

1 Director Ownership, Governance, and 2 Performance

3 Sanjai Bhagat and Brian Bolton*

4 Abstract

5 We study the impact of the Sarbanes-Oxley Act on the relationship between corporate
6 governance and company performance. We consider 5 measures of corporate governance
7 during the period 1998–2007. We find a significant negative relationship between board
8 independence and operating performance during the pre-2002 period, but a *positive* and
9 significant relationship during the post-2002 period. Our most important contribution is a
10 proposal of a governance measure, namely, dollar ownership of the board members, that
11 is simple, intuitive, less prone to measurement error, and not subject to the problem of
12 weighting a multitude of governance provisions in constructing a governance index.

13 I. Introduction

14 The corporate scandals of the early 2000s, including Enron, Worldcom, Tyco,
15 and others, led to a wave of regulation aimed at improving the corporate govern-
16 nance environment. A common feature of this was the implementation of guide-
17 lines concerning the independence of the members of the board of directors. For
18 example, the Sarbanes-Oxley Act of 2002 (SOX) mandated that all members of
19 a listed firm’s audit committee must be independent. Soon thereafter, both the
20 New York Stock Exchange and the NASDAQ Stock Market required all listed
21 companies to have a majority of independent directors.

22 The regulatory and institutional focus on board independence is surprising
23 given that most of the prior academic research found no statistical relationship
24 and, in many cases, found a negative relationship, between board independence
25 and firm performance. The above research, however, focuses on a time period
prior to this recent wave of regulation aimed at increasing board independence on

*Bhagat, sanjai.bhagat@colorado.edu, Leeds School of Business, University of Colorado at Boulder, UCB 419, Boulder, CO 80309; Bolton, bbolton@pdx.edu, School of Business Administration, Portland State University, PO Box 751, Portland, OR 97207. We thank Yaniv Grinstein (the referee), Paul Malatesta (the editor), Andrew Metrick, and seminar participants at Harvard University and American Finance Association meetings for constructive comments on a previous draft of this paper.

2 Journal of Financial and Quantitative Analysis

1 boards and audit committees. Even those studies that do include some post-2002
2 data include mostly pre-2002 data, so it is difficult to separate the findings into
3 pre- and post-regulation relationships.

4 This paper fills the above gap in the literature: We study the relationships
5 between various measures of corporate governance (especially board indepen-
6 dence) and firm performance during the period 1998–2007. We explicitly separate
7 the sample period into pre- and post-2002 subperiods to focus on the effects of
8 the regulation. While we confirm the negative relationship between board inde-
9 pendence and firm performance (that most prior research has identified) for the
10 pre-2002 period, this result is reversed for the post-2002 period. *During the years*
11 *2003–2007, greater board independence is positively correlated with operating*
12 *performance.* In other tests, we find that this result is driven by firms that increase
13 their number of independent directors. An event study provides independent evi-
14 dence supportive of the above results – specifically, when a company goes from
15 being noncompliant to being compliant with SOX’s board independence require-
16 ment, the market response is significantly positive. The above findings are consis-
17 tent with and supportive of the event-study results of Chhaochharia and Grinstein
18 (2007) and DeFond, Hann, and Hu (2005). Chhaochharia and Grinstein find that
19 firms that were less compliant with the rules imposed by SOX and the exchanges
20 earned more positive abnormal returns on the announcement of the rules. DeFond
21 et al. document a positive stock market reaction when a director with accounting
22 expertise is appointed to the audit committee.

23 While SOX specifically affects board independence, perhaps the increased
24 scrutiny of all firms’ corporate governance environments forces firms to imple-
25 ment better corporate governance practices, regardless of how those governance
26 practices are measured.¹ As such, board independence is not the only measure
27 of governance that we consider. We find that the dollar value of director stock
28 ownership is positively related to operating performance both pre- and post-2002.
29 We also find that whether or not a firm’s chief executive officer (CEO) is also the
30 board chair is negatively related to operating performance throughout the sample
31 period. These findings are consistent with prior literature. We also consider 2 pop-
32 ular corporate governance indices: the G-Index of Gompers, Ishii, and Metrick
33 (GIM) (2003) and the E-Index of Bebchuk, Cohen, and Ferrell (BCF) (2009).
34 During 1998–2001, both the G-Index and the E-Index suggest a positive and
35 significant relation between good governance and performance; these findings are
36 consistent with the extant literature. However, during 2003–2007, the G-Index
37 suggests a *negative* and significant relation between good governance and per-
38 formance. Also, during 2003–2007, the E-Index suggests an inconsistent relation
39 between good governance and performance.

40 As many prior studies note, the relationship between corporate governance
41 and company performance is plagued by endogeneity concerns. It is unclear
42 whether performance causes governance or whether governance causes perfor-
43 mance. To account for this, we utilize a 4-equation system to allow for governance,
44 performance, ownership, and capital structure to be potentially endogenous. We

¹For example, Brochet (2010) finds that Section 403 of SOX has brought about more timeliness and transparency in the communication of insider trading.

1 adopt an instrumental variables (IV) approach to estimate the system of equations,
2 checking for the validity and strength of our instruments and specification of
3 the system of equations. In addition, as a robustness check we consider alter-
4 native methodologies less susceptible to the endogeneity concern (with consistent
5 results).

6 Although most prior research has not found a positive relationship between
7 board independence and firm performance prior to 2002, some research has found
8 support for board independence in specific situations. Hermalin (2005) develop
9 a model predicting that board independence provides greater oversight of man-
10 agerial actions. Bhagat and Bolton (BB) (2008) find that firms with greater board
11 independence are more likely to replace the CEO following periods of bad
12 performance. We extend this CEO turnover test to our sample period and find this
13 result persists in the post-2002 time period. In sum, these findings are consistent
14 with the notion that the wave of corporate governance regulation that occurred
15 during 2002 may have had some desired effect. Specifically, post-2002, com-
16 panies whose boards are more independent are positively correlated with better
17 operating performance.

18 In addition to studying the changing nature of corporate governance across
19 the pre- and post-2002 subperiods, we make 5 additional contributions to the lit-
20 erature. First, consistent with the efficient market hypothesis, we show that none
21 of the governance measures are correlated with current or future stock market
22 performance, in contrast to the claims in papers such as GIM (2003) and BCF
23 (2009). Second, we find that given poor firm performance, the probability of dis-
24 ciplinary management turnover is positively correlated with stock ownership of
25 board members and board independence. However, given poor firm performance,
26 the probability of disciplinary management turnover is *negatively* correlated with
27 better governance measures as proposed by GIM and BCF. In other words, so
28 called “better-governed firms” as measured by the GIM and BCF indices are
29 *less* likely to experience disciplinary management turnover in spite of their poor
30 performance. Third, we find that firms with greater stock ownership of board
31 members and board independence are less likely to engage in a value-destroying
32 activity, namely, acquisitions. On the other hand, better-governed firms as mea-
33 sured by the GIM and BCF indices are more likely to engage in acquisitions.
34 Fourth, we show that firms that are not compliant with SOX have significantly
35 higher abnormal returns upon becoming compliant than do noncompliant firms
36 that stay noncompliant; this is consistent with and supportive of the results of
37 Chhaochharia and Grinstein (2007) and DeFond et al. (2005). The most important
38 contribution of this paper is our proposal of a governance measure, namely, dollar
39 ownership of the board members, that is simple, intuitive, less prone to measure-
40 ment error, and not subject to the problem of weighting a multitude of governance
41 provisions in constructing a governance index. Consideration of this governance
42 measure by future researchers would enhance the comparability of research find-
43 ings with more robust progress in governance research.

44 The remainder of this paper is organized as follows: The next section
45 discusses the relevant literature. Section III introduces our model specification
46 and sample. Section IV presents the results on the relationship between corpo-
47 rate governance and company performance. Section V discusses results of an

4 Journal of Financial and Quantitative Analysis

1 event study where we focus on the announcement by sample firms of the nomi-
2 nation of additional independent directors that would enable the firm to comply
3 with SOX's board independence requirement for the audit committee. Section VI
4 considers the relationship between corporate governance, company performance,
5 and CEO turnover. Section VII considers the relationship between corporate
6 governance and merger and acquisition (M&A) deals. Section VIII notes our
7 conclusions.

8 II. Corporate Governance and Board Independence

9 The relationship between board independence and firm performance is one
10 of the most studied relationships in the corporate governance literature. Hermalin
11 and Weisbach (1991) find no relationship between board composition and perfor-
12 mance (using Tobin's Q (Q) as the performance measure). Agrawal and Knoeber
13 (1996) study the interrelationships among 7 corporate governance mechanisms
14 and find a negative relationship between independence and firm performance
15 (as measured by Q). Bhagat and Black (2002), using a variety of performance
16 measures, document that firms with more independent boards do not perform bet-
17 ter. They also find that poorly performing firms are more likely to increase the
18 number of independent directors, but that this does not improve performance.
19 More recently, BB (2008) find a negative relationship between board indepen-
20 dence and operating performance. The overwhelming majority of work finds that
21 having a more independent board of directors does not lead to better performance
22 and may actually lead to worse performance.

23 Adams and Ferreira (2007) introduce a model that suggests CEOs may be
24 reluctant to share information with more independent boards, thereby decreas-
25 ing shareholder value. This suggests that the requirements of SOX and the stock
26 exchanges for firms to increase director independence may potentially be detri-
27 mental to firm value. Laux (2008) presents a model considering CEO turnover and
28 board independence, and shows that greater board independence might be detri-
29 mental to the firm because independent boards might be too active in
30 replacing the CEO and in formulating CEO compensation. Raheja (2005) looks
31 at the board's monitoring role with respect to investment projects. In her model,
32 inside directors have more knowledge of the firm's investments, so the optimal
33 board structure will depend on the project verification costs to outsiders and
34 private benefits from projects to insiders. This suggests greater board indepen-
35 dence can be beneficial in some firms while being detrimental in other firms. Sim-
36 ilarly, Coles, Daniel, and Naveen's (2008) work suggests that smaller and more
37 independent boards may not be superior in all cases. Using data from 1997–2000,
38 Gillan, Hartzell, and Starks (2003) show that firms with more powerful boards
39 (or more independent boards) also have higher *G-Index* scores, suggesting that
40 managers may become more entrenched to protect themselves from the oversight
41 of an independent board. Finally, Chhaochharia and Grinstein (2007) find that
42 firms that were less compliant with the rules imposed by SOX and the exchanges
43 earned positive abnormal returns on the announcement of the rules, relative to
44 firms that were more compliant.

1 One common feature of these studies is that they mostly focus on boards and
2 relationships prior to 2002. It is rare to see an exogenous shock to the corporate
3 governance landscape, but the increased regulation of 2002 may be just the kind
4 of event to provide a demarcation of corporate governance regimes. Section 301
5 of SOX mandates that the audit committees of public firms be comprised entirely
6 of independent directors and that the audit committee contain at least one “fi-
7 nance expert.” While firms could meet the independence requirement by remov-
8 ing affiliated directors from the board, some firms might have to add independent
9 directors in order to meet the “finance expert” requirement.² Further, it stipu-
10 lates that if a firm does not have a stand-alone audit committee, then the entire
11 board functions as the audit committee and it, therefore, must be comprised en-
12 tirely of outside directors. Subsequent to the passage of SOX, the New York Stock
13 Exchange and the NASDAQ Stock Market simultaneously instituted standards re-
14 quiring listed companies to have a majority of independent directors. This regula-
15 tion did force firms to add independent directors, as fewer than 80% of firms had a
16 majority of independent directors in 2003.³ Further, SOX and the listing standards
17 impose new responsibilities on firms’ directors, such as regular meetings of the
18 independent directors, approval of director nominations by independent directors,
19 and approval of CEO compensation by independent directors. As a consequence
20 of these policies, boards began including more independent directors,⁴ and, ar-
21 guably, the independent directors became more engaged in the firm’s governance
22 processes.

23 While the explicit objective of the SOX and exchange regulations is increas-
24 ing and improving board effectiveness through greater independence, it is possi-
25 ble that the firm’s entire corporate governance environment changes, regardless
26 of how corporate governance is measured. There are many plausible proxies for
27 corporate governance, but there is no agreed-upon “best” measure. As such, it is
28 possible these other measures have also been impacted by the new regulations.
29 GIM (2003) create a governance index (*G-Index*) using 24 antitakeover provi-
30 sions. They show that firms with strong shareholder rights outperform firms with
31 weak shareholder rights by 8.50% per year during the 1990s. They further show
32 that firms with strong shareholder rights have higher firm value, higher profits, and
33 higher sales growth. Core, Guay, and Rusticus (2006) extend this work and show
34 that firms with weaker governance as measured by *G-Index* have lower operat-
35 ing performance (and that this is anticipated by the market). BCF (2009) modify
36 the *G-Index* using only 6 of the 24 provisions to create an entrenchment index
37 (*E-Index*), and find that firms with higher *E-Index* scores (associated with weaker
38 governance) have lower firm valuation.

39 Beyond looking at indices that are comprised of various corporate governance
40 components, a substantial body of work considers individual firm characteristics

²See Securities Exchange Act Release No. 47137 (Jan. 8, 2003), 68 FR 2637 (Jan. 17, 2003), or <http://www.sec.gov/rules/sro/34-48745.htm>.

³Firms could also meet the independence requirement by removing employee and affiliated direc-
tors from the board and reducing the size of the board.

⁴As indicated in Table 1, the percentage of directors that are independent increased from 62% in
1998 to 72% in 2007.

6 Journal of Financial and Quantitative Analysis

1 as measures of corporate governance. These studies focus on the relationship
2 between a single firm governance characteristic and firm performance. The liter-
3 ature on board independence and firm performance is discussed above. Brickley,
4 Coles, and Jarrell (1997) study the benefits and costs of having the CEO also serve
5 as the board chair. BB (2008) and Bhagat and Tookes (2012) consider the stock
6 ownership of directors.

7 Can a single board characteristic be as effective a measure of corporate
8 governance as indices that include dozens of corporate charter and board char-
9 acteristics?⁵ While, ultimately, this is an empirical question, on both economic
10 and econometric grounds it is possible. Bhagat, Bolton, and Romano (2008)
11 argue that since boards have the power to make (or at least ratify) all important
12 company decisions, it is plausible that board members with appropriate stock
13 ownership will have the *incentive* to provide effective monitoring and oversight
14 of these important corporate decisions. Also, simple measures such as board
15 independence and director ownership can be a good proxy for overall good
16 governance on econometric grounds: The measurement error associated with a
17 simple variable such as board independence can be much less than the total
18 measurement error in measuring a multitude of board processes, compensation
19 structures, and charter provisions. Further, construction of a governance index
20 requires proper weighting of these board characteristics, antitakeover provisions,
21 and compensation variables; if the weights in the index are not the same as the
22 (unobservable) weights used by informed market participants in assessing the
23 governance and performance relationship, then incorrect inferences would be
24 made.

25 This paper is closest in spirit to BB (2008); however, we extend that work in
26 3 ways: First, BB consider governance-performance relationships only during the
27 pre-SOX period of 1998–2002; we consider both pre-SOX (1998–2001) and post-
28 SOX (2003–2007) periods. Given the scope of SOX and that it was the 1st such
29 significant corporate governance-related regulation in decades, it is important to
30 consider the extent to which governance-performance relationships changed sub-
31 sequent to the passage of SOX. For example, board independence is negatively
32 correlated with performance pre-SOX, but positively correlated with performance
33 post-SOX. Second, this study documents that firms that are not compliant with
34 SOX regarding audit committee independence have significantly higher abnormal
35 returns upon becoming compliant than do noncompliant firms that stay noncom-
36 pliant; BB do not consider any market responses to changes in board structure.
37 Finally, BB consider governance-performance relationships during 1998–2002
38 and propose a new governance measure (namely, dollar ownership of board di-
39 rectors). This study corroborates the statistical and economic significance of their
40 governance measure with out-of-sample data.

⁵For example, Brown and Caylor's (2006) *Gov-Score* index includes 51 factors, while commercial providers such as RiskMetrics Group (formerly Institutional Shareholder Services), The Corporate Library, and Glass Lewis & Company offer proprietary governance indices using, sometimes, several hundred governance characteristics.

1 III. Data Description and Model Specification

2 A. Data

3 Our primary source of corporate governance data is the RiskMetrics directors
4 and governance databases (formerly the Investor Responsibility Research Center
5 (IRRC)). In addition, we use the Compustat Industrial Annual database for fi-
6 nancial statement information, the Center for Research in Security Prices (CRSP)
7 database for stock market data, and the Compustat Executive Compensation
8 (ExecuComp) database for CEO ownership and turnover information. The Se-
9 curities and Exchange Commission's (SEC's) EDGAR database of SEC filings is
10 also used to obtain specific information from proxy statements.

11 The RiskMetrics databases track governance and director information for
12 approximately 1,500 large U.S. companies from 1990 to 2007. The governance
13 database provides corporate antitakeover provisions on these companies, plus the
14 *G-Index* score used in GIM (2003). This database provides updates for 1990,
15 1993, 1995, 1998, 2000, 2002, 2004, and 2007. The director database provides
16 detailed director information annually from 1996 to 2007. However, the director
17 ownership data are not tracked consistently until 1998, so our primary sample is
18 for 1998–2007. The ExecuComp database provides compensation and ownership
19 data on approximately 1,500 large U.S. firms annually from 1992 to 2007. There
20 is considerable overlap across these sources: The final merged sample has 1,000–
21 1,400 firms per year. The final sample is an unbalanced panel with 10 years of
22 data from 1998 to 2007 and a total of over 13,000 firm-year observations.

23 B. Governance Variables

24 This study considers the following 5 measures of corporate governance:⁶
25 *Independence*. Board independence is measured as the percentage of direc-
26 tors who are unaffiliated with the sample firm. This includes directors who are not
27 employees of the firm and directors who do not have any identifiable relationship
28 with the sample firm.

29 *DirectorOwn*. Director ownership is measured as the natural log of the dollar
30 value of common stock owned by the median director. We focus on the dollar
31 value rather than percentage of ownership because it serves as a more
32 direct measure of director incentives. Consistent with the political economy lit-
33 erature, we focus on the median directors because they have the ability to cast
34 the deciding vote on board issues (see Shleifer and Murphy (2004) and Milavonic
35 (2004)).

36 *CEO-Duality*. CEO-Chair duality is an indicator variable taking the value of
37 1 if the CEO of the sample firm is also the board chair, and 0 otherwise.

⁶In supplementary tests, we consider 2 other measures of corporate governance. *BusyBoards* is the percentage of directors who serve on more than 3 corporate boards; our results are consistent with that of Fich and Shivdasani (2006). *IndepInsider* is the number of the sample firm's executives on the board who hold at least 1 additional outside directorship; our results are supportive of Masulis and Mobbs (2011).

8 Journal of Financial and Quantitative Analysis

1 *G-Index*. From GIM (2003), the *G-Index* is the compilation of antitakeover
2 provisions in the firm's bylaws. The index is comprised of 24 corporate charter
3 provisions, with a possible index value ranging from 0 to 24. Consistent with
4 GIM, higher index values represent weaker corporate governance, while lower
5 index values represent stronger corporate governance.

6 *E-Index*. From BCF (2009), the *E-Index* is a subset of the *G-Index*. It includes
7 only 6 of the 24 corporate charter provisions believed consistent with entrenching
8 management, thus taking a value of 0–6.⁷ Again, higher index values represent
9 weaker corporate governance.

10 C. Performance Variables

11 Consistent with Barber and Lyon (1996) and Core, Guay, and Rusticus
12 (2006), we consider return on assets (*ROA*) as our primary measure of firm op-
13 erating performance. In supplementary tests, we also use stock return (*Return*)
14 and Tobin's Q (*Q*) as alternative measures of firm performance. Industry-adjusted
15 performance is obtained by subtracting the average performance of the sample
16 firm's 4-digit Standard Industrial Classification code from the sample firm's per-
17 formance measure.

18 D. Other Endogenous and Control Variables

19 In addition to governance and performance, ownership and capital structure
20 are also presumed to be endogenously determined. We consider *CEOwn%* as the
21 percentage of stock owned by the CEO. *Leverage* is the capital structure measure,
22 calculated as the long-term debt-to-assets ratio.

23 Regarding the control variables, prior literature (e.g., Core, Holthausen, and
24 Larcker (1999), Gillan et al. (2003), and Core et al. (2006)) suggests that industry
25 performance, return volatility, growth opportunities, and firm size are important
26 determinants of firm performance. Yermack (1996) documents a relation between
27 board size and performance. Demsetz (1983) suggests that small firms are more
28 likely to be closely held, suggesting a different governance structure than large
29 firms. Theoretical work on board independence (Hermalin and Weisbach (1998),
30 Raheja (2005), Adams and Ferreira (2007), and Harris and Raviv (2008)) sug-
31 gests that more independent boards are not necessarily value-enhancing; rather,
32 there is an optimal level of board independence depending on the information cost
33 that outside directors incur in becoming effective monitors. We consider the infor-
34 mation cost (*InfoCost*) variables as developed in Krishnaswami and Subramanian
35 (1999) as a determinant of board independence; specifically, we consider the stan-
36 dard deviation of monthly stock returns and the standard deviation of
37 analyst forecasts.

38 *FirmSize* is the natural log of assets for the firm. *R&DAdvExp* is the ratio
39 of research and development plus advertising expenses to assets; if the data are

⁷The 6 provisions are staggered boards, limits to shareholder bylaw amendments, supermajority requirements for mergers, supermajority requirements for charter amendments, poison pills, and golden parachutes.

1 missing, they are presumed to be zero. *MktBook* is the ratio of market to
2 book value of equity. *BoardSize* is the number of directors on the board.

3 We adopt an IV approach to dealing with the potential endogeneity among
4 governance, performance, ownership, and capital structure. We identify the
5 following primary IV used in the 1st-stage fitted regressions. We utilize 3 instru-
6 ments for the governance variables: *Dir%Own* is the average *percentage* of com-
7 mon stock owned by all directors (this is different from *DirectorOwn*, which is the
8 natural log of the dollar value of common stock owned by the median director).
9 We use this variable as an instrument for all 5 governance variables. *Dir%CEOs*
10 is the percentage of directors who are CEOs; this variable is used as an instrument
11 for *Independence*, *DirectorOwn*, and *CEO-Duality*. Hallock (1997) and Westphal
12 and Khanna (2003) emphasize the role of networks among CEOs that serve on
13 boards and the adverse impact on the governance of such firms. *Dir%15Ten* is
14 the percentage of directors who have served on the board for at least 15 years;
15 this variable is used as an instrument for *G-Index* and *E-Index*. *TreasStock* is the
16 ratio of treasury stock to assets, which we use as the primary instrument for per-
17 formance (as in Palia (2001)). *CEOTenAge* is the ratio of CEO tenure to CEO
18 age; this variable is used as the instrument for ownership. A CEO who has had
19 5 years of tenure at age 65 is likely to be of different quality and have a different
20 equity ownership than a CEO that has had 5 years of tenure at age 50. These
21 CEOs likely have different incentive, reputation, and career concerns. Gibbons
22 and Murphy (1992) provide evidence on this. Therefore, we use the ratio of
23 CEO tenure to CEO age as a measure of CEO quality, which will serve as an
24 instrument for CEO ownership. *ZScore* is the modified Altman's (1968) Z-Score;
25 this variable is used as the instrument for leverage.^{8,9}

26 E. Model Specification

27 The main relationship analyzed in this study is the effect that corporate
28 governance has on firm performance. We note above the potential endogeneity
29 between governance and performance. Bhagat and Jefferis (2002) highlight the
30 reasons for focusing on the interrelationships between performance, governance,
31 ownership, and capital structure. Therefore, we specify the following 4-equation
system of equations allowing for these interdependencies:

⁸Our choice of the instrument variables is motivated by the extant literature. However, it is difficult for us to argue that the instruments are uncorrelated with the regression error terms. A vast body of theoretical and empirical literature has focused on the interrelationships between performance, governance, ownership, and capital structure; see Bhagat and Jefferis (2002). In light of the above interrelationships, and the model we are trying to estimate (equations (1a), (1b), (1c), and (1d) as noted), we think it is close to impossible to propose instruments that are in theory *uncorrelated* with the error terms. From an econometric perspective, validity of instruments is a matter of degree, not kind; see Berkowitz, Caner, and Fang (2008) and Chao and Swanson (2005). Ashbaugh-Skaife, Collins, and LaFond (2006) make a similar point in their study of the effects of corporate governance on firms' credit ratings. We implement a battery of tests checking for the validity and strength of our instruments, and specification of the system of equations; please see Section IV and the Internet Appendix (www.jfq.org).

⁹We consider alternative instruments for leverage such as Graham's (1996) marginal tax rate; *ZScore* is more appropriate based on our diagnostic tests.

10 Journal of Financial and Quantitative Analysis

$$\begin{aligned}
 (1a) \quad Performance_{i,t} &= Governance_{i,t} + Ownership_{i,t} + Leverage_{i,t} \\
 &\quad + IndustryPerformance_{i,t} + FirmSize_{i,t} \\
 &\quad + R\&DAdvExp_{i,t} + BoardSize_{i,t} \\
 &\quad + InfoCost_{i,t} + TreasStock_{i,t} + \varepsilon a_{i,t}, \\
 (1b) \quad Governance_{i,t} &= Performance_{i,t} + Ownership_{i,t} + Leverage_{i,t} \\
 &\quad + FirmSize_{i,t} + R\&DAdvExp_{i,t} + BoardSize_{i,t} \\
 &\quad + InfoCost_{i,t} + Dir\%Own_{i,t} + Dir\%CEOs_{i,t} + \varepsilon b_{i,t}, \\
 (1c) \quad Ownership_{i,t} &= Performance_{i,t} + Governance_{i,t} + Leverage_{i,t} \\
 &\quad + FirmSize_{i,t} + R\&DAdvExp_{i,t} + BoardSize_{i,t} \\
 &\quad + InfoCost_{i,t} + CEOTenAge_{i,t} + \varepsilon c_{ai,t}, \\
 (1d) \quad Leverage_{i,t} &= Performance_{i,t} + Governance_{i,t} + Ownership_{i,t} \\
 &\quad + IndustryLeverage_{i,t} + FirmSize_{i,t} + R\&DAdvExp_{i,t} \\
 &\quad + MktBook_{i,t} + BoardSize_{i,t} + InfoCost_{i,t} \\
 &\quad + ZScore_{i,t} + \varepsilon d_{i,t}.
 \end{aligned}$$

1 The primary focus of this study is on equation (1a), and specifically on the coef-
 2 ficient on *Governance* in that equation. This relationship is studied for different
 3 time periods and for different subsamples.

4 In using IV estimation, 2 questions need to be addressed: Are the instru-
 5 ments valid, and is IV estimation necessary? An instrument is “weak” if the cor-
 6 relation between the instruments and the endogenous variable is small. Nelson
 7 and Startz (1990) and Bound, Jaeger, and Baker (1995) were among the first
 8 to discuss how IV estimation can perform poorly if the instruments are weak.
 9 Nelson and Startz show that the true distribution of the IV estimator may look
 10 nothing like the asymptotic distribution. Bound et al. focus on 2 related prob-
 11 lems. First, if the instruments and the endogenous variables are weakly correlated,
 12 then even a weak correlation between the instruments and the error in the orig-
 13 inal structural equation (which should be 0) can lead to large inconsistencies in
 14 the IV estimates; this is known as the “bias” issue related to weak instruments.
 15 Second, finite sample results can differ substantially from asymptotic theory.
 16 Specifically, IV estimates are generally biased in the same direction as ordi-
 17 nary least squares (OLS) estimates, with the magnitude of this bias increasing
 18 as the R^2 of the 1st-stage regression between the instruments and the endoge-
 19 nous variable approaches 0; this is known as the “size” issue related to weak
 20 instruments.

21 More recently, Stock and Yogo (2004) formalize the definitions and provide
 22 tests to determine if instruments are weak. They introduce 2 alternative definitions
 23 of weak instruments. First, a set of instruments is weak if the bias of the IV
 24 estimator, relative to the bias of the OLS estimator, exceeds a certain limit b .
 25 Second, the set of instruments is weak if the conventional α -level Wald test
 26 based on IV statistics has a size that could exceed a certain threshold r . These
 27 2 definitions correspond to the “bias” and “size” problems mentioned earlier.

28 Consistent with the recommendations of Chenhall and Moers (2007), we use
 29 the Stock and Yogo (2004) test for weak instruments and the Hahn and

1 Hausman (2002) test for the validity of the instruments. We also use the Durbin-
 2 Wu-Hausman specification test based on Hausman (1978) to test for differences
 3 between the OLS and 2-stage least squares (2SLS) results and to determine which
 4 estimation method is more appropriate for statistical inference.¹⁰

5 IV. Corporate Governance and Firm Performance

6 A. Descriptive Statistics

7 Table 1 presents the descriptive statistics for the main governance, perfor-
 8 mance, and other variables for the entire sample and for the pre- and post-2002
 9 subsamples. In general, the summary statistics for the entire sample period are
 10 similar to prior literature. The average board has 9.3 directors, 67% of whom are
 11 outsiders. The average *G-Index* is 9.2, and the average *E-Index* is 2.2. The median
 12 director owns about \$887,000 worth of company stock, and the CEO is also the
 13 board chair in about 60% of the firms.

TABLE 1
Descriptive Statistics

Table 1 presents the mean, median, and standard deviation for the primary governance, performance, and other variables. The statistics are presented for 3 time periods: the full sample, 1998–2007; and the 2 subsamples, 1998–2001 and 2003–2007. The variables are as defined in the text. The number of observations refers to observations with *Independence* only; the other governance variables may have slightly more or fewer observations, depending on availability.

	1998–2007 (n = 13,135)			1998–2001 (n = 5,230)			2003–2007 (n = 6,683)		
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
<i>Governance Variables</i>									
<i>Independence</i>	67.03%	70.00%	17.28%	61.56%	63.64%	19.90%	71.95%	75.00%	14.55%
<i>DirectorOwn</i>	13.69%	13.73%	1.58%	13.58%	13.48%	1.89%	13.89%	13.94%	1.34%
<i>CEO-Duality</i>	59.55%	100.00%	43.05%	59.46%	100.00%	40.75%	58.28%	100.00%	42.26%
<i>G-Index</i>	9.17%	9.00%	2.66%	8.887	9.00%	2.789	9.356	9.00%	2.579
<i>E-Index</i>	2.210	2.000	1.298	2.029	2.000	1.325	2.332	2.000	1.269
<i>Performance Variables</i>									
<i>ROA</i>	12.50%	12.38%	8.11%	12.63%	12.85%	8.49%	13.02%	12.28%	7.75%
<i>Return</i>	13.20%	7.28%	38.00%	13.81%	1.95%	42.72%	17.82%	13.72%	32.87%
<i>Q</i>	1.999	1.522	1.018	2.200	1.472	1.119	1.957	1.594	0.961
<i>Other Variables</i>									
<i>CEOOwn%</i>	1.78%	0.00%	3.86%	3.53%	0.00%	4.63%	1.32%	0.00%	3.02%
<i>Leverage</i>	18.56%	16.14%	13.45%	20.15%	17.65%	13.84%	17.62%	15.19%	12.97%
<i>FirmSize</i>	7.671	7.508	1.676	7.480	7.294	1.659	7.876	7.699	1.674
<i>R&DAdvExp</i>	3.90%	0.97%	4.63%	4.06%	0.52%	4.63%	3.62%	1.16%	4.62%
<i>BoardSize</i>	9.251	9.000	2.873	9.265	9.000	3.340	9.381	9.000	2.529
<i>InfoCost</i>	11.20%	9.32%	5.48%	14.49%	12.41%	6.05%	8.27%	7.38%	3.89%
<i>TreasStock</i>	5.71%	0.28%	10.57%	6.07%	0.28%	9.78%	8.01%	0.31%	10.65%
<i>Dir%Own</i>	0.41%	0.05%	2.24%	0.40%	0.05%	5.36%	0.14%	0.51%	0.45%
<i>Dir%CEOs</i>	24.22%	22.22%	13.87%	26.53%	25.00%	16.11%	21.36%	20.00%	11.92%
<i>Dir%15Ten</i>	15.95%	11.11%	19.59%	16.37%	10.00%	20.98%	14.26%	11.11%	16.01%
<i>CEOTenAge</i>	0.135	0.095	0.119	0.153	0.108	0.122	0.129	0.093	0.109
<i>MktBook</i>	2.684	2.240	1.708	3.397	2.200	1.912	2.763	2.303	1.560
<i>ZScore</i>	2.037	1.986	0.950	2.028	1.985	0.971	2.061	1.997	0.940

14 Some notable differences are seen when we compare the pre- and post-
 15 2002 subsamples. We note that post-2002 boards have become more independent,

¹⁰In addition to 2SLS, we also consider 3SLS, which allows for cross-correlation in the errors of the equations in the system. There is qualitatively very little difference between the 2SLS and 3SLS results, so we only report the 2SLS results.

1 directors own more stock, boards have become more entrenched (with *G-Index*
2 increasing from 8.9 to 9.4 and *E-Index* increasing from 2.0 to 2.3), but slightly
3 fewer CEOs are serving as board chair. Fewer directors are active CEOs. The size
4 of the board has remained relatively constant, but *Independence* has increased
5 from 61.6% before 2002 to 72.0% after 2002. Median director ownership has
6 significantly increased from about \$790,000 before 2002 to about \$1,100,000
7 after 2002.

8 Table 2 presents the correlation coefficients for select governance and other
9 variables. For the most part, the governance variables are not highly correlated,
10 with the exception of *G-Index* and *E-Index*. *Independence* and *G-Index* are mod-
11 erately highly correlated, consistent with Gillan et al. (2007).

12 B. Governance and Performance, Pre- and Post-2002 Periods

13 The year 2002 was seminal in terms of corporate governance regulation,
14 specifically with respect to board independence. We use 2002 as the break-point
15 for our 2 subperiods, since SOX was enacted in 2002; for this reason, we exclude
16 2002 from our analysis.¹¹

17 We find the most interesting result when we consider the relationship be-
18 tween *Independence* and *ROA* during the pre- and post-2002 periods. Consis-
19 tent with the extant literature, we find *Independence* is negatively related to *ROA*
20 during the 1998–2001 period (see Panel B of Table 3).¹² However, during the
21 2003–2007 period, we find that *Independence* is *positively* and significantly re-
22 lated to *ROA* (see Panel D). Boards have become more independent, and now this
23 independence is positively correlated with better operating performance.

24 A 2nd interesting result in Table 3 is that the relationship between *ROA* and
25 *G-Index* is negative and significant in the pre-2002 period (Panel B), but posi-
26 tive and significant during the post-2002 period (Panel D). The other 3 gover-
27 nance variables (*DirectorOwn*, *CEO-Duality*, and *E-Index*) all have similar signs
28 and significance pre- and post-2002. Director ownership is positively related to
29 operating performance, whereas *CEO-Duality* and *E-Index* are negatively related.
30 (Recall that lower values of the *E-Index* and *CEO-Duality* are associated with
31 better governance.)

32 Table 3 also summarizes the relationship between various governance mea-
33 sures and stock market-based measures of performance, *Return* and *Q*. Consis-
34 tent with the efficient market hypothesis, we do not find any consistent significant
35 relation between any measure of governance (including those proposed by GIM
36 (2003) and BCF (2009)) and stock market-based measures of performance. This
37 evidence is consistent with a growing body of evidence that does *not* find a consis-
38 tent and significant relationship between governance measures proposed by GIM
39 and BCF and stock market-based measures of performance (e.g., see Johnson,

¹¹The results are robust to excluding both 2002 and 2003 from the analysis. We choose to include 2003, because many firms were compliant with SOX by 2003.

¹²In Panels A and C of Table 3, we report OLS and 2SLS results for completeness. However, the Hausman (1978) test indicates that the 2SLS estimates are more appropriate for inference; see Appendix A in the Internet Appendix.

TABLE 2
Correlation Coefficients

Table 2 presents the correlation coefficients for the primary governance variables and other select variables. Pearson correlation coefficients are below the diagonal; Spearman rank correlation coefficients are above the diagonal. Panel A presents the coefficients for 1998–2001, and Panel B presents the coefficients for 2003–2007.

	<u>Independence</u>	<u>DirectorOwn</u>	<u>CEO-Duality</u>	<u>G-Index</u>	<u>E-Index</u>	<u>ROA</u>	<u>Return</u>	<u>Q</u>	<u>Ownership</u>	<u>Leverage</u>	<u>FirmSize</u>	<u>BoardSize</u>
Panel A. Correlation Coefficients: 1998–2001												
<u>Independence</u>	—											
<u>DirectorOwn</u>	-0.23	—										
<u>CEO-Duality</u>	0.05	-0.03	—									
<u>G-Index</u>	0.27	0.10	0.10	—								
<u>E-Index</u>	0.28	0.07	0.07	0.74	—							
<u>ROA</u>	0.02	0.07	0.01	0.02	-0.03	—						
<u>Return</u>	-0.02	0.15	-0.01	-0.04	-0.03	0.09	—					
<u>Q</u>	-0.06	0.31	-0.02	-0.11	-0.13	0.00	0.28	—				
<u>Ownership</u>	-0.19	0.10	0.10	-0.14	-0.15	0.07	0.02	0.03	—			
<u>Leverage</u>	0.00	-0.08	0.03	0.06	0.06	0.00	-0.02	-0.20	-0.10	—		
<u>FirmSize</u>	0.16	0.08	0.15	0.17	0.05	0.08	-0.03	-0.12	-0.12	0.11	—	
<u>BoardSize</u>	0.14	-0.04	0.14	0.24	0.13	0.07	-0.04	-0.12	-0.12	0.05	0.59	—
Panel B. Correlation Coefficients: 2003–2007												
<u>Independence</u>	—											
<u>DirectorOwn</u>	-0.17	—										
<u>CEO-Duality</u>	0.09	-0.05	—									
<u>G-Index</u>	0.18	-0.07	0.11	—								
<u>E-Index</u>	0.18	-0.07	0.07	0.70	—							
<u>ROA</u>	-0.04	0.17	-0.02	-0.02	-0.07	—						
<u>Return</u>	-0.05	0.08	0.03	0.02	0.02	0.08	—					
<u>Q</u>	-0.04	0.31	-0.05	-0.09	-0.11	0.47	0.21	—				
<u>Ownership</u>	-0.15	0.01	0.07	-0.14	-0.14	0.04	-0.02	0.04	—			
<u>Leverage</u>	0.06	-0.09	0.03	0.08	0.06	-0.05	-0.03	-0.26	-0.08	—		
<u>FirmSize</u>	0.16	0.10	0.14	0.12	0.00	-0.13	-0.04	-0.22	-0.15	0.20	—	
<u>BoardSize</u>	0.09	0.01	0.05	0.21	0.10	-0.11	-0.05	-0.19	-0.14	0.11	0.61	—

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

14 Journal of Financial and Quantitative Analysis

1 Moorman, and Sorescu (2009), Core et al. (2006), Lehn, Patro, and Zhao (2007),
 2 and Cremers and Nair (2005)).

3 Table 4 summarizes the relationship between various governance measures
 4 and future firm performance. In general, these results are consistent with those

TABLE 3
 Governance and Performance, Equation (1a)

Table 3 presents the results from estimating equation (1a), the performance equation. Five different specifications are presented with 5 different governance variables: *Independence*, board independence; *DirectorOwn*, the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index*, the GIM (2003) governance index; and *E-Index*, the BCF (2009) entrenchment index. Here, *ROA*, return on assets in the current period, is used as the measure of performance. All other variables are as defined in the text. Panel A presents the results using ordinary least squares (OLS) for the 1998–2001 period; Panel B presents the results using 2-stage least squares (2SLS) for the 1998–2001 period; Panel C presents the results using OLS for the 2003–2007 period; and Panel D presents the results using 2SLS for the 2003–2007 period. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent Variable: Return on Assets (<i>ROA</i> _{<i>t</i>})				
	<i>Independence</i> _{<i>t</i>}	<i>DirectorOwn</i> _{<i>t</i>}	<i>CEO-Duality</i> _{<i>t</i>}	<i>G-Index</i> _{<i>t</i>}	<i>E-Index</i> _{<i>t</i>}
<i>Panel A. OLS Estimation: 1998–2001</i>					
<i>Governance</i> _{<i>t</i>}	−0.027*** (0.01)	0.015*** (0.00)	−0.003 (0.57)	−0.001 (0.54)	−0.006*** (0.00)
<i>Ownership</i> _{<i>t</i>}	−0.001 (0.80)	−0.001 (0.38)	0.000 (0.59)	−0.001 (0.93)	−0.001 (0.51)
<i>Leverage</i> _{<i>t</i>}	−0.123*** (0.00)	−0.105*** (0.00)	−0.122*** (0.00)	−0.133*** (0.00)	−0.131*** (0.00)
<i>IndustryPerformance</i> _{<i>t</i>}	0.575*** (0.00)	0.565*** (0.00)	0.576*** (0.00)	0.590*** (0.00)	0.588*** (0.00)
<i>FirmSize</i> _{<i>t</i>}	−0.003 (0.11)	−0.007*** (0.00)	−0.003 (0.11)	−0.002 (0.15)	−0.003* (0.07)
<i>R&DAdvExp</i> _{<i>t</i>}	−0.895*** (0.00)	−0.940*** (0.00)	−0.897*** (0.00)	−0.890*** (0.00)	−0.898*** (0.00)
<i>BoardSize</i> _{<i>t</i>}	−0.003*** (0.00)	−0.002* (0.05)	−0.003*** (0.00)	−0.003*** (0.00)	−0.003*** (0.00)
<i>InfoCost</i> _{<i>t</i>}	−0.076*** (0.00)	−0.094*** (0.00)	−0.074*** (0.00)	−0.053* (0.06)	−0.059** (0.04)
<i>TreasStock</i> _{<i>t</i>}	0.263*** (0.00)	0.266*** (0.00)	0.263*** (0.00)	0.261*** (0.00)	0.261*** (0.00)
No. of obs.	5,156	4,665	5,156	4,566	4,566
<i>Panel B. 2SLS Estimation: 1998–2001</i>					
<i>Governance</i> _{<i>t</i>}	−0.739*** (0.00)	0.028** (0.02)	−0.167*** (0.00)	−0.097*** (0.00)	−0.196*** (0.00)
<i>Ownership</i> _{<i>t</i>}	−0.014*** (0.00)	−0.008*** (0.01)	−0.001* (0.10)	−0.016*** (0.00)	−0.014*** (0.00)
<i>Leverage</i> _{<i>t</i>}	−0.205*** (0.00)	−0.200*** (0.00)	−0.202*** (0.00)	−0.213*** (0.00)	−0.274*** (0.00)
<i>IndustryPerformance</i> _{<i>t</i>}	0.714*** (0.00)	0.694*** (0.00)	0.694*** (0.00)	0.791*** (0.00)	0.708*** (0.00)
<i>FirmSize</i> _{<i>t</i>}	0.015*** (0.00)	0.006 (0.33)	0.002*** (0.00)	0.006 (0.30)	−0.003 (0.67)
<i>R&DAdvExp</i> _{<i>t</i>}	−0.689*** (0.00)	−0.753*** (0.00)	−0.658*** (0.00)	−0.910*** (0.00)	−0.795*** (0.00)
<i>BoardSize</i> _{<i>t</i>}	−0.008*** (0.00)	−0.006** (0.01)	−0.005** (0.04)	0.002 (0.68)	−0.004 (0.20)
<i>InfoCost</i> _{<i>t</i>}	−0.226*** (0.00)	−0.198*** (0.01)	−0.190** (0.01)	−0.390*** (0.00)	−0.251** (0.01)
<i>TreasStock</i> _{<i>t</i>}	0.367*** (0.00)	0.364*** (0.00)	0.389*** (0.00)	0.368*** (0.00)	0.329*** (0.00)
No. of obs.	5,156	4,665	5,156	4,566	4,566

(continued on next page)

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

Bhagat and Bolton 15

TABLE 3 (continued)
 Governance and Performance, Equation (1a)

	Dependent Variable: Return on Assets (ROA_t)				
	$Independence_t$	$DirectorOwn_t$	$CEO-Duality_t$	$G-Index_t$	$E-Index_t$
<i>Panel C. OLS Estimation: 2003–2007</i>					
$Governance_t$	0.014 (0.14)	0.015*** (0.00)	−0.001 (0.65)	−0.001* (0.07)	−0.004 (0.00)
$Ownership_t$	0.000** (0.05)	0.000* (0.07)	0.000** (0.02)	0.000* (0.08)	0.000 (0.17)
$Leverage_t$	−0.042*** (0.00)	−0.021*** (0.01)	−0.042*** (0.00)	−0.042*** (0.00)	−0.041*** (0.00)
$IndustryPerformance_t$	0.478*** (0.00)	0.461*** (0.00)	0.477*** (0.00)	0.470*** (0.00)	0.468*** (0.00)
$FirmSize_t$	−0.003*** (0.00)	−0.006*** (0.00)	−0.003*** (0.00)	−0.003*** (0.00)	−0.004*** (0.00)
$R\&DAdvExp_t$	−0.202*** (0.00)	−0.242*** (0.00)	−0.204*** (0.00)	−0.199*** (0.00)	−0.203*** (0.00)
$BoardSize_t$	−0.003*** (0.00)	−0.002*** (0.01)	−0.003*** (0.00)	−0.003*** (0.00)	−0.002*** (0.00)
$InfoCost_t$	−0.456*** (0.00)	−0.414*** (0.00)	−0.454*** (0.00)	−0.460*** (0.00)	−0.464*** (0.00)
$TreasStock_t$	0.147*** (0.00)	0.147*** (0.00)	0.147*** (0.00)	0.147*** (0.00)	0.147*** (0.00)
No. of obs.	6,515	6,377	6,515	7,665	7,665
<i>Panel D. 2SLS Estimation: 2003–2007</i>					
$Governance_t$	0.178** (0.01)	0.006** (0.03)	−0.029** (0.04)	0.014 (0.16)	−0.493* (0.05)
$Ownership_t$	0.002* (0.05)	0.000 (0.16)	0.001 (0.15)	0.001 (0.18)	0.018* (0.06)
$Leverage_t$	−0.671*** (0.00)	−0.656*** (0.00)	−0.649*** (0.00)	−0.673*** (0.00)	−0.030* (0.09)
$IndustryPerformance_t$	0.537*** (0.00)	0.537*** (0.00)	0.537*** (0.00)	0.544*** (0.00)	0.501* (0.07)
$FirmSize_t$	−0.005*** (0.00)	−0.007*** (0.00)	−0.008*** (0.00)	−0.008*** (0.00)	−0.072* (0.08)
$R\&DAdvExp_t$	−0.481*** (0.00)	−0.453*** (0.00)	−0.456*** (0.00)	−0.396*** (0.00)	−0.500*** (0.01)
$BoardSize_t$	−0.003 (0.28)	−0.001 (0.27)	−0.001 (0.37)	−0.003* (0.09)	−0.031* (0.07)
$InfoCost_t$	−0.266*** (0.00)	−0.305*** (0.00)	−0.313*** (0.00)	−0.212*** (0.01)	−0.288** (0.03)
$TreasStock_t$	0.156*** (0.00)	0.163*** (0.00)	0.165*** (0.00)	0.156*** (0.00)	0.150*** (0.01)
No. of obs.	6,515	6,377	6,515	7,665	7,665

1 discussed above. One exception to this is the relationship between ROA in the next
 2 2 years and $E-Index$, which reverses from negative prior to 2002 to positive after
 3 2002.

4 We next try to better characterize and understand the surprising significant
 5 positive relation between board independence and operating performance for the
 6 period 2003–2007. Using the sample of 13,135 firm-year observations, we de-
 7 termine the year-to-year change in the number of independent directors for each
 8 firm-year. An increase in the number of independent directors from the previous
 9 year is observed for only about $\frac{1}{3}$ of these observations. In Panel A of Table 5, we
 10 observe a significant positive relation between board independence and contem-
 11 poraneous operating performance for the period 2003–2007 for those observations

16 Journal of Financial and Quantitative Analysis

TABLE 4
Governance and Performance (Equation (1a)) by Subperiod

	Dependent Variable																				
	Contemporaneous Performance						Next Year's Performance						Next 2 Years' Performance								
	1998-2001		2003-2007		1998-2001		2003-2007		1998-2001		2003-2007		1998-2001		2003-2007		1998-2001		2003-2007		
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	
<i>Panel A. Independence^t</i>																					
ROA	-0.027*** (0.01)	-0.739*** (0.00)	0.014 (0.14)	0.178** (0.01)	-0.043*** (0.00)	-0.401*** (0.00)	0.019** (0.03)	0.116 (0.10)	-0.020*** (0.00)	-0.081* (0.06)	0.016*** (0.00)	0.013 (0.10)									
Return	-0.051 (0.33)	-0.352 (0.27)	0.021 (0.56)	-0.180 (0.39)	-0.033 (0.61)	-0.594 (0.13)	0.017 (0.60)	-0.129 (0.47)	-0.037 (0.21)	-0.357** (0.05)	0.008 (0.59)	-0.047 (0.61)									
Q	-0.537*** (0.00)	-0.641 (0.55)	-0.250* (0.06)	0.351 (0.19)	-0.457** (0.01)	1.319 (0.32)	-0.289 (0.13)	0.833 (0.23)	-0.317* (0.07)	-2.210* (0.05)	-0.393 (0.33)	0.613 (0.14)									
No. of obs.	5,156	5,156	6,515	6,515	4,537	4,537	5,738	5,738	3,354	3,354	4,558	4,558									
<i>Panel B. DirectorOwn^t</i>																					
ROA	0.015*** (0.00)	0.028** (0.02)	0.015*** (0.00)	0.006** (0.03)	0.008*** (0.00)	0.034*** (0.00)	0.012*** (0.00)	0.004 (0.13)	0.004*** (0.00)	0.010*** (0.00)	0.003*** (0.00)	0.003* (0.07)									
Return	0.061*** (0.00)	0.046** (0.03)	0.025*** (0.00)	0.021* (0.10)	0.006 (0.41)	0.073*** (0.00)	0.018 (0.28)	0.012 (0.28)	0.003 (0.35)	0.029* (0.09)	0.009 (0.11)	0.003 (0.26)									
Q	0.417*** (0.00)	0.345*** (0.00)	0.286*** (0.00)	-0.033 (0.54)	0.308*** (0.00)	0.452*** (0.00)	0.234*** (0.00)	0.015 (0.44)	0.174*** (0.00)	0.250 (0.18)	0.142 (0.12)	0.142 (0.18)									
No. of obs.	4,665	4,665	6,377	6,377	4,537	4,537	5,738	5,738	2,976	2,976	4,300	4,300									

(continued on next page)

Table 4 presents the results from estimating equation (1a), the performance equation, across 2 different time periods: 1998-2001 and 2003-2007. Only the coefficient and p -value associated with the Governance variable in equation (1a) is presented. Five different specifications are presented with 5 different governance variables: Independence, board independence, DirectorOwn, the dollar value of the median director's stock ownership: CEO-Duality, whether or not the CEO is also the board chair; G-Index, the GMI (2003) governance index; and E-Index, the BCF (2009) enrichment index. Only the coefficient on the Governance variable in equation (1a) is presented. Three different measures of performance are estimated: ROA, return on assets; Return, stock return; and Q, Tobin's Q. Performance is measured in 3 different time periods: t , $t+1$, $t+2$. All other variables are as defined in the text. Ordinary least squares (OLS) and 2-stage least squares (2SLS) results are both presented. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with p -values below in parentheses. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

Bhagat and Bolton 17

TABLE 4 (continued)
 Governance and Performance (Equation (1a)) by Subperiod

	Dependent Variable											
	Contemporaneous Performance				Next Year's Performance				Next 2 Years' Performance			
	1998-2001		2003-2007		1998-2001		2003-2007		1998-2001		2003-2007	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
<i>Panel C. CEO-Duality</i>												
ROA	-0.003 (0.57)	-0.167*** (0.00)	-0.001 (0.65)	-0.029** (0.04)	-0.003 (0.43)	-0.094*** (0.00)	-0.003 (0.41)	-0.024 (0.12)	-0.003 (0.30)	-0.023** (0.02)	-0.003* (0.06)	-0.005 (0.37)
Return	-0.034 (0.18)	-0.088 (0.22)	-0.009 (0.46)	-0.019 (0.61)	-0.024 (0.45)	-0.193** (0.03)	-0.007 (0.58)	-0.027 (0.50)	-0.021 (0.15)	-0.950** (0.02)	-0.007 (0.28)	-0.012 (0.56)
Q	-0.077 (0.28)	-0.243 (0.27)	-0.062 (0.18)	0.028 (0.86)	-0.121 (0.17)	-0.297 (0.28)	-0.082* (0.09)	0.091 (0.59)	0.058 (0.50)	-0.199 (0.45)	-0.048 (0.50)	-0.409 (0.21)
No. of obs.	5,156	5,156	6,515	6,515	4,537	4,537	5,738	5,738	3,354	3,354	4,558	4,558
<i>Panel D. G-Index</i>												
ROA	-0.001 (0.54)	-0.097*** (0.00)	-0.001* (0.07)	0.014 (0.16)	0.002*** (0.00)	-0.040** (0.04)	-0.007 (0.15)	0.035*** (0.00)	-0.001** (0.01)	-0.019** (0.03)	-0.001 (0.30)	0.014 (0.39)
Return	-0.001 (0.82)	-0.049 (0.28)	0.003 (0.11)	-0.015 (0.52)	0.006 (0.13)	-0.106** (0.05)	-0.003* (0.06)	-0.006 (0.72)	-0.003 (0.23)	-0.073* (0.06)	0.001 (0.25)	0.007 (0.53)
Q	-0.047*** (0.00)	-0.583*** (0.00)	-0.027*** (0.00)	0.138 (0.18)	-0.031*** (0.00)	-0.248** (0.05)	-0.020*** (0.00)	0.144* (0.08)	-0.016 (0.19)	-0.150 (0.39)	-0.011 (0.40)	0.018 (0.90)
No. of obs.	4,566	4,566	7,665	7,665	3,758	3,758	6,733	6,733	2,909	2,909	5,479	5,479
<i>Panel E. E-Index</i>												
ROA	-0.006*** (0.00)	-0.196*** (0.00)	-0.004*** (0.00)	-0.493* (0.05)	-0.004*** (0.00)	-0.247*** (0.01)	-0.004*** (0.00)	-0.126 (0.17)	-0.003*** (0.00)	-0.047** (0.03)	-0.001** (0.02)	0.067* (0.01)
Return	0.000 (0.99)	-0.118 (0.28)	0.007 (0.10)	-0.156 (0.24)	0.007 (0.48)	-0.488** (0.04)	0.007 (0.30)	-0.189 (0.26)	0.003 (0.54)	-0.176* (0.05)	0.004* (0.05)	-0.020 (0.68)
Q	-0.135*** (0.00)	-0.202*** (0.00)	-0.072*** (0.00)	0.383 (0.21)	-0.149*** (0.00)	-2.428*** (0.01)	-0.070*** (0.00)	0.977 (0.17)	-0.074*** (0.01)	-0.953** (0.05)	-0.059 (0.28)	-0.395 (0.12)
No. of obs.	4,566	4,566	7,665	7,665	3,758	3,758	6,733	6,733	2,909	2,909	5,479	5,479

TABLE 5
 Governance and Performance (Equation (1a)) by Change in Independent Directors

Table 5 presents the results from estimating equation (1a), the performance equation, across the 2 different time periods, 1998–2001 and 2003–2007, for 2 unique subsamples: those firms that increased their number of independent directors and those that did not. Five different specifications are presented with 5 different governance variables: *Independence*, board independence; *DirectorOwn*, the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index*, the GIM (2003) governance index; and *E-Index*, the BCF (2009) entrenchment index. Only the coefficient on the *Governance* variable in equation (1a) is presented. Return on assets, *ROA*, is the measure of performance. Panel A gives the results for the subsample of firms that increased the number of independent directors on its board; Panel B gives the results for the subsample of firms that did not increase the number of independent directors on its board. All other variables are as defined in the text. Only 2-stage least squares (2SLS) results are presented. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent Variable					
	Contemporaneous ROA		Next Year's ROA		Next 2 Years' ROA	
	1998– 2001	2003– 2007	1998– 2001	2003– 2007	1998– 2001	2003– 2007
<i>Panel A. Increase in Number of Independent Directors</i>						
<i>Independence_t</i>	−0.412* (0.10)	0.509*** (0.00)	−0.583*** (0.00)	0.114* (0.10)	−0.052 (0.29)	0.177*** (0.03)
No. of obs.	1,344	2,066	1,187	1,982	887	1,588
<i>DirectorOwn_t</i>	0.018** (0.03)	0.001*** (0.01)	0.017*** (0.00)	0.009*** (0.00)	0.011 (0.12)	0.007** (0.02)
No. of obs.	1,283	1,967	1,160	1,871	863	1,454
<i>CEO-Duality_t</i>	−0.087 (0.18)	−0.004 (0.84)	−0.092*** (0.01)	0.000 (0.98)	−0.012 (0.52)	−0.075*** (0.00)
No. of obs.	1,344	2,066	1,187	1,982	887	1,588
<i>G-Index_t</i>	−0.053 (0.13)	0.040* (0.08)	0.010 (0.27)	−0.047*** (0.00)	0.005 (0.56)	−0.033*** (0.01)
No. of obs.	1,208	2,015	1,085	1,958	793	1,621
<i>E-Index_t</i>	−0.063 (0.32)	−0.567 (0.27)	−0.169*** (0.00)	−0.004*** (0.00)	−0.008 (0.58)	−0.071** (0.03)
No. of obs.	1,208	2,015	1,085	1,958	793	1,621
<i>Panel B. No Increase in Number of Independent Directors</i>						
<i>Independence_t</i>	−0.230*** (0.01)	−0.077 (0.40)	−0.133** (0.03)	0.181 (0.23)	−0.085*** (0.01)	0.074** (0.02)
No. of obs.	3,812	4,449	3,350	3,756	2,468	2,970
<i>DirectorOwn_t</i>	0.018*** (0.00)	0.019* (0.08)	0.015*** (0.01)	0.024** (0.02)	0.005** (0.04)	0.010*** (0.00)
No. of obs.	3,382	4,410	2,945	3,656	2,113	2,847
<i>CEO-Duality_t</i>	−0.061*** (0.00)	−0.023 (0.18)	−0.217*** (0.00)	−0.116*** (0.00)	−0.048*** (0.00)	−0.038** (0.01)
No. of obs.	3,812	4,449	3,350	3,756	2,468	2,970
<i>G-Index_t</i>	−0.036** (0.02)	0.039* (0.10)	0.041*** (0.00)	0.019* (0.07)	−0.016** (0.04)	0.029*** (0.00)
No. of obs.	3,358	5,650	2,673	4,775	2,115	3,858
<i>E-Index_t</i>	−0.064** (0.03)	−0.161* (0.06)	0.032 (0.29)	0.145 (0.17)	−0.032** (0.02)	0.217 (0.15)
No. of obs.	3,358	5,650	2,673	4,775	2,115	3,858

- 1 where there is an increase in the number of independent directors from the pre-
- 2 vious year; this is in contrast to the negative relation for the period 1998–2001.
- 3 In Panel B, we consider observations where there is no increase in the number of
- 4 independent directors from the previous year: We do not observe a significant re-
- 5 lation between board independence and contemporaneous operating performance
- 6 for the period 2003–2007. Hence, the positive relation between board indepen-
- 7 dence and operating performance for the period 2003–2007 appears to be driven
- 8 by those companies that increase their number of independent directors from the

1 previous year. This is consistent with and supportive of the event-study results of
 2 Chhaochharia and Grinstein (2007), who find that firms that were less compli-
 3 ant with the rules imposed by SOX and the exchanges earned positive abnormal
 4 returns on the announcement of the rules.

5 We document above that director ownership is positively correlated with op-
 6 erating performance. It is possible that the positive relation between board inde-
 7 pendence and operating performance for the period 2003–2007 might be due to
 8 an increase in director ownership over the period 2003–2007. We examine this
 9 possibility in Table 6 by including both director ownership and board indepen-
 10 dence along with the other variables in equation (1a). This involves adding a
 11 5th equation to the system and using all 3 governance IV. Consistent with the
 12 evidence in Tables 3 and 4, we document a significant *positive* relation between
 13 board independence and contemporaneous operating performance for the period
 14 2003–2007; this is in contrast to the negative relation for the period 1998–2001.
 15 Director ownership is positively associated with firm performance during both
 16 the subsample periods. This indicates that the reversal of the relationship between
 17 board independence and operating performance after SOX is independent of the
 18 governance effects of director ownership.

TABLE 6
 Two Endogenous Governance Variables

Table 6 presents the results from estimating a modified version of equation (1a), the performance equation, across 2 different time periods: 1998–2001 and 2003–2007. A 5th equation is added to equation (1) for a 2nd endogenous governance variable. *Independence*, board independence, is presumed to be endogenous in one equation, and *DirectorOwn* is included as a 2nd endogenous governance variable in a separate equation. Only the coefficients on the 2 *Governance* variables in equation (1a) are presented. Three measures of operating performance are considered: *Contemporaneous ROA*, *Next Year's ROA*, and *Next 2 Years' ROA*. Two-stage least squares (2SLS) results are presented. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent Variable					
	<i>Contemporaneous ROA</i>		<i>Next Year's ROA</i>		<i>Next 2 Years' ROA</i>	
	1998–2001	2003–2007	1998–2001	2003–2007	1998–2001	2003–2007
<i>DirectorOwn_t</i>	0.010** (0.03)	0.199** (0.03)	0.009*** (0.00)	0.012 (0.17)	0.004*** (0.00)	0.002*** (0.00)
<i>Independence_t</i>	–0.325** (0.03)	0.480** (0.04)	–0.015 (0.15)	0.391** (0.02)	–0.006 (0.37)	0.009** (0.02)
No. of obs.	4,492	6,035	2,515	5,332	1,861	4,217

19 C. Robustness Checks

20 We perform 11 robustness checks to increase our confidence in the
 21 performance-governance results noted in Tables 3 and 4. For example, we conduct
 22 the Stock and Yogo (2004) test to ensure that our instruments are strong. We
 23 also perform the Hansen (1982)-Sargan (1958) overidentification test and the
 24 Cragg-Donald (1993) test for model identification. We estimate the performance-
 25 governance relationship using the fixed effects estimator including firm and year
 26 fixed effects, and clustered (Rogers (1993)) standard errors. We include market-
 27 to-book in our system of equations. We consider alternative measures of operating

1 performance. Finally, following Duchin, Matsusaka, and Ozbas (2010), we con-
2 struct an *InfoCost* index and evaluate its impact on the performance-governance
3 relationship. Detailed results of these and other robustness checks are in the
4 Internet Appendix. Briefly, the performance-governance results obtained after
5 performing these robustness checks are entirely consistent with the performance-
6 governance results noted in Tables 3 and 4.

7 V. Market Response to Firms' Announcement of 8 Compliance

9 The focus of this paper is on the impact of SOX on the performance-
10 governance relation. We find a negative and significant relationship between board
11 independence and operating performance during 1998–2001, but a *positive* and
12 significant relationship during 2003–2007. Also, we find that this result is driven
13 by firms that increase their number of independent directors. Given that SOX at-
14 tempts to increase the number and role of independent board members, the above
15 evidence suggests a positive correlation between SOX's board independence re-
16 quirements and company performance. However, correlation is not causation, as
17 other economic events during 2003–2007 could lead to the above observed corre-
18 lation (e.g., increased shareholder activism and corporate scandals in that period).

19 To get additional insight on the impact of SOX on the relation between board
20 independence and company performance, we conduct an event study. We focus on
21 the announcement by sample firms of the nomination of additional independent
22 directors that would enable the firm to comply with SOX's board independence re-
23 quirements for the audit committee.¹³ We use the filing of the firm's annual proxy
24 statement as the event date. Table 7 summarizes the stock market's response to
25 these announcements. When a company goes from being noncompliant to be-
26 ing compliant with SOX's board independence requirement, the market response
27 (market-adjusted cumulative abnormal return (CAR)) is significantly positive for
28 the post-SOX period (July 22, 2002–December 31, 2007) using a 3-day event
29 window from day -1 to day $+1$.¹⁴ Also, the market response is positive for the
30 years 2002, 2003, 2004, 2005, 2006, and 2007. Similar results are obtained using
31 longer event windows. The above findings are consistent with and supportive of
32 the event-study results of Chhaochharia and Grinstein (2007) and DeFond et al.
33 (2005). Chhaochharia and Grinstein find that firms that were less compliant with
34 the rules imposed by SOX and the exchanges earned more positive abnormal re-
35 turns on the announcement of the rules. DeFond et al. document a positive stock
36 market reaction when a director with accounting expertise is appointed to the
37 audit committee.

¹³Section III, subsection 301 of SOX required that all audit committee members of the board be independent; 69.9% of our sample firms were SOX compliant in 2002; 76.9% in 2003, 82.9% in 2004, 85.8% in 2005, 84.6% in 2006, and 96.8% in 2007. In practice, firms become compliant by removing affiliated directors from the board, or when the nature of an affiliated relationship changes.

¹⁴Value-weighted market from CRSP is used as the market index. We also estimated the CARs based on the market model with similar results. See MacKinlay (1977) for a discussion of event studies.

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

TABLE 7
Event-Study Results

Table 7 presents the results from event studies performed on a sample of firms that were not compliant with Section 301 of SOX in year $t - 1$. Section 301 requires that all members of a firm's audit committee be independent. Market-adjusted cumulative abnormal returns (CARs) are calculated for days $-1, 0$, and $+1$ for years 2002 and 2003; day 0 is the proxy mailing date in year t . The value-weighted market is used as the market index. Two subsamples are considered: i) firms that were not compliant in year $t - 1$ and became compliant in year t in columns 1-5; and, ii) firms that were not compliant in both year $t - 1$ and year t in columns 6-10. Firm audit committees consisting only of independent directors are denoted as "Compliant." Firms whose audit committees do not consist only of independent directors are denoted as "Not Compliant." Panel A presents results from only firms that became SOX compliant and added independent directors to the board; Panel B presents the results from all firms that became SOX compliant. The nonparametric test is the Wilcoxon signed-rank test. The "Diff. in Means" in the last column tests for the difference in CARs between columns 1 and 6. ** indicates results statistically different from Pre-SOX CAR at a 1% level.

Period	Compliant in Year t					Not Compliant in Year t					Diff. in Means, p -Value 1 - 6
	CAR	z-Statistic	Sample Size	Positive: Negative Returns	Non-parametric Statistic	CAR	z-Statistic	Sample Size	Positive: Negative Returns	Non-parametric Statistic	
	1	2	3	4	5	6	7	8	9	10	
<i>Panel A. Firms That Became Compliant and Added Independent Directors to the Audit Committee</i>											
All years	0.48%	2.586	826	445:382	3.029	0.26%	-0.078	2,140	1,049:1,095	2.425	<0.0001
Pre-SOX	0.57%	1.303	293	184:165	1.811	0.38%	1.032	1,239	728:725	2.997	<0.0001
Post-SOX	0.41%**	2.436	466	261:217	2.413	0.02%**	0.075	645	321:370	-1.567	<0.0001
1998	-0.38%	-0.940	48	20:28	-0.667	0.20%	-1.588	81	32:49	-0.050	<0.0001
1999	0.15%	0.478	72	36:36	-0.438	-0.24%	-1.844	420	178:242	-1.228	<0.0001
2000	0.54%	1.067	78	41:37	1.222	1.35%	4.073	383	218:165	5.546	<0.0001
2001	1.26%	1.260	95	56:39	2.249	0.50%	0.499	355	184:171	1.803	<0.0001
2002	0.97%	1.801	67	36:31	1.151	-0.20%	-0.680	256	119:137	-0.594	<0.0001
2003	0.86%	1.939	99	59:40	1.231	-0.08%	-1.233	219	101:118	-1.641	<0.0001
2004	0.27%	1.685	93	54:39	0.921	0.26%	0.298	150	67:83	0.698	0.12:14
2005	0.61%	1.907	70	36:34	1.354	0.16%	0.768	130	69:61	0.266	<0.0001
2006	0.49%	0.771	38	20:18	0.654	-0.07%	-1.147	127	55:72	-0.698	<0.0001
2007	0.30%	0.754	166	86:80	0.240	-0.73%	-0.989	19	7:12	-1.062	<0.0001

(continued on next page)

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

22 Journal of Financial and Quantitative Analysis

TABLE 7 (continued)
Event-Study Results

Period	Compliant in Year t				Not Compliant in Year t				Diff. in Means, p -Value		
	CAR	z-Statistic	Sample Size	Positive: Negative Returns	Non-parametric Statistic	CAR	z-Statistic	Sample Size		Positive: Negative Returns	Non-parametric Statistic
	1	2	3	4	5	6	7	8	9	10	1 - 6
<i>Panel B: Firms That Became Compliant by Adding Independent Directors to the Audit Committee, or Removing Inside Directors from the Audit Committee</i>											
All years	0.55%	3.813	1,265	689:576	4.306	0.26%	-0.078	2,140	1,049:1,095	2.425	<0.0001
Pre-SOX	0.77%	2.563	521	322:272	3.265	0.38%	1.032	1,239	728:725	2.997	<0.0001
Post-SOX	0.36%**	2.841	655	367:304	2.386	0.02%**	0.075	645	321:370	-1.567	<0.0001
1998	0.06%	0.325	94	47:47	0.371	0.20%	-1.588	81	32:49	-0.050	<0.0001
1999	0.07%	0.113	118	56:62	-0.637	-0.24%	-1.844	420	178:242	-1.228	<0.0001
2000	0.95%	1.454	151	79:72	2.733	1.33%	4.073	383	218:165	5.546	<0.0001
2001	1.49%	2.451	158	98:60	3.113	0.50%	0.499	355	184:171	1.803	<0.0001
2002	1.03%	1.725	89	50:39	1.137	-0.20%	-0.680	256	119:137	-0.594	<0.0001
2003	0.56%	2.087	158	92:66	1.612	-0.08%	-1.233	219	101:118	-1.641	<0.0001
2004	0.24%	2.269	149	87:62	1.876	0.26%	0.298	150	67:83	0.698	0.3716
2005	0.26%	1.255	97	50:47	1.299	0.16%	0.768	130	69:61	0.266	0.0008
2006	0.69%	1.646	57	32:25	0.602	-0.07%	-1.147	127	55:72	-0.698	<0.0001
2007	0.13%	0.781	194	100:94	0.005	-0.73%	-0.989	19	7:12	-1.062	<0.0001

1 Table 7 also summarizes the stock market's response to announcements of
2 annual board elections by firms that continue being noncompliant with SOX's
3 board independence requirements during 2002–2007. The market response is in-
4 significantly different from 0. Also, the difference in CARs of firms that go from
5 being noncompliant to compliant and firms that stay noncompliant is significantly
6 positive for the post-SOX period and for each of the years 2002, 2003, 2005,
7 2006, and 2007. The above evidence is consistent with the argument that SOX's
8 board independence requirement perhaps played a positive role in enhancing firm
9 performance.

10 Table 7 also compares the pre- and post-SOX announcement returns to the
11 addition of independent directors to the audit committee or removal of inside
12 directors from the audit committee. The above announcements will be better an-
13 ticipated post-SOX compared to the pre-SOX period, since SOX mandated the
14 independence requirement for audit committee members. Consistent with the
15 above arguments, the pre-SOX announcement returns are significantly greater
16 than post-SOX returns.

17 VI. Corporate Governance and CEO Turnover

18 The preceding analysis focuses on the relation between governance and per-
19 formance generally and in the specific case of SOX compliance. However, gover-
20 nance scholars and commentators suggest that governance is especially critical in
21 imposing discipline and providing fresh leadership when the corporation is per-
22 forming particularly poorly. For this reason, we study the relationship between
23 governance, performance, and CEO turnover.

24 Using Compustat's ExecuComp database, we identify 1,951 CEO changes
25 from 1998 to 2007. We hand-collect information from company press releases
26 and press articles to determine whether the CEO departure was disciplinary or not.
27 Table 8 documents the number of disciplinary and nondisciplinary CEO turnovers
28 during this period. Our criteria for classifying CEO turnover as disciplinary or
29 nondisciplinary are similar to those of Weisbach (1988), Gilson (1989), Huson,
30 Parrino, and Starks (2001), and Farrell and Whidbee (2003). CEO turnover is
31 classified as "nondisciplinary" if the CEO died, if the CEO was older than 63,
32 if the change was the result of an announced transition plan, or if the CEO stayed
33 on as chairman of the board for more than a year. CEO turnover is classified
34 as "disciplinary" if the CEO resigned to pursue other interests, if the CEO was
35 terminated, or if no specific reason is given.¹⁵

We consider a multinomial logit regression with 3 independent categories:
no turnover, disciplinary turnover, and nondisciplinary turnover.¹⁶ The dependent

¹⁵For our purposes, distinguishing between the different subcategories within the "disciplinary" and "nondisciplinary" groups is not essential. There may be situations where a 65 year-old CEO leaves as part of a succession plan and stays on as board chair for 12 months. This is a "nondisciplinary" turnover, regardless of which subcategory it gets classified in.

¹⁶We 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 5 or less (as is the case in this study), nonlinear estimation may produce coefficients that can be biased in the range of 32%–68%.

TABLE 8
Reasons for CEO Turnover

Table 8 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 were obtained from Compustat's ExecuComp database. CEO Turnover is classified as "Nondisciplinary" 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. 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.

	Reasons for CEO Turnover: 1998–2007			
	Disciplinary	Nondisciplinary	Other	Total
1998	65	118	18	201
1999	66	127	5	198
2000	92	143	9	244
2001	86	162	7	255
2002	81	100	1	182
2003	82	94	3	179
2004	49	122	3	174
2005	73	135	2	210
2006	61	126	0	187
2007	46	73	2	121
Total	701	1,200	50	1,951
% of Total	35.9%	61.5%	2.6%	100%

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 nondisciplinary. We consider the last 2 years' stock return as the performance measure. We estimate the following base-line equation:

$$(2a) \quad \text{Type of CEO Turnover}_{i,t} = \text{Last 2 Years' Return}_{i,t} \\ + \text{Last 2 Years' Industry Return}_{i,t} \\ + \text{CEOOwn\%}_{i,t} + \text{FirmSize}_{i,t} \\ + \text{CEO Age}_{i,t} + \text{CEOTenure}_{i,t} + \varepsilon_{i,t}.$$

The control variables are motivated by a substantial extant literature on performance and CEO turnover (e.g., see Huson et al. (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 (*Last 2 Years' 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 equation (2a):

$$(2b) \quad \text{Type of CEO Turnover}_{i,t} = \text{Last 2 Years' Return}_{i,t} \\ + \text{Last 2 Years' Industry Return}_{i,t} \\ + \text{Governance}_{i,t} + (\text{Governance}_{i,t} \\ \times \text{Last 2 Years' Return}_{i,t}) + \text{CEOOwn\%}_{i,t} \\ + \text{FirmSize}_{i,t} + \text{CEO Age}_{i,t} \\ + \text{CEOTenure}_{i,t} + \varepsilon_{i,t}.$$

1 Table 9 highlights the relation between different measures of governance
2 and disciplinary CEO turnover. Panel A details the multinomial logit regression
3 results for the determinants of disciplinary CEO turnover for the pre-2002 period.
4 Consider first the baseline results without governance variables in the regression.
5 The baseline results indicate that a firm's stock market returns during the previ-
6 ous 2 years, CEO stock ownership, and CEO tenure are significantly negatively
7 related to disciplinary CEO turnover; these findings are consistent with the prior
8 literature noted above.

9 Does good governance have an impact on disciplinary CEO turnover di-
10 rectly, or is governance related to disciplinary turnover only in poorly performing
11 companies? The results in Panel A of Table 9 shed light on this question for the
12 pre-2002 period. Note that when the governance variables are included, the prior
13 return variable is not significant in 3 of the 5 cases, suggesting that bad perfor-
14 mance alone is not enough to lead to a change in senior management. Also, note
15 that the governance variable by itself is statistically not significant in most cases.¹⁷
16 This suggests that good governance per se is not related to disciplinary turnover.
17 The coefficient of the interactive term (*Last 2 Years' Return* × *Governance*) sheds
18 light on the question of whether governance is related to disciplinary turnover
19 only for poorly performing firms. The interactive term suggests that good gover-
20 nance as measured by the dollar value of the median director's stock ownership
21 and the percentage of directors who are independent, increases the probability of
22 disciplinary turnover for poorly performing firms.^{18,19}

23 Panel B of Table 9 shows the results for disciplinary turnover in the post-
24 2002 period. The results in the 2003–2007 period are qualitatively unchanged
25 from the results in 1998–2001, with the following exception: Both the GIM
26 (2003) and BCF (2009) measures of good governance are *negatively* related to
27 the probability of disciplinary turnover for poorly performing firms. This suggests
28 that better-governed firms as measured by the GIM and BCF indices are *less* likely
29 to experience disciplinary management turnover in spite of their poor perfor-
30 mance. With respect to disciplining CEOs following poor firm performance, board
31 independence appears to be an effective monitoring mechanism both before SOX
32 and after SOX. It is important to note that we do not see the reversal post-SOX
33 of the disciplining effect of board independence (in contrast to the performance-
34 independence relation discussed in Section IV).²⁰

¹⁷The exception is that when the CEO is also the chairman, he is less likely to experience disciplinary turnover.

¹⁸The finding of the probability of disciplinary CEO turnover (given poor prior firm performance) increasing with greater board independence is consistent with the extant literature (e.g., see Fich and Shivdasani (2005) and Weisbach (1988)).

¹⁹The economic importance of the dollar ownership of the median director is greater than board independence. We calculate the predicted probability of disciplinary and nondisciplinary turnover, using the coefficient estimates from Table 9. 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 (*Last 2 Years' Return* × *DirectorOwn*) interaction term decreases by 1 standard deviation. The corresponding probabilities are 2.90% and 7.96% for board independence.

²⁰Similar to footnote 19, we again consider the economic importance of the dollar ownership of the median director, and board independence in disciplining CEOs of poorly performing firms. We calculate the predicted probability of disciplinary turnover, using the coefficient estimates from Table 9.

1 Panel C of Table 9 compares the coefficients of the interactive term (*Last*
2 *2 Years' Return* \times *Governance*) post-SOX to pre-SOX for the different gover-
3 nance measures. The sensitivity of board independence to disciplinary turnover
4 and board ownership to disciplinary turnover has increased significantly in the
5 post-SOX period compared to the pre-SOX period (suggesting that independent
6 directors and directors that own more stock are more likely to discipline the CEO
7 of a poorly performing firm in the post-SOX period).

8 We also study the determinants of nondisciplinary CEO turnover. We do not
9 expect any relation between good governance and nondisciplinary CEO turnover,
10 both unconditionally and conditional on poor prior performance; untabulated
11 results are consistent with this.

12 VII. Corporate Governance and M&A Deals

13 We find that given poor firm performance, the probability of disciplinary
14 management turnover is positively correlated with stock ownership of board mem-
15 bers and board independence. Do governance mechanisms affect operational per-
16 formance in other ways?²¹ For example, previous studies have found that board
17 independence affects corporate M&As (see Byrd and Hickman (1992) and Cotter,
18 Shivdasani, and Zenner (1997)).

19 Using the Securities Data Company (SDC) database, we identify whether or
20 not each of our sample firms made an acquisition in a given firm-year. We consider
21 a logit model where the dependent variable is equal to 1 if the sample firm makes
22 an acquisition in a year, and 0 otherwise. Table 10 highlights the relation between
23 different measures of governance and corporate acquisitions. Panel A details the
24 logit regression results for the determinants of corporate acquisitions for the pre-
25 SOX period. The key explanatory variable of interest is the Governance variable.
26 We consider the 5 governance variables separately: Board Independence, Director
27 Ownership, CEO Duality, GIM (2003) G-Index, and BCF (2009) E-Index. We
28 include year and industry fixed effects.

29 The results show that firms with greater board independence and greater di-
30 rector ownership are less likely to make acquisitions. Since public acquisitions
31 are associated with negative returns for acquiring shareholders (e.g., see Moeller,
32 Schlingemann, and Stulz (2005)), this suggests another channel by which greater
33 board independence and director ownership positively impact a firm's operational
34 performance.²² With regard to the GIM (2003) and BCF (2009) governance mea-
35 sures, the negative coefficient implies that GIM and BCF measures of good

We find a significant increase in the predicted probability of disciplinary turnover for both governance measures (dollar ownership of the median director and board independence). This suggests that the disciplinary role of independent directors and board holdings has increased subsequent to passage of SOX. The increased disciplinary role of independent directors subsequent to SOX is a potential explanation for the positive stock market response to companies becoming compliant to SOX's board independence requirement as noted above in Section V.

²¹We are indebted to the referee for suggesting this to us, and for help in developing this section.

²²Panel D of Table 10 summarizes the market-adjusted CAR surrounding the acquisition announcement date for different event windows for the sample firms in this study. Consistent with prior literature, the CARs in our sample are significantly negative, suggesting that these acquisitions are viewed negatively by investors.

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

Bhagat and Bolton 27

TABLE 9
CEO Turnover-Governance Relation

Table 9 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 = Nondisciplinary turnover, 0 = no turnover. Baseline results without governance are presented in the 1st column; all other columns present results including Governance and (*Performance* × *Governance*) variables. The other control variables are described in the text. Year dummy variables are included but are not shown. Panel A presents the results for disciplinary turnover for 1998–2001; Panel B presents the results for disciplinary turnover for 2003–2007; Panel C compares the $Return_{t-2 \text{ to } t-1} \times Governance_t$ interactive terms from Panels A and B across the 2 time periods, pre-SOX to post-SOX. Sample size refers to the entire sample for the particular period, and not just to cases of disciplinary turnover and nondisciplinary turnover. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Baseline Performance	Governance Variable				
		<i>Independence_t</i>	<i>DirectorOwn_t</i>	<i>CEO-Duality_t</i>	<i>G-Index_t</i>	<i>E-Index_t</i>
<i>Panel A. Disciplinary Turnover: 1998–2001</i>						
<i>Intercept</i>	−3.330*** (0.00)	−3.268*** (0.00)	−4.000*** (0.00)	−3.310*** (0.00)	−2.978*** (0.00)	−3.170*** (0.00)
<i>Return_{t−2 to t−1}</i>	−1.576*** (0.00)	−0.486 (0.59)	−2.443 (0.27)	−0.956* (0.06)	−1.277 (0.20)	−1.483*** (0.01)
<i>IndustryReturn_{t−2 to t−1}</i>	0.452 (0.20)	0.454 (0.19)	0.531 (0.12)	0.443 (0.21)	0.512 (0.14)	0.543 (0.12)
<i>Governance_t</i>	—	−0.140 (0.22)	0.045 (0.42)	−0.513*** (0.01)	−0.030 (0.36)	0.001 (0.99)
<i>Return_{t−2 to t−1} × Governance_t</i>	—	−1.784* (0.07)	−0.044* (0.08)	−0.929 (0.12)	−0.004 (0.85)	−0.119 (0.60)
<i>CEOOwn%_t</i>	−0.119*** (0.00)	−0.121*** (0.00)	−0.121*** (0.00)	−0.118*** (0.00)	−0.114*** (0.00)	−0.111*** (0.00)
<i>FirmSize_t</i>	−0.093* (0.09)	−0.090 (0.10)	−0.094* (0.09)	−0.059 (0.30)	−0.077 (0.17)	−0.082 (0.14)
<i>CEOAge_{t−1}</i>	0.020 (0.12)	0.020 (0.11)	0.021* (0.10)	0.022* (0.08)	0.015 (0.23)	0.014 (0.27)
<i>CEOTenure_{t−1}</i>	−0.025* (0.07)	−0.026* (0.07)	−0.027* (0.06)	−0.025* (0.08)	−0.020 (0.15)	−0.019 (0.18)
Years included	1998–2001	1998–2001	1998–2001	1998–2001	1998–2001	1998–2001
Sample size	4,257	4,257	4,228	4,257	4,075	4,075
<i>Panel B. Disciplinary Turnover: 2003–2007</i>						
<i>Intercept</i>	−0.978 (0.98)	−14.468 (0.87)	−11.677 (0.90)	−13.555 (0.88)	−12.921 (0.88)	−12.879 (0.88)
<i>Return_{t−2 to t−1}</i>	−3.510*** (0.00)	−0.712 (0.83)	−0.161 (0.92)	−2.942*** (0.00)	0.628 (0.72)	−2.194** (0.03)
<i>IndustryReturn_{t−2 to t−1}</i>	0.344** (0.05)	0.456 (0.49)	0.542 (0.41)	0.491 (0.46)	0.337 (0.58)	0.309 (0.61)
<i>Governance_t</i>	—	1.935 (0.14)	−0.121 (0.26)	−0.948 (0.10)	−0.009 (0.83)	−0.025 (0.76)
<i>Return_{t−2 to t−1} × Governance_t</i>	—	−3.726* (0.09)	−0.248** (0.05)	−1.407 (0.21)	−0.519*** (0.01)	−0.777** (0.03)
<i>CEOOwn%_t</i>	−0.205** (0.04)	−0.230* (0.08)	−0.221* (0.09)	−0.206 (0.11)	−0.289** (0.03)	−0.285** (0.04)
<i>FirmSize_t</i>	0.079 (0.14)	0.074 (0.23)	0.101 (0.10)	0.145** (0.02)	0.103* (0.06)	0.105* (0.06)
<i>CEOAge_{t−1}</i>	0.056*** (0.00)	0.068*** (0.00)	0.067*** (0.00)	0.078*** (0.00)	0.059*** (0.00)	0.058*** (0.00)
<i>CEOTenure_{t−1}</i>	−0.030* (0.07)	−0.036* (0.07)	−0.039** (0.04)	−0.029 (0.12)	−0.035* (0.05)	−0.034* (0.05)
Years included	2003–2007	2003–2007	2003–2007	2003–2007	2003–2007	2003–2007
Sample size	6,410	5,547	5,501	5,547	5,876	5,876

(continued on next page)

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

28 Journal of Financial and Quantitative Analysis

TABLE 9 (continued)
CEO Turnover-Governance Relation

	Governance Variable				
	<i>Independence_t</i>	<i>DirectorOwn_t</i>	<i>CEO-Duality_t</i>	<i>G-Index_t</i>	<i>E-Index_t</i>
<i>Panel C. Comparison of Disciplinary Turnover Interactive Terms</i>					
<i>Pre-SOX Return_{t-2 to t-1} × Governance_t</i>	-1.784	-0.044	-0.929	-0.004	-0.119
<i>Post-SOX Return_{t-2 to t-1} × Governance_t</i>	-3.726	-0.248	-1.407	-0.519	-0.777
<i>Difference: Pre-SOX – Post-SOX</i>	1.941*** (0.00)	0.204* (0.08)	0.478** (0.02)	0.515** (0.01)	0.658*** (0.00)

1 governance are positively related to the probability of a value-destroying activity,
2 namely, acquisitions. (Recall that lower values of the GIM and BCF indices are
3 associated with better governance.)

4 Panel B of Table 10 details the logit regression results for the determinants of
5 corporate acquisitions for the post-SOX period. Again, the results show that firms
6 with greater board independence and greater director ownership are less likely to
7 make acquisitions. With regard to the GIM (2003) and BCF (2009) governance

TABLE 10
Impact of Corporate Governance on Making Acquisitions

Using the full sample of firms, Table 10 presents the results from a logit model estimating the probability of a firm making an acquisition relative to not making an acquisition. SDC data are used to identify whether or not a sample firm made an acquisition in a given year. The dependent variable is equal to 1 if the firm makes an acquisition, and 0 otherwise. Baseline results without governance are presented in the 1st column; all other columns present results including Governance variables. The other control variables are described in the text. Year dummy variables are included but are not shown. Intercepts and year and industry dummy variables are included but not presented. Panel A presents the results for 1998–2001; Panel B presents the results for disciplinary turnover for 2003–2007; Panel C presents the implied probabilities of acquisition for both sample periods and compares these probabilities across sample periods; and Panel D presents an event study of the cumulative abnormal returns (CARs) surrounding the acquisition announcement date within sample. In Panels A, B, and C, statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	<i>Baseline</i>	<i>Independence</i>	<i>DirectorOwn</i>	<i>CEO-Duality</i>	<i>GIM G-Index</i>	<i>BCF E-Index</i>
<i>Panel A. Pre-SOX: 1998–2001</i>						
<i>Last 2 Years' Return</i>	0.469*** (0.00)	0.471*** (0.00)	0.396*** (0.00)	0.467*** (0.00)	0.490*** (0.00)	0.483*** (0.00)
<i>Last 2 Years' Industry Return</i>	0.469*** (0.01)	0.470*** (0.01)	0.471*** (0.01)	0.472*** (0.01)	0.463** (0.01)	0.454** (0.01)
<i>Governance</i>	—	-0.111* (0.06)	-0.084*** (0.00)	-0.057** (0.05)	-0.008* (0.06)	-0.016* (0.06)
<i>CEO Ownership</i>	-0.011 (0.11)	-0.010 (0.14)	-0.013* (0.06)	-0.011* (0.09)	-0.007 (0.34)	-0.007 (0.28)
<i>Size (Assets)</i>	0.292*** (0.00)	0.290*** (0.00)	0.283*** (0.00)	0.289*** (0.00)	0.300*** (0.00)	0.301*** (0.00)
<i>Leverage</i>	0.088 (0.70)	0.092 (0.69)	0.199 (0.39)	0.084 (0.71)	0.252 (0.29)	0.260 (0.27)
<i>MktBook</i>	0.006 (0.11)	0.006 (0.11)	0.005 (0.21)	0.006 (0.11)	0.006 (0.12)	0.006 (0.12)
<i>CEOAge</i>	-0.014** (0.01)	-0.014** (0.01)	-0.012** (0.04)	-0.014** (0.01)	-0.015*** (0.01)	-0.015** (0.01)
<i>CEOTenure</i>	0.000 (0.99)	0.000 (0.95)	-0.002 (0.72)	0.000 (0.97)	0.001 (0.83)	0.001 (0.89)
No. of obs.	4,510	4,510	4,510	4,510	4,278	4,278

(continued on next page)

S0022109013000045_JFQA481_Feb2013_Bhagat-Bolton_ms10950_SH_0327.pdf

Bhagat and Bolton 29

TABLE 10 (continued)
Impact of Corporate Governance on Making Acquisitions

	<i>Baseline</i>	<i>Independence</i>	<i>DirectorOwn</i>	<i>CEO-Duality</i>	<i>GIM G-Index</i>	<i>BCF E-Index</i>	
<i>Panel B. Post-SOX: 2003–2007</i>							
<i>Last 2 Years' Return</i>	0.343** (0.03)	0.340** (0.03)	0.261* (0.10)	0.339** (0.04)	0.347** (0.03)	0.345** (0.03)	
<i>Last 2 Years' Industry Return</i>	0.246 (0.22)	0.254 (0.20)	0.239 (0.23)	0.258 (0.20)	0.260 (0.20)	0.259 (0.20)	
<i>Governance</i>	—	−0.428* (0.08)	−0.138*** (0.00)	−0.206*** (0.01)	−0.002* (0.09)	−0.002 (0.19)	
<i>CEO Ownership</i>	−0.018* (0.09)	−0.019* (0.07)	−0.018* (0.10)	−0.019 (0.10)	−0.016 (0.13)	−0.016 (0.14)	
<i>Size (Assets)</i>	0.204*** (0.00)	0.209*** (0.00)	0.190*** (0.00)	0.211*** (0.00)	0.200*** (0.00)	0.200*** (0.00)	
<i>Leverage</i>	0.109 (0.62)	0.113 (0.61)	0.254 (0.25)	0.134 (0.56)	0.089 (0.69)	0.088 (0.70)	
<i>MktBook</i>	−0.004 (0.30)	−0.004 (0.31)	−0.006 (0.19)	−0.004 (0.35)	−0.004 (0.31)	−0.004 (0.31)	
<i>CEOAge</i>	−0.024*** (0.00)	−0.023*** (0.00)	−0.021*** (0.00)	−0.021*** (0.00)	−0.019*** (0.00)	−0.019*** (0.00)	
<i>CEOTenure</i>	0.010* (0.06)	0.008 (0.12)	0.006 (0.28)	0.011** (0.04)	0.008 (0.14)	0.008 (0.14)	
No. of obs.	5,059	5,059	5,059	5,059	4,923	4,923	
		<i>Governance Variable</i>					
	<i>Baseline Performance</i>	<i>Independence_t</i>	<i>DirectorOwn_t</i>	<i>CEO-Duality_t</i>	<i>G-Index_t</i>	<i>E-Index_t</i>	
<i>Panel C. Implied Probability of Acquisitions</i>							
<i>Implied Probability</i>							
<i>Pre-SOX Acquisition</i>	31.5%	31.3%	31.4%	31.6%	31.8%	31.8%	
<i>Post-SOX Acquisition</i>	30.0%	27.5%	29.0%	31.7%	32.0%	31.9%	
<i>Difference in Probabilities: Pre-SOX – Post-SOX</i>	1.5% (0.02)**	3.8% (0.00)***	2.4% (0.00)***	−0.1% (0.14)	−0.2% (0.19)	−0.1% (0.12)	
		<i>Market-Adjusted Returns</i>					
<i>Window</i>	<i>Sample Size</i>	<i>Positive: Negative Returns</i>	<i>CAR</i>	<i>z-Statistic</i>	<i>p-Value</i>	<i>Non-parametric Statistic</i>	<i>p-Value</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
<i>Panel D. Acquisition Announcement Abnormal Returns (CAR) for Sample Firms during 1998–2007</i>							
<i>Equal-Weighted Index</i>							
(−1, +1)	4,815	2,399:2,416	−0.21%	3.654	0.0003	4.431	<0.0001
(−3, +3)	4,815	2,360:2,455	−0.25%	2.225	0.0261	4.184	<0.0001
(−3, +10)	4,815	2,309:2,506	−0.15%	1.072	0.2838	4.129	<0.0001
(−5, +5)	4,815	2,346:2,469	−0.12%	0.523	0.6010	4.167	<0.0001
(−10, +10)	4,815	2,252:2,563	−0.56%	3.145	0.0017	3.710	0.0003
<i>Value-Weighted Index</i>							
(−1, +1)	4,815	2,328:2,487	−0.31%	5.798	<0.0001	4.148	<0.0001
(−3, +3)	4,815	2,332:2,483	−0.47%	5.791	<0.0001	3.772	0.0002
(−3, +10)	4,815	2,338:2,477	−0.41%	3.576	0.0004	3.138	0.0019
(−5, +5)	4,815	2,305:2,510	−0.49%	4.785	<0.0001	3.297	0.0011
(−10, +10)	4,815	2,361:2,454	−0.41%	2.942	0.0033	2.781	0.0057

1 measures, the negative coefficient again implies that GIM and BCF measures of
2 good governance are positively related to the probability of a value-destroying
3 activity, namely, acquisitions, in the post-SOX period.

4 Panel C of Table 10 summarizes the difference in implied acquisition
5 probabilities pre- and post-SOX for the different governance measures. Board

1 independence and director ownership are associated with a statistically and eco-
2 nomically significant decrease in acquisition probabilities in the post-SOX period
3 compared to the pre-SOX period.

4 VIII. Conclusions

5 We study the impact of SOX on the relationship between corporate gover-
6 nance and company performance. A significant part of SOX and other exchange
7 requirements increases the role of independent board members. Given that prior
8 academic research suggests there is no positive relationship between board inde-
9 pendence and firm performance, the above regulatory efforts are especially no-
10 table.

11 We find a shift in the relationship between board independence and firm per-
12 formance after 2002. Prior to 2002, we document a *negative* relationship between
13 board independence and operating performance. After 2002, we find a *positive* re-
14 lationship between independence and operating performance. We find this result
15 is driven by firms that increase their number of independent directors. An event
16 study provides independent evidence supportive of the above results (specifically,
17 when a company goes from being noncompliant to being compliant with SOX's
18 board independence requirement, the market response is significantly positive).
19 Why might SOX be related to this positive performance? SOX and the listing stan-
20 dards impose new responsibilities on firms' directors, such as regular meetings of
21 the independent directors, approval of director nominations by independent direc-
22 tors, and approval of CEO compensation by independent directors. As a conse-
23 quence of these policies, boards began including more independent directors, and
24 perhaps the independent directors became more engaged in the firm's governance
25 processes. For example, we find that firms with greater board independence (and
26 stock ownership of board members) are less likely to engage in a value-destroying
27 activity, namely, acquisitions.

28 We find a consistent positive performance-governance relationship for direc-
29 tor ownership. On average, the median director's stock ownership is 45% greater
30 in 2003–2007 than it was in 1998–2001, and the relationship between director
31 ownership and firm performance is consistently positive for both subperiods; this
32 relationship is robust to a battery of specification tests. Hence, this study proposes
33 a governance measure, namely, dollar ownership of the board members, that is
34 simple, intuitive, less prone to measurement error, and not subject to the problem
35 of weighting a multitude of governance provisions in constructing a governance
36 index. Consideration of this governance measure by future researchers would
37 enhance the comparability of research findings with more robust progress in gov-
38 ernance research.

39 References

- 40 Adams, R., and D. Ferreira. "A Theory of Friendly Boards." *Journal of Finance*, 62 (2007), 217–250.
41 Agrawal, A., and C. R. Knoeber. "Firm Performance and Mechanisms to Control Agency Problems
42 between Managers and Shareholders." *Journal of Financial and Quantitative Analysis*, 31 (1996),
43 377–397.
44 Altman, E. I. "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy." *Journal of Finance*, 23 (1968), 589–609.
45

- 1 Ashbaugh-Skaife, H.; D. W. Collins; and R. LaFond. "The Effects of Corporate Governance on Firms' Credit Ratings." *Journal of Accounting and Economics*, 42 (2006), 203–243.
- 2 Barber, B., and J. Lyon. "Detecting Abnormal Operating Performance: The Empirical Power and Specification of Test Statistics." *Journal of Financial Economics*, 41 (1996), 359–400.
- 3 Bebczuk, L.; A. Cohen; and A. Ferrell. "What Matters in Corporate Governance?" *Review of Financial Studies*, 22 (2009), 783–827.
- 4 Berkowitz, D.; M. Caner; and Y. Fang. "Are 'Nearly Exogenous Instruments' Reliable?" *Economics Letters*, 2008, 101 (2008), 20–23.
- 5 Bhagat, S., and B. Black. "The Non-Correlation between Board Independence and Long-Term Firm Performance." *Journal of Corporation Law*, 27 (2002), 231–274.
- 6 Bhagat, S., and B. Bolton. "Corporate Governance and Firm Performance." *Journal of Corporate Finance*, 14 (2008), 257–273.
- 7 Bhagat, S.; B. Bolton; and R. Romano. "The Promise and Peril of Corporate Governance Indices." *Columbia Law Review*, 108 (2008), 1803–1882.
- 8 Bhagat, S., and R. Jefferis, Jr. *The Econometrics of Corporate Governance Studies*. Cambridge, MA: MIT Press (2002).
- 9 Bhagat, S., and H. Tookes. "Voluntary and Mandatory Skin in the Game: Understanding Outside Directors' Stock Holdings." *European Journal of Finance*, 18 (2012), 191–207.
- 10 Bound, J.; D. A. Jaeger; and R. M. Baker. "Problems with Instrumental Variables Estimation When the Correlation between the Instruments and the Endogenous Explanatory Variable Is Weak." *Journal of the American Statistical Association*, 90 (1995), 443–450.
- 11 Brickley, J. A.; J. L. Coles; and G. Jarrell. "Leadership Structure: Separating the CEO and Chairman of the Board." *Journal of Corporate Finance*, 3 (1997), 189–220.
- 12 Brochet, F. "Information Content of Insider Trades Before and After the Sarbanes-Oxley Act." *Accounting Review*, 85 (2010), 419–446.
- 13 Brown, L. D., and M. L. Caylor. "Corporate Governance and Firm Valuation." *Journal of Accounting and Public Policy*, 25 (2006), 409–434.
- 14 Byrd, J., and K. Hickman. "Do Outside Directors Monitor Managers?" *Journal of Financial Economics*, 32 (1992), 195–221.
- 15 Chao, J. C., and N. R. Swanson. "Consistent Estimation with Large Number of Weak Instruments." *Econometrica*, 73 (2005), 1673–1692.
- 16 Chenhall, R. H., and F. Moers. "The Issue of Endogeneity Within Theory-Based, Quantitative Management Accounting Research." *European Accounting Review*, 16 (2007), 173–195.
- 17 Chhaochharia, V., and Y. Grinstein. "Corporate Governance and Firm Value: The Impact of the 2002 Governance Rules." *Journal of Finance*, 62 (2007), 1789–1825.
- 18 Coles, J. L.; N. D. Daniel; and L. Naveen. "Boards: Does One Size Fit All?" *Journal of Financial Economics*, 79 (2008), 329–356.
- 19 Core, J. E.; W. R. Guay; T. O. Rusticus. "Does Weak Governance Cause Weak Stock Returns? An Examination of Firm Operating Performance and Investors' Expectations." *Journal of Finance*, 61 (2006), 655–687.
- 20 Core, J. E.; R. W. Holthausen; and D. F. Larcker. "Corporate Governance, Chief Executive Officer Compensation, and Firm Performance." *Journal of Financial Economics*, 51 (1999), 371–406.
- 21 Cotter, J.; A. Shivdasani; and M. Zenger. "Do Independent Directors Enhance Target Shareholder Wealth During Tender Offers?" *Journal of Financial Economics*, 43 (1997), 195–218.
- 22 Cragg, J. G., and S. G. Donald. "Testing Identifiability and Specification in Instrumental Variable Models." *Econometric Theory*, 9 (1993), 222–240.
- 23 Cremers, K. J. M., and V. B. Nair. "Governance Mechanisms and Equity Prices." *Journal of Finance*, 60 (2005), 2859–2894.
- 24 Davidson, R., and J. G. MacKinnon. *Estimation and Inference in Econometrics*. New York, NY: Oxford University Press (2004).
- 25 DeFond, M. L.; R. N. Hann; and X. Hu. "Does the Market Value Financial Expertise on Audit Committees of Boards of Directors?" *Journal of Accounting Research*, 43 (2005), 153–173.
- 26 Demsetz, H. "The Structure of Ownership and the Theory of the Firm." *Journal of Law and Economics*, 26 (1983), 375–390.
- 27 Duchin, R.; J. G. Matsusaka; and O. Ozbas. "When Are Outside Directors Effective?" *Journal of Financial Economics*, 96 (2010), 195–214.
- 28 Dufour, J. "Some Impossibility Theorems in Econometrics, with Applications to Structural and Dynamic Models." *Econometrica*, 65 (1997), 1365–1389.
- 29 Engel, E.; R. M. Hayes; and X. Wang. "CEO Turnover and Properties of Accounting Information." *Journal of Accounting and Economics*, 36 (2003), 197–226.
- 30 Farrell, K. A., and D. A. Whidbee. "The Impact of Firm Performance Expectations on CEO Turnover and Replacement Decisions." *Journal of Accounting and Economics*, 36 (2003), 165–196.

32 Journal of Financial and Quantitative Analysis

- 1 Fich, E. M., and A. Shivdasani. "Are Busy Boards Effective Monitors?" *Journal of Finance*, 61 (2006),
2 689–724.
- 3 Gibbons, R., and K. J. Murphy. "Optimal Incentive Contracts in the Presence of Career Concerns:
4 Theory and Evidence." *Journal of Political Economy*, 100 (1992), 468–505.
- 5 Gillan, S. L.; J. C. Hartzell; and L. T. Starks. "Explaining Corporate Governance: Boards, Bylaws,
6 and Charter Provisions." Working Paper, University of Georgia (2003).
- 7 Gilson, S. C. "Management Turnover and Financial Distress." *Journal of Financial Economics*,
8 25 (1989), 241–262.
- 9 Gompers, P. A.; J. L. Ishii; and A. Metrick. "Corporate Governance and Equity Prices." *Quarterly*
10 *Journal of Economics*, 118 (2003), 107–155.
- 11 Graham, J. R. "Debt and the Marginal Tax Rate." *Journal of Financial Economics*, 41 (1996), 41–73.
- 12 Greene, W. H. "The Behavior of the Fixed Effects Estimator in Nonlinear Models." *Econometrics*
13 *Journal*, 7 (2004), 98–119.
- 14 Guggenberger, P. "Finite-Sample Evidence Suggesting a Heavy Tail Problem of the Generalized Em-
15 pirical Likelihood Estimator." Working Paper, University of California at Los Angeles (2005).
- 16 Hahn, J., and J. A. Hausman. "A New Specification Test for the Validity of Instrumental Variables." *Econometrica*, 70 (2002), 163–189.
- 17 Hall, A.; G. Rudebusch; and D. Wilcox. "Judging Instrument Relevance in Instrumental Variables
18 Estimation." *International Economic Review*, 37 (1996), 283–298.
- 19 Hallock, K. F. "Reciprocally Interlocking Boards of Directors and Executive Compensation." *Journal*
20 *of Financial and Quantitative Analysis*, 32 (1997), 331–344.
- 21 Hansen, L. P. "Large Sample Properties of Generalized Method of Moments Estimators." *Economet-*
22 *rica*, 50 (1982), 1029–1054.
- 23 Harris, M., and A. Raviv. "A Theory of Board Control and Size." *Review of Financial Studies*,
24 21 (2008), 1797–1832.
- 25 Hausman, J. A. "Specification Tests in Econometrics." *Econometrica*, 46 (1978), 1251–1271.
- 26 Hermalin, B. E. "Trends in Corporate Governance." *Journal of Finance*, 60 (2005), 2351–2384.
- 27 Hermalin, B. E., and M. S. Weisbach. "The Effects of Board Composition and Direct Incentives on
28 Firm Performance." *Financial Management*, 20 (1991), 101–112.
- 29 Hermalin, B. E., and M. S. Weisbach. "Endogenously Chosen Boards of Directors and Their Moni-
30 toring of the CEO." *American Economic Review*, 88 (1998), 96–118.
- 31 Hermalin, B. E., and M. S. Weisbach. "Boards of Directors as an Endogenously Determined Institu-
32 tion: A Survey of the Economic Evidence." *Economic Policy Review*, 9 (2003), 7–26.
- 33 Himmelberg, C. P.; R. G. Hubbard; and D. Palia. "Understanding the Determinants of Managerial
34 Ownership and the Link between Ownership and Performance." *Journal of Financial Economics*,
35 53 (1999), 353–384.
- 36 Huson, M. R.; R. Parrino; and L. T. Starks. "Internal Monitoring Mechanisms and CEO Turnover: A
37 Long-Term Perspective." *Journal of Finance*, 54 (2001), 2265–2297.
- 38 Johnson, S.; T. C. Moorman; and S. Sorescu. "A Reexamination of Corporate Governance and Equity
39 Prices." *Review of Financial Studies*, 22 (2009), 4753–4786.
- 40 Kennedy, P. *A Guide to Econometrics*, 5th ed. Cambridge, MA: MIT Press (2003).
- 41 Krishnaswami, S., and V. Subramanian. "Information Asymmetry, Valuation, and the Corporate Spin-
42 Off Decision." *Journal of Financial Economics*, 53 (1999), 73–112.
- 43 Larcker, D. F., and S. A. Richardson. "Fees Paid to Audit Firms, Accrual Choices, and Corporate
44 Governance." *Journal of Accounting Research*, 42 (2004), 625–658.
- 45 Laux, V. "Board Independence and CEO Turnover." *Journal of Accounting Research*, 46 (2008),
46 137–171.
- 47 Lehn, K.; S. Patro; and M. Zhao. "Governance Indices and Valuation Multiples: Which Causes
48 Which?" *Journal of Corporate Finance*, 13 (2007), 907–928.
- 49 Linck, J. S.; J. M. Netter; and T. Yang. "The Determinants of Board Structure." *Journal of Financial*
50 *Economics*, 87 (2008), 308–328.
- 51 MacKinlay, A. C. "Event Studies in Economics and Finance." *Journal of Economic Literature*, 35
52 (1997), 13–39.
- 53 Masulis, R. W., and S. Mobbs. "Are All Inside Directors the Same? Evidence from the External
54 Directorship Market." *Journal of Finance*, 66 (2011), 823–872.
- 55 Milanovic, B. "Do More Unequal Countries Redistribute More? Does the Median Voter Hypothesis
56 Hold?" World Bank Policy Research Working Paper Series, Carnegie Endowment for International
57 Peace (2004).
- 58 Moeller, S. B.; F. P. Schlingemann; and R. M. Stulz. "Wealth Destruction on a Massive Scale? A Study
59 of Acquiring-Firm Returns in the Recent Merger Wave." *Journal of Finance*, 60 (2005), 757–782.
- 60 Nelson, C. R., and R. Startz. "Some Further Results on the Exact Small Sample Properties of the
61 Instrumental Variables Estimator." *Econometrica*, 58 (1990), 967–976.
- 62

- 1 Palia, D. "The Endogeneity of Managerial Compensation in Firm Valuation: A Solution." *Review of*
2 *Financial Studies*, 14 (2001), 735–764.
- 3 Petersen, M. A. "Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches."
4 *Review of Financial Studies*, 22 (2009), 435–480.
- 5 Raheja, C. G. "Determinants of Board Size and Composition: A Theory of Corporate Boards." *Journal*
6 *of Financial and Quantitative Analysis*, 40 (2005), 283–306.
- 7 Rogers, W. "Regression Standard Errors in Clustered Samples." *Stata Technical Bulletin*, 13 (1993),
8 19–23.
- 9 Sargan, J. D. "The Estimation of Economic Relationships Using Instrumental Variables." *Economet-*
10 *rica*, 26 (1958), 393–415.
- 11 Shea, J. "Instrument Relevance in Multivariate Linear Models: A Simple Measure." *Review of Eco-*
12 *nomics and Statistics*, 79 (1997), 348–352.
- 13 Shleifer, A., and K. M. Murphy. "Persuasion in Politics." *American Economic Association Papers and*
14 *Proceedings*, 94 (2004), 435–439.
- 15 Stock, J. H.; J. Wright; and M. Yogo. "A Survey of Weak Instruments and Weak Identification
16 in Generalized Method of Moments." *Journal of Business and Economic Statistics*, 20 (2002),
17 518–529.
- 18 Stock, J. H., and M. Yogo. "Testing for Weak Instruments in Linear IV Regression." In *Identification*
19 *and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg*, D. W. K.
20 Andrews and J. H. Stock, eds. Cambridge, UK: Cambridge University Press (2004).
- 21 Weisbach, M. S. "Outside Directors and CEO Turnover." *Journal of Financial Economics*, 20 (1988),
22 432–460.
- 23 Westphal, J. D., and P. Khanna. "Keeping Directors in Line: Social Distancing as a Control Mecha-
24 nism in the Corporate Elite." *Administrative Science Quarterly*, 48 (2003), 361–398.
- 25 Wooldridge, J. M. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT
26 Press (2002).
- 27 Yermack, D. "Higher Market Valuation for Firms with a Small Board of Directors." *Journal of Finan-*
28 *cial Economics*, 40 (1996), 185–211.