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Corporate governance and firm performance

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ABSTRACT

How is corporate governance measured? What is the relationship between corporate governance and performance? This paper sheds light on these questions while taking into account the endogeneity of the relationships among corporate governance, corporate performance, corporate capital structure, and corporate ownership structure. We make three additional contributions to the literature:
First, we find that better governance as measured by the Gompers, Ishii, and Metrick [Gompers, P.A., Ishii, J.L., and Metrick, A., 2003, Corporate governance and equity prices, Quarterly Journal of Economics 118(1), 107–155.] and Bebchuk, Cohen and Ferrell [Bebchuk, L., Cohen, A., and Ferrell, A., 2004, What matters in corporate governance?, Working paper, Harvard Law School] indices, stock ownership of board members, and CEO-Chair separation is significantly positively correlated with better contemporaneous and subsequent *operating* performance.
Second, contrary to claims in GIM and BCF, none of the governance measures are correlated with future stock market performance. In several instances inferences regarding the (stock market) performance and governance relationship do depend on whether or not one takes into account the endogenous nature of the relationship between governance and (stock market) performance.
Third, given poor firm performance, the probability of disciplinary management turnover is positively correlated with stock ownership of board members, and 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.

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%/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

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might be endogenous raising doubts about the causality explanation. There is a significant body of theoretical and empirical literature in accounting and 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 has 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. 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), and Bhagat and Black (2002)), 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 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 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 NASDAQ corporate governance listing requirements.[2] We conduct a battery of robustness checks including (a) consideration of alternate instruments for estimating the system of equations, (b) consideration of diagnostic tests to ensure that our instruments are valid and our system of equations is well-identified, and (c) 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, contrary to claims in GIM and BCF, none of the governance measures are correlated with future stock market performance. In several instances inferences regarding the (stock market) performance and governance relationship do depend on whether or not one takes into account the endogenous nature of the relationship between governance and (stock market)

[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.

[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.

performance.[3] For example, the OLS estimate indicates a significantly negative relation between the GIM index and next year's 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 next year's 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 and finance 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 compensation as *separate* governance measures. Cremers and Nair (2005) focus on the interaction between several governance measures and firm performance. They consider the GIM index as a measure of external governance and pension fund block ownership as a measure of inside governance; they also investigate other similar governance measures. 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 - this measure 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 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. Second, 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. Third, even though the GIM and BCF good governance indices are positively related to future *operating* 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] Finally, our recommendations on incentive effects of board stock ownership are consistent with the implications of Hermalin and Weisbach (2007) who analyze the role of disclosure on the contractual and monitoring relationship between the board and the CEO. Hermalin and Weisbach highlight the costs and benefits of greater disclosure. Greater stock ownership by the board would help internalize these costs and benefits-making (board) level.

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 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).

[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.

[4] Given space constraints we are unable to review the vast and growing literature on the relation between governance and finance, accounting, 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), at the decision Marquardt and Wiedman (2005), Rajan and Wulf (2006), Bergstresser and Philippon (2006), Gillan (2006), Yermack (2006), Bushman, Chen, Engel and Smith (2004), and Bebchuk and Cohen (2005).

[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."

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.

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.[7] 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:

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

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

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

$$\text{Capital Structure} = f_4(\text{Governance}, \text{Performance}, \text{Ownership}, Z_4, \varepsilon_4) \tag{1d}$$

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

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.

3.1.1. 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 liteõrature on the median voter; see Shleifer and Murphy (2004), and Milavonic (2004).[8] 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.

[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.

[7] 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.

[8] The median director is an outside (inside) director in 71.6% (13.2%) of our observations.

Table 1
Description of variables

	Years available	Sample size
Panel A: Governance variables		
(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 score is associated with weak shareholder rights.	1990–2002	11,736
(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.	1990–2002	11,736
(C) 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.	1996–2003	9,317
(D) Median Director Dollar Value Ownership		
The dollar value of the stock ownership / voting power 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.	1998–2002	6,126
(E) 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.	1998–2002	6,130
(F) 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.	1998–2002	8,847
Panel B: Other endogenous variables		
(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 C: Performance variables		
(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).	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 AssetsMarket 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 D: Other variables		
(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.	1992–2003	10,990
(E) CEO Tenure		
The number of years the CEO has been CEO, obtained from Execucomp.	1992–2003	10,651
(F) Risk		
The standard deviation of the monthly stock return for the five preceding years.	1990–2004	15,272

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.

3.1.2. 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

Table 2
Sample statistics

	All available firm years			2002 only		
	Mean	Median	# of Obs.	Mean	Median	# of Obs.
A. Governance variables						
Log $ Value, Median Director	13.334	13.289	6126	14.090	12.564	1482
Dollar value, median director	617,814	590,582	6126	1,315,517	286,109	1482
% holdings, median director	0.19%	0.04%	6130	0.10%	0.02%	1481
GIM G-Index	9.218	9.000	11,736	9.030	9.000	1894
BCF E-Index	2.107	2.000	11,736	2.224	2.000	1894
BC GovScore	23.479	22.000	1003	22.469	22.000	2538
TCL benchmark score	60.132	61.000	4168	56.750	55.000	1534
% independent directors	63.69%	64.71%	9317	63.84%	66.67%	1997
CEO-Chair duality	77.56%	100.00%	8847	66.90%	100.00%	1994
% directors, CEOs	24.65%	20.00%	9311	25.44%	23.08%	1997
% directors, on 4boards	3.36%	0.00%	8334	6.34%	0.00%	1997
% directors, 15+ years tenure	14.16%	0.00%	8705	14.61%	9.09%	1997
% directors, over 70	9.00%	0.00%	8515	8.02%	0.00%	1997
% directors, women	8.79%	9.09%	8782	8.95%	9.09%	1997
% directors, 0 shares	7.90%	0.00%	8656	23.83%	11.11%	1997
B. Performance variables						
Return, annual	17.13%	12.76%	16,936	−12.99%	−10.75%	1485
ROA, annual	13.80%	13.54%	21,681	11.00%	10.88%	1680
Tobin's Q, annual	2.072	1.508	17,587	1.631	1.298	1456
C. Other variables						
CEO holdings, %	2.92%	0.34%	13,044	2.64%	0.31%	1598
Leverage (Debt / Assets)	42.69%	43.21%	17,438	43.00%	44.29%	1684
Assets (×$1,000,000)	1341	1226	24,255	2704	2293	1727
CEO Age	54.628	55.000	10,990	54.942	55.000	1744
CEO Tenure	8.859	7.909	10,651	6.491	4.000	2143
Director tenure, average	7.534	5.060	19,718	8.761	8.300	1920

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.

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.

3.1.3. 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).

3.1.4. 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. Also, we perform the Hahn and Hausman (2002) weak instrument test, the Hansen–Sargan overidentification test, the Cragg–Donald (1993) test for model identification, and the Anderson–Rubin test for the joint significance of the set of endogenous variables in our system of equations. Additionally, we consider alternate instruments than the ones noted below. We identify the following variables as instruments for ownership, performance, governance, and capital structure.

3.1.4.1. CEO Tenure-to-Age. A CEO who 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.

[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 Eq. (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.

Table 3
Correlations

		Return		ROA		Tobin's Q	
Panel A: Correlations among performance measures							
Return				0.345***		0.475***	
ROA		0.321***				0.196***	
Tobin's Q		0.58***		0.251***			
	GIM G-Index	BCF E-Index	TCL Benchmark Score	BC GovScore	% Independent	Director Holdings	CEO-Chair Duality
Panel B: Correlations among governance measures							
GIM G-Index		0.719***	−0.327***	−0.105***	0.275***	0.005	0.088***
BCF EIndex	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*	

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.

3.1.4.2. Treasury Stock. Palia (2001) suggests that a firm is most likely to buy back its stock when it believes the stock to be 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. We use the ratio of the treasury stock to total assets as the instrument for performance.[10]

3.1.4.3. 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.[11]

3.1.4.4. 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.[12]

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

The instruments for performance, governance, ownership and capital structure in Eqs. (1a), (1b), (1a) 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 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 Eq. (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 Eq. (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 Eq. (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 Eq. (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.

[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] For example, if a firm has nine board members, and three are currently CEOs (this will usually include the sample firm's CEO), then *Currently Active CEOs on Board* is 3/9 or 33.3%. For our complete sample, the mean is 24.65%, and the median is 20.0%.

[12] We also considered Graham's (1996a,b) marginal tax rate as an instrument for leverage. The Stock and Yago (2004) test indicates that this is a weak instrument.

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.[13] Properly specified instrumental variables (IV) estimates such as the two stage least squares (2SLS) are 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. Stock and Yogo (2004) provide tests to determine if instruments are weak.

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 correlated with governance even if a significant correlation between performance and governance indeed exists.[14]

In Table 4, Panels A through C, we report the results for the relationship between operating performance (ROA) and the following governance measures respectively: GIM index, BCF index, and stock ownership of the median board member. In each panel we report the OLS, 2SLS, and 3SLS estimates of the Eq. (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.[15]

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 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 Table 4, Panel D, indicate there is no significant relation between GIM's measure of governance and next year's stock returns, or Tobin's Q.

In Table 4, Panel B, we note the relationship between the BCF governance index and operating performance. The Hausman test suggests we consider the 3SLS 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 Table 4, Panel D, indicate there is no significant relation between BCF's measure of governance and next year's stock returns, or Tobin's Q.[17]

[13] 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)."

[14] However, to aid the comparison of our results with the extant literature, in Table 4, Panel D, we report results considering stock return and Tobin's Q as performance measures.

[15] To the extent governance impacts performance, operating performance may be impacted for the next several years. Hence, we also consider the next two years' operating performance.

[16] Consistent with the findings reported here, Core, Guay and Rusticus (2006) 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] For robustness, we also estimate the performance-governance relation for each of the seven governance measures using the fixed effects estimator. 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.

Table 4
Governance–performance relation

Contemporaneous performance				Next 1 Year Performance				Next 2 Years Performance			
Panel A: Gompers, Ishii and Metrick (2003) *G-Index is the governance measure ("Gov") Return on Assets is the performance measure ("ROA")*											
OLS		Estimate	*p*-value	OLS		Estimate	*p*-value	OLS		Estimate	*p*-value
ROA =	Gov	−0.001	*(0.10)*	ROA =	Gov	−0.001	*(0.03)*	ROA =	Gov	−0.001	(0.02)
	CEO Own	0.053	*(0.01)*		CEO Own	0.073	*(0.00)*		CEO Own	0.021	(0.10)
	Leverage	−0.061	*(0.00)*		Leverage	−0.035	*(0.00)*		Leverage	−0.040	(0.00)
2SLS				2SLS				2SLS			
ROA =	Gov	−0.013	*(0.01)*	ROA =	Gov	−0.011	(0.03)	ROA =	Gov	−0.004	(0.16)
	CEO Own	0.185	*(0.02)*		CEO Own	0.326	(0.00)		CEO Own	0.093	(0.07)
	Leverage	−0.045	*(0.00)*		Leverage	−0.014	(0.13)		Leverage	−0.032	(0.00)
3SLS				3SLS				3SLS			
ROA =	Gov	−0.013	*(0.01)*	ROA =	Gov	−0.011	(0.02)	ROA =	Gov	−0.004	(0.15)
	CEO Own	0.191	*(0.02)*		CEO Own	0.334	(0.00)		CEO Own	0.098	(0.06)
	Leverage	−0.045	*(0.00)*		Leverage	−0.014	(0.13)		Leverage	−0.032	(0.00)
Sample Size	4,600			Sample Size	4,561			Sample Size	3,416		
Hausman (1978) Specification Test:											
	h-statistic	*p*–value			*h*-statistic	*p*-value			*h*-statistic	*p*-value	
OLS v. 2SLS	66.84	(0.00)		OLS v. 2SLS	78.62	(0.00)		OLS v. 2SLS	37.69	(0.10)	
OLS v. 3SLS	48.79	(0.01)		OLS v. 3SLS	69.29	(0.00)		OLS v. 3SLS	103.40	(0.00)	
2SLS v. 3SLS	19.96	(0.87)		2SLS v. 3SLS	18.09	(0.92)		2SLS v. 3SLS	31.63	(0.29)	
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	35.52	9.53		Gov	34.02	9.53		Gov	24.76	9.53	
CEO Own	215.21	9.53		CEO Own	232.02	9.53		CEO Own	172.11	9.53	
Leverage	98.74	9.53		Leverage	106.98	9.53		Leverage	87.70	9.53	
Panel B: Bebchuk, Cohen and Ferrel (2004) *E-Index is is the governance measure ("Gov") Return on Assets is the performance measure ("ROA")*											
OLS		Estimate	*p*-value	OLS		Estimate	*p*-value	OLS		Estimate	*p*-value
ROA =	Gov	−0.004	*(0.00)*	ROA =	Gov	−0.005	*(0.00)*	ROA =	Gov	−0.002	*(0.00)*
	CEO Own	0.042	*(0.03)*		CEO Own	0.061	*(0.00)*		CEO Own	0.015	*(0.22)*
	Leverage	−0.059	*(0.00)*		Leverage	−0.033	*(0.00)*		Leverage	−0.039	*(0.00)*
2SLS				2SLS				2SLS			
ROA =	Gov	−0.034	*(0.01)*	ROA =	Gov	−0.031	*(0.02)*	ROA =	Gov	−0.015	*(0.07)*
	CEO Own	0.066	*(0.55)*		CEO Own	0.211	*(0.07)*		CEO Own	0.025	*(0.75)*
	Leverage	−0.038	*(0.00)*		Leverage	−0.008	*(0.43)*		Leverage	−0.028	*(0.00)*
3SLS				3SLS				3SLS			
ROA =	Gov	−0.037	*(0.00)*	ROA =	Gov	−0.032	*(0.01)*	ROA =	Gov	−0.017	*(0.04)*
	CEO Own	0.076	*(0.49)*		CEO Own	0.223	*(0.05)*		CEO Own	0.033	*(0.67)*
	Leverage	−0.038	*(0.00)*		Leverage	−0.008	*(0.43)*		Leverage	−0.028	*(0.00)*
Sample Size	4,600			Sample Size	4,561			Sample Size	3,416		
Hausman (1978) Specification Test:											
	h-statistic	*p*-value			*h*-statistic	*p*-value			*h*-statistic	*p*-value	
OLS v. 2SLS	74.15	*(0.00)*		OLS v. 2SLS	96.53	*(0.00)*		OLS v. 2SLS	40.19	*(0.06)*	
OLS v. 3SLS	174.70	*(0.00)*		OLS v. 3SLS	244.20	*(0.00)*		OLS v. 3SLS	92.33	*(0.00)*	
2SLS v. 3SLS	132.80	*(0.00)*		2SLS v. 3SLS	138.60	*(0.00)*		2SLS v. 3SLS	152.60	*(0.00)*	
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	35.03	9.53		Gov	32.63	9.53		Gov	23.90	9.53	
CEO Own	215.21	9.53		CEO Own	232.05	9.53		CEO Own	172.11	9.53	
Leverage	98.74	9.53		Leverage	106.98	9.53		Leverage	87.70	9.53	
Panel C: Log of Dollar Value of the median director's stock ownership is the governance measure ("Gov") Return on Assets is the preformance measure ("ROA")											
OLS		Estimate	*p*-value	OLS		Estimate	*p*-value	*OLS*		Estimate	*p*-value
ROA =	Gov	0.011	(0.00)	ROA =	Gov	0.010	*(0.00)*	ROA =	Gov	0.004	*(0.00)*
	CEO Own	0.047	(0.01)		CEO Own	0.050	*(0.01)*		CEO Own	0.013	*(0.32)*
	Leverage	−0.038	(0.00)		Leverage	−0.018	*(0.03)*		Leverage	−0.034	*(0.00)*

(continued on next page)

Table 4 (*continued*)

Contemporaneous performance				Next 1 Year Performance				Next 2 Years Performance			
Panel C: Log of Dollar Value of the median director's stock ownership is the governance measure ("Gov") Return on Assets is the preformance measure ("ROA")											
2SLS				2SLS							
ROA =	Gov	0.006	(0.01)	ROA =	Gov	0.005	*(0.04)*		Gov	0.002	*(0.16)*
	CEO Own	0.211	(0.00)		CEO Own	0.287	*(0.00)*		CEO Own	0.112	*(0.01)*
	Leverage	−0.040	(0.00)		Leverage	−0.017	*(0.06)*		Leverage	−0.032	*(0.00)*
3SLS				3SLS							
ROA =	Gov	0.005	(0.02)	ROA =	Gov	0.004	*(0.08)*		Gov	0.002	*(0.18)*
	CEO Own	0.179	(0.00)		CEO Own	0.206	*(0.00)*		CEO Own	0.112	*(0.01)*
	Leverage	−0.038	(0.00)		Leverage	−0.015	*(0.09)*		Leverage	−0.032	*(0.00)*
Sample Size	5,101			Sample Size	5,053			Sample Size	3,814		
Hausman (1978) *Specification Test:*											
	h-statistic	*p*-value			*h*-statistic	*p*-value			*h*-statistic	*p*-value	
OLS v. 2SLS	127.70	*(0.00)*		OLS v. 2SLS	148.60	*(0.00)*		OLS v. 2SLS	42.93	*(0.04)*	
OLS v. 3SLS	−2123.00	–		OLS v. 3SLS	1.75	*(1.00)*		OLS v. 3SLS	17.29	*(0.94)*	
2SLS v. 3SLS	1407.00	*(0.00)*		2SLS v. 3SLS	6.64	*(1.00)*		2SLS v. 3SLS	−16.70	–	
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	180.22	9.53		Gov	185.11	9.53		Gov	139.53	9.53	
CEO Own	250.54	9.53		CEO Own	257.66	9.53		CEO Own	197.45	9.53	
Leverage	96.51	9.53		Leverage	107.23	9.53		Leverage	92.74	9.53	

Panel D: Only the coefficient estimate on the governance variable in (1a) is presented; p-values are in parentheses. The estimation method deemed most appropriate by the Hausman (1978) specification test is in bold.

		Next 1 Year's ROA			*Next 1 Year's Return*			*Next 1 Year's Tobin's Q*		
	Predicted Sign	OLS	2SLS	3SLS	OLS	2SLS	3SLS	OLS	2SLS	3SLS
GIM	−	−0.001	−0.011	−0.011	−0.003	−0.013	−0.014	−0.045	0.156	0.164
G-Index		(0.03)	(0.03)	(0.02)	(0.44)	(0.71)	(0.69)	(0.00)	(0.11)	(0.10)
BCF	−	−0.005	−0.031	−0.032	0.001	−0.021	−0.022	−0.143	0.242	0.227
E-Index		(0.00)	(0.02)	(0.01)	(0.89)	(0.81)	(0.81)	(0.00)	(0.33)	(0.36)
TCL	+	0.000	−0.003	−0.003	0.002	0.000	0.000	0.003	0.037	0.048
Benchmark		(0.26)	(0.27)	(0.26)	(0.14)	(0.97)	(0.97)	(0.38)	(0.20)	(0.09)
BC	+	0.000	−0.005	−0.005	0.007	−0.049	−0.099	−0.003	0.034	0.125
GovScore		(0.85)	(0.61)	(0.65)	(0.09)	(0.41)	(0.04)	(0.76)	(0.81)	(0.35)
Director	+	0.010	0.005	0.004	0.020	0.008	0.005	0.235	0.000	−0.003
Ownership		(0.00)	(0.00)	(0.01)	(0.00)	(0.64)	(0.77)	(0.00)	(1.00)	(0.96)
CEO-Chair	−	0.000	−0.029	−0.028	−0.007	−0.064	−0.058	−0.005	0.209	0.189
Duality		(0.88)	(0.00)	(0.00)	(0.75)	(0.29)	(0.34)	(0.94)	(0.23)	(0.28)
Board	+	−0.052	−0.121	−0.120	−0.038	−0.250	−0.249	−0.666	0.634	0.662
Independence		(0.00)	(0.00)	(0.00)	(0.42)	(0.33)	(0.33)	(0.00)	(0.40)	(0.38)

Panels A–C: Simultaneous Equations System Estimation, Performance Measured by Return on Assets.
Panel D: Simultaneous Equations System Estimation, Performance Measured by Return on Assets, Stock Return, and 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 Eq. (1a) are presented in Panels A–C 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, the dollar value of the median director's stock holdings 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 Eq. (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.
In Panel D, the results for the seven governance measures are summarized. The results are presented using next year's Return on Assets as the performance measure, for all seven governance variables and for all three estimation methods. The results using next year's stock return and next year's Tobin's Q are also presented. Only the coefficient estimate on the governance variable is presented; *p*-values are in parentheses. The estimation method deemed most appropriate by the Hausman (1978) specification test is in bold.

Table 5
Governance–performance relation: robustness checks

	Governance Variable						
	GIM G-Index	BCF E-Index	TCL Benchmark Score	Brown and Caylor GovScore (OLS)	$ Value of Median Director's Holdings	CEO-Chair Duality (=1 if Dual)	% of Directors Independent
Panel A: OLS and clustered (Rogers) standard errors. Only the coefficients on the governance variable from Eq. (1a) are presented; p-values are in parentheses.							
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
Panel B: Only the coefficients on the governance variable from Eq. (1a) are presented; p-values are in parentheses.							
OLS, Table 4	−0.001	−0.005	0.000	0.000	0.010	0.000	−0.052
	(0.03)	*(0.00)*	*(0.26)*	*(0.85)*	*(0.00)*	*(0.88)*	*(0.00)*
OLS, Clustered SE	−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)*
2SLS, Table 4	−0.011	−0.031	−0.003	−0.005	0.005	−0.029	−0.121
	(0.03)	*(0.02)*	*(0.27)*	*(0.61)*	*(0.04)*	*(0.00)*	*(0.00)*
2SLS, Clustered SE	−0.011	−0.031	−0.003	−0.005	0.005	−0.029	−0.121
	(0.07)	*(0.09)*	*(0.23)*	*(0.84)*	*(0.07)*	*(0.01)*	*(0.01)*
2SLS, White SE	−0.011	−0.031	−0.003	−0.005	0.005	−0.029	−0.121
	(0.05)	*(0.10)*	*(0.09)*	*(0.84)*	*(0.06)*	*(0.02)*	*(0.04)*
Fixed Effects	−0.005	−0.004	0.000	–	0.003	0.002	−0.017
Firm and Year FE	*(0.00)*	*(0.02)*	*(0.25)*	–	*(0.00)*	*(0.42)*	*(0.02)*
FE, Clustered SE	−0.005	−0.004	0.000	–	0.003	0.002	−0.017
Firm and Year FE	*(0.01)*	*(0.08)*	*(0.30)*	–	*(0.03)*	*(0.50)*	*(0.06)*

In this table we report the results from estimating Eq. (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. In Panel A, we report results using OLS and *clustered (Rogers) standard errors*. In Panel B, we report results using 2SLS clustered standard errors, 2SLS using White standard errors, two fixed effects models, plus results from Table 4 for comparison. The performance measure is next year's Return on Assets (ROA_{t+1}). Only the coefficients on the governance variable from Eq. (1a) are presented; *p*-values are in parentheses.

In Table 4, Panel C, 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.

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.[18] 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 Table 4, Panel D. The OLS estimate indicates a significantly negative relation between the GIM index and next year's Tobin's Q. However, the 2SLS estimate is positive but statistically insignificant for next year's Tobin's Q. The Hausman (1978) specification test suggests that the 2SLS estimates are more appropriate for statistical inferences.

4.1. Economic significance of impact of governance on 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. We find that a 1% improvement in governance as measured by the composite index is

[18] We find that the relation between the GIM governance index and abnormal stock returns (after adjusting for market, size, book-to-market, and momentum factors) is not robust to either the construction of the abnormal stock return, or the sample period. Detailed results will be provided on request.

Table 6
CEO turnover statistics

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

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" (columns 1 thru 4) 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" (columns 5 thru 7) if the CEO resigned to pursue other interests, if the CEO was fired, or if no specific reason is given.

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. Validity and strength of instruments

First, following the suggestion of Larcker and Rusticus (2005), we consider an alternate set of instruments in addition to the instruments noted above. For example, we consider (one year) lagged performance for performance, lagged ownership for ownership, and lagged leverage for leverage. Results using these instruments are consistent with the results reported above.

We have conducted the Stock and Yogo (2004) test to ensure that our instruments are strong. We also perform the Hahn and Hausman (2002) weak instrument test, and the Hansen–Sargan overidentification test as discussed in Davidson and Mackinnon (2004); inferences from these tests are consistent with the reported Stock and Yogo test results.

Third, following the suggestions of Stock, Wright and Yogo (2002) and Hall, Rudebusch and Wilcox (1996) we perform the Cragg–Donald test for model identification. The Cragg–Donald test indicates that our system of equations is well-specified.

Fourth, we perform the Anderson–Rubin test suggested by Dufour (1997) to test the joint significance of the set of endogenous variables in our system of equations. The Anderson–Rubin test supports the joint significance of our set of endogenous variables.

4.2.2. k-Class estimators

In the case of simultaneously determined variables, 2SLS can address this problem by using instrumental variables. There are estimators other than the 2SLS estimator, such as the *k*-class estimator that can address the endogeneity problem; see Kennedy (2003) and Guggenberger (2005). The results for *k*-class estimators and next year's operating performance, next two years' operating performance, stock return and Tobin's Q (for contemporaneous and for the two additional time periods) as the performance measures are consistent with the results reported in Table 4.

4.2.3. 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.

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 suggest that this relationship needs to be estimated as a system of simultaneous equations as in Eqs. (1a), (1b), (1a) and (1d). We estimate the performance–governance relationship using 2SLS and heteroscedasticity adjusted White and clustered (Rogers) standard errors, respectively. Also, we estimate the performance–governance relationship using OLS with fixed effects estimator including firm and year fixed effects, and OLS with fixed effects estimator with clustered (Rogers) standard errors, respectively. These results are consistent with those reported earlier and are summarized in Table 5.

Table 7
CEO turnover–governance relation

	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
Panel A: Disciplinary turnover								
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×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	1993–2002	1993–2002	2001–2003	2002	1998–2002	1996–2003	1996–2003
Sample Size	8965	3329	3329	3488	788	4766	6871	7278
Panel B: Non-disciplinary turnover								
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×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	1993–2002	1993–2002	2001–2003	2002	1998–2002	1996–2003	1996–2003
Sample Size	8965	3329	3329	3488	788	4766	6871	7278

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. Baseline results are presented in the first column; all other columns present results including Governance and (Performance×Governance) variables. The other control variables are 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. Sample size refers to the entire sample (disciplinary turnover, non-disciplinary turnover, and no turnover cases) for the particular period, and not just to cases of disciplinary turnover and non-disciplinary turnover.

4.2.4. Outsider and non-outsider as median director

Given that most of our median directors are outsiders (please see footonote 8), and given the negative relationship we find between board independence and firm performance, it is possible that there is a difference between the governance–performance relation of firms with an outsider median director and a non-outsider median director. When the analyses in Table 4 (and Table 7, later) are performed using only those 71.6% of firms with outsiders as median directors, or the 28.4% of firms with non-outsiders as median directors, the results are qualitatively unchanged.

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 6 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.[19] 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:

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

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 × Governance). The reason behind this is that if the firm is performing adequately, good governance *per se* 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 Eq. (2a):

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

Table 7 highlights the relation between different measures of governance and disciplinary CEO turnover. Table 7, Panel A, details the multinomial logit regression results for the determinants of disciplinary CEO turnover. Consider first the baseline results without governance 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 7, 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.[20] This suggests that good governance *per se* is not related to disciplinary turnover. The coefficient of the interactive term (Past 2 years' stock return × 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.[21,22] 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 the CEO is also the Chairman, he is more likely to experience disciplinary turnover *given* poor firm performance.

Table 7, 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

First, we have highlighted above the endogenous relationships among corporate governance, performance, capital structure, and corporate ownership structure. It is possible that management turnover and performance (and ownership) are also endogenous. To address turnover endogeneity we estimate a system of five Eqs. (1a), (1b), (1a), (1d), and (2b).[23] Motivated by the

[19] 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%.

[20] When the CEO is also the Chairman, he is less likely to experience disciplinary turnover.

[21] 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 (2006), and Weisbach (1988).

[22] 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 7. 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 × Director $ Ownership) interaction term decreases by one standard deviation. The corresponding probabilities are 2.90% and 7.96% for board independence.

[23] Wooldridge (2002) cautions about the two-stage estimation procedure when the dependent variable in one of the equations is dichotomous. However, on the basis of the evidence in Angrist (2001) and Alvarez and Glasgow (1999) we interpret the signs of the two-stage estimates in the usual way.

findings of Fich and Shivdasani (2006) we use percentage of board members who are on more than four boards as instrument for CEO Turnover; the Stock and Yogo (2002) test, the Hahn and Hausman (2002) test and the Hansen–Sargan test suggest that this is an appropriate instrument. Results from taking turnover endogeneity into account are entirely consistent with the disciplinary turnover results noted in Table 7, Panel A.

Second, due to data limitations the sample periods and sample sizes for the various governance measures are different in Table 7, 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.[24]

Third, for reasons noted in Section 4.2.3. above, we computed the clustered (Rogers) standard errors for the coefficients in the CEO turnover model; the results are consistent with those reported in Table 7.

Fourth, 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 those reported above.

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, 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*. 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. We conduct a battery of robustness checks including (a) consideration of alternate instruments for estimating the system of equations, (b) consideration of diagnostic tests to ensure that our instruments are valid and our system of equations is well-identified, and (c) 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, contrary to claims in the literature, none of the governance measures are correlated with future stock market performance. In several instances inferences regarding the (stock market) performance and governance relationship do depend on whether or not one takes into account the endogenous nature of the relationship between governance and (stock market) 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, finance, and corporate law 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

[24] Motivated by the findings of Huson, Malatesta and Parrino (2004) we also controlled for turnovers as a consequence of takeover pressure and other types of forced turnover. The results are qualitatively similar to that noted above.

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 *operating* 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.

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