

Do Board Structure and CEO Selection Sources Affect the Effectiveness of Board Monitoring?

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It is widely believed that outsider boards are better monitors of management because of their independence. In this paper, we re-examine this notion by looking into the sensitivity of CEO turnover to firm performance when firms are overseen by outsider boards relative to when they are controlled by insider boards. Holding constant CEO selection sources (internal promotion vs. external hire), we find that CEO turnover is not more sensitive to performance for firms with outsider boards. This result suggests that outsider boards are not necessarily the more active or stronger monitors of CEOs. We also find that whether CEOs are hired from outside or are promoted from within the firms has little impact on the likelihood of their termination by either insider or outsider boards.

JEL classification: G30; G34

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1. Introduction

Many studies have suggested that outsider-dominated boards provide better oversight of management (Weisbach, 1988; Borokhovich et al., 1996; Cotter et al., 1997; Uzun et al., 2004; Marciukaityte et al., 2006). The pre-dominance of this view prompted the NYSE and the Nasdaq Stock Exchange to require firms listed on the exchanges to have boards composed of a majority of independent or outside directors, ones who are un-affiliated with or are outside the firm. However, boards also rely, at least in part, on management to provide them with the information that is necessary for effective oversight. To the extent that the information provided by management may be used by the board for monitoring and disciplinary purposes, it is possible that management may be reluctant to provide such information, or present it accurately, to the board (Adams and Ferreira, 2007). Thus, it is not obvious that firms are always better off having boards that are dominated by outsiders. In this context, it is also unclear if such outsider boards are necessarily more effective monitors of management.

Although boards perform many functions of oversight, the most important is, perhaps, the decision to terminate poorly performing incumbent CEOs and to replace them with new hires. To carry out this duty more effectively, boards must undertake active monitoring of CEOs. All else the same, boards that are engaged in more active monitoring are more likely to identify and replace poor-performing CEOs. Moreover,

since outsider boards are independent of management, they are believed to be more effective in monitoring and in oversight (Hermalin and Weisbach, 1998; Bhagat and Black, 2002; Hermalin and Weisbach, 2003; Uzun et al., 2004). Indeed, Weisbach (1988) among others reports a higher sensitivity of CEO turnover to firm performance when firms have outsider boards than when they have boards that are dominated by insiders.

Just as directors of a board can come from inside or outside the firm, so does the firm's CEO when he or she was first appointed. Unlike a CEO who is hired from outside and has no connection with the firm (an outside CEO), an inside CEO is one who was an officer or an inside director of the firm prior to his/her appointment. CEO types may affect the effectiveness of board monitoring, for example, if there were close interactions or connections between inside CEOs and inside directors. In contrast, outside CEOs are less likely to have prior connections with either inside or outside directors, and therefore, may be easier for boards to oversee.

In this paper, we re-examine the propensity of both outsider and insider boards to monitor and replace poor-performing CEOs by incorporating CEO selection sources (internal promotion vs. external hire). In contrast to the result in the existing literature, we find that the sensitivity of CEO turnover to firm performance is lower with outsider boards than with insider boards. In other words, outsider boards are less likely than insider boards to terminate CEOs when firms are performing poorly. An implication of this result is that outsider boards do not appear to be the more active or stronger monitors of CEOs. Moreover, the sensitivity of CEO turnover to firm performance is not significantly different between inside and outside CEOs, regardless of insider or outsider board type. Thus, CEO selection sources also have no influence on the effectiveness of board monitoring.

Our analysis differs from the existing literature in that we not only recognize different board types, but also different CEO categories. Moreover, we follow the methodology of Ai and Norton (2003) to estimate the magnitude and significance of pooled logit analysis.

The remainder of this paper is organized as follows. In section 2, we summarize the relevant literature and develop the hypotheses. In section 3, we describe our data sources and variables. The empirical findings are presented in section 4. Section 5 concludes.

2. Literature Review and Hypothesis Development

One important function of the board of directors is monitoring which helps mitigate managerial agency problems (Jensen and Meckling, 1976). Research has identified several factors that affect the monitoring role of the board. For example, it is received wisdom that outsider boards are better monitors owing to the greater independence from management. Indeed, Weisbach (1988) reports a higher sensitivity of CEO turnover to prior firm performance for companies with outsider-dominated boards than with insider boards, indicating that outsider boards carry out more monitoring and are more likely to take drastic disciplinary actions such as firing

incumbent CEOs. Uzun et al. (2004) document that as the number of independent directors increases in the board and in its audit and compensation committees, the likelihood decreases of the firm's committing various forms of regulatory violations and fraudulent financial reporting. Jenter and Lewellen (2010) show an increase in the turnover-performance sensitivity when board quality, including board independence, improves.

However, the literature also suggests that certain types of firms may be better off with boards that consist with more insiders. For example, Coles et al. (2008) find that R&D-intensive firms, for which the firm-specific knowledge of inside directors is clearly important, have a higher firm value when the fraction of inside directors increases. In Masulis and Mobbs (2009), inside directors who also have outside directorships are associated with better operating performance and higher market-to-book ratios for their firms. Inside directors are also associated with better board decision making, evidenced in their firms' better acquisition decisions, large holdings of liquid assets, lower likelihood of overstating earnings and more positive seasoned equity offering announcement effects.

In general, the optimal board composition is seen to be a function of firm characteristics such as the industry that the firm operates. Harris and Raviv (2008) argue that when insiders have important information, having an outsider board can result in a loss of information that is more costly than the agency cost associated with an insider-dominated board. Linck et al. (2008) find empirical evidence that board structure across firms is consistent with the cost and benefit tradeoff of the board's monitoring and advising roles.

Boards are viewed as serving two distinct functions: monitoring and advising (Raheja, 2005; Coles et al., 2008; Harris and Raviv, 2008; Linck et al., 2008; and Masulis and Mobbs, 2009). While the main function of board of directors is to oversee top management, veto poor decisions, and in extreme situations, replace CEOs (Weisbach, 1988; Yermack, 1996; Uzun et al., 2004; Fich and Shivdasani, 2006; Paul, 2007), the board also plays an important role in advising management, using the expertise and experience of directors to help the CEOs make better management decisions (Rosenstein and Wyatt, 1997; Adams and Ferreira, 2007). Klein (1998) argues that the CEO's needs for advice increase with the complexity of the firm. Similarly, Hermalin and Weisbach (1988), and Yermack (1996) suggest that CEOs of diversified firms have greater needs for advice. Inside directors are an important source for providing information to outsiders, for example, CEOs hired from outside (Jensen, 1993). Also, inside directors possess more firm-specific knowledge (Fama and Jensen, 1983). Moreover, Adams and Ferreira (2007) suggest that a board's advisory quality is positively related to the precision of the information provided by the CEO. The CEO faces a tradeoff in sharing his information. On one hand, he will likely get better advice if he shares more information. On the other hand, the more information the board knows about the firm's options, the greater the likelihood that

it might interfere with the CEO's decision. As a result, CEOs may not communicate precise information with boards that are too independent. Studies in the literature have attempted to identify board characteristics that would help improve corporate governance assuming that all CEOs are the same. That is, when examining the effectiveness of board monitoring, they did not consider that CEOs might be different based on their affiliation with their firms. The affiliation level could influence the way that the board monitors the CEO. Therefore, the types of CEO should be considered when examining the effectiveness of board monitoring. Specifically, we examine the probability of CEO turnover due to prior performance not only under different board structures (insider or outsider boards), but also under different CEO affiliations (inside or outside CEOs).

Literature has shown some relation between board characteristics and CEO selections. Borokhovich et al. (1996) show a strong positive relation between the percentage of outside directors and the frequency of outside CEO succession. Thus, the probability that a firm will hire an outside CEO increases with the percentage of outside directors on the board. Parrino (1997) also finds that it is more likely for a board to fire the CEO with poor performance, and to hire a new CEO externally when there are more similar firms in an industry. Huson et al. (2001) document that during their 1971 to 1994 sample period, boards fired CEOs and hired outside CEOs more frequently, but the turnover-performance sensitivity did not change significantly. None of these studies, however, has considered that CEOs are different based on their affiliation with their firms.

As mentioned, firms generally have two types of CEOs, inside and outside CEOs. Unlike inside CEOs, who were an officer or an inside director of the hiring firm prior to their appointment, outside CEOs might not have affiliation with the hiring firm prior to their appointment. Because an inside CEO was an officer or an inside director of the hiring firm, he/she might have established certain relationships with inside directors of the firm. If this is the case, it probably would influence the effectiveness of board monitoring. McPherson et al. (2001) assert that similarities between people such as work and membership foster connections. People have an easier mutual understanding and are more comfortable with others who share similar characteristics and experiences. Thus, due to these connections, inside directors might treat inside CEOs differently.

In summary, we propose the following hypotheses to examine whether outsider boards are more active monitors – more likely to take actions when firms perform poorly, and if CEO selection sources (inside or outside CEOs) have any influence on the effectiveness of board monitoring.

I. For firms with outsider-dominated boards, the probability of CEO resignation due to prior performance is higher than that for firms with insider-dominated boards, holding CEO type constant.

II. For firms with outside CEOs, the probability of CEO resignation due to prior performance is higher than that for firms with inside CEOs, holding board structure constant.

3. Data and Variables

We identify the CEO turnover sample from ExecuComp database over the period from 1997 to 2010. We obtain CEO age, tenure, ownership, duality, and the information on board members from ExecuComp, proxy statements, 10-K reports, and Edgar data retrieval system. Stock market data is obtained from the University of Chicago's Center for Research in Security Prices (CRSP). Mergers and acquisitions data is obtained from Security Data Corporation (SDC). To determine whether a CEO turnover was forced, we follow the rules used by Huson, Parrino, and Starks (2001). The turnover is classified as forced if: (i) the CEO was fired, forced out from the position, or departed due to policy differences; or (ii) the departing CEO's age is less than 60, and the announcement does not report that the CEO died, left because of poor health, or accepted another position elsewhere or within the firm; or (iii) the CEO "retires" but leaves the job within six months of the "retirement" announcement. Our final sample includes 892 CEO turnovers from 1997 to 2010.

We also construct a control sample of firms from ExecuComp that do not experience any CEO turnover during the sample period. The control firms meet the same data requirements as the firms in the CEO turnover sample, and are included in the analyses only for the years in which they have complete data. We match control firms and turnover firms according to firm size and industry. We exclude observations in the control sample that are in different industries or have different firm size from the firms in the turnover sample. In total, we have a control sample of 2148 firm-year observations that do not have CEO changes over the same period.

The performance measure is the Fama-French four-factor industry-adjusted stock returns over the 12-month period immediately preceding the CEO turnover month. The measure of outsider domination of the board is the fraction of board members who are outsiders. A firm's board is outsider-dominated – an outsider board – if the percentage of outsider directors is greater than 50%, and is insider-dominated – an insider board – if the percentage of outsider directors is no more than 50%. CEOs of firms are also classified as either inside or outside CEOs. An inside CEO is one who was an officer or an insider director of the hiring firm prior to his or her appointment while an outside CEO is one who was in neither capacity in the firm prior to the hiring.

To test the hypotheses, we use logit models to estimate the probability of a CEO change. As in Ai and Norton (2003), we estimate the magnitude and significance of pooled logit analysis using equation (1) as follows:

$$y = a + \beta_1 * R + \beta_2 * R * D_{outside_board} + \beta_3 * R * D_{outside_CEO} + \delta_1 * D_{outside_board} + \delta_2 * D_{outside_CEO} + \delta_3 * (CEO_chair) + \delta_4 * (CEO\ age) + \delta_5 * (CEO\ tenure)$$

$$\begin{aligned}
& + \delta_6 * (\text{CEO ownership}) + \delta_7 * (\text{firm size}) + \delta_8 * (\text{stock return volatility}) \\
& + \delta_9 * (\text{market-to-book ratio}) + \delta_{10} * (\text{leverage}) + \text{errors}
\end{aligned} \tag{1}$$

The dependent variable in equation (1) equals either 1 if there is a CEO change in a given month or 0 if otherwise. Variable R is the Fama-French four-factor industry-adjusted stock return over the 12-month period immediately preceding the CEO turnover month. The logit equations are estimated using firm-months as the unit of observation and the return for the year prior to the month of resignation as the performance measure in order to minimize the time between the performance period and the resignation. $D_{\text{outside_board}}$ is a dummy variable that equals 1 if the firm has an outsider-dominated board and 0 if otherwise. Similarly, $D_{\text{outside_CEO}}$ equals 1 if the company has an outside CEO and 0 if otherwise. CEO_chair is another dummy variable which takes the value of 1 if the CEO is also the chairman of the board. Other control variables on governance include CEO age, tenure, as well as ownership of the firm. Economic control variables are firm size, stock return volatility, market-to-book ratio, and leverage. Table 1 provides the detailed definitions of all variables.

Now, if outsider boards are more active or stronger monitors of CEOs (hypothesis I), we expect β_2 in equation (1) to be significantly negative, and if CEO hiring sources have an impact on board monitoring (hypothesis II), we expect β_3 in equation (1) to be statistically significant.

4. Empirical Results

4.1. Summary statistics

Table 2 describes the mean, median, standard deviation, 5th percentile, and 95th percentile of the performance measure, outsider board dummy variable, outside CEO dummy variable, and other control variables for the CEO turnover sample as well as for the control sample. The mean value of the outside CEO dummy is 0.39 for the CEO turnover sample and is 0.45 for the control sample. The median values of this dummy variable are 0 for both samples. Table 2 also shows that firms with CEO turnover perform poorly relative to the control firms that experience no turnover. The mean (median) of the industry-adjusted stock returns for the CEO turnover sample is -4.4% (-3.3%), significantly worse than the mean of 6.1% (median of 0.6%) of the industry-adjusted stock returns for the control sample. CEOs in the turnover sample also have shorter average tenure, although their ages are comparable to those of CEOs in the control sample.

Table 3 shows the yearly and total distributions of inside and outside CEOs who are overseen by either outsider boards (the percentage of outsider directors exceeding 50%) or by insider boards (all boards not classified as outsider boards). Under insider boards, our sample has 470 inside CEOs (56.42%) and 363 outside CEOs (43.58%), and under outsider boards, it has 1236 inside CEOs (56.00%) and 971 outside CEOs (44.00%). The distributions of inside and outside CEOs are similar under both types of board structure; however, more firms have inside than outside CEOs.

Table 1: Variable Definitions

Variable	Description	Definition
N	Number of Firm Years	The number of firm years.
Pr (CEO turnover)	Probability of Non-voluntary CEO Turnover	Binary variable equal to one if there is a non-voluntary CEO turnover in a month and zero otherwise.
R	Industry-adjusted Stock Returns	12-month return on the firm's stock prior to the month of resignation minus the contemporaneous industry return based on the Fama-French 48 portfolios.
$D_{\text{outside_board}}$	Outsider Board	Binary variable equal to one if the percentage of independent director of a firm is greater than 50 percent and zero otherwise.
$D_{\text{outside_CEO}}$	Outside CEO	Binary variable equal to one if a CEO was hired from outside of the firm and zero otherwise.
CEO_chair	CEO Duality	Binary variable equal to one if the CEO is also the chairman of the board and zero otherwise.
CEO age	CEO Age	Age of the CEO during the event year.
CEO tenure	CEO Tenure	The number of years the CEO had held the position as of the year of the turnover.
CEO ownership	CEO Ownership	The percentage of shares owned by the CEO.
Firm size	Firm Size	Natural logarithm of total book assets.
σ_R	Stock Return Volatility	The volatility in the firm's stock return over the 12 months before the CEO turnover.
M/B	Market-to-book Ratio	The sum of the book value of total debt and the market value of equity divided by the firm's total book assets.
Leverage	Leverage	The book value of debt divided by the sum of the book value of debt and market value of equity.

Table 2: Summary Statistics

Panel (A): Firms with CEO Turnover						
<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	σ	<i>5th</i>	<i>95th</i>
<i>R</i>	892	-0.0440	-0.0334	0.5724	-0.9914	0.8669
<i>D_{outside_board}</i>	892	0.6580	1.0000	0.4746	0.0000	1.0000
<i>D_{outside_CEO}</i>	892	0.3946	0.0000	0.4890	0.0000	1.0000
<i>CEO_chair</i>	892	0.0269	0.0000	0.1618	0.0000	0.0000
<i>CEO age</i>	892	54.218	55.000	11.255	31.000	71.0000
<i>CEO tenure</i>	892	8.7769	7.0000	7.8656	0.0000	21.0000
<i>CEO ownership</i>	892	4.6770	1.2940	7.9580	0.0200	31.2000
<i>Firm size</i>	892	6.2333	6.0762	2.3243	2.6881	10.1870
σ_R	892	0.1942	0.1534	0.1659	0.0541	0.4742
<i>M/B</i>	892	0.6434	0.7227	0.8605	0.2227	0.9089
<i>Leverage</i>	892	0.2821	0.2005	0.4053	0.0000	0.8570
Panel (B): Firms without CEO Turnover						
<i>R</i>	2148	0.0619	0.0065	0.5022	-0.6379	0.9009
<i>D_{outside_board}</i>	2148	0.7541	1.0000	0.4306	0.0000	1.0000
<i>D_{outside_CEO}</i>	2148	0.4571	0.0000	0.4982	0.0000	1.0000
<i>CEO_chair</i>	2148	0.2006	0.0000	0.4005	0.0000	1.0000
<i>CEO age</i>	2148	55.839	55.500	8.5347	43.000	70.0000
<i>CEO tenure</i>	2148	10.907	8.0000	9.4149	1.0000	30.0000
<i>CEO ownership</i>	2148	3.9200	1.1600	6.7144	0.0700	19.1500
<i>Firm size</i>	2148	7.0538	6.8959	1.4749	4.9287	9.5692
σ_R	2148	0.1358	0.1136	0.0822	0.0520	0.2836
<i>M/B</i>	2148	0.6958	0.7419	0.1875	0.2769	0.9051
<i>Leverage</i>	2148	0.2734	0.2394	0.3093	0.0000	0.7396

Descriptive statistics for firms that changed CEO from 1997 through 2010 and for a control sample that did not have CEO turnover for the same period. Panel (A) uses a sample of 892 CEO turnovers, and Panel (B) uses a control sample of 2,148 firm-year observations from 600 firms.

Table 3: Frequency Table by Year

Insider Board			
Year	Inside CEO	Outside CEO	Total
1997	32 (03.84%)	22 (2.64%)	54 (6.48%)
1998	35 (04.20%)	74 (8.88%)	109 (13.09%)
1999	45 (05.40%)	39 (4.68%)	84 (10.08%)
2000	48 (05.76%)	38 (4.56%)	86 (10.32%)
2001	193 (23.17%)	36 (4.32%)	229 (27.49%)
2002	36 (04.32%)	38 (4.56%)	74 (8.88%)
2003	29 (03.48%)	32 (3.84%)	61 (7.32%)
2004	30 (03.60%)	64 (7.68%)	94 (11.28%)
2005	11 (01.32%)	9 (1.08%)	20 (2.40%)
2006	11 (01.32%)	10 (1.20%)	21 (2.52%)
2007	0 (00.00%)	0 (0.00%)	0 (0.00%)
2008	0 (00.00%)	0 (0.00%)	0 (0.00%)
2009	0 (00.00%)	1 (0.12%)	1 (0.12%)
2010	0 (00.00%)	0 (0.00%)	0 (0.00%)
Total	470 (56.42%)	363 (43.58%)	833 (100.00%)
Outsider Board			
1997	36 (1.63%)	25 (1.13%)	61 (2.76%)
1998	60 (2.72%)	77 (3.49%)	137 (6.21%)
1999	64 (2.90%)	62 (2.81%)	126 (5.71%)
2000	64 (2.90%)	83 (3.76%)	147 (6.66%)
2001	78 (3.53%)	84 (3.81%)	162 (7.34%)
2002	91 (4.12%)	114 (5.17%)	205 (9.29%)
2003	117 (5.30%)	105 (4.76%)	222 (10.06%)
2004	121 (5.48%)	122 (5.53%)	243 (11.01%)
2005	76 (3.44%)	57 (2.58%)	133 (6.03%)
2006	83 (3.76%)	52 (2.36%)	135 (6.12%)
2007	59 (2.67%)	59 (2.67%)	118 (5.35%)
2008	168 (7.61%)	31 (1.40%)	199 (9.02%)
2009	120 (5.44%)	58 (2.63%)	178 (8.07%)
2010	99 (4.49%)	42 (1.90%)	141 (6.39%)
Total	1236 (56.00%)	971 (44.00%)	2207 (100.00%)

Notes: Yearly frequency of inside and outside CEO representation under insider board and outsider board over the sample period based on 3,040 firm-year observations. Numbers in parentheses are percentages.

Table 4 presents Pearson correlations between independent variables in our regression tests. Except for the correlations between CEO age and CEO tenure and between firm size and stock return volatility, all other correlations are small in magnitude (the absolute correlation coefficients are not higher than 0.3), suggesting that multicollinearity is not likely to pose a serious problem in the multivariate analysis.

4.2. Turnover sensitivities of CEOs under different board structures

Table 5 reports the results of logit models that predict the probability of CEO turnover. The dependent variable takes value 1 for the CEO turnover firms and zero for the control firms. Independent variables include industry-adjusted stock returns, outsider board dummy (equal to 1 if an outsider board), outside CEO dummy (equal to 1 if an outside CEO), CEO-chairman dummy (equal to 1 if the CEO is also the chairman of the board), CEO age, CEO tenure, CEO ownership, firm size, stock return volatility, market-to-book ratio, leverage, and interaction terms as specified in equation (1).

The first column of Table 5 shows that the coefficient of the performance measure (β_1) is significantly negative. This result is consistent with Weisback (1988) and indicates that there is a negative association between the probability of CEO turnover and firm performance. In other words, poor (good) stock return performances increase (decrease) the likelihood that CEOs will lose their jobs.

The second column of Table 5 examines the effect of stock returns on CEO turnover across different board structures and CEO types. The coefficient of the interaction term for stock return and outsider board dummy (β_2) is significantly positive. This result suggests that the sensitivity of CEO turnover to firm performance is not stronger for firms with outsider boards, holding CEO type constant, since the positive coefficient reduces the negative association between the probability of CEO turnover and firm performance. An implication of this finding is that outsider boards do not appear to be the stronger monitors; outsider boards are not more likely to take actions on CEO jobs amid poor performances of firms. The coefficient of the interaction term for stock return and outside CEO dummy (β_3) is statistically insignificant. The latter result indicates that for outside CEOs, the sensitivity of their turnover to firm performance is also not stronger, holding board structure constant. Thus, CEO selection sources do not appear to affect board monitoring – the likelihood of CEO termination.

The third column of Table 5 includes governance control variables, and the fourth column incorporates economic control variables. The results of the third and the fourth columns are consistent with those of the second column. In the fourth column of Table 5, β_2 of equation (1) is 0.08 and significant at the 5% level, suggesting as before that outsider boards reduce the negative association between the probability of CEO turnover and firm performance. And β_3 is 0.004 but statistically insignificant,

suggesting again that CEO selection sources indeed have little relevance to board monitoring.

Table 4: Pearson Correlation

	R	D _{outside_board}	D _{outside_CEO}	CEO_chair	CEO age	CEO tenure	CEO ownership	Firm size	OR	M/B	Leverage
R	1	0.06***	0.030**	0.020	0.001	0.010	0.010	0.040**	0.003	0.060***	-0.050***
D _{outside_board}		1	0.003	-0.070***	0.110	-0.020	-0.200***	0.170***	-0.160***	0.006	0.070***
D _{outside_CEO}			1	-0.040***	0.040**	0.220***	0.190***	-0.050***	0.010	0.010	-0.050***
CEO_chair				1	0.100***	0.150***	0.050***	0.090***	-0.050***	0.010	0.004
CEO age					1	0.560***	-0.070***	0.190***	-0.200***	0.010	0.070***
CEO tenure						1	0.270***	0.150***	-0.130***	0.020	-0.003
CEO ownership							1	-0.003	-0.001	-0.008	-0.040**
Firm size								1	-0.370***	-0.030**	0.260***
OR									1	-0.050***	-0.020
M/B										1	-0.020
Leverage											1

Notes: Correlations are based on 3,040 firm-year observations. See Table 1 for variable definitions. *** indicates significant at 1 percent level; ** indicates significant at 5 percent level; * indicates significant at 10 percent level.

Table 5: Estimates of Logit Models with industry-adjusted returns

	(1)	(2)	(3)	(4)
	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>
Constant	-0.875***	-0.893***	-0.512*	-0.087
R	-0.400***	-0.875***	-0.692***	-0.591***
R * D _{outside_board}		0.149***	0.126***	0.080**
R * D _{outside_CEO}		0.013	-0.005	0.004
D _{outside_board}			-0.474***	-0.286***
D _{outside_CEO}			-0.270***	-0.344***
CEO_chair			-2.260***	-2.180***
CEO age			0.007	0.017***
CEO tenure			-0.025***	-0.019***
Ownership			0.027***	0.031***
Firm size				-0.175***
σ_R				3.684***
M/B				-0.924***
Leverage				0.267**
Wald test on β_2 & β_3		0.000	0.003	0.074
Log likelihood	-1826.600	-1816.800	-1685.900	-1598.900
Pseudo R ²	0.007	0.012	0.083	0.130
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes

Notes: This table uses the Ai and Norton (2003) procedure to estimate the magnitude and significance of pooled logit analysis of non-voluntary CEO turnover based on equation (1) for a sample of 3,040 firm-year observations from 1997 to 2010. Year and industry fixed effects are controlled by dummy variables. The performance measure is the Fama-French four-factor industry-adjusted annual return prior to the observation. *** indicates significant at 1 percent level; ** indicates significant at 5 percent level; * indicates significant at 10 percent level.

Table 6: Estimates of Logit Models with market-adjusted returns

	(1)	(2)	(3)	(4)
	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>
Constant	-0.872***	-0.895***	-0.499*	-0.062
R	-0.318***	-0.786***	-0.596***	-0.493***
R * D _{outside_board}		0.172***	0.146***	0.098***
R * D _{outside_CEO}		-0.029	-0.049	-0.034
D _{outside_board}			-0.492***	-0.303***
D _{outside_CEO}			-0.263***	-0.337***
CEO_chair			-2.260***	-2.19***
CEO age			0.007	0.017***
CEO tenure			-0.025***	-0.019***
Ownership			0.027***	0.030***
Firm size				-0.176***
σ_R				3.655***
M/B				-0.93***
Leverage				0.281**
Wald test on β_2 & β_3		0.000	0.000	0.007
Log likelihood	-1831.400	-1818.400	-1686.300	-1599.900
Pseudo R ²	0.004	0.011	0.083	0.130
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes

Notes: This table uses the Ai and Norton (2003) procedure to estimate the magnitude and significance of pooled logit analysis of non-voluntary CEO turnover based on equation (1) for a sample of 3,040 firm-year observations from 1997 to 2010. Year and industry fixed effects are controlled by dummy variables. The performance measure is the Fama-French four-factor market-adjusted annual return prior to the observation. *** indicates significant at 1 percent level; ** indicates significant at 5 percent level; * indicates significant at 10 percent level.

The coefficients on the control variables reported in Table 5 are generally consistent with the estimates in the extant literature. For example, the significant negative coefficients of CEO tenure (-0.019) and CEO_chair dummy (-2.18) show that CEO turnover is indeed less likely when the CEO's tenure is longer or when he/she also chairs the board. Moreover, the significant positive coefficient of stock return volatility (3.684) indicates the increased likelihood of CEO turnover when stock returns are more volatile.

4.3. Robustness checks

We check the results for robustness to different performance measures. Table 6 presents logit results according to the Ai and Norton (2003) procedure with the Fama-French four-factor market-adjusted stock returns over the 12-month period immediately before the CEO turnover month. The fourth column of Table 6 shows that β_2 of equation (1) is 0.098 and significant at the 1% level. Again, this shows that outsider boards reduce the negative association between the probability of CEO turnover and firm performance. In addition, β_3 of equation (1) is -0.034 but still statistically insignificant, indicating as before that CEO selection sources do not have much effect on board monitoring. Finally, the signs and significance levels of the control variables remain consistent with the results in Table 5.

5. Conclusions

We examine whether outsider boards are really better monitors of corporate CEOs, and whether CEO selection sources affect board monitoring. We use the sensitivity of CEO turnover to firm performance to indicate the effectiveness of board monitoring. The more (less) effective a board monitors, the more (less) sensitive the CEO turnover probability to firm performance. Using Ai and Norton (2003) procedure to estimate the magnitude and significance of pooled logit analysis, this paper shows that outsider boards actually reduce the sensitivity of CEO turnover to firm performance. This suggests that outsider boards are not better monitors than insider boards. In addition, we also find that the sensitivity of CEO turnover to firm performance is not different between inside CEOs and outside CEOs regardless of board type. Therefore, CEO selection sources have no influence on monitoring. Our results are robust to various measures of firm performance.

A possible explanation of our results is that it may not be entirely ideal to categorize inside and outside CEOs simply based on their work history associated with the hiring firm. Connections between people may be built outside of the professional world. Similarities between people such as personal experience and membership can also foster connections. People may have an easier mutual understanding and are more comfortable with others who share similar characteristics and experiences such as going to the same college or church. Thus, due to these connections built outside of the professional world, it would be extremely difficult to categorize inside and outside CEOs. This is an unfortunate limitation our study has due to the unavailability of CEOs' personal information.

However, the findings of this paper have interesting implication. Literature suggests that firms may not always be better off with outsider boards because certain types of firms may be better off with insider boards (Coles et al., 2008; Masulis and Mobbs, 2009). As a result, if effective board monitoring is the reason of the revised listing standards approved by SEC in 2003 to require companies listed on NYSE or Nasdaq to have an outsider board, we have provided evidence showing that an insider board is just as effective as an outsider board in monitoring.

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