0.023
	(0.00)	*(0.00)*	*(0.00)*	*(0.02)*	*(0.01)*	*(0.01)*
Board Independence	-0.121	-0.118	-0.117	-0.131	-0.138	-0.139
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*

Panel C – Next two years' performance:

	Leverage Variable:					
	Baseline	***Debt 1***	***Debt 2***	***Debt 3***	***Debt 4***	***Debt 5***
GIM G-Index	-0.004	-0.004	-0.003	-0.001	-0.002	-0.001
	(0.15)	*(0.18)*	*(0.26)*	*(0.69)*	*(0.55)*	*(0.61)*
BCF E-Index	-0.015	-0.015	-0.014	-0.009	-0.009	-0.011
	(0.07)	*(0.08)*	*(0.09)*	*(0.33)*	*(0.30)*	*(0.20)*
TCL Benchmark Score	-0.002	-0.002	-0.002	-0.001	-0.002	-0.002
	(0.22)	*(0.23)*	*(0.27)*	*(0.37)*	*(0.24)*	*(0.31)*
Director $ Ownership	0.002	0.002	0.002	0.002	0.002	0.002
	(0.16)	*(0.18)*	*(0.18)*	*(0.38)*	*(0.35)*	*(0.26)*
CEO - Chair duality	-0.017	-0.016	-0.015	-0.014	-0.017	-0.014
	(0.00)	*(0.00)*	*(0.01)*	*(0.02)*	*(0.01)*	*(0.02)*
Board Independence	-0.068	-0.066	-0.062	-0.057	-0.065	-0.062
	(0.01)	*(0.01)*	*(0.02)*	*(0.06)*	*(0.04)*	*(0.04)*

Appendix E. Multinomial logit models for CEO turnover, industry adjusted performance

It is possible that the governance function reacts to poor performance relative to industry performance, rather than absolute performance of the firm as was considered in equations (2a) and (2b). To address this, we reconsider equations (2a) and (2b) using industry adjusted performance by itself, rather than using firm performance and industry performance as two separate variables. The performance term in the interaction term is also industry adjusted performance.

The results from this analysis are qualitatively similar to the results presented in Table 9. The three measures of entrenchment – G-Index, E-Index, and CEO / Chair duality – suggest that better governed firms are less likely to experience disciplinary management turnover in spite of their performance. Using the dollar value of the median director's stock ownership and the percentage of directors who are independent, the results suggest that better governed firms are more likely to experience disciplinary management turnover following poor performance.

Appendix E Table

Multinomial Logit Models for CEO Turnover, Industry Adjusted Performance

This table presents the results from multinomial logistic regressions estimating the probability of CEO Turnover. The dependent variables are type of CEO turnover: 1 = Disciplinary turnover, 2 = Non-disciplinary turnover, 0 = no turnover. No turnover is the baseline category. Baseline results are presented in the first column; all other columns present results including Governance and (Performance *x* Governance) variables. Performance is measured as the compound industry adjusted stock return for the two years prior to the year of observation. The governance variables are described in Table 1. The other control variables are also described in Table 1. Year dummy variables are included but are not shown. Panel A presents the results for disciplinary turnover for all available years; Panel B presents the results for non-disciplinary turnover for all available years. Results for disciplinary turnover for 2000 to 2002 only are similar to those reported in Panel A. Results for non-disciplinary turnover for 2000 to 2002 only are similar to the results in Panel B. Coefficients are presented and *p*-values are in parentheses.

Panel A: Disciplinary Turnover, Industry Adjusted Performance, all available years

	Baseline Performance	GIM G-Index	BCF E-Index	TCL Benchmark Score	BC GovScore	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
				Governance Variable				
Intercept	-11.391	-11.147	-11.223	-5.020	-2.471	-2.322	-4.135	-3.632
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.21)*	*(0.01)*	*(0.00)*	*(0.00)*
Industry Adjusted Return, Last 2 years	-1.641	-0.414	-0.601	-4.340	-6.147	0.415	-0.680	-0.075
	(0.00)	*(0.62)*	*(0.20)*	*(0.03)*	*(0.29)*	*(0.75)*	*(0.08)*	*(0.92)*
Governance	-	-0.015	-0.026	0.022	-0.052	-0.076	-0.899	-0.609
	-	*(0.58)*	*(0.64)*	*(0.06)*	*(0.32)*	*(0.10)*	*(0.00)*	*(0.11)*
(Ind. Adj. Return, Last 2 years x Governance)	-	-0.133	-0.466	0.045	0.200	-0.158	-1.487	-2.381
	-	*(0.15)*	*(0.02)*	*(0.15)*	*(0.43)*	*(0.11)*	*(0.00)*	*(0.04)*
CEO Own %	-10.266	-12.027	-12.003	-7.329	-16.194	-8.617	-8.952	-10.749
	(0.00)	*(0.00)*	*(0.00)*	*(0.04)*	*(0.20)*	*(0.01)*	*(0.00)*	*(0.00)*
Size (Assets)	-0.091	-0.137	-0.136	-0.094	-0.235	-0.095	-0.056	-0.104
	(0.02)	*(0.00)*	*(0.00)*	*(0.08)*	*(0.05)*	*(0.05)*	*(0.21)*	*(0.01)*
CEO Age	0.011	0.008	0.008	0.031	0.051	0.016	0.014	0.013
	(0.26)	*(0.47)*	*(0.47)*	*(0.02)*	*(0.08)*	*(0.19)*	*(0.20)*	*(0.21)*
CEO Tenure	-0.030	-0.024	-0.023	-0.048	-0.043	-0.028	-0.034	-0.031
	(0.01)	*(0.06)*	*(0.07)*	*(0.01)*	*(0.26)*	*(0.06)*	*(0.01)*	*(0.01)*
Years Included	1993-2003	1993 , '95, '98, '00, '02	1993 , '95, '98, '00, '02	2001-2003	2002	1998-2002	1996-2003	1996-2003
Sample Size	8,965	7,532	7,532	3,488	788	4,766	6,871	7,278

Panel B: Non-disciplinary Turnover, Industry Adjusted Performance, all available years

		Governance Variable						
	Baseline Performance	GIM G-Index	BCF E-Index	TCL Benchmark Score	BC GovScore	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
Intercept	-13.764	-14.413	-14.384	-10.059	-7.666	-9.956	-12.083	-11.625
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Industry Adjusted Return, Last 2 years	-0.308	-0.932	-0.728	0.342	-4.559	-1.436	-0.250	0.129
	(0.06)	*(0.19)*	*(0.05)*	*(0.79)*	*(0.35)*	*(0.16)*	*(0.39)*	*(0.82)*
Governance	-	0.010	0.018	0.005	-0.060	-0.004	-1.066	-0.161
	-	*(0.60)*	*(0.64)*	*(0.55)*	*(0.16)*	*(0.92)*	*(0.00)*	*(0.58)*
(Ind. Adj. Return, Last 2 years x Governance)	-	0.075	0.220	-0.010	0.172	0.077	0.046	-0.645
	-	*(0.33)*	*(0.15)*	*(0.65)*	*(0.42)*	*(0.27)*	*(0.90)*	*(0.47)*
CEO Own %	-19.276	-18.840	-18.800	-15.305	-8.252	-15.553	-18.291	-19.665
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.07)*	*(0.00)*	*(0.00)*	*(0.00)*
Size (Assets)	-0.016	-0.026	-0.024	-0.016	-0.083	-0.001	0.058	-0.020
	(0.57)	*(0.38)*	*(0.43)*	*(0.70)*	*(0.37)*	*(0.98)*	*(0.07)*	*(0.50)*
CEO Age	0.133	0.134	0.134	0.130	0.123	0.129	0.136	0.137
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
CEO Tenure	0.018	0.019	0.019	0.027	0.022	0.010	0.010	0.013
	(0.00)	*(0.00)*	*(0.00)*	*(0.01)*	*(0.27)*	*(0.19)*	*(0.15)*	*(0.06)*
Years Included	1993-2003	1993 , '95, '98, '00, '02	1993 , '95, '98, '00, '02	2001-2003	2002	1998-2002	1996-2003	1996-2003
Sample Size	8,965	7,532	7,532	3,488	788	4,766	6,871	7,278