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The costs of a (nearly) fully independent board ☆

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ABSTRACT

A significant and growing percentage of U.S. firms now have boards where the CEO is the only employee director (hereinafter fully independent boards). This paper studies whether and how this practice impacts board effectiveness. I find that fully independent boards are associated with a significant reduction in firm performance. Further tests suggest two channels for this effect. First, full independence deprives the board of spontaneous and regular access to the firm-specific information of other senior executives. Second, full independence eliminates the first-hand exposure of future CEOs to board-level discussions of strategy, which steepens the learning curve for eventually promoted candidates.

1. Introduction

American corporate boards have undergone significant changes in recent times, with a trend toward smaller and more independent boards. According to the 2012 Spencer Stuart Board Index,[1] 86% of the boards of Standard and Poor's (S&P) 500 companies had 12 or fewer directors in 2012, compared with 68% in 2002. Similarly, the percentage of independent directors increased from 79% in 2002 to 84% in 2012 while the proportion of chief executive officers (CEOs) who also chaired their boards declined from 75% to 57% during the same period. Perhaps the most significant of these trends is the exclusion of all employees but the CEO from serving on the board of directors. In 1998, only 36% of S&P 1500 firms had no other employee directors besides the CEO. The proportion of such firms has increased steadily each year since then, reaching 70% in 2011. In this paper, I study whether and how excluding non-CEO executives from the board impacts board effectiveness and firm performance.

The primary benefit of excluding employees other than the CEO from the board is that doing so allows the firm to increase the number of outside directors without enlarging the board. This can enhance board effectiveness because a smaller size allows the board to avoid the communication and coordination costs associated with larger boards and also reduces the potential for free-rider problems (Jensen, 1993; Yermack, 1996). More importantly, the substitution of outside directors for insiders increases board independence, which can lower agency problems because independent directors are less beholden to top management. In addition, recent regulatory mandates (Sarbanes–Oxley Act of 2002 as well as New York Stock Exchange and NASDAQ listing requirements) have significantly increased the monitoring duties of independent directors. As shown by Faleye et al. (2011), this intense focus on board monitoring hinders overall board effectiveness but the negative impact is attenuated when the board reduces the

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[1] Available on the internet at http://www.spencerstuart.com/research/bi.

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involvement of individual independent directors in oversight duties by increasing the number of such directors. Thus, substituting employee directors with independent directors allows the board more freedom in allocating oversight duties, which can enhance the effectiveness of board monitoring.

Resource dependence theory (see, e.g., Pfeffer (1972)) views the corporate board as a provider of resources to the firm. According to Hillman and Dalziel (2003), these resources include human capital (experience, expertise, and reputation) as well as relational capital (connections to other firms and external contingencies). Thus, increasing the number of independent directors can enhance board effectiveness by magnifying the firm's access to essential external resources that complement the skills and competencies of corporate insiders. Moreover, an increase in the number of independent directors is likely to shift the balance of power on the board away from the CEO, which increases his willingness to seek and utilize board counsel (Golden and Zajac, 2001) and potentially improves board effectiveness.

Nevertheless, the exclusion of other top executives from the board can hurt board effectiveness and firm performance in several ways. First, it reduces the proximity between the board and the sub-CEO layer of corporate leadership. This denies the board of spontaneous access to the firm- and position-specific information of these executives. Since such information is costly to transmit through others (Fama and Jensen, 1983), excluding non-CEO executives from the board can negatively impact the formulation and execution of corporate strategies and weaken the effectiveness of board monitoring. At the same time, this lack of proximity to independent directors can hinder the CEO succession process by diminishing the board's ability to evaluate internal candidates before promoting them. Finally, internally promoted CEOs without prior board service are likely to face a steeper learning curve than those who served as directors prior to promotion because such service provides valuable learning opportunities via regular exposure to board-level discussions of corporate strategy.

I study these issues using the sample of all firms covered in the Riskmetrics directors' database over 1998–2011. I find that firms where the CEO is the only employee director earn significantly lower operating profits than other firms and suffer from depressed firm values. Specifically, their return on assets (ROA) and Tobin's q are lower by 78 basis points and 4.2%, respectively. An extensive battery of additional tests confirms that these results are robust to reverse causality and other endogeneity issues.

Next, I examine potential channels for this effect by focusing on two complementary explanations. First, I investigate the hypothesis that firms where the CEO is the only employee director underperform because their boards are denied regular and unfiltered access to the firm-specific information possessed by other senior executives. Prior research on board composition (e.g., Boone et al., 2007; Linck et al., 2008; Raheja, 2005) suggests that employee directors are more valuable when a firm's projects are costly for outsiders to evaluate and monitor. This literature also suggests that the skills and expertise of independent directors are less valuable when the firm's need for board advising is low. Therefore I construct an index that measures project verification costs and advising needs based on firm size, scope of operations, asset characteristics, and dependence on external financing. Since their need for employee directors is higher and their need for independent directors is lower, the information hypothesis predicts that firms with higher project verification costs coupled with low advising requirements will experience more negative performance effects if such firms limit employee board membership to their CEOs. Consistent with this, I find that fully independent boards are associated with a reduction of 88 basis points and 5.6% in operating profitability and Tobin's q among these firms, compared with a reduction of 47 basis points and 1.4% among firms with a lower need for employee directors.

Next, I examine the hypothesis that the poorer performance of firms where the CEO is the only employee director is explained in part by the loss of board-level experience for their future CEOs. Here, I distinguish between two alternative (though not necessarily mutually exclusive) channels. First, lack of board experience for top executives can diminish directors' ability to select the best CEO candidate since the board lacks direct observation of and continuous interactions with potential successors (Fama and Jensen, 1983). Second, eventual CEO appointees with no prior experience on the firm's board may experience initial missteps due to a steeper learning curve. Empirically, these explanations can be separated from each other in that the former predicts sustained inferior performance when an internally promoted CEO lacks pre-appointment experience on his firm's board because such CEOs are more likely to be poorer fits. In contrast, the latter predicts that such performance differentials will be temporary, lasting only for as long as it takes the CEO without prior board service to bridge his experience and/or learning gap. Consistent with the latter, I find that internally promoted CEOs without prior board service underperform those with such experience only in the first two post-promotion years; thereafter, the two groups perform equally.

These results fill an important gap in the literature. Prior research (see Adams et al. (2010) for a recent review) has long established the value of independent directors as arm's length monitors and advisors. Yet recent mandates requiring increased board independence raise the question of whether independent directors can fully substitute for employee directors. By focusing on what is plausibly the limit of such substitution, this paper demonstrates the potential costs of an (almost) fully independent board. In particular, firm performance diminishes when the board does away with the skills and idiosyncratic information of employee directors, especially when the firm's projects are difficult for outsiders to monitor and its advising needs are lower.

My results also raise the question of why firms adopt fully independent boards when the structure is detrimental to firm performance and value. First, it is likely that the effect of these boards is not yet widely known because they became widespread relatively recently and academic research on their impact is sparse. This explanation is consistent with the evolution of changes in other board structures following academic research into such structures. For example, average board size among S&P 500 firms was 15 in the years before Yermack's (1996) finding of an inverse relation between board size and firm value. By 2002, average board size among these firms has declined to 11. Similarly, 60% of directors of S&P 500 firms were elected to staggered terms in 2003 prior to the publication of Bebchuk and Cohen (2005) and Faleye (2007) documenting the negative effects of a classified board on firm value and board

effectiveness. In 2011, fewer than 25% of S&P 500 directors were elected to staggered terms.[2] Thus, it is likely that the trend toward fully independent boards will reverse once their effects become well known.

Second, regulators and activist shareholders have pushed for greater board independence since the scandals of 2001/2002. It is therefore plausible that some firms view the adoption of a fully independent board as demonstrating a credible commitment to stricter levels of corporate accountability. These early adopters then became industry hubs for spreading what is supposedly a higher (albeit voluntary) standard of corporate governance. The evidence on the incidence of fully independent boards is consistent with this explanation. In particular, the proportion of firms with fully independent boards exhibits a dramatic jump around the regulatory changes of 2001/2002, from 40% in 2000 to 53% in 2003. This explanation also suggests that the incidence of fully independent boards should diminish once their effects are better understood.

Finally, the adoption of fully independent boards may be a clever manifestation of the classic agency problem between shareholders and management. Joseph et al. (forthcoming) examine the evolution of fully independent boards using the sample of Fortune 250 firms over 1981–2007. They show that firms are more likely to adopt a fully independent board structure when it is in the CEO's interest to do so and he is powerful enough to stamp his preferences on the board. They conclude that powerful CEOs use the adoption of a fully independent board as a means of appearing to pursue shareholder interest (i.e., an independent board) while primarily serving their own interests of becoming the principal connection between the firm and its outside directors and attenuating potential challenges from other top executives.

The rest of the paper is organized as follows. The next section describes my sample, data, and main variables. Section 3 contains results and discussions of my analysis of the impact of fully independent boards on firm performance together with associated robustness checks. Section 4 examines potential channels for these effects while the last section concludes with a brief summary.

2. Sample and variables

My sample consists of all firms covered in the Riskmetrics directors database between 1998 and 2011, for a sample of 20,086 observations on 2900 unique firms.[3] Riskmetrics provides detailed information on the directors of these firms, covering such items as age, gender, primary occupation, independence status, service on other corporate boards, and committee memberships. I use these data to construct my main variable of interest, an indicator variable that equals one if the CEO is the only employee director (i.e., fully independent boards), zero otherwise.

I also construct four variables that measure basic board attributes to provide context. These are board size (number of directors) and three measures of board composition: the percentages of directors who are current employees (i.e., inside directors), affiliated non-employees (i.e., gray directors), and unaffiliated non-employees (i.e., independent directors). Table 1 provides annual summary statistics for these variables. As the table shows, average board size is quite stable over the sample period, ranging from a low of 9.3 directors in 2001 to a high of 9.7 in 1999. In fact, the median board has nine directors in each year during the period (not tabulated). In contrast, the percentage of independent directors increased steadily from 59.8% in 1998 to 79.2% in 2011, while the percentages of inside and gray directors declined correspondingly. More notably, the fraction of firms with fully independent boards increased each year over the entire period, from 36.4% in 1998 to 70.2% in 2011.[4] These statistics are very similar to those in other recent studies using Riskmetrics data. For example, Knyazeva et al. (2013) report mean and median board size of 9.1 and 9.0, and mean and median percent independent directors of 65.1% and 66.7% over 1996–2006.

My primary measure of firm outcome is operating earnings as measured by ROA. Using data from Compustat, I calculate ROA as the ratio of operating income after depreciation to total assets at the beginning of the year. Its mean and median are 9.7% and 8.7%, respectively. Shareholders may be better (worse) off even if fully independent boards are associated with depressed (higher) earnings if the reduction (increase) in earnings is coincident with a greater reduction (increase) in risk. Therefore, I also examine the impact of fully independent boards on firm operating risk, which I define as the standard deviation of ROA over the next three years (i.e., for each year t, operating risk is measured as the standard deviation of ROA over years $t+1$, $t+2$, and $t+3$).[5] This allows me to provide a more complete picture of the effect of this structure on the two major determinants of corporate value. Mean and median operating risk are 3.1% and 1.9%. My final outcome variable is Tobin's q. This is defined as the market value of common equity plus the book values of preferred equity and long-term debt, divided by the book value of assets. Mean and median Tobin's q are 1.5 and 1.1, respectively. I winsorize each outcome variable at the 1st and 99th percentiles to minimize the impact of a few outliers in both tails.

Prior research identifies several covariates of firm performance.[6] Therefore, I control for these variables in ROA and Tobin's q regressions in order to isolate the effect of fully independent boards on firm performance. The control variables and my proxies for them include firm size (natural log of the book value of total assets), investment opportunities (the ratio of capital expenditures to total assets), research and development expenditures (R&D, normalized by total assets), and leverage (the ratio of long-term debt to total assets). Others are board size, board independence, CEO equity ownership (proportion of outstanding shares owned by the CEO), board monitoring intensity (equals one if a majority of independent directors serve on two or more monitoring committees, zero otherwise), CEO duality (equals one if the CEO serves as board chair, zero otherwise), the number of other corporate boards

[2] Board structure references in this paragraph are from various issues of the Spencer Stuart Board Index.

[3] This is the number of observations with data on my primary variable of interest, that is, fully independent boards. Depending on each model and data availability on specific variables, regression sample sizes are generally smaller than 20,086. Table 2 provides sample sizes for the major variables in my regressions.

[4] The correlation between board independence and fully independent boards is 0.488. Thus, neither is subsumed in the other.

[5] Results are similar if I measure operating risk as the standard deviation of ROA over preceding years.

[6] See Adams et al. (2010) for a recent review.

Table 1
Board trends: 1998–2011. The sample consists of all firms covered in the Riskmetrics directors' database. Board size is the number of directors. %Indp, %Gray, and %Insid are the respective percentages of directors who are independent directors (i.e., unaffiliated with the firm beyond their directorships), gray directors (i.e., non-employee directors who have family or business ties with the firm or its management), and employee directors. Fully indp. equals 1 if the CEO is the only employee director, 0 otherwise.

Year	Sample	Board size	%Indp	%Gray	%Insid	Fully indp.
1998	1620	9.58	59.8%	17.1%	23.1%	36.4%
1999	1627	9.67	60.2%	17.0%	22.8%	36.9%
2000	1620	9.49	61.0%	16.5%	22.5%	39.9%
2001	1676	9.27	62.9%	15.1%	22.0%	43.0%
2002	1369	9.38	66.1%	13.4%	20.4%	47.8%
2003	1399	9.39	68.7%	12.3%	19.0%	52.8%
2004	1403	9.38	70.4%	11.4%	18.2%	54.6%
2005	1389	9.36	71.7%	10.9%	17.4%	59.1%
2006	1341	9.50	72.3%	11.0%	16.6%	61.4%
2007	1329	9.30	77.1%	6.0%	16.7%	62.8%
2008	1352	9.45	77.7%	6.0%	16.3%	64.4%
2009	1342	9.41	77.8%	6.1%	16.1%	66.6%
2010	1321	9.45	78.8%	5.5%	15.7%	69.0%
2011	1298	9.41	79.2%	5.1%	15.7%	70.2%
	20,086	9.44	69.7%	11.3%	19.0%	53.7%

on which the CEO serves, and the average number of other corporate boards on which directors as a group serve. I use data from Compustat and Riskmetrics to construct these variables.

In addition to the preceding variables, my operating risk regressions also include controls for the following variables identified in the literature (see, e.g., Cheng, 2008; Faleye et al., forthcoming) as important determinants of corporate risk-taking: CEO tenure (number of years of service as CEO), CEO incentives (delta of stock and options owned by the CEO), corporate diversification (number of business segments in which the firm operates), and the presence of the firm's founder on its board.

Table 2 provides summary statistics. As expected, sample firms are fairly large, with mean and median total assets of $15.9 billion and $2.0 billion, respectively. Average investments in R&D[7] and capital expenditures are 2.5% and 4.9% of total assets, with corresponding medians of 0.0% and 3.5%. The median firm finances 16.9% of its assets with long-term debt. The CEO owns 3.5% of outstanding shares at the average firm, with a median ownership of 1.0%. The CEO chairs the board in 61.6% of the sample, and the median CEO serves on no other corporate boards. These numbers are comparable to those in other studies. For his sample of S&P 1500 firms (excluding financials and utilities) over 1997–2006, Mobbs (2013) reports mean and median R&D investment of 3.0% and 0.0%, mean and median CEO ownership of 4.2% and 1.4%, and mean and median total debt (including short-term debt) ratio of 22% and 21%.

3. Corporate outcomes when the CEO is the only employee director

I begin my empirical tests by estimating regressions of my measures of corporate outcomes on the fully independent board indicator variable and the control variables discussed earlier. I also include two-digit standard industrial classification (SIC) code and year dummies to control for industry effects and secular performance trends, respectively.

3.1. Operating performance (ROA)

Table 3A presents results of ROA regressions. In the first column, the model is a pooled time-series cross-sectional ordinary least squares (OLS) regression with robust standard errors clustered at the firm level. As the table shows, the indicator variable for fully independent boards is negative and significant at the 1% level. Its coefficient implies that ROA is lower by 78 basis points when the CEO is the only employee director. Since the sample average ROA is 9.7%, this implies an economically significant reduction of 8.0% in operating profitability when the board is (nearly) fully independent.

While this suggests that operating performance suffers when the board is fully independent, it is nevertheless possible that the result is simply a spurious relation attributable to other factors. In particular, the result potentially suffers from reverse causality because poorly performing firms may restructure their boards to include more outsiders at the expense of employee directors. For example, Easterwood and Raheja (2008) find that boards become more independent in the three years following underperformance. Several factors mitigate this concern, however. First, as shown in Table 1, the proportion of firms where the CEO is the only inside director increased each year in the sample, from 36.4% in 1998 to 70.2% in 2011. A reverse causality explanation implies that such a dramatic and steady increase would be preceded by a noticeable decline in average firm performance. Yet there are no clear trends in ROA during the sample period: average ROA declined from 10.7% in 1998 to 6.4% in 2001, increased steadily to 11.1% in 2006, then declined to 7.9% in 2009, and finally increased to 10.6% in 2011. Thus, the proportion of firms with fully independent boards increased during years following good as well as poor firm performance, which is inconsistent with poor performance causing the reduction in the number of employee directors.

[7] I set R&D to zero when Compustat reports R&D expenses as missing. Compustat typically reports R&D as missing when the firm reports its R&D expenses as negligible.

Table 2
Summary statistics. ROA is the ratio of operating income after depreciation to total assets at the beginning of the year. Operating risk is the standard deviation of ROA over years $t + 1$, $t + 2$, and $t + 3$ relative to each year. Tobin's q is the market value of common equity plus the book values of preferred equity and long-term debt, divided by the book value of assets. Firm size is the natural log of the book value of total assets. Growth opportunities is the ratio of capital expenditures to total assets. R&D is the ratio of research and development expenditures to total assets. Leverage is the ratio of long-term debt to total assets. Board size is the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. CEO ownership is the proportion of outstanding shares owned by the CEO. Monitoring intensity equals 1 if a majority of independent directors serve on two or more monitoring (audit, compensation, and nominating/governance) committees, 0 otherwise. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. CEO external boards is the number of other corporate boards on which the CEO serves. Average other boards is the average number of other corporate boards on which directors as a group serve. P25 and P75 are the first and third quartiles, respectively.

Variable	Sample	P25	Mean	Median	P75	Std. dev.
ROA	20,084	0.040	0.097	0.087	0.148	0.100
Operating risk	18,392	0.845%	3.075%	1.881%	3.839%	3.546%
Tobin's q	20,086	0.742	1.455	1.106	1.749	1.215
Firm size	20,086	6.557	7.773	7.595	8.836	1.664
Growth opportunities	19,429	0.016	0.049	0.035	0.064	0.055
R&D	20,086	0.000	0.025	0.000	0.028	0.056
Leverage	20,086	0.037	0.192	0.169	0.300	0.175
Board size	20,086	8.000	9.436	9.000	11.000	2.704
Board independence	20,086	0.600	0.697	0.727	0.833	0.170
CEO ownership	20,066	0.003	0.035	0.010	0.027	0.073
Monitoring intensity	20,086	0.000	0.550	1.000	1.000	0.498
CEO duality	20,086	0.000	0.616	1.000	1.000	0.486
CEO external boards	20,075	0.000	0.552	0.000	1.000	0.853
Average other boards	20,086	0.364	0.818	0.727	1.174	0.590

Second, I compare the prior performance of firms whose boards became fully independent after a period of at least three years during which they had other employee directors with the same-period performance of firms that continued to have other employee directors. Specifically, I identify firm-years preceded by at least three years during which the firm had other employee directors besides the CEO. I then compare average ROA during these years for firms that subsequently removed non-CEO employee directors with the average ROA for firms that retained their other employee directors. Mean and median ROA are 11.0% and 9.3% for the former group, compared with 11.3% and 10.0% for the latter. Neither the means nor the medians are significantly different from each other at conventional levels. Similarly, Joseph et al. (forthcoming) show that prior performance in itself has no effect on the likelihood of a firm adopting a fully independent board structure. These findings are inconsistent with reverse causality.

The above notwithstanding, I perform additional tests to examine the robustness of my results to these issues. Boone et al. (2007) and Faleye et al. (forthcoming), among others, address reverse causality concerns by regressing the dependent variable on lagged values of the explanatory variable based on the intuition that such historical values are largely predetermined. I follow this approach and estimate a regression of ROA three years in the future on fully independent boards and the other explanatory variables in the current year. As the second column of Table 3A shows, the coefficient on fully independent boards is negative and significant. Thus, firms where the CEO is the only employee director in the current year perform significantly worse three years later, which is inconsistent with a reverse causality explanation for my results.

Faleye (2007) focuses on the subset of top-performing firms to address reverse causality problems when the concern is about the adoption of a governance practice in response to poor performance. The intuition here is that top-performing firms that adopted the practice are less likely to have done so because of poor performance since they were top performers around the time of adoption. Following this approach, I estimate a second regression over firms classified as historical top performers, that is, those whose average ROA during the three-year period when they had other employee directors is at or above the sample third quartile. As the third column of Table 3A shows, the fully independent board indicator variable remains negative and significant in this regression. I obtain similar results in untabulated regressions in which I define top performers as those at or above the 90th percentile of historical ROA and when I use industry-adjusted ROA as the measure of historical performance.

Overall, the above results suggest that my findings are less likely attributable to reverse causality. As a further step in addressing potential endogeneity problems, I estimate a firm fixed effect regression with standard errors clustered at the firm level. This allows me to eliminate the effects of time-invariant omitted variables by using within-firm variations to identify the effects of full board independence and is particularly useful in this context where there are significant firm-level time series changes in the variable of interest. The fourth column of Table 3A presents results of this regression. As before, the indicator variable for fully independent boards is negatively associated with firm performance at less than the 1% level.

While firm fixed effect regressions correct for time-invariant correlated omitted variables, they do not address time-variant unobservable heterogeneity. As a first step, I perform a Davidson–MacKinnon test of exogeneity to examine whether the results suffer from unobservable heterogeneity. The test fails to reject the null hypothesis that the fully independent board variable is exogenous, with a p-value of 0.191. Still, I perform two additional tests using different approaches to address potential endogeneity biases.

The first test uses a quasi-natural experiment based on regulatory changes in 2002. During this period, U.S. Congress and the major stock exchanges mandated new governance standards requiring corporate boards to be majority independent and the principal board committees to be fully independent. Admittedly, these mandates do not require the board itself to be fully independent, that is, they

Table 3A
Fully independent boards and firm operating performance. The dependent variable in all but one column is ROA, the ratio of operating income after depreciation to total assets at the beginning of the year. The dependent variable in the "*Nat. exp.*" column is the year-on-year change in ROA. Fully independent board equals 1 if the CEO is the only employee director, 0 otherwise. Firm size is the natural log of the book value of total assets. Leverage is the ratio of long-term debt to total assets. Growth opportunities is the ratio of capital expenditures to total assets. R&D spending is the ratio of research and development expenditures to total assets. CEO ownership is the proportion of outstanding shares owned by the CEO. CEO outside boards is the number of other corporate boards on which the CEO serves. Board size is the natural log of the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. Monitoring intensity equals 1 if a majority of independent directors serve on two or more monitoring (audit, compensation, and nominating/governance) committees, 0 otherwise. Average other boards is the average number of other corporate boards on which directors as a group serve. Historical ROA is average ROA over the three-year period immediately preceding the year when the board became fully independent. The model in the "*Pooled*" column is estimated over the full panel. The model in the "*Forward DV*" column is a regression of the 3-year forward dependent variable on current independent variables. Regressions in the "*Top P75*" column is estimated over subsequent years for firms whose average ROA during a three-year period when they have other employee directors is at or above the sample third quartile. The model in the "*FFE*" column is a firm fixed effect regression estimated over the full sample. The model in the "*Nat. exp.*" column is a firm fixed effect regression estimated over 2001–2004 for firms whose boards were forced by regulatory changes to become majority independent. The models in the "*2SLS: 1st stage*" and "*2SLS: 2nd stage*" columns are the first and second stages of an instrumental variable two-stage least squares regression in which fully independent board is instrumented using the percentages of same-industry and same-size-decile firms with fully independent boards in the preceding year. Each regression includes year and industry (or firm) fixed effects. *P*-values are in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

	Pooled	*Forward DV*	*Top P75*	*FFE*	*Nat. exp.*	*2SLS: 1st stage*	*2SLS: 2nd stage*
Fully independent board	−0.0078***	−0.0057*	−0.0133*	−0.0064***	−0.0332**	–	−0.0295*
	(0.003)	(0.056)	(0.095)	(0.004)	(0.047)		(0.093)
Firm size	0.0037**	−0.0016	−0.0000	0.0111***	0.0069	−0.0133	0.0127***
	(0.024)	(0.406)	(0.988)	(0.002)	(0.846)	(0.135)	(0.000)
Leverage	−0.0851***	−0.0296**	−0.0133	−0.0929***	−0.1911**	0.0434	−0.0854***
	(0.000)	(0.034)	(0.735)	(0.000)	(0.047)	(0.150)	(0.000)
Growth opportunities	0.2097***	0.1010***	0.1465	0.2412***	−0.2260	−0.2071**	0.2653***
	(0.000)	(0.005)	(0.182)	(0.000)	(0.500)	(0.034)	(0.000)
R&D spending	−0.4263***	−0.2243***	0.0201	−0.2858***	−0.5967	−0.2299*	−0.2220***
	(0.000)	(0.001)	(0.808)	(0.000)	(0.178)	(0.092)	(0.000)
CEO ownership	−0.0369*	−0.0153	0.0454	0.0143	0.0293	0.0052	−0.0090
	(0.060)	(0.542)	(0.162)	(0.476)	(0.675)	(0.0052)	(0.531)
CEO outside boards	0.0008	0.0015	−0.0013	−0.0013	0.0186	−0.0164***	−0.0005
	(0.548)	(0.314)	(0.726)	(0.293)	(0.294)	(0.001)	(0.641)
Board size	−0.0013	−0.0007	−0.0033	−0.0196***	−0.0565	−0.6032***	−0.0250**
	(0.833)	(0.922)	(0.863)	(0.004)	(0.338)	(0.000)	(0.032)
Board independence	−0.0015	−0.0178*	0.0303	0.0056	0.1274*	1.0737***	0.0217
	(0.877)	(0.088)	(0.244)	(0.521)	(0.080)	(0.000)	(0.275)
CEO is board chair	0.0023	−0.0003	−0.0023	0.0031	−0.0075	0.0567***	0.0033*
	(0.372)	(0.935)	(0.734)	(0.157)	(0.701)	(0.000)	(0.078)
Monitoring intensity	−0.0012	−0.0025	−0.0145**	−0.0006	−0.0038	−0.0451***	−0.0021
	(0.609)	(0.339)	(0.015)	(0.744)	(0.740)	(0.000)	(0.194)
Average other boards	−0.0050*	0.0031	0.0003	−0.0081***	0.0098	0.0682***	−0.0055**
	(0.077)	(0.340)	(0.966)	(0.003)	(0.713)	(0.000)	(0.012)
Historical ROA	–	–	0.6485***	–	–	–	–
			(0.000)				
%Same industry firms	–	–	–	–	–	0.3319***	–
						(0.000)	
%Same size decile firms	–	–	–	–	–	0.3092***	–
						(0.000)	
Observations	19,397	11,547	1023	19,397	337	15,832	15,832
Adjusted R^2	0.179	0.144	0.327	0.097	0.074	0.244	n.a

do not require companies to replace all non-CEO employee directors with independent directors. Nevertheless, the data suggest that many companies adopted this practice in response to the new regulatory demands. For example, the proportion of firms where the CEO is the only inside director jumped by 10 percentage points from 43% in 2001 (the year immediately preceding the mandates) to 53% in 2003 (the year immediately after). This is the largest two-year increase during the entire sample period.

Consequently, I identify 184 firms whose boards were not majority independent prior to 2002, had non-CEO employee directors prior to the same year,[8] and became majority independent thereafter. This allows me to identify firms that were forced by regulatory changes to increase the independence of their boards. In the process of doing so, some removed all non-CEO employee directors while others did not. To identify the effect of fully independent boards, I focus on how the change to full board independence around these mandates impacts firm performance by estimating a firm fixed effect regression for this sample over the year just before the regulatory changes to the two years after, that is, over 2001–2004. The dependent variable in this regression is the year-on-year change in ROA. As the fifth column of Table 3A shows, I find that performance is significantly lower for firms whose boards became fully independent following the mandated governance changes relative to those whose boards became compliant with the mandates without becoming fully independent.

[8] It is possible for a firm to have no non-CEO employee directors and still have a board that is not majority independent because of grey directors.

Finally, I employ two-stage instrument variable (IV) regression in a further attempt to address potential endogeneity issues. The major benefit of an IV framework is that it allows consistent estimation in the presence of reverse causality, correlated omitted variables, and other sources of unobserved heterogeneity. The difficulty lies in finding relevant and valid instruments, that is, variables that are correlated with the endogenous variable but uncorrelated with the error term in the structural model. For this purpose, I use two instruments for firm-level full board independence. The first is the percentage of same-industry (two-digit SIC code) firms with fully independent boards in the preceding year while the second is the percentage of same-size-decile firms with fully independent boards, also in the preceding year.

My instrument choice is based on two considerations. First is the intuition that a firm is more likely to institute a governance practice if similar firms engage in the same practice. This intuition is supported by shareholder activists and management who usually reference governance structures at similar firms in proposing (or opposing) specific governance practices. Joseph et al. (forthcoming) confirm this intuition by showing that the likelihood of a firm adopting a fully independent board is significantly related with the number of similar firms with the same structure. Second, while it is difficult to argue that these variables have absolutely no direct effect on firm performance, it is not likely that firm-level operating performance is directly impacted by the extent to which similar firms have fully independent boards.

To evaluate these arguments, I perform econometric tests that examine the strength and validity of my instruments. With respect to instrument strength, as the sixth column of Table 3A shows, both variables are highly significant in the first stage regression predicting fully independent boards. Furthermore, the Cragg–Donald Wald *F*-statistic for weak instruments is 60.93, which is larger than the largest Stock–Yogo critical value of 19.93 (Stock and Yogo, 2005). Similarly, the Sargan–Hansen over-identification test does not reject the null hypothesis that the instruments are uncorrelated with the error term in the second stage regression, with a *p*-value of 0.34. The final column of Table 3A presents results of the second stage model. As before, it shows that fully independent boards have a negative and significant effect on operating performance.

Besides the foregoing, I perform additional tests using the framework suggested by Barber and Lyon (1996).[9] First, I identify firms in my sample that did not have a fully independent board for a period of at least three consecutive years, switched to a fully independent board structure, and maintained that structure for at least three subsequent years. I categorize the 321 firms that satisfy these requirements as test firms and denote the year each firm switched to a fully independent board as its event year, that is, year 0. Next, I identify the 683 firms that did not have a fully independent board at any point during my sample period. I then attempt to find a suitable control firm among these firms for each test firm based on the test firm's industry and ROA in the year before its event year. I start by requiring control firms to be in the same four-digit SIC code industry as the test firm and have their ROAs within ±10% of the test firm's ROA. This produces 44 matches. I successively relax these requirements to increase the sample of matched firms as follows: four-digit SIC code and ROA within ±25%, 28 additional matches; three-digit SIC code and ROA within ±10%, 13 matches; three-digit SIC code and ROA within ±25%, 9 matches; two-digit SIC code and ROA within ±10%, 29 matches; and two-digit SIC code and ROA within ±25%, 21 matches. Overall, I am able to match 144 of the test firms with a control firm. Mean and median pre-event year ROA for test firms are 12.6% and 10.9%, compared with 12.3% and 11.2% for control firms. The difference between each statistic is not significant.

Next, I estimate two regressions using the sample of 144 test firms and their matching control firms. Since this sample is matched on industry and pre-event performance, this attenuates the concern that firms with fully independent boards are poor performers to begin with. Results are presented in Table 3B. The dependent variable in the first column is the change in each year's ROA relative to ROA in the pre-event year. The dependent variable in the second column is the year-on-year change in ROA. Each regression is estimated over year $t-1$ to year $t+3$ relative to the event year with year and firm fixed effects and standard errors clustered at the firm level. As the table shows, fully independent boards continue to exhibit a negative relation with ROA.

Each of the above tests has its limitations and weaknesses. Taken together, however, they do suggest that my results are less likely to be mere artifacts of some confounding underlying issues, reverse causality, or other endogeneity problems. Rather, they suggest that fully independent boards negatively impact firm performance.

3.2. Operating risk (standard deviation of ROA)

Table 4 presents results of regressions where the dependent variable is the three-year standard deviation of ROA. The model in the first column is a pooled time-series, cross-sectional regression with year and two-digit SIC code industry fixed effects and standard errors clustered at the firm level. The second column uses the three-year forward standard deviation of ROA as its dependent variable, while the third column is a firm fixed effect model. The regression in the fourth column is estimated over firms in the natural experiment sample described earlier in Section 3.1, while the last two columns contain the first and second stage models of a 2SLS estimation procedure where I use the percentages of same-industry and same-size-decile firms with fully independent boards in the preceding year as instruments for firm-level fully independent boards.[10]

As Table 4 shows, the fully independent board indicator variable is not significant in any of the regressions. I also perform several additional tests similar to those reported for ROA in Section 3.1, including using the Barber and Lyon framework. In each case, I do not find a significant relation between fully independent boards and the riskiness of corporate earnings. Furthermore, I obtain similar

[9] I thank an anonymous reviewer for suggesting these additional tests.

[10] The instruments are positive and significant in the first stage regression predicting fully independent boards. The Cragg–Donald Wald *F*-statistic is 13.318, which is larger than all but the largest Stock–Yogo critical values. In addition, the Sargan–Hansen test of overidentification does not reject the null that the instruments are uncorrelated with the error term in the second stage regression, with a p-value of 0.641.

Table 3B
Fully independent boards and firm operating performance. The sample for these regressions consists of 144 test firms and 144 control firms. Test firms did not have a fully independent board for a period of at least three consecutive years, switched to a fully independent board, and maintained that structure for at least three subsequent years. Control firms did not have a fully independent board at any point during 1998–2011 and are matched to test firms on the basis of industry and ROA in the year before the test firm switched to a fully independent board. The dependent variable in the first column is the change in each year's ROA relative to ROA in the pre-event year. The dependent variable in the second column is the year-on-year change in ROA. Each regression is estimated over year $t-1$ to year $t+3$ relative to the event year with year and firm fixed effects. Fully independent board equals 1 if the CEO is the only employee director, 0 otherwise. Firm size is the natural log of the book value of total assets. Leverage is the ratio of long-term debt to total assets. Growth opportunities is the ratio of capital expenditures to total assets. R&D spending is the ratio of research and development expenditures to total assets. CEO ownership is the proportion of outstanding shares owned by the CEO. CEO outside boards is the number of other corporate boards on which the CEO serves. Board size is the natural log of the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. Monitoring intensity equals 1 if a majority of independent directors serve on two or more monitoring (audit, compensation, and nominating/governance) committees, 0 otherwise. Average other boards is the average number of other corporate boards on which directors as a group serve. *P*-values are in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

	$ROA_t - ROA_{-1}$	$ROA_t - ROA_{t-1}$
Fully independent board	−0.0100*	−0.0189**
	(0.072)	(0.011)
Firm size	0.0322**	−0.0526***
	(0.013)	(0.001)
Leverage	−0.1313***	−0.0937***
	(0.000)	(0.003)
Growth opportunities	0.4690***	−0.0531
	(0.000)	(0.645)
R&D spending	0.3045	−0.1128
	(0.236)	(0.755)
CEO ownership	0.0413	0.1529
	(0.614)	(0.195)
CEO outside boards	−0.0023	−0.0025
	(0.564)	(0.672)
Board size	−0.0174	−0.0281
	(0.451)	(0.217)
Board independence	0.0104	0.0343
	(0.642)	(0.207)
CEO is board chair	−0.0017	−0.0111
	(0.813)	(0.283)
Monitoring intensity	−0.0037	−0.0064
	(0.508)	(0.248)
Average other boards	−0.0061	0.0022
	(0.458)	(0.795)
Observations	1166	1113
Adjusted R^2	0.187	0.102

results when I define operating risk as the standard deviation of ROA over the preceding (rather than the subsequent) three or five years. I do not tabulate these results to conserve space but they are available upon request. Overall, the results suggest that fully independent boards have no effect on the riskiness of corporate earnings. In the next subsection, I examine the effect of this board structure on firm value.

3.3. Firm value (Tobin's q)

Table 5 presents results of Tobin's *q* regressions that are analogous to those in Table 3A for ROA. In the first column, the coefficient of the indicator variable for fully independent boards is −0.061, which is significant at less than the 1% level. Thus, fully independent boards are associated with a reduction of 6.1 percentage points in Tobin's *q*. Relative to the sample average Tobin's *q* of 1.5, this translates into an economically significant reduction of 4.2% in firm value. This negative association between firm value and fully independent boards is consistent with my earlier results on operating earnings and operating risk. As reported in Tables 3A, 3B, and 4, fully independent boards are associated with a significant reduction in operating earnings but have no effect on the riskiness of those earnings. Thus, its net effect is a reduction in overall firm value.

I also perform several tests to examine the robustness of this result to concerns about reverse causality and other endogeneity issues. These tests follow the same approaches as in the analysis for ROA and are thus not discussed in detail here. As the other columns in Table 5 show, results generally confirm the negative association between firm value and fully independent boards.[11]

[11] I do not perform an instrumental variable 2SLS analysis for Tobin's *q* for two reasons. First, the Davidson–MacKinnon test does not reject the null hypothesis that fully independent board is exogenous in the firm value regression. Second, the Sargan–Hansen over-identification test rejects the null that the instruments I used in the ROA regression (i.e., the percentages of same-industry firms and same-size-decile firms with fully independent boards in the preceding year) are uncorrelated with the error terms in the second stage Tobin's *q* regression. Thus, it appears that no instruments are needed and I am not able to find good instruments for the Tobin's *q* regression.

Table 4
Fully independent boards and corporate operating risk. The dependent variable for each year t is the standard deviation of ROA over years $t+1$, $t+2$, and $t+3$. Fully independent board equals 1 if the CEO is the only employee director, 0 otherwise. Firm size is the natural log of the book value of total assets. Corporate diversification is the number of business segments in which the firm operates. Growth opportunities is the ratio of capital expenditures to total assets. Leverage is the ratio of long-term debt to total assets. R&D spending is the ratio of research and development expenditures to total assets. Company founder on board equals 1 if the company's founder or co-founder is a director, 0 otherwise. CEO incentives is the dollar sensitivity of CEO firm-specific wealth (option and stockholdings) to 1% change in the firm's stock price. CEO tenure is the natural log of the number of years for which the CEO has been in office. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. Board size is the natural log of the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. The "*Pooled*" column is a pooled time-series cross sectional OLS model estimated over the full sample. The "*Forward DV*" column is similar except that its dependent variable is the three-year forward dependent variable. The "*FFE*" column is a firm fixed effect regression. The "*Nat. exp.*" column is a firm fixed effect model estimated over 2001–2004 for firms whose boards were forced by regulatory changes to become majority independent. The models in the "*2SLS: 1st stage*" and "*2SLS: 2nd stage*" columns are the first and second stages of an instrumental variable two-stage least squares regression in which fully independent board is instrumented using the percentages of same-industry and same-size-decile firms with fully independent boards in the preceding year. Each regression includes year and industry (or firm) fixed effects. *P*-values are in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

	Pooled	*Forward DV*	*FFE*	*Nat. exp.*	*2SLS: 1st stage*	*2SLS: 2nd stage*
Fully independent board	0.0002	−0.0018	0.0012	−0.0067	–	−0.0065
	(0.868)	(0.114)	(0.288)	(0.241)		(0.657)
Firm size	−0.0037***	−0.0038***	−0.0052***	0.0137	0.0021	−0.0040***
	(0.000)	(0.000)	(0.008)	(0.216)	(0.887)	(0.000)
Corporate diversification	−0.0030***	−0.0024**	−0.0005	−0.0102	−0.0087	−0.0004
	(0.003)	(0.028)	(0.751)	(0.685)	(0.607)	(0.775)
Growth opportunities	0.0841***	0.0444**	0.0382**	0.0238	−0.1520	0.0322***
	(0.000)	(0.011)	(0.020)	(0.803)	(0.323)	(0.007)
Leverage	−0.0067	0.0001	−0.0236***	−0.0031	−0.0076	−0.0248***
	(0.120)	(0.978)	(0.000)	(0.885)	(0.871)	(0.000)
R&D spending	0.2000***	0.1588***	0.1510***	0.3344	−0.3376	0.1402***
	(0.000)	(0.000)	(0.000)	(0.188)	(0.204)	(0.000)
Company founder on board	−0.0006	0.0003	−0.0040	−0.0023	−0.0719**	−0.0034
	(0.706)	(0.845)	(0.197)	(0.907)	(0.011)	(0.158)
CEO incentives	0.0450**	0.0112	0.0738***	0.2958	0.7516**	0.0701**
	(0.013)	(0.624)	(0.008)	(0.190)	(0.026)	(0.012)
CEO tenure	−0.0007	−0.0010	0.0005	0.0003	0.0111*	0.0004
	(0.239)	(0.117)	(0.319)	(0.915)	(0.077)	(0.386)
CEO is board chair	−0.0017	−0.0010	−0.0007	0.0129*	0.0446***	−0.0003
	(0.100)	(0.369)	(0.494)	(0.092)	(0.000)	(0.754)
Board size	−0.0040	−0.0007	−0.0054*	−0.0311**	−0.6165***	−0.0105
	(0.133)	(0.803)	(0.087)	(0.028)	(0.000)	(0.270)
Board independence	0.0030	0.0016	0.0027	−0.0545**	1.0950***	0.0114
	(0.403)	(0.665)	(0.489)	(0.031)	(0.000)	(0.492)
%Same industry firms	–	–	–	–	0.2341***	–
					(0.000)	
%Same size decile firms	–	–	–	–	0.1869*	–
					(0.077)	
Observations	9161	6791	9161	259	8217	8217
Adjusted R^2	0.261	0.269	0.042	0.123	0.212	n.a.

3.4. Other robustness checks

Governance studies sometime exclude financial firms (and to a lesser extent, utilities) from their samples because such firms are subject to regulatory oversight that can limit the board's role. I include these firms in the samples for my main results reported earlier. As a robustness check, I estimate additional regressions where I exclude (i) financial firms and (ii) financials and utilities from the samples. In each case, I obtain results that are quite similar to those for the full sample.

4. Channels for performance loss

In this sections, I examine two potential channels for the poorer performance associated with fully independent boards while recognizing that these channels need not be mutually exclusive. Specifically, I focus on the loss of inputs from other executives in board decision-making and the loss of board-level experience for future CEOs.

4.1. Loss of inputs from employee directors

The governance literature has long recognized that employee and outside directors bring different but potentially complementary qualifications and skills to the board of directors. As argued by Fama and Jensen (1983), employee directors possess firm- and position-specific skills and information. This equips them with deeper insights into the firm's operations and potentially facilitates better monitoring and advising. Nevertheless, being insiders themselves and subordinate to the CEO, employee directors lack independence from the latter and enjoy greater private benefits of control, both of which compromise their effectiveness as monitors. In contrast, outside directors are more independent of the CEO, have reputational capital often acquired in other contexts, and

Table 5
Fully independent boards and firm value. The dependent variable is Tobin's *q*, the market value of common equity plus the book values of preferred equity and long-term debt, divided by the book value of assets. Fully independent board equals 1 if the CEO is the only employee director, 0 otherwise. Firm size is the natural log of the book value of total assets. Leverage is the ratio of long-term debt to total assets. Growth opportunities is the ratio of capital expenditures to total assets. R&D spending is the ratio of research and development expenditures to total assets. CEO ownership is the proportion of outstanding shares owned by the CEO. CEO outside boards is the number of other corporate boards on which the CEO serves. Board size is the natural log of the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. Monitoring intensity equals 1 if a majority of independent directors serve on two or more monitoring (audit, compensation, and nominating/governance) committees, 0 otherwise. Average other boards is the average number of other corporate boards on which directors as a group serve. Historical *q* is average Tobin's *q* over the three-year period immediately preceding the year when the board became fully independent. The model in the "*Pooled*" column is estimated over the full panel. The model in the "*Forward DV*" column is a regression of the 3-year forward dependent variable on current independent variables. Regressions in the "*Top P75*" column is estimated over subsequent years for firms whose average Tobin's *q* during a three-year period when they have other employee directors is at or above the sample third quartile. The model in the "*FFE*" column is a firm fixed effect regression estimated over the full sample. The model in the "*Nat. exp.*" column is a firm fixed effect regression estimated over 2001–2004 for firms whose boards were forced by regulatory changes to become majority independent. Each regression includes year and industry (or firm) fixed effects. *P*-values are in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

	Pooled	*Forward DV*	*Top P75*	*FFE*	*Nat. exp.*
Fully independent board	−0.0610***	−0.0221	−0.1602**	−0.0445**	−0.0064
	(0.009)	(0.384)	(0.050)	(0.042)	(0.966)
Firm size	−0.0366***	−0.0432***	−0.1227***	−0.4131***	−0.0532
	(0.003)	(0.003)	(0.000)	(0.000)	(0.901)
Leverage	−0.3355***	−0.3545***	−0.7148**	−0.3137***	0.4406
	(0.001)	(0.002)	(0.034)	(0.002)	(0.560)
Growth opportunities	1.9676***	0.6153*	−0.4537	1.2683***	3.0218
	(0.000)	(0.079)	(0.609)	(0.000)	(0.236)
R&D spending	9.4905***	7.1230***	2.6504**	1.8716**	6.3653
	(0.000)	(0.000)	(0.015)	(0.022)	(0.551)
ROA	6.2070***	4.0872***	3.8558***	4.2537***	−1.1495
	(0.000)	(0.000)	(0.000)	(0.000)	(0.604)
CEO ownership	0.1890	0.4242*	0.0614	0.2805	−0.6197
	(0.344)	(0.073)	(0.877)	(0.118)	(0.280)
CEO outside boards	−0.0301**	−0.0137	−0.0127	−0.0113	−0.0694
	(0.018)	(0.334)	(0.795)	(0.340)	(0.635)
Board size	−0.2552***	−0.1891***	0.2611	−0.1934***	−0.8493
	(0.000)	(0.008)	(0.184)	(0.003)	(0.304)
Board independence	−0.2307***	−0.2075**	−0.0692	0.0244	0.8009
	(0.009)	(0.034)	(0.826)	(0.768)	(0.323)
CEO duality	−0.0024	−0.0319	−0.0336	0.0434**	−0.1143
	(0.918)	(0.254)	(0.682)	(0.044)	(0.498)
Monitoring intensity	−0.0650***	−0.0439*	−0.0982	−0.0078	−0.1682
	(0.002)	(0.076)	(0.219)	(0.667)	(0.331)
Average other boards	0.0801***	0.0516*	0.0562	−0.0027	−0.0744
	(0.001)	(0.073)	(0.490)	(0.921)	(0.843)
Historical *q*	–	–	0.3795***	–	–
			(0.000)		
Observations	19,397	11,548	956	19,397	337
Adjusted R^2	0.513	0.428	0.590	0.295	0.176

bring a wealth of outside expertise that can complement the skills of employee directors. Thus, outside directors are often regarded as better monitors and valuable advisors. As argued by Song and Thakor (2006), however, their effectiveness in both roles often depends on the quality of information provided by employee directors.

These considerations suggest that an important channel for the poorer performance associated with fully independent boards is the loss of the inputs of non-CEO executives into board monitoring and advising, either directly as board members themselves or indirectly through the spontaneous provision of information to outside directors. If this channel is important, then the negative performance effects of fully independent boards would be stronger at firms with greater needs for employee directors. To test this conjecture, I rely on predictions from the literature that analyzes the optimal mix of employee and outside directors as a function of firm characteristics.

This literature shows that the need for independent directors depends on organizational complexity and the firm's information environment. Klein (1998) and Coles et al. (2008) argue that larger and more diversified firms benefit more from a higher number of independent directors because such directors provide strategic advising that complements the skills of top management. Coles, Daniel, and Naveen argue further that the demand for independent directors increases with a firm's reliance on external capital because independent directors can enhance the firm's access to external financing, for example, in the form of bank loans. Fama and Jensen (1983) argue that the monitoring effectiveness of independent directors decreases as the knowledge and information critical for an organization's success becomes diffused throughout the organization because such diffusion increases the difficulty for outsiders to access the information necessary for efficient monitoring and increases the costs for insiders to transmit such information. Consistent with this, Raheja (2005, p.285) analyzes a model that shows that "firms for which it is more difficult for outsiders to verify projects, such as high tech firms, optimally have a higher proportion of insiders on the board." Boone et al. (2007) provide supportive empirical evidence.

Taken together, these studies suggest that the need for employee directors is greater at less complex firms who also undertake projects that are more difficult for outsiders to verify. Because their projects are harder for outsiders to verify, these firms are more difficult for independent directors to monitor and would benefit less from such monitoring in the absence of firm- and position-specific information typically provided by employee directors. In addition, while a firm with high project verification costs can benefit from the advising inputs of independent directors, such benefits are negligible if the firm's advising needs are low because its operations are relatively less complex. Thus, I expect the negative effects of fully independent boards to be larger for less complex firms with high project verification costs since such firms have a greater need for employee directors.

Following Coles et al. (2008), I employ firm size (natural log of revenue), scope of operations (number of business segments reported in the Compustat segment files), and external capital dependence (ratio of long-term debt to total assets) as proxies for firm complexity. I also employ R&D intensity (ratio of R&D expenses to total assets) and asset intangibility (ratio of intangible assets to total assets) as proxies for project verification costs. I then utilize principal component analysis to extract a common factor from these variables. The factor loadings are 0.50 on firm size, 0.36 on scope of operations, 0.43 on external capital dependence, −0.52 on R&D intensity, and −0.41 on asset intangibility. The factor explains 35.2% of the variation in the underlying variables and its Eigenvalue is 1.76. As the factor loadings indicate, the factor assigns higher scores to larger, diversified, and highly leveraged firms (i.e., more complex firms who therefore need greater board advice) with low R&D spending and fewer intangible assets (i.e., firms whose projects are more easily verified and are therefore easily monitored by independent directors). This implies that the need for independent directors is higher at firms with higher factor scores while the need for employee directors is higher at lower scoring firms. Thus, I expect the performance loss associated with fully independent boards to be larger for low-scoring firms on this factor under the information hypothesis.

Panel A of Table 6 presents results of ROA regressions estimated over low-and high-scoring firms with the sample split at the median. As the table shows, the indicator variable for firms whose CEOs are their only employee directors is negative and significant in

Table 6
Fully independent boards, need for employee directors, and firm performance. High need firms are firms with high needs for employee directors. Low need firms are firms with low need for employee directors. This classification is based on factor scores on a principal component that contrasts project verification costs and board advising requirements. The dependent variable in Panel A is ROA, defined as the ratio of operating income after depreciation to total assets at the beginning of the year. The dependent variable in Panel B is Tobin's *q*, which is calculated as the market value of common equity plus the book values of preferred equity and long-term debt, divided by the book value of assets. Fully independent board equals 1 if the CEO is the only employee director, 0 otherwise. Firm size is the natural log of the book value of total assets. Leverage is the ratio of long-term debt to total assets. Growth opportunities is the ratio of capital expenditures to total assets. R&D spending is the ratio of research and development expenditures to total assets. CEO ownership is the proportion of outstanding shares owned by the CEO. CEO outside boards is the number of other corporate boards on which the CEO serves. Board size is the natural log of the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. Monitoring intensity equals 1 if a majority of independent directors serve on two or more monitoring (audit, compensation, and nominating/governance) committees, 0 otherwise. Average other boards is the average number of other corporate boards on which directors as a group serve. Each regression includes year and industry fixed effects. *P*-values are in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively. The Chow test is for the null hypothesis that the coefficients of fully independent board are not significantly different from each other in the two regressions in each panel.

	Panel A: ROA		*Panel B: Tobin's q*	
	High need	*Low need*	*High need*	*Low need*
Fully independent board	−0.0088*	−0.0047*	−0.1103**	−0.0163
	(0.081)	(0.081)	(0.015)	(0.501)
Firm size	0.0149***	0.0007	−0.0019	−0.0423***
	(0.000)	(0.655)	(0.944)	(0.000)
Leverage	−0.1102***	−0.0726***	−0.5137**	0.1554
	(0.000)	(0.000)	(0.017)	(0.186)
Growth opportunities	0.5593***	0.1452***	2.7549***	1.9739***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D spending	−0.5373***	0.2888	8.5790***	10.5384***
	(0.000)	(0.100)	(0.000)	(0.000)
ROA	–	–	6.4912***	5.1370***
			(0.000)	(0.000)
CEO ownership	−0.0235	−0.0571**	0.2448	−0.1088
	(0.442)	(0.016)	(0.412)	(0.528)
CEO outside boards	−0.0005	0.0001	−0.0422	−0.0245**
	(0.861)	(0.930)	(0.134)	(0.014)
Board size	−0.0025	−0.0033	−0.3791***	−0.0018
	(0.825)	(0.618)	(0.000)	(0.975)
Board independence	0.0031	−0.0056	−0.1743	−0.1992**
	(0.862)	(0.570)	(0.278)	(0.027)
CEO duality	0.0058	0.0013	0.0095	−0.0110
	(0.226)	(0.642)	(0.832)	(0.626)
Monitoring intensity	−0.0006	−0.0033	−0.1156***	−0.0092
	(0.892)	(0.152)	(0.006)	(0.643)
Average other boards	−0.0068	−0.0016	0.0927**	0.1166***
	(0.168)	(0.596)	(0.039)	(0.000)
Observations	8097	8104	8097	8104
Adjusted R^2	0.187	0.188	0.460	0.485
Chow test	0.530		3.460	
(*p*-value)	(0.467)		(0.063)	

each regression and the Chow test indicates that the coefficients are not significantly different from each other across the two samples. However, the economic impact is larger among firms with a greater need for employee directors. Among these firms, excluding other executives from the board is associated with a reduction of 88 basis points in ROA, which translates to a decrease of 8.2% relative to the average ROA of these firms. In contrast, firms with a lower need for employee directors suffer a more moderate 4.8% reduction in ROA if their CEOs are their only employee directors.

Panel B of Table 6 shows results for Tobin's *q*. The indicator variable for full board independence is negative and significant at the 5% level in the regression for firms with a greater need for employee directors, with the coefficient implying a reduction of 5.6% in Tobin's *q* among these firms. In contrast, the variable is not significant in the regression estimated for firms with a lower need for employee directors. Furthermore, the Chow test indicates that the two coefficients are significantly different from each other. Overall, the evidence in Table 6 suggests that firms with a greater need for employee directors are more negatively affected when the board is fully independent. Thus, boards that stand to benefit more from the information of top-level executives as directors are significantly less effective when such employees are excluded from the board of directors, which suggests that the loss of information from employee directors is an important channel for the negative effects of full board independence.[12]

4.2. Loss of board-level experience for future CEOs

The second major consequence of excluding non-CEO employees from service on the board of directors is that doing so deprives the company's potential future CEOs of first-hand exposure to board-level discussions of firm-specific strategic issues. This can lead to poorer performance for two reasons. First, as argued by Fama and Jensen (1983, p. 314), service on the board by non-CEO executives enables the board to use "information from each of the top managers about his decision initiatives and the decision initiatives and performance of other managers" to better evaluate them for succession. This presumably increases the quality and fit of the eventual CEO appointee. Second, exposure to board-level strategy discussions provides valuable training for top managers so that a CEO appointee without such exposure potentially faces a significantly steeper learning curve as the firm's top executive.

I test these conjectures by focusing on the subset of internally promoted CEOs because meaningful variation in pre-succession board membership exists only within this group since CEOs appointed from outside the firm typically do not serve as directors prior to their appointment. I use the sample of firms switching to fully independent boards and their matched control firms discussed in Section 3.1 above in order to sidestep concerns about performance around board structure changes. For this sample, I identify internally promoted CEOs using data from Execucomp, proxy filings, and internet searches. I then estimate regressions where the dependent variables are the year-on-year changes in ROA and Tobin's *q* and the main independent variables of interest are two variables that measure pre-succession board experience. The first is an indicator variable that equals one if the CEO was an employee director for at least one year before becoming CEO. The second is the (natural log of) number of years for which the CEO served on the board prior to his appointment as CEO. Seventy-four percent of internally promoted CEOs in this sample served on their companies' boards before becoming CEOs. Among this group, mean and median number of years of pre-appointment board service are 6.2 years and 4.0 years, respectively.

Panel A1 of Table 7 shows that both the indicator and continuous variables are positive and significantly related with the change in ROA in full sample regressions, which suggests that pre-succession board service enhances the performance of internally promoted CEOs. Nevertheless, Panels A2 and A3 show that these results are driven by newer internally promoted CEOs (i.e., those with tenures shorter than or equal to the first quartile of CEO tenures, which is two years). In Panel A2, the indicator and continuous variables are positive and significant at the 5% and 1% level, respectively. In contrast, the variables are statistically insignificant in regressions for seasoned internally promoted CEOs (i.e., those with tenures longer than the first quartile). The Chow test indicates that the two sets of coefficients (i.e., indicator and continuous variables) are significantly different from each other across the two samples at the 1% level.

Panels B1–B3 of Table 7 presents results of analogous regressions for the change in Tobin's *q*. As the table shows, results are somewhat similar to those for the change in ROA. In particular, the change in Tobin's *q* is positively related with the indicator variable for pre-succession board service and the number of years of pre-succession board membership in the regression for newer CEOs (Panel B2). However, only the latter variable is statistically significant at conventional levels. In contrast, the two variables are statistically insignificant in regressions for seasoned internally promoted CEOs. The Chow test confirms that the coefficient for the continuous variable is significantly different across the regressions for newer and seasoned internally promoted CEOs.

These results suggest that including non-CEO executives on the board does not provide a significant comparative advantage in evaluating and choosing intrinsically "better" internal CEO candidates since neither the number of years of pre-succession board service nor the simple indicator variable for such service is significant in regressions for seasoned CEOs.[13] Rather, membership on the board of directors prior to assuming the CEO position appears to have beneficial effects only in the first few years of the CEO's tenure. After those initial years when the CEO has presumably overcome the position's learning curve, it does not matter whether and for how long he served as a director in his pre-appointment years.

[12] Interestingly, I find that firms with one additional employee director besides the CEO do not underperform firms with more than two insiders, either in terms of ROA or Tobin's *q*. I do not tabulate these results due to space considerations but they are available upon request.

[13] An important caution in interpreting this result is the possibility that the regressions for seasoned internally promoted CEOs suffer from a survivorship bias, that is, it is possible that internally promoted CEOs without pre-succession board service in the seasoned CEO subsample are the better performers in that category who survived termination earlier in their tenures. An analysis of the impact of pre-succession board service on CEO turnover is beyond the scope of this paper.

Table 7
Pre-appointment board service and firm performance. The dependent variable in Panel A is the year-on-year change in ROA (the ratio of operating income after depreciation to total assets at the beginning of the year). The dependent variable in Panel B is the year-on-year change in Tobin's *q* (the market value of common equity plus the book values of preferred equity and long-term debt, divided by the book value of assets). The sample for each regression consists of firms with internally promoted CEOs among the sample of firms with fully independent boards and their industry-and-performance matched control firms. Newer CEOs have served for 2 or fewer years. Other CEOs have served for longer. Prior board service equals 1 if an internally promoted CEO served on the firm's board prior to being promoted, 0 otherwise. Prior board years is the natural log of one plus the number of years of such service. Firm size is the natural log of the book value of total assets. Leverage is the ratio of long-term debt to total assets. Growth opportunities is the ratio of capital expenditures to total assets. R&D spending is the ratio of research and development expenditures to total assets. CEO ownership is the proportion of outstanding shares owned by the CEO. CEO outside boards is the number of other corporate boards on which the CEO serves. Board size is the natural log of the number of directors. Board independence is the percentage of directors who are unaffiliated with the firm beyond their directorship. CEO duality equals 1 if the CEO serves as board chair, 0 otherwise. Monitoring intensity equals 1 if a majority of independent directors serve on two or more monitoring (audit, compensation, and nominating/governance) committees, 0 otherwise. Average other boards is the average number of other corporate boards on which directors as a group serve. Each regression includes year and firm fixed effects. *P*-values are in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively. The Chow test is for the null hypothesis that the coefficient of "Prior board service" or "Prior board years" in the regression for newer CEOs is not significantly different from its coefficient in the corresponding regression for other CEOs.

Panel A: ΔROA	*A1*: *Full sample*		*A2*: *Newer CEOs*		*A3*: *Other CEOs*	
Prior board service	0.0419**	–	0.1256**	–	−0.0110	–
	(0.049)		(0.013)		(0.499)	
Prior board years	–	0.0183**	–	0.0589***	–	−0.0044
		(0.018)		(0.000)		(0.496)
Firm size	−0.0418***	−0.0420***	−0.0940***	−0.0707***	−0.0357***	−0.0351***
	(0.000)	(0.000)	(0.007)	(0.005)	(0.000)	(0.000)
Leverage	−0.0804***	−0.0849***	−0.1857**	−0.1918***	−0.0691*	−0.0688*
	(0.006)	(0.005)	(0.013)	(0.009)	(0.091)	(0.093)
Growth opportunities	−0.1287	−0.1428	−0.6204**	−0.6150***	−0.1040	−0.0999
	(0.276)	(0.228)	(0.020)	(0.009)	(0.254)	(0.259)
R&D spending	−0.1042	−0.1431	−1.0184	−1.1137	0.0438	0.0469
	(0.713)	(0.606)	(0.155)	(0.102)	(0.889)	(0.881)
CEO ownership	0.0670	0.0260	−0.0045	−0.2096	−0.0806	−0.0645
	(0.267)	(0.702)	(0.978)	(0.437)	(0.337)	(0.452)
CEO outside boards	0.0076	0.0064	0.0126	−0.0003	0.0082	0.0083
	(0.128)	(0.209)	(0.426)	(0.983)	(0.198)	(0.196)
Board size	0.0274	0.0290	0.0841	0.1032	−0.0014	−0.0019
	(0.161)	(0.142)	(0.261)	(0.191)	(0.955)	(0.935)
Board independence	0.0210	0.0250	0.0530	0.1261	0.0128	0.0125
	(0.388)	(0.297)	(0.548)	(0.170)	(0.659)	(0.667)
CEO duality	−0.0099	−0.0095	−0.0180	−0.0289*	−0.0026	−0.0031
	(0.187)	(0.224)	(0.286)	(0.062)	(0.792)	(0.738)
Monitoring intensity	−0.0083	−0.0093	−0.0249**	−0.0289**	−0.0017	−0.0015
	(0.181)	(0.146)	(0.048)	(0.030)	(0.806)	(0.829)
Average other boards	0.0006	−0.0002	0.0041	0.0037	−0.0059	−0.0056
	(0.941)	(0.984)	(0.901)	(0.881)	(0.553)	(0.571)
Observations	854	854	219	219	635	635
Adjusted R^2	0.116	0.117	0.299	0.352	0.086	0.086
Chow test	–	–	7.330	16.070	–	–
(p-value)			(0.007)	(0.000)		
Panel B: ΔTobin's *q*	*B1*: *Full sample*		*B2*: *Newer CEOs*		*B3*: *Other CEOs*	
Prior board service	0.0537	–	0.0767	–	−0.0442	–
	(0.660)		(0.808)		(0.783)	
Prior board years	–	0.1039*	–	0.2883***	–	0.0381
		(0.090)		(0.010)		(0.639)
Firm size	−0.5040***	−0.5211***	−0.6405**	−0.6941**	−0.5617***	−0.5731***
	(0.000)	(0.000)	(0.045)	(0.015)	(0.000)	(0.000)
Leverage	−0.3200	−0.3351	0.4516	0.4231	−0.1891	−0.1846
	(0.306)	(0.297)	(0.614)	(0.623)	(0.513)	(0.527)
Growth opportunities	−2.4132**	−2.4379**	−4.2982	−4.3039	−1.8606*	−1.8609*
	(0.019)	(0.018)	(0.307)	(0.287)	(0.099)	(0.094)
R&D spending	−4.9475**	−5.1195**	−14.2245	−16.3740	−3.3330	−3.3644
	(0.026)	(0.021)	(0.173)	(0.116)	(0.135)	(0.131)
ROA	0.2237	0.2393	1.2154	0.7807	0.2516	0.2712
	(0.728)	(0.710)	(0.457)	(0.605)	(0.690)	(0.669)
CEO ownership	2.6312	2.4162	−0.5920	−1.1423	3.8136**	3.7030**
	(0.101)	(0.103)	(0.805)	(0.514)	(0.018)	(0.019)
CEO outside boards	−0.0303	−0.0426	−0.2173	−0.2829	0.0309	0.0281
	(0.589)	(0.446)	(0.258)	(0.144)	(0.601)	(0.631)
Board size	0.0933	0.0858	−0.6833	−0.6199	0.0011	−0.0030
	(0.622)	(0.654)	(0.242)	(0.301)	(0.996)	(0.990)
Board independence	0.5417**	0.5390**	0.8281	1.0678	0.5248**	0.4991**
	(0.034)	(0.034)	(0.378)	(0.260)	(0.029)	(0.040)

(continued on next page)

Table 7 *(continued)*

Panel B: ΔTobin's *q*	*B1*: *Full sample*		*B2*: *Newer CEOs*		*B3*: *Other CEOs*	
CEO duality	0.0057	−0.0043	−0.0536	−0.1058	0.1237*	0.1134
	(0.901)	(0.928)	(0.745)	(0.495)	(0.088)	(0.115)
Monitoring intensity	−0.0432	−0.0481	−0.0816	−0.0856	−0.0220	−0.0255
	(0.303)	(0.265)	(0.561)	(0.545)	(0.669)	(0.619)
Average other boards	0.0206	0.0223	0.2457	0.1950	0.0105	0.0108
	(0.796)	(0.785)	(0.357)	(0.446)	(0.888)	(0.887)
Observations	854	854	219	219	635	635
Adjusted R^2	0.178	0.182	0.205	0.234	0.213	0.213
Chow test	–	–	0.130	4.050	–	–
(p-value)			(0.717)	(0.044)		

5. Summary and conclusion

One of the most significant changes in board structure since the late 1990s is a dramatic increase in the percentage of fully independent boards, that is, boards where the CEO is the only employee director. Among S&P 1500 firms, 36% had fully independent boards in 1998; in 2011, that proportion stood at 70%. I study the impact of this practice on board effectiveness using a sample of 2900 unique S&P 1500 firms over 1998–2011.

I find that fully independent boards are associated with poorer operating performance and lower firm value. The effect is stronger when the firm has less need for independent directors (and a correspondingly higher need for employee directors). As a corollary, I also find that internally promoted CEOs who did not serve as directors prior to their appointment perform worse initially than their counterparts who served on their firms' boards prior to promotion.

These results illustrate the importance of a balanced approach to corporate governance. While the role of independent directors in facilitating improved board effectiveness is well documented, my results suggest that independent directors cannot fully replace employee directors. The knowledge, skills, and firm-specific information of employee directors are valuable resources. My results suggest that doing away with these resources ultimately diminishes board effectiveness.

References

Adams, R.B., Hermalin, B.E., Weisbach, M.S., 2010. The role of boards of directors in corporate governance: a conceptual framework and survey. J. Econ. Lit. 48, 58–107.
Barber, B.M., Lyon, J.D., 1996. Detecting abnormal operating performance: the empirical power and specification of test statistics. J. Financ. Econ. 41, 359–399.
Bebchuk, L.A., Cohen, A., 2005. The costs of entrenched boards. J. Financ. Econ. 78, 409–433.
Boone, A.L., Field, L.C., Karpoff, J.M., Raheja, C.G., 2007. The determinants of corporate board size and composition: an empirical analysis. J. Financ. Econ. 85, 66–101.
Cheng, S., 2008. Board size and the variability of corporate performance. J. Financ. Econ. 87, 157–176.
Coles, J., Daniel, N., Naveen, L., 2008. Boards: does one size fit all? J. Financ. Econ. 87, 329–356.
Easterwood, J.C., Raheja, C.G., 2008. CEOs vs. directors: who calls the shots when firms underperform? Working paper. Virginia Tech and Wake Forest University
Faleye, O., 2007. Classified boards, firm value, and managerial entrenchment. J. Financ. Econ. 83, 501–529.
Faleye, O., Hoitash, R., Hoitash, U., 2011. The costs of intense board monitoring. J. Financ. Econ. 101, 160–181.
Faleye, O., Kovacs, T., Venkateswaran, A., 2014. Do better-connected CEOs innovate more? J. Financ. Quant. Anal. (forthcoming).
Fama, E.F., Jensen, M.C., 1983. Separation of ownership and control. J. Law Econ. 26, 301–325.
Golden, B.R., Zajac, E.J., 2001. When will boards influence strategy? Inclination × power = strategic change. Strateg. Manag. J. 22, 1087–1112.
Hillman, A.J., Dalziel, T., 2003. Boards of directors and firm performance: Integrating agency and resource dependence perspectives. Acad. Manag. Rev. 28, 383–396.
Jensen, M.C., 1993. The modern industrial revolution, exit, and the failure of internal control systems. J. Financ. 48, 831–880.
Joseph, J., Ocasio, W., McDonnell, M., 2014. The structural elaboration of board independence: executive power, institutional logics, and the adoption of CEO-only board structures in U.S. corporate governance. Acad. Manag. J. (forthcoming).
Klein, A., 1998. Firm performance and board committee structure. J. Law Econ. 41, 137–165.
Knyazeva, A., Knyazeva, D., Masulis, R.W., 2013. The supply of corporate directors and board independence. Rev. Financ. Stud. 26, 1561–1605.
Linck, J.S., Netter, J.M., Yang, T., 2008. The determinants of board structure. J. Financ. Econ. 87, 308–328.
Mobbs, S., 2013. CEOs under fire: the effects of competition from inside directors on forced CEO turnover and CEO compensation. J. Financ. Quant. Anal. 48, 669–698.
Pfeffer, J., 1972. Size and composition of corporate boards of directors: the organization and its environment. Adm. Sci. Q. 17, 218–229.
Raheja, C., 2005. Determinants of board size and composition: a theory of corporate boards. J. Financ. Quant. Anal. 40, 283–306.
Song, F., Thakor, A., 2006. Information control, career concerns, and corporate governance. J. Financ. 61, 1845–1896.
Stock, J.H., Yogo, M., 2005. Testing for weak instruments in linear IV regression. In: Andrews, D.W.K., Stock, J.H. (Eds.), Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg. Cambridge University Press, Cambridge.
Yermack, D., 1996. Higher market valuation of companies with a small board of directors. J. Financ. Econ. 40, 185–213.