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Two Essays on Corporate Governance

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Two Essays on

Corporate Governance

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
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Abstract

This dissertation includes two related chapters that investigate corporate governance. In the first chapter, we examine the effectiveness of board monitoring on CEOs. It is widely believed that outsider boards are better monitors. In fact, regulations now require that the board of directors of publicly traded firms be composed of a majority of independent directors (or outsiders). However, this paper documents that an insider-dominated board can monitor the CEO just as well as an outsider board can when the firm's CEO is hired from outside. The results suggest that what matters is not so much as the structure of the board, but the "independence" between the board and the CEO it monitors. Specifically, we find that insider boards monitor more of their firms' CEOs if the CEO is hired from outside than from within. In addition, outsider boards monitor both inside and outside CEOs the same way. We also find little difference between insider and outsider boards when they monitor outside CEOs. The main contribution of this paper is to show that an insider board can be an effective monitor as long as it is independent of the CEO. In other words, what is important is board independence, not board structure per se.

In chapter two, we examine the relation between the change in a firm's value and its CEO selection sources: internal promotion versus external hire in both high and low product competition environments. Our results show that firms

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will be better off hiring an outside CEO (external hire) when the firms operate in a low product competition industry. Specifically, the evidence shows that hiring an outside CEO for a firm in a low product competition industry will increase the firm's value by about 3% for the entire tenure of the CEO. The main contribution of this paper is to show that product market competition is an important factor in CEO selection.

Chapter 1

Monitoring CEOs: Can Insider-dominated Boards Do a Good Job?

1.1 Introduction

Many studies suggest that better corporate governance leads to better firm performance (Core et al., 1999; Baek et al., 2004; Marciukaityte et al., 2006; Bhagat and Bolton, 2008). How do we improve corporate governance? There is a large literature examining the factors that affect corporate governance. It is widely believed that outsider boards are associated with better governance (Weisbach, 1988; Borokhovich et al., 1996; Cotter et al., 1997; Uzun et al., 2004; Marciukaityte et al., 2006). On November 4, 2003, the Securities and Exchange Commission (SEC) approved the revised listing standards proposed by the New York Stock Exchange (NYSE) and the Nasdaq Stock Market (Nasdaq) to require firms listed on the NYSE or Nasdaq to have a board composed of a majority of independent directors — with independent directors being those who are un-affiliated with or outside the firm. However, it is not obvious that firms are always better off with outsider boards because the board serves two distinct functions of monitoring and advising (Raheja, 2005; Coles et al., 2008; Harris and Raviv, 2008; Linck et al., 2008; Masulis and Mobbs, 2009). While a main function of

board of directors is to oversee top management, veto poor decisions, and in extreme situations, replace chief executive officers (CEOs) (Weisbach, 1988; Yermack, 1996; Uzun et al., 2004; Fich and Shivdasani, 2006; Paul, 2007), the board also plays an important function of advising, using the expertise and experience of directors to help the CEOs make better management decisions (Rosenstein and Wyatt, 1997; Adams and Ferreira, 2007).

If boards serve both advisory and monitoring functions, it is not clear that the monitoring function provided by boards should always be more important than advising for all firms. Indeed, Klein (1998) argues that the CEO's need for advice will increase with the complexity of the firm. Hermalin and Weisbach (1988), and Yermack (1996) suggest that CEOs of diversified firms have greater need for advice. Inside directors play an important role on the board by providing information to outsiders (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 will interfere with the CEO's decision. As a result, CEOs may not communicate precise information with boards that are too independent. Thus, here is the question that this paper addresses: can a firm have an insider-dominated board whose members will have the necessary information for good advice and yet will still have the

incentive to monitor the CEO? In this paper, we argue that if the CEO is hired from outside and thus has limited connection with inside directors, then an insider board will have the same incentive to monitor the CEO as will an outsider board. That is, we examine the relation between CEO selection sources – internal promotion vs. external hire – and the effective monitoring of CEOs by boards with different compositions of directors (outsider vs. insider boards).

There is a large literature that examines the relation between corporate governance and board characteristics. The literature covers topics such as board independence (Weisback, 1988; Hermalin and Weisbach, 1998; Bhagat and Black, 2002; Hermalin and Weisbach, 2003; Uzun et al., 2004), board quality (Jenter and Lewellen, 2010), stock ownership of board members (Denis and Sarin, 1999), board size (Yermack, 1996; Cheng, 2008; Coles et al., 2008), whether a board is a busy one [1](Fich and Shivdasani, 2006), and whether the chairman and CEO positions are occupied by the same individuals (Brickley et al., 1997; Goyal and Park, 2002). Many of these studies have showed that a board with more outside directors is associated with more effective governance. Weisbach (1988) among others reports that companies with outsider-dominated boards have a higher sensitivity of CEO turnover to firm performance than companies with insider-dominated boards. Fama and Jensen (1983) argue that reputation concerns and fear of lawsuits can motivate outside directors to represent the interests of shareholders if the directors are frequent players in the market for outside directorship. Reputation concerns provide a strong incentive

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[1] Busy boards are boards in which the majority of outside directors hold three or more directorships.

for outside directors to deliver effective corporate governance, enabling them to signal their quality to the market. Thus, outside directors are expected to be the better monitor of the CEO.

Most studies focus on identifying necessary board characteristics in order for firms to have better corporate governance. Nevertheless, we can also mitigate agency problem by directly aligning the CEO's incentive with the shareholders'. One way to achieve this is through the design of CEO compensation. Indeed, the literature has showed that management compensation package and ownership influence firm performance by alleviating agency problem (Morck et al., 1988; Bosehem and Smith, 1995; Mehran, 1995).

However, are there any characteristics of the CEO that will affect monitoring by the board of directors? As the board that can have inside and outside directors, the CEO can also come from inside or outside of the firm. Inside CEOs are those who were an officer or an inside director of the hiring firm prior to their appointment, whereas outside CEOs are those who were not an officer or an inside director of the hiring firm prior to the appointment. According to the definitions of inside and outside CEOs, clearly there must be significant connection between an inside CEO and the firm's inside directors. In contrast, outside CEOs are less likely to have much connection with either inside directors or outside directors. Thus, because outside CEOs are not tied to either type of directors (inside or outside), they should experience the same level of monitoring regardless of the firm's board composition. Hwang and Kim (2009) show that

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when a firm's CEO and its board of directors are less socially tied,[2] the board provides better oversight: there is a stronger sensitivity of CEO turnover to firm performance. Similarly, when a firm has an insider-dominated board, it will monitor an outside CEO more rigorously than an inside CEO because of the lack of connection between members of the board and the outside CEO. On the other hand, when a firm has an outsider-dominated board, it will monitor an inside or an outside CEO in the same way because neither is closely tied to the directors.

We test two hypotheses using a sample of 363 CEO turnovers from 1998 to 2004 and a control sample of 784 firm-year observations that do not change CEOs over the same period. The first hypothesis is whether the probability of resignation due to prior performance of an outside CEO is higher than that of an inside CEO when the firm has an insider-dominated board. That is, whether insider boards monitor outside CEOs more than they monitor inside CEOs? The second hypothesis is whether there is a difference in the probability of CEO turnover due to prior performance between an outsider-dominated board and an insider-dominated board when the firm has an outside CEO. In other words, do outsider boards monitor outside CEOs more than do insider boards? Our results show that the sensitivity of CEO turnover to firm performance is significantly higher between an insider board and an outside CEO than between an insider board and an inside CEO. This suggests that insider boards monitor outside

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[2] Social ties are informal relationships built by sharing similar experiences that facilitate interactions and thereby foster personal connections. People enjoy an easier mutual understanding and are more comfortable with others who share similar characteristics and experiences [Mcpherson, Smith-Lovin, and Cook (2001)].

CEOs more than they monitor inside CEOs. In addition, the sensitivity of CEO turnover to firm performance is the same between an inside CEO and an outside CEO when the firm has an outsider board. We also find that the sensitivity of CEO turnover to firm performance is the same between an insider board and an outsider board when the firm has an outside CEO. Thus, there is no difference between an insider and an outsider board when it monitors an outside CEO. Therefore, as far as board oversight is concerned, what matters is the independence of the board from the CEO rather than a particular board structure. In this regard, if a firm is better off with an insider board, it can choose to hire an outside CEO because the insider board will be as effective in monitoring the outside CEO.

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 used in the analysis. The empirical findings are presented in section 4. Section 5 concludes.

1.2 Relevant Literature and Hypothesis Development

1.2.1 Agency Problem

One of the most challenging issues that the firm is facing today is the agency problem between shareholders and management. Jensen and Meckling (1976) argue that zero or partial ownership of firm managers cause them to work less vigorously and pursue personal benefits because shareholders bear most of

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the costs. Besides pecuniary benefits, managers will also pursue non-pecuniary benefits at the cost of shareholders.   Managers enjoy power and prestige associated with their positions, and this can lead to over-expanding firm size (empire building).   Harris and Raviv (1990) argue that managers prefer continuation of the firm to keep their control rents even if liquidation would be better for shareholders.

1.2.2 Mitigate Agency Problem through board monitoring

To mitigate agency problem, recent studies have focused on the monitoring function of the board of directors. Scholars have attempted to identify the characteristics of the board that would improve corporate governance. Evidence suggests that outsider boards are better monitors. Weisbach (1988) reports a higher sensitivity of CEO turnover to prior firm performance for companies with outsider-dominated boards than for companies with insider boards. Uzun et al. (2004) use a broad definition of fraud, including regulatory violations and frauds of stakeholders and financial reporting, to find that as the number of independent outside director increases in the board and in its audit and compensation committees, the likelihood that the firm will commit fraud decreases.   Jenter and Lewellen (2010) show that the turnover-performance sensitivity increases substantially with board quality, including board independence.

However, firms are not always better off with outsider boards. Coles et al. (2008) find that R&D-intensive firms, for which the firm-specific knowledge of

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inside directors is clearly important, have a higher firm value when the fraction of inside directors increases. Masulis and Mobbs (2009) find that inside directors with outside directorships are associated with better firm operating performance and higher market-to-book ratios. Inside directors are also associated with better board decision making, as evident in their firms' better acquisition decisions, large holdings of liquid assets, lower likelihood of overstating earnings and more positive seasoned equity offering announcement effects.

Firm characteristics are also important to its board structure. For example, Raheja (2005) shows that optimal board composition is a function of the firm's characteristics such as the industry that the firm operates in. Harris and Raviv (2008) show 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 insider boards. 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.

Board size is another important factor. There is some evidence indicating that small boards are better monitors. Yermack (1996) finds an inverse association between board size and firm value in a sample of large US industrial corporations. Furthermore, Eisenberg et al. (1998) find a significant negative correlation between board size and profitability in a sample of small and midsize Finnish firms. However, Coles et al. (2008) shows that complex firms, which have greater advising requirements than simple firms, have large boards, and Tobin's q increases in board size for complex firms. Also, Cheng (2008) provides

empirical evidence that firms with larger boards have lower variability of corporate performance. The results are consistent with the view that it takes more compromises for a larger board to reach consensus, and consequently, decisions of larger boards are less extreme, leading to less variable corporate performance.

There is also evidence indicating that less-busy boards are better monitors. Fich and Shivdasani (2006) document that firms with busy boards are associated with weak corporate governance --- a low sensitivity of CEO turnover to firm performance. They also show that departures of busy outside directors tend to generate positive abnormal returns, while companies with new busy outside directors experience negative abnormal returns. Moreover, Vafeas (1999) finds that the annual number of board meetings is inversely related to firm value, which implies that boards with fewer annual meetings are better monitors.

All these studies have attempted to identify board characteristics that help to improve corporate governance assuming that all CEOs are the same. In other words, when examining the effects of board monitoring, they did not consider that CEOs are different based on their affiliation with their firms. We believe that the affiliation level can influence the way that the board monitors the CEO. Thus, in this paper, 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).

1.2.3 Hypothesis development

Our analysis is closely related to studies that investigate the relation between board characteristics and CEOs. 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 categorized both the board members and the CEOs into inside and outside groups, and examined whether there is any difference in board monitoring after the appointment of an inside or an outside CEO.

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 had no 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 has established certain relationships with inside directors of the firm. 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, inside directors might be more

friendly to inside CEOs due to these connections. In contrast, inside directors would have incentive to monitor outside CEOs because outside CEOs do not have such connections. Likewise, outside directors would monitor both inside and outside CEOs in the same way since outside directors do not have connections with either. Thus, outside CEOs should experience the same level of monitoring regardless of the firm's board composition (inside or outside).

In summary, we propose the following hypotheses. The sensitivity of an outside CEO's turnover to prior firm performance should be higher than that of an inside CEO for companies with insider-dominated boards. In addition, the sensitivity of an outside CEO's turnover to prior firm performance under an insider-dominated board should be similar to the sensitivity of an outside CEO's turnover to prior firm performance under an outsider-dominated board.

I. *For firms with insider-dominated boards, the probability of resignation of an outside CEO due to prior performance is higher than that of an inside CEO.*

II. *When firms have outside CEOs, the probability of resignation of the CEO due to prior performance is higher under an outsider-dominated board than under an insider-dominated board.*

1.3 Data and Variables

We identify the CEO turnover sample from ExecuComp database over the period from 1998 to 2004. 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). We exclude firms where the CEO turnover event is due to promotion, retirement, death, or merger and acquisition according to LexisNexis database and SDC. However, CEO turnovers with an unknown reason are included in the sample. Our final sample includes 363 CEO turnovers from 1998 to 2004. We also construct a control sample of firms from ExecuComp that do not experience any CEO turnover during the period 1998 to 2004. The control firms meet the same data requirements as the firms in the CEO turnover sample and are included in the analysis only for the years in which they have complete data. In total, we have a control sample of 784 firm-year observations that do not change CEOs over the same period. The performance measure is the market-adjusted stock returns estimated as the stock return minus the return on the equally-weighted portfolio of all CRSP firms accumulated over the 12-month period immediately preceding the CEO turnover month. The measure of outside domination of the board is the fraction of board members who are outsiders following Weisbach (1988). All firms in which the percentage of outsiders is no more than 40% of the directors are considered insider-dominated firms.   All firms in which the

percentage of outsiders is at least 60% of the board are classified as outsider-dominated firms, and all firms with a percentage of outsiders between 40% and 60% are considered to be grey boards. CEOs are categorized into two groups; inside or outside CEOs. Inside CEOs are those who were an officer or an inside director of the hiring firm prior to their appointment, whereas outside CEOs are those who were not an officer or an inside director of the hiring firm prior to their appointment.

To test whether boards monitor inside CEOs and outside CEOs differently and to compare the sizes of the effects across board types, we relate CEO resignations to performance measure. We test the hypotheses using logit models to estimate the probability of a CEO change. The complete logistic model is as follows:

$$\Pr(\text{CEO leaves his job}) = \alpha + \beta_1 * R + \beta_2 * R * D_{inside} + \beta_3 * R * D_{outside}$$
$$+ \beta_4 * R * D_{inside} * D_{outside\_CEO} + \beta_5 * R * D_{outside} * D_{outside\_CEO} + \delta_1 * D_{inside}$$
$$+ \delta_2 * D_{outside} + \delta_3 * D_{outside\_CEO} + \delta_4 * (\text{CEO\_chair}) + \delta_5 * (\text{CEO age})$$
$$+ \delta_6 * (\text{CEO tenure}) + \delta_7 * (\text{CEO ownership}) + \varepsilon \qquad (1)$$

The dependent variable in equation (1) is equal to 1 if there is a CEO change in a given month and 0 otherwise. R is the annual return on the company's stock prior to the month of resignation minus the return on an equally-weighted market portfolio. 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_{inside} is a dummy variable that is equal to 1 if the company has an insider-dominated board and 0 otherwise. Similarly, $D_{outside}$ is a dummy variable that is equal to 1 if the company has an outsider-dominated board and 0 otherwise. $D_{outside\_CEO}$ is a dummy variable that is equal to 1 if the company has an outside CEO and 0 otherwise. CEO_chair is a dummy variable that is equal to 1 if the CEO is also the chairman of the board and 0 otherwise. Other control variables include CEO age, tenure, and ownership of the firm. The detailed definitions of all variables are shown in Table 1.1.

Based on our discussion, we expect the following signs. First, we expect the coefficient of annual return (β_1 in equation (1)) to be negative and significantly different from zero, indicating that a poor prior performance increases the probability of a CEO's resignation. Second, for an outside CEO to have a higher probability of resignation than that of an inside CEO for firms with insider-dominated boards (hypothesis I), we expect the coefficient of the interactive term for annual return, the dummy variable for board characteristics D_{inside} , and the dummy variable for CEO characteristics $D_{outside\_CEO}$ (β_4 in equation (1)) to be negative and significantly different from zero. Third, the necessary condition for an outside CEO under an outsider-dominated board to have a higher probability of resignation due to prior performance than that of an outside CEO under an insider-dominated board (hypothesis II), β_3 and β_5 are required to be jointly significant. Also, if β_2 and β_4 are jointly significant, then

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$\dfrac{e^z}{e^z+1}$, where z = α + (β$_1$ * R) + (β$_3$ * R) + (β$_5$ * R) + δ$_2$ + δ$_3$ + (δ$_4$ * CEO_chair) +

(δ$_5$ * CEO age) + (δ$_6$ * CEO tenure) + (δ$_7$ * CEO ownership) from equation (1)

should be larger than $\dfrac{e^z}{e^z+1}$, where z = α + (β$_1$ * R) + (β$_2$ * R) + (β$_4$ * R) + δ$_1$ +

δ$_3$ + (δ$_4$ * CEO_chair) + (δ$_5$ * CEO age) + (δ$_6$ * CEO tenure) + (δ$_7$ * CEO

ownership) from equation (1).   This is to compare the marginal effect of

monitoring between an outsider board and an insider board given an outside

CEO.

1.4 Empirical Results

1.4.1 Summary statistics

Table 1.2 describes the mean, median, standard deviation, 5th percentile,

and 95th percentile of the performance measure, insider board dummy variable,

outsider board dummy variable, outside CEO dummy variable, and other control

variables for the CEO turnover sample and the control sample. The mean of the

outside CEO dummy is 0.44 for the CEO turnover sample and 0.43 for the

control sample.   The median values of this dummy variable are 0 for both

samples.   Table 1.2 also shows that firms with CEO turnover perform poorly

compared with the control firms that experience no turnover.   The mean and

median of the market-adjusted stock returns for the CEO turnover sample are -

11.1% and -12.4%, while the mean and median of the market-adjusted stock returns for the control sample are 6.3% and 2.7%.

CEOs in the turnover sample have shorter tenure. They are at about the same age as the CEOs in the control sample. Because CEO turnovers with an unknown reason are also included in the sample, it is possible that the turnover sample might include some routine retirement-related turnover at age 65 (Mruphy and Zimmerman, 1993). To control for this effect, we include in the multivariate tests a dummy variable for CEOs whose age is between 63 and 65.

Table 1.3 shows the distributions of inside and outside CEOs under insider board, outsider board, and grey board. Boards in which the percentage of outsiders is no more than 40% of the directors are considered to be insider boards. Boards in which the percentage of outsiders is at least 60% of the directors are classified as outsider boards. All boards with a percentage of outsiders between 40% and 60% are termed grey boards. According to these classifications, the combined sample has 56 inside CEOs (54.9%) and 46 outside CEOs (45.1%) under insider board, 465 inside CEOs (57.8%) and 339 outside CEOs (42.2%) under outsider board, and 124 inside CEOs (51.4%) and 117 outside CEOs (48.6%) under grey board. The distributions of inside and outside CEOs under all three different types of board structures are similar.

Table 1.4 presents Pearson correlations between independent variables included in the regression tests. Except for the correlation between outside board dummy and inside board dummy, and the correlation between CEO ownership and CEO tenure, most other correlations are small in magnitude (the

absolute correlation coefficients are not higher than 0.3). This suggests that multicollinearity is not likely to pose a serious problem in the multivariate analysis.

1.4.2 Turnover sensitivities of CEOs under different board structures

Table 1.5 reports the results of logit models that predict the probability of CEO turnover. The dependent variable is a dummy variable that takes a value of one for the CEO turnover firms and a value of zero for the control firms. Independent variables include market-adjusted stock returns, inside board dummy (equal to 1 if the firm has an inside board and 0 otherwise), outside board dummy (equal to 1 if the firm has an outside board and 0 otherwise), outside CEO dummy (equal to 1 if the firm has an outside CEO and 0 otherwise), CEO-chairman dummy (equal to 1 if the CEO is also the chairman of the board and 0 otherwise), CEO age dummy for the CEO age of 63 to 65, CEO tenure, CEO ownership, and interaction terms as specified in equation (1).

The first column of Table 1.5 shows that the coefficient on the return variable is negative and significantly different from zero. This means that a poor stock performance increases the probability of a CEO's losing his job. This result replicates the result of Weisback (1988).

The second column of Table 1.5 examines the effect of stock returns on turnover across different board and CEO types. The coefficient of the interaction term consisted of return, inside board dummy, and outside CEO dummy is negative and statistically significant. This indicates that (hypothesis I) cannot be rejected. Note that the estimated coefficient on the interaction term consisted of

return, inside board dummy, and outside CEO dummy is consistently negative and significant for all logit models in table 1.5. This means that for firms with insider-dominated boards, the probability of resignation due to prior performance of an outside CEO is higher than that of an inside CEO. The necessary condition for hypothesis II to be true is to have two coefficients to be jointly significant. The first one is the coefficient on the interaction term consisted of return and outside board dummy (β_3 in equation (1)), and the second one is the coefficient of the interaction term consisted of return, outside board dummy, and outside CEO dummy (β_5 in equation (1)). The first thing we can see about these two coefficients is that they are both individually insignificant. Also, according to the Wald test result of a significance level of 56.9%, we can conclude that the above two coefficients are jointly insignificant. This means that (hypothesis II) is rejected. Note that the Wald test results are similar for all logit models in table 1.5. Therefore, outsider boards do not monitor outside CEOs more than do insider boards.

The third column of Table 1.5 includes a dummy variable for whether the CEO age between 63 and 65, while the final column includes CEO-chairman dummy, CEO age dummy, CEO tenure, CEO ownership as control variables. The results of the third and the final columns are similar to those of the second column. The final column of table 1.5 shows that the estimated coefficient of the interaction term consisted of return, inside board dummy, and outside CEO dummy (β_4 in equation (1)) is -1.519 and significant at the 5% level. The corrected interaction effect of β_4 is -0.844 and significant at the 10% level based

on Ai and Norton (2003). This suggests that insider boards indeed monitor outside CEOs more than they monitor inside CEOs. In addition, the estimated coefficient on the interaction term consisted of return and outside board dummy, and the interaction term consisted of return, outside board dummy, and outside CEO dummy are both individually insignificant. Also, according to the Wald test result of a significance level of 40.2%, the above two coefficients are still jointly insignificant. Again, this suggests that outsider boards do not monitor outside CEOs more than do insider boards.

Table 1.5 also reports that the estimated coefficients on the control variables are generally in the predicted direction. Note that the estimated coefficient on CEO tenure is negative and significant, suggesting that CEO turnover is less likely when CEOs have longer tenure. The estimated coefficient on CEO_chair dummy is negative, suggesting a decline in the likelihood of CEO turnover when the CEO is also the chairman of the board. The estimated coefficient on CEO ownership is negative. This means that when CEOs own more shares of their firms, the likelihood of CEO turnover will decline.

1.4.3 Robustness checks

Table 1.6 presents logit results for the sample of only forced CEO turnovers and the same control sample. We exclude all turnovers that are due to promotion, retirement, death, mergers and acquisitions, and unknown reasons according to LexisNexis database and SDC. The combined sample has 123 CEO turnovers and 784 no CEO turnover observations. The distributions of

inside and outside CEOs under insider board, outsider board, and grey board are still about equally distributed and are similar to the results in Table 1.3.

The final column of Table 1.6 shows that the estimated coefficient of the interaction term consisted of return, inside board dummy, and outside CEO dummy is   -3.206 and significant at the 1% level. The corrected interaction effect of β_4 is -1.684 and significant at the 5% level based on Ai and Norton (2003). This result is stronger than the result in Table 1.5 and suggests that insider boards monitor outside CEOs more than they monitor inside CEOs. In addition, the estimated coefficient on the interaction term consisted of return and outside board dummy, and the interaction term consisted of return, outside board dummy, and outside CEO dummy are both individually insignificant. Also, according to the Wald test result of a significance level of 68.4%, the above two coefficients are jointly insignificant. Again, this suggests that outsider boards do not monitor outside CEOs more than do insider boards. The signs and significance of the control variables are consistent with those reported in Table 1.5.

We also examine if the results are robust to different performance measures. Table 1.7 presents logit results based on the 2-year market-adjusted returns prior to the months of the observations.[3] The final column of Table 1.7 shows that the estimated coefficient of the interaction term consisted of return, inside board dummy, and outside CEO dummy is -0.987 and significant at the 10% level. The corrected interaction effect of β_4 is -0.256 based on Ai and

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[3] We also examine the results of Table 1.5 by using the 3-year market-adjusted returns prior to the months of the observations. The results are similar with those reported in Table 1.5.

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Norton (2003). This result suggests that insider boards monitor outside CEOs more than they monitor inside CEOs. In addition, the estimated coefficient on the interaction term consisted of return and outside board dummy, and the interaction term consisted of return, outside board dummy, and outside CEO dummy are both individually insignificant. Also, according to the Wald test result of a significance level of 53.4%, the above two coefficients are jointly insignificant. Again, this suggests that outsider boards do not monitor outside CEOs more than do insider boards. The signs and significance of the control variables are consistent with those reported in Table 1.5.

Table 1.8 presents logit results based on Fama-French four-factor risk-adjusted returns prior to the months of the observations. The final column of Table 1.8 shows that the estimated coefficient of the interaction term consisted of return, inside board dummy, and outside CEO dummy is -1.2 and significant at the 10% level. The corrected interaction effect of β_4 is -0.103 based on Ai and Norton (2003). This result suggests that insider boards monitor outside CEOs more than they monitor inside CEOs. In addition, the estimated coefficient on the interaction term consisted of return and outside board dummy, and the interaction term consisted of return, outside board dummy, and outside CEO dummy are both individually insignificant. Also, according to the Wald test result of a significance level of 47.2%, the above two coefficients are jointly insignificant. Again, this suggests that outsider boards do not monitor outside CEOs more than do insider boards. The signs and significance of the control variables are consistent with those reported in Table 1.5.

We also find that outsider boards do not monitor inside and outside CEOs differently. Table 1.9 reports the results of logit models that predict the probability of CEO turnover when monitored by an outsider board. The final column of this table shows that the estimated coefficient of the interaction term consisted of return and outside CEO dummy is -0.514 but not significant. The corrected interaction effect is -0.095 and also insignificant based on Ai and Norton (2003). This result suggests that outsider boards do not monitor inside and outside CEOs differently. The result is consistent with Fama and Jensen (1983) which argue that reputation concerns and fear of lawsuits can motivate outside directors to represent the interests of shareholders.

1.5 Conclusions

Do insider boards monitor outside CEOs more than they monitor inside CEOs? And do outsider boards and insider boards monitor outside CEOs differently? If board monitoring of CEO is more effective in certain firms, it is predicted that the sensitivity of CEO turnover to firm performance is higher in those firms. We find that the sensitivity of CEO turnover to firm performance is significantly higher between an insider board and an outside CEO than between an insider board and an inside CEO. This suggests that insider boards monitor outside CEOs more than they monitor inside CEOs. In addition, the sensitivity of CEO turnover to firm performance is the same between an inside CEO and an outside CEO when the firm has an outsider board. We also find that the sensitivity of CEO turnover to firm performance is the same between an insider

board and an outsider board when the firm has an outside CEO. This suggests that there is no difference between insider and outsider board monitoring of outside CEOs. Therefore, as far as board monitoring is concerned, what matters is the independence of the board from the CEO rather than the board structure itself. Thus, if a firm is better off with an insider board, it can choose to hire an outside CEO because the insider board will be effective in monitoring the outside CEO. Our results are robust to various measures of firm performance and to the exclusion of CEO turnovers with unknown reasons.

Our results have interesting implication. If effective board monitoring is the reason of the revised listing standards approved by SEC to require companies listed on NYSE or Nasdaq to have a board that is composed of a majority of independent (or outsider) directors, we can provide more flexibility and choices to the listed firms. For example, firms that will be better off with insider boards can choose to hire outside CEOs because monitoring effects on outside CEOs are the same regardless of board types. Indeed, the main contribution of this paper is to show that an insider board can be an effective monitor as long as it is independent of the CEO, as when the CEO is hired from outside.

Table 1.1: Variable Definitions

Variable	Description	Definition
Panel A: Summary Statistics and Correlation Table Variables		
N	Number of Firm Years	The number of firm years.
Pr (CEO turnover)	Probability of CEO Turnover	Binary variable equal to one if there is a CEO turnover and zero otherwise.
R	Market-adjusted Stock Returns	12-month return on the company's stock prior to the month of resignation minus the return on an equally-weighted market portfolio.
D_{inside}	Insider Board	Binary variable equal to one if the firm has an insider board and zero otherwise.
$D_{outside}$	Outsider Board	Binary variable equal to one if the firm has an outsider board and zero otherwise.
$D_{outside\_CEO}$	Outside CEO	Binary variable equal to one if the firm has an outside CEO and zero otherwise.
CEO_chair	CEO Durality	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 fraction of shares owned by the CEO.
Panel B: Regression Dependent Variable		
Pr (CEO turnover)	Probability of CEO Turnover	Binary variable equal to one if there is a CEO turnover and zero otherwise.
Panel C: Regression Independent Variables		
R	Market-adjusted Stock Returns	12-month return on the company's stock prior to the month of resignation minus the return on an equally-weighted market portfolio.
D_{inside}	Insider Board	Binary variable equal to one if the firm has an insider board and zero otherwise.
$D_{outside}$	Outsider Board	Binary variable equal to one if the firm has an outsider board and zero otherwise.
$D_{outside\_CEO}$	Outside CEO	Binary variable equal to one if the firm has an outside CEO and zero otherwise.
CEO_chair	CEO Durality	Binary variable equal to one if the CEO is also the chairman of the board and zero otherwise.
CEO age	CEO Age	Binary variable equal to one if the CEO is aged 63-65 and zero otherwise.
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 fraction of shares owned by the CEO.

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Table 1.2: Summary Statistics

Panel A: Firms with CEO Turnover

Variable	N	Mean	Median	σ	5th	95th
R	363	-0.11152	-0.12470	0.57492	-0.99254	0.84445
D_{inside}	363	0.07989	0	0.27149	0	1
$D_{outside}$	363	0.69146	1	0.46252	0	1
$D_{outside\_CEO}$	363	0.44904	0	0.49808	0	1
CEO_chair	363	0.23141	0	0.42231	0	1
CEO age	363	57.63085	58	9.04233	42	72
CEO tenure	363	8.34435	7	7.61902	1	22
CEO ownership	363	0.02082	0	0.05996	0	0.131

Panel B: Firms without CEO Turnover

Variable	N	Mean	Median	σ	5th	95th
R	784	0.06372	0.02756	0.52782	-0.6599	0.90774
D_{inside}	784	0.09311	0	0.29077	0	1
$D_{outside}$	784	0.70535	1	0.45617	0	1
$D_{outside\_CEO}$	784	0.43239	0	0.49572	0	1
CEO_chair	784	0.25765	0	0.43762	0	1
CEO age	784	57.66071	58	8.27803	43	71
CEO tenure	784	12.36989	10	8.19359	3	31
CEO ownership	784	0.03579	0.0022	0.07771	0	0.2374

Descriptive statistics for firms that changed CEOs from 1998 through 2004 and for a control sample that did not change CEOs over the same period. Panel A uses a sample of 363 CEO turnovers, and Panel B uses a control sample of 784 firm-year observations.

Table 1.3: Frequency Table

	Inside CEO	*outside CEO*	*Total*
Insider Board	56	46	102
	(54.9%)	(45.1%)	
Outsider Board	465	339	804
	(57.8%)	(42.2%)	
Grey Board	124	117	241
	(51.4%)	(48.6%)	
Total	645	502	1147
	(56.2%)	(43.8%)	

The frequency of inside and outside CEO representation under insider board, outsider board, and grey board based on 1,147 observations. Numbers in parentheses are percentages.

Table 1.4: Pearson Correlation

	D_{inside}	$D_{outside}$	$D_{outside\_CEO}$	CEO_chair	CEO age	CEO tenure	Ownership
R	-0.04	0.01	0.04	0.00	-0.00	0.03	0.04
D_{inside}		-0.47***	0.00	0.04	-0.03	0.17***	0.12***
$D_{outside}$			-0.04*	0.01	0.06**	-0.13***	-0.30***
$D_{outside\_CEO}$				-0.01	-0.04	0.26***	0.18***
CEO_chair					0.01	0.04	0.02
CEO age						0.08***	-0.03
CEO tenure							0.38***

Correlations are based on 1,147 observations. See Table 1 for variable definitions.

 * p<10%, ** p<5%, *** p<1%

Table 1.5: Estimates of Logit Models

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	-0.776***	-0.636***	-0.600***	0.207
	(-11.92)	(-4.07)	(-3.79)	(1.09)
R	-0.640***	-0.638**	-0.634**	-0.487**
	(-4.38)	(-2.5)	(-2.51)	(-2.20)
D_{inside}		-0.349	-0.368	-0.173
		(-1.27)	(-1.33)	(-0.61)
$D_{outside}$		-0.181	-0.184	-0.304*
		(-1.13)	(-1.15)	(-1.77)
$D_{outside\_CEO}$		0.033	0.027	0.314**
		(0.26)	(0.21)	(2.19)
CEO_chair				-0.070
				(-0.45)
CEO age			-0.280	-0.300
			(-1.26)	(-1.35)
CEO tenure				-0.081***
				(-5.56)
Ownership				-0.005
				(-0.45)
$R * D_{inside}$		1.035*	1.067*	0.867*
		(1.74)	(1.73)	(1.74)
$R * D_{outside}$		0.148	0.152	-0.024
		(0.4)	(0.42)	(-0.07)
$R * D_{inside} *$ $D_{outside\_CEO}$		-1.606**	-1.653**	-1.519**
		(-2.03)	(-2.03)	(-2.06)
$R * D_{outside} *$ $D_{outside\_CEO}$		-0.414	-0.430	-0.438
		(1.05)	(-1.09)	(-1.12)
Wald test (β_3, β_5) Prob > chi2		0.569	0.545	0.402
Log likelihood	-699.52	-695.18	-694.32	-656.90
R-squared	0.018	0.024	0.026	0.078
Corrected Interaction Effect of β_4 on Model (4) based on Ai and Norton (2003)				
Interaction Term		-0.844		
Z-Value		-1.89		

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

This table reports estimates of pooled logit analysis of CEO turnover regressed on performance measure, interactive terms between performance measure and board dummy variables, interactive terms between performance measure and outside CEO dummy variable, and other control variables for a sample of 363 CEO changes and 784 no changes. The performance measure is the annual return prior to the observation.

Table 1.6: Robustness Test of Logit Models

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	-1.865***	-1.684***	-1.657***	0.279
	(-18.41)	(-7.06)	(-6.78)	(0.79)
R	-0.707***	-0.672*	-0.670*	-0.336
	(-2.87)	(-1.92)	(-1.93)	(-1.15)
D_{inside}		-1.014*	-1.032*	-0.748
		(-1.83)	(-1.85)	(-1.44)
$D_{outside}$		-0.187	-0.190	-0.608**
		(-0.77)	(-0.79)	(-2.23)
$D_{outside\_CEO}$		0.018	0.015	0.606***
		(0.09)	(0.07)	(2.72)
CEO_chair				-0.067
				(-0.27)
CEO age			-0.198	-0.220
			(-0.58)	(-0.63)
CEO tenure				-0.216***
				(-4.76)
Ownership				-0.064
				(-1.45)
R * D_{inside}		0.812	0.807	0.292
		(0.45)	(0.45)	(0.28)
R * $D_{outside}$		0.201	0.203	-0.243
		(0.35)	(0.35)	(-0.44)
R * D_{inside} * $D_{outside\_CEO}$		-2.999	-2.992	-3.206***
		(-1.61)	(-1.60)	(-2.60)
R * $D_{outside}$ * $D_{outside\_CEO}$		-0.281	-0.292	-0.268
		(-0.40)	(-0.42)	(-0.37)
Wald test (β_3, β_5) Prob > chi2		0.910	0.905	0.684
Log likelihood	-351.98	-347.01	-346.82	-286.14
R-squared	0.019	0.032	0.033	0.202

Corrected Interaction Effect of β_4 on Model (4) based on Ai and Norton (2003)

Interaction Term		-1.684		
Z-Value		-2.15		

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

   This table reports estimates of pooled logit analysis of only forced CEO turnover regressed on performance measure, interactive terms between performance measure and board dummy variables, interactive terms between performance measure and outside CEO dummy variable, and other control variables for a sample of 123 CEO changes and 784 no changes. The performance measure is the annual return prior to the observation.

Table 1.7: Robustness Test of Logit Models

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	1.024***	1.241***	1.274***	1.671***
	(9.57)	(4.89)	(4.99)	(5.45)
R	-0.589***	-0.518**	-0.521**	-0.543**
	(-4.04)	(-2.02)	(-2.04)	(-2.10)
D_{inside}		-0.996***	-1.01***	-0.952**
		(-2.59)	(-2.62)	(-2.51)
$D_{outside}$		-0.055	-0.052	-0.140
		(-0.20)	(-0.19)	(-0.49)
$D_{outside\_CEO}$		-0.130	-0.142	-0.066
		(-0.60)	(-0.65)	(-0.31)
CEO_chair				-0.333
				(-1.38)
CEO age			-0.265	-0.336
			(-0.73)	(-0.91)
CEO tenure				-0.027**
				(-2.12)
Ownership				-0.005
				(-0.36)
$R * D_{inside}$		0.750*	0.786*	0.783*
		(1.76)	(1.84)	(1.86)
$R * D_{outside}$		-0.444	-0.432	-0.448
		(-1.07)	(-1.03)	(-1.04)
$R * D_{inside} *$ $D_{outside\_CEO}$		-1.113**	-1.132**	-0.987*
		(-2.02)	(-2.04)	(-1.89)
$R * D_{outside} *$ $D_{outside\_CEO}$		0.380	0.377	0.414
		(0.96)	(0.94)	(1.01)
Wald test (β_3, β_5) Prob > chi2		0.532	0.551	0.534
Log likelihood	-672.58	-665.48	-665.19	-661.42
R-squared	0.042	0.067	0.068	0.081

Corrected Interaction Effect of β_4 on Model (4) based on Ai and Norton (2003)			
Interaction Term	-0.256		
Z-Value	-1.49		

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

   This table reports estimates of pooled logit analysis of CEO turnover regressed on performance measure, interactive terms between performance measure and board dummy variables, interactive terms between performance measure and outside CEO dummy variable, and other control variables for a sample of 363 CEO changes and 784 no changes. The performance measure is the 2-year return prior to the observation.

Table 1.8: Robustness Test of Logit Models

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	0.979***	1.301***	1.281***	1.850***
	(9.64)	(5.02)	(4.89)	(5.88)
R	-0.557***	-0.978***	-0.988***	-0.992***
	(-3.39)	(-2.68)	(-2.69)	(-2.61)
D_{inside}		-0.368	-0.361	-0.361
		(-0.85)	(-0.84)	(-0.79)
$D_{outside}$		-0.318	-0.314	-0.527*
		(-1.18)	(-1.17)	(-1.81)
$D_{outside\_CEO}$		-0.119	-0.118	0.049
		(-0.58)	(-0.58)	(0.23)
CEO_chair				0.415
				(1.57)
CEO age			0.195	0.259
			(0.52)	(0.68)
CEO tenure				-0.052***
				(-3.88)
Ownership				-0.017
				(-1.07)
$R * D_{inside}$		1.400	1.385	1.315
		(1.39)	(1.35)	(1.16)
R * $D_{outside}$		1.053	1.053	1.087
		(1.28)	(1.23)	(0.86)
$R * D_{inside} * D_{outside\_CEO}$		-1.654*	-1.615*	-1.200*
		(-1.74)	(-1.74)	(-1.69)
$R * D_{outside} * D_{outside\_CEO}$		-0.792	-0.786	-0.855
		(-1.32)	(-1.30)	(-1.24)
Wald test (β_3, β_5) Prob > chi2		0.478	0.479	0.472
Log likelihood	-692.77	-688.26	-688.12	-676.19
R-squared	0.020	0.035	0.035	0.075

Corrected Interaction Effect of β_4 on Model (4) based on Ai and Norton (2003)				
Interaction Term	-0.103			
Z-Value	-1.28			

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

This table reports estimates of pooled logit analysis of CEO turnover regressed on performance measure, interactive terms between performance measure and board dummy variables, interactive terms between performance measure and outside CEO dummy variable, and other control variables for a sample of 363 CEO changes and 784 no changes. The performance measure is the Fama-French four-factor risk-adjusted return prior to the observation.

Table 1.9: Estimates of Logit Models

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	0.889***	0.936***	0.887***	1.319***
	(7.51)	(5.82)	(5.38)	(5.75)
R	-0.501**	-0.228	-0.246	-0.226
	(-2.40)	(-0.69)	(-0.74)	(-0.66)
$D_{outside\_CEO}$		-0.093	-0.083	0.008
		(-0.39)	(-0.35)	(0.04)
CEO_chair				0.430
				(1.41)
CEO age			0.580	0.623
			(1.21)	(1.27)
CEO tenure				-0.057***
				(-3.26)
Ownership				-0.019
				(-0.77)
R *		-0.452	-0.449	-0.514
$D_{outside\_CEO}$		(-1.05)	(-1.04)	(-1.16)
Log likelihood	-309.30	-308.68	-307.87	-299.95
R-squared	0.013	0.016	0.020	0.057

Corrected Interaction Effect of *R* * $D_{outside\_CEO}$ on Model (4) based on Ai and Norton (2003)

Interaction Term		-0.095		
Z-Value		-1.10		

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

This table reports estimates of pooled logit analysis of CEO turnover regressed on performance measure, interactive terms between performance measure and outside CEO dummy variable, and other control variables for a sample of 251 CEO changes and 553 no changes. The performance measure is the annual return prior to the observation.

Chapter 2

The Impact on Firm Value: CEO Selection and Competition

2.1 Introduction

The Chief Executive Officer (CEO) is the most important economic agent in the firm. The selection of the CEO affects the firm's performance tremendously in all aspects because he/she has the ultimate responsibility to design and implement all policy decisions of the firm. Indeed, the evidence in Bertrand and Schoar (2003), Bennedsen et al. (2006), and Bennedsen et al. (2007) all shows that CEOs matter for firm performance. Thus, the selection of CEO is critical. This paper contributes to the literature by showing that product market competition is also an important factor in CEO selection.

Choosing a right CEO is one of the most important decisions made by a firm's board of directors. When hiring a new CEO, the board has two options. The board can promote one of the firm's current executives or board members to be the new CEO. We refer to the CEOs who are promoted from within the firm (an officer or an inside director of the firm prior to their appointment) as inside CEOs. Alternatively, the board can hire someone outside the company to be the

new CEO. We call these outside CEOs since they were not an officer or an inside director of the hiring firm prior to their appointment. The decision to promote an insider or hire an outsider to be the CEO depends on the quality of internal and external candidates. When choosing a new CEO, the board considers how well suited the abilities of each candidate are for the competitive environment faced by the firm. Due to the existence of information asymmetry between CEO candidates and the board of directors, board members should be able to more accurately evaluate the abilities of inside candidates because they know better the characteristics of these candidates. Internal candidates must first survive the in-house tournaments to become an executive or a director. This internal selection process provides the board with plenty of opportunities to assess how well the internal candidates would match the firm's mode of operations and culture. Holmstrom (1982) models the mechanism by which a principal can learn about the agent's ability over time. He shows that the updating of ability estimate becomes more informative each successive period. Therefore, it is likely that the board has the opportunity to update its ability estimate of an inside CEO candidate more accurately over time. As a result, the possibility of having a mismatch between an inside candidate and the CEO position is lower than between an outside candidate and the CEO position. The greater the lack of knowledge about the ability and fit of outside candidates, the greater the dispersion in the assessment of a pool of such candidates, even if they are on average of similar quality. In this regard, inside CEOs should outperform outside CEOs as the job matching theory in labor economics has

showed that the best performance is the result of the best match between a job and the worker whose skill set best fits the needs of the firm (Jovanovic, 1979; Jovanovic, 1984; Simon and Warner, 1992; McLaughlin, 1994).

Proponents of hiring external candidates to the position of CEO, however, believe that managerial skills that come from both innate abilities and experiences are transferable between firms. This means that a successful CEO at one firm will be able to replicate the success at other firms with his managerial skills. Indeed, while most of the internal candidates for a CEO position have no previous experience serving as a CEO, many external candidates tend to have impressive stories of being a successful CEO elsewhere. However, the literature has showed mixed results. While some researches present evidence that, on average, externally hired CEOs outperform internally promoted CEOs, others find the opposite.[4]

Externally hired CEOs are believed to be more willing and able to change a firm to make it more efficient than internally promoted CEOs who are burdened by internal connections (Cao and Mauer, 2010). However, hiring external CEOs is not without costs. Agrawal et al. (2006) shows that disincentives and discouragements created to current employees who hope to become the CEO can be costly to the firm. Given the cost and benefit, companies whose benefits of hiring external CEOs outweigh the costs should find it valuable in doing so. In contrast, companies whose costs of hiring external CEOs outweigh the benefits will find it more valuable to promote new CEOs internally.

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[4] See the literature review for detailed descriptions of these researches.

The benefits for firms to hire external CEOs are not the same according to two competing theories: increasing incentive theory and Schumpeterian theory. According to increasing incentive theory, product market competition induces managers to improve efficiency by increasing their supply of effort (Hart, 1983; Hermalin, 1992; Schmidt, 1997; Karuna, 2007). With a higher level of competition, CEOs have greater incentives to work harder in order to retain their jobs because an increase in competition increases the likelihood of liquidation. Unlike inside CEOs who are burdened with internal connections, outside CEOs are more able and willing to improve firm efficiency with necessary restructuring. When an outside CEO is motivated to work harder by product market competition, the value he creates for the firm may be higher than the cost of discouragements to current employees. As a result, it will increase firm value for companies in the more competitive environment to hire outside CEOs because the benefits of hiring outside CEOs may outweigh the costs.

However, Schumpeterian theory suggests that competition increases managerial slack and firms need to provide stronger incentives for their CEOs (Scharfstein, 1988; Raith, 2003). Firms that survive in more competitive industries should have already operated in a very efficient mode. The CEOs of these firms realize that there is not much room that is worth improving so they tend to work less hard. When an outside CEO is not motivated to work harder by product market competition, the value he creates for the firm may not be high enough to cover the cost of discouragements to current employees. However, CEOs of firms in a less competitive environment are more motivated to work hard

because they know there is huge space to improve and more profit can be extracted for being more efficient. Consequently, Schumpeterian theory suggests that it will increase firm value for companies in the less competitive environment to hire outside CEOs because the benefits will outweigh the costs.

We test the two theories using a sample of 461 CEO turnovers from 1998 to 2004. Our results support Schumpeterian theory, which suggests that firms will be better off hiring an outside CEO if they operate in a low product competition environment. The evidence shows that hiring an outside CEO for a firm in a low product competition environment will increase the firm's value by about 3% for the entire tenure of the CEO. The main contribution of this paper is to show that product market competition is important in CEO selection.

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

2.2 Relevant Literature and Hypothesis Development

2.2.1 Literature on CEO and firm performance

Various studies have showed mixed results for post-succession performance comparison between externally hired and internally promoted CEOs. However, their findings are only based on different accounting measures that they choose to estimate firm value. When the most commonly used measure for

firm value, Tobin's q, is used, their results disappear. Our paper identifies product market competition as an important factor in CEO selection. We show that firms will be better off with hiring an outside CEO by having a higher firm value measured in Tobin's q when the firms operate in a low product competition industry.

Some studies, present evidence that, on average, externally hired CEOs outperform internally promoted CEOs. Huson et al. (2004) use a sample of all CEOs listed in the Forbes annual compensation surveys over the 1971-1995 period, and document that post-turnover changes in firm's operating rate of return on total assets (OROA) are positive and greater when the successor CEOs are hired externally.[5] They classified each succession as either forced or voluntary by using the Wall Street Journal. However, there is no evidence showing a difference between post-turnover performance changes for forced and voluntary successions. Falato et al. (2009) use a hand-collected sample of 2,195 CEO successions between 1993 and 2005, and document that appointments of talented CEOs are associated with significantly higher stock market returns and operating performance, and the positive relation between firm performance and CEO talent is significantly stronger for outside successions. Liang (2007) uses a survey dataset covering 800 Chinese enterprises from 1994 to 1999, and finds that productivity of a firm increases by two to three percentage points more when an outside CEO is appointed than when an insider is appointed.

However, there is also evidence in the literature that shows CEOs who are promoted from within the firm outperform outside CEOs. Zajac (1990) uses a

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[5] OROA is the ratio of operating income to book value of assets.

sample of Forbes 500 listing companies combined with some very large firms that are not listed in the Forbes 500 index but designated by Forbes as having annual sales of at least $1 billion. He finds that firms with inside CEOs tend to be significantly more profitable than firms with outside CEOs. The post-succession average return on assets (ROA) associated with inside CEOs is significantly higher than the average ROA associated with outside CEOs. He argues that because of asymmetric information, board of directors is more likely to know better the characteristics of a CEO candidate who is from within the firm. Therefore, boards have advantage in observing the characteristics of an inside CEO, but may face a relative informational disadvantage in considering outside CEOs. Even though boards may have informational disadvantage in considering outside CEOs, it may still be beneficial to the firms when certain criteria are met such as the product market competition that we identify in this paper. Ang and Nagel (2010) use a sample of non-financial firm CEO appointments for companies that have total assets greater than $250 million at the start of the CEO's tenure over the period from 1970 to 2005. They find that inside CEOs deliver superior performance that persists for more years than outside CEOs. Also, in some cases which internal CEOs are perceived to be inferior, they still do not underperform and in many circumstances outperform outside CEOs. However, after the hiring date, no difference is found between inside and outside hires' Tobin's q.

2.2.2 Costs of hiring external CEOs

In addition to the benefits that externally hired CEOs could bring to the hiring firm such as new innovative ideas in production, management, etc., there are also costs associated with hiring CEOs externally such as the disincentives and discouragements to current employees who are in the process to survive the in-house tournaments to become an internal candidate for the CEO position. Agrawal et al. (2006) document that when firms are choosing new CEOs, external candidates are handicapped. They argue that in order to win the prize of being named CEO, employees of the firm will compete with each other. Such aspirations provide employees with an incentive to work hard. The more responsive is an employee's chance of winning, the greater is the incentive effect that CEO aspirations have on employees' effort. Adding outsiders to the competition to become CEO typically weakens the relation between hard work by an insider and his chance of success to the CEO position. As a result, including outsiders in the succession contest typically reduces the incentive that current employees have to work hard. In many cases, incumbent executive officers may be forced to leave the firm or choose to leave voluntarily when the firm hires a new CEO externally (Fee and Hadlock, 2004). Shen and Cannella (2002) show that focusing on a CEO successor alone without considering other personnel changes within top management cannot fully and accurately capture the performance consequences of CEO succession. Post-succession senior executive turnover has been primarily studied as an outcome of CEO succession (Friedman and Saul, 1991). Results of this study suggest that post-succession

senior executive turnover has important implications for firm performance and, more important, that the direction of its impact depends on successor type. They find that senior executive turnover has a positive impact on firm ROA in insider succession, but a negative impact in outsider succession. Shen and Cannella (2002) find that senior executive turnover has a negative impact on firm performance when the successor is an outsider. Because there are both benefits and costs associated with hiring new CEOs externally, firms whose benefits of hiring external CEOs outweigh the costs should find it valuable in doing so. Contrarily, firms whose costs of hiring external CEOs outweigh the benefits will find it more economically sensible to promote new CEOs internally. Firms whose externally hired CEOs work harder will benefit more from outside hires, whereas firms whose outside CEOs work less hard will benefit less from outside hires. Given the costs of hiring external CEOs, when firms benefit more, it is more likely to have positive impact on firm value than when firms benefit less. CEOs' effort depends on incentives provided to them. As a result, whether product market competition serves as an incentive or disincentive to CEOs depends on the dominance between increasing incentive theory and Schumpeterian theory.

2.2.3 Product market competition and hypothesis development

As we have seen from the mixed results in the literature on CEO selection and firm performance, some previous studies find external CEOs outperform internal CEOs based on some accounting measures of performance, whereas others find the opposite based on different accounting measures of performance.

However, none of the previous studies has showed a significant result when the most conventional measure of firm value Tobin's q was used. If firms in different competitive environments have different benefits with hiring external CEOs, then insignificant Tobin's q may be what we can observe. That is, no one group of CEOs (external or internal) will always outperform the other. It may be advantageous for some firms to hire external CEOs, and others to hire internal CEOs. The main contribution of this paper is to add a crucial dimension of product market competition to the selection of CEOs by linking the literature on CEO selection and firm performance with the literature of the principal-agent problem to the degree of competition in product markets.

Hart (1983), Hermalin (1992), Schmidt (1997), and Karuna (2007) consider whether product market competition induces managers to improve efficiency by increasing their supply of effort (increasing incentive theory). These papers show that increased competition in a product market increases the provision of effort by managers. Hart (1983) shows that greater competition provides stronger implicit managerial incentives, as additional market players make firms better informed and thus better able to evaluate managers' actions. Similarly, Schmidt (1997) shows that an increase in competition increases the likelihood of liquidation and therefore greater incentives to managers, who work harder to retain their jobs. Karuna (2007) also finds results that support the conclusion that firms provide stronger managerial incentives when industry competition is greater. So what kind of firms should find it more valuable to hire new CEOs externally than to promote from within the company? According to

increasing incentive theory, product market competition serves as a positive incentive that makes CEOs work harder. When outside CEOs work harder, the benefits of hiring them are more likely to outweigh the costs. Therefore, the impact on firm value of hiring external CEOs may be positive for firms in a more competitive industry. Contrarily, in a less competitive industry, without product market competition to motivate CEOs to put more effort into work, the costs of hiring them are more likely to outweigh the benefits. Therefore, the impact on firm value of hiring external CEOs may be negative for firms in a less competitive industry.

Hypothesis I: For firms in more competitive product markets, the benefits of hiring outside CEOs are greater than the costs. Therefore, firms should hire outside CEOs.

Hypothesis II: For firms in less competitive product markets, the benefits of hiring outside CEOs are smaller than the costs. Therefore, firms should promote inside CEO candidates.

In contrast to increasing incentive theory, Schumpeterian theory suggests that competition increases managerial slack (Scharfstein, 1988; Raith, 2003). Scharfstein (1988) among others shows that competition may actually exacerbate the incentive problem. Schumpeterian theory argues that firms in a less competitive environment may not be operated efficiently so there is much

room to improve. However, firms that survive in a more competitive environment should have already in an extremely efficient mode so there is not much space to improve. Knowing that more profit can be extracted for being more efficient, managers of firms in a less competitive environment are more motivated to work hard. Managers of firms in a more competitive environment are less motivated to work hard because it is very difficult to further enhance efficiency. Therefore, if Schumpeterian theory is supported, product market competition serves as a negative incentive that makes CEOs put less effort into work. When outside CEOs work less hard, the costs of hiring them are more likely to outweigh the benefits. Therefore, the impact on firm value of hiring external CEOs may be negative for firms in a more competitive industry. Because CEOs work harder, the benefits associated with hiring outside CEOs may be greater than the costs for firms in a less competitive environment.

Hypothesis III: For firms in more competitive product markets, the costs of hiring outside CEOs are greater than the benefits. Therefore, firms should promote inside CEO candidates.

Hypothesis IV: For firms in less competitive product markets, the benefits of hiring outside CEOs are greater than the costs. Therefore, firms should hire outside CEOs.

2.3 Data and Variables

2.3.1 Sample

We identify the CEO turnover sample for both voluntary and forced leaves from ExecuComp database over the period from 1998 to 2004. We obtain information of CEOs and board members from ExecuComp, proxy statements, 10-K reports, and Edgar data retrieval system. For each observation in the sample, financial data must be available from either the University of Chicago's Center for Research in Security Prices (CRSP) or the Standard & Poor's Compustat database. Mergers and acquisitions data is obtained from Security Data Corporation (SDC). CEOs are categorized into two groups; inside or outside CEOs. Inside CEOs are those who were an officer or an inside director of the hiring firm prior to their appointment whereas outside CEOs are those who were not an officer or an inside director of the hiring firm prior to their appointment. We eliminate the resignations of CEOs from the sample if they are directly related to takeovers. Our final sample comprises observations for 461 CEO turnovers across all industrial sectors in the economy.

2.3.2 Measure of firm value

Firm value is measured by Tobin's q according to Chung and Pruitt (1994) method. Approximate Tobin's Q is computed as follows:

Approximate q= (MVE+PS+DEBT)/TA   (1)

Where MVE is the product of a firm's share price and the number of common stock shares outstanding, PS is the liquidating value of the firm's outstanding preferred stock, DEBT is the value of the firm's short-term liabilities net of its short-term assets, plus the book value of the firm's long-term debt, and TA is the book value of the total assets of the firm. Approximate q requires only basic financial and accounting information. Furthermore, results of a series of regression comparisons indicate that at least 96.6% of the variability of Tobin's q is explained by approximate q. The cumulative amount of value created is directly related to the CEO's performance. Therefore, the dependent variable used in the regressions is the change in Tobin's q of a firm from the year of hire to the year of the turnover of the CEO.

2.3.3 Measures of competition

2.3.3.1 Herfindahl index

The first measure of competition we use is Herfindahl index, a measure of the size of firms in relation to the industry, as an indicator of the amount of competition among firms. The Herfindahl index can range from 0 to 1, moving from an extremely large number of very small firms to a single monopoly. Increases in the Herfindahl index indicate a decrease in competition and an increase of market power.

2.3.3.2 Product substitutability

The second measure of competition we use is product substitutability. Prior studies in the industrial organizations literature have used the price-cost margin to measure product substitutability in an industry (Demsetz, 1997; Besanko et al., 2000; Nevo, 2001). Low (high) levels of the price-cost margin signify high (low) levels of substitutability. Hence, the greater the intensity of price competition due to higher substitutability, the smaller the price-cost margin is. We calculate the price-cost margin as sales divided by operating costs, all at the four-digit SIC code level.

2.3.3.3 Market size

The third measure of competition we use is market size. Market size reflects the density of consumers in a market or industry. We measure an industry's market size by industry sales. This reflects the fact that, when market demand for a product increases at any given price, sales of that product also increase.

2.3.4 Methodology

Following the methodology of Huson et al. (2004) and Ang and Nagel (2010), we use the lagged value of firm characteristics to account for endogeneity concerns. There is a possible selection bias in the estimation of an ordinary least squares (OLS) regression with change of firm value as the dependent variable and CEO and other firm characteristics as independent

variables because there may be systematic differences between firms that hire external and internal CEOs. As a result, we use the two-step procedure introduced by Heckman (1979) to compute the inverse Mills ratio (IML) to control for potential selection bias. A probit model, in which the dependent variable equals one if the CEO is hired externally and zero otherwise, is first used to estimate the IML, where

$$\text{IML} = \frac{\varPhi(-\left(x_i'\frac{\beta}{\sigma}\right))}{1-\varPhi(-\left(x_i'\frac{\beta}{\sigma}\right))} \ . \tag{2}$$

In equation (2), φ and $\varPhi$ represent the density and cumulative density functions of the standard normal distribution, respectively, x_i' is a vector that contains observations for the independent variables predicting whether a firm hires an external CEO, β is the vector of coefficient estimates from the probit regression, and σ is the standard deviation for the residuals from the probit regression. The second step of the Heckman procedure is to simply estimate the OLS regression with the IML as an independent variable.

To investigate how CEO hiring sources and competitive environments affect firm value, we use OLS regressions to estimate the relation between the change in firm value and the interaction between CEO hiring sources and industry competitiveness. The complete regression model is as follows:

Δ Tobin's q_t =

$\alpha + \beta_1 * D_{outside\_highH} + \beta_2 * D_{outside\_lowH} + \beta_3 * D_{inside\_highH}$

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$$+ \delta_1 * \text{Ln (total assets)} + \delta_2 * (\Delta \text{ Leverage})_{t-1} + \delta_3 * (\Delta \text{ R\&D})_{t-1}$$

$$+ \delta_4 * (\text{CEO\_chair}) + \delta_5 * (\Delta \text{ percentage of outside directors})_{t-1}$$

$$+ \delta_6 * (\Delta \text{ number of directors})_{t-1} + \delta_7 * (\Delta \text{ CEO ownership})_{t-1}$$

$$+ \delta_8 * (\Delta \text{ institution ownership})_{t-1} + \delta_9 * (\text{CEO tenure})$$

$$+ \delta_{10} * (\Delta \text{ Tobin's q})_{t-1} + \delta_{11} * \text{IML} + \varepsilon \qquad\qquad (3)$$

$D_{outside\_highH}$ is a dummy variable that is equal to 1 if the firm hires an outside CEO and is in a high Herfindahl industry (less competitive), and 0 otherwise. An industry's Herfindahl index is considered high (low) if it is above (below) the sample median. $D_{outside\_lowH}$ is a dummy variable that is equal to 1 if the firm has an outside CEO and is in a low Herfindahl industry (more competitive), and 0 otherwise. Similarly, D_{inside_highH} is a dummy variable that is equal to 1 if the firm has an inside CEO and is not in a competitive industry, and 0 otherwise. We measure firm size by total assets in millions of dollars, and leverage by the ratio of long term debt to total assets. R&D is research and development of the firm to proxy its growth opportunities. CEO_chair is a dummy variable that is equal to 1 if the CEO is also the chairman of the board and 0 otherwise. Percentage of outside directors is the percentage of outside directors on the firm's board to proxy board independence. Number of directors is the number of directors on the board to proxy board size. CEO ownership is the percentage of shares held by the firm's CEO. Institution ownership is the percentage of shares held by institutions. Finally, we control for CEO tenure and past performance. The detailed definitions of all variables are shown in Table 2.1.

If increasing incentive theory is supported, we expect the sign of the coefficient of $D_{outside\_highH}$ (β_1 in equation (3)) not to be significantly positive because the benefits for a firm to hire an outside CEO in a less competitive industry should be smaller than the costs. Thus, the total effect should be negative (hypothesis II).

The sign of the coefficient of $D_{outside\_lowH}$ (β_2 in equation (3)) is expected to be positive and significant because the benefits for a firm to hire an outside CEO in a more competitive industry are greater than the costs, and the total effect will be positive (hypothesis I).

If Schumpeterian theory is supported, the sign of the coefficient of $D_{outside\_highH}$ (β_1 in equation (3)) should be positive and significant. The benefits for a firm to hire an outside CEO in a less competitive industry are greater than the costs, therefore, the total effect should be positive (hypothesis IV). Also, the sign of the coefficient of $D_{outside\_lowH}$ (β_2 in equation (3)) is expected not to be significantly positive because the benefits for a firm to hire an outside CEO in a more competitive industry are smaller than the costs, thus, the total effect should be negative (hypothesis III). Lastly, the coefficient of D_{inside_highH} (β_3 in equation (3)) indicates the total effect on the change of firm value when a firm hires an inside CEO in a less competitive industry. Therefore, β_3 should be statistically insignificant because when a firm hires an inside CEO, both the benefits and costs associated with hiring an outside CEO are not relevant.

2.4 Empirical Results

2.4.1 Summary statistics

Table 2.2 provides the mean, median, standard deviation, 5th percentile, and 95th percentile of all the variables we use in our regressions. The mean of the outside CEO_high Herfindahl dummy is 0.065, while the median value of this dummy variable is 0. The mean of the outside CEO_low Herfindahl dummy is 0.245, while the median value of this dummy variable is also 0.

Table 2.3 shows the distributions of inside and outside CEOs under high and low Herfindahl industries. An industry's Herfindahl index is considered high (low) if it is above (below) the sample median. The final sample has 31 inside CEOs (50.8%) and 30 outside CEOs (49.2%) in high Herfindahl industries, while it has 287 inside CEOs (71.7%) and 113 outside CEOs (28.3%) in low Herfindahl industries.

Table 2.4 presents Pearson correlations between independent variables included in the regression tests. Except for the correlation between total assets and the change in board size, and the correlation between the change in leverage and the change in Tobin's q, all other correlations are small in magnitude (the absolute correlation coefficients are not higher than 0.3). This suggests that multicollinearity is not likely to pose a serious problem in the multivariate analysis.

2.4.2 The impact of CEO selection on firm value

Table 2.5 reports the results of OLS models that predict the percentage change in Tobin's q of a firm from the year of hire to the year of the turnover of the CEO. The dependent variable is the percentage change in Tobin's q of a firm from the year of hire to the year of the turnover of the CEO. Independent variables include outside CEO_high Herfindahl dummy (equal to 1 if the firm is in a high Herfindahl industry and has an outside CEO and zero otherwise), outside CEO_low Herfindahl dummy (equal to 1 if the firm is in a low Herfindahl industry and has an outside CEO and zero otherwise), inside CEO_high Herfindahl dummy (equal to 1 if the firm is in a high Herfindahl industry and has an inside CEO and zero otherwise), and other control variables as specified in equation (3).

The first column of Table 2.5 shows that the coefficient on outside CEO_high Herfindahl dummy is positive and significantly different from zero (0.036). This means that the firm value will be increased by 3.6% when a firm operates in a high Herfindahl industry hires an outside CEO.

The second column of Table 2.5 examines the effect of CEO selection on firm value when controlling for governance variables. The coefficient on outside CEO_high Herfindahl dummy is positive and significantly different from zero (0.032). This means that the firm value will be increased by 3.2% when a firm operates in a high Herfindahl industry hires an outside CEO when controlling for governance variables.

The third column of Table 2.5 examines the effect of CEO selection on firm value when controlling for economic variables, while the final column

controls for both governance and economic variables. The results of the third and the final columns are similar to those of the second column. The final column of table 2.5 shows that the coefficient on outside CEO_high Herfindahl dummy is 0.034 and significant at the 10% level. This suggests that the firm value will be increased by 3.4% when a firm operates in a high Herfindahl industry hires an outside CEO when controlling for both governance and economic variables. Also note that the estimated coefficient on the outside CEO_low Herfindahl dummy is consistently insignificant for all OLS models in table 2.5. This indeed indicates that Schumpeterian theory is supported.

Table 2.5 also reports that the estimated coefficients on the control variables are generally in the predicted direction. The estimated coefficient on CEO_chair dummy is -0.017, suggesting a reduction of firm value by 1.7% when the CEO is also the chairman of the board. The estimated coefficient on board size is -0.003. This means that when board size increases by 1%, firm value will drop by 0.3%. The estimated coefficient on CEO ownership is -0.0007. This means that when CEOs own one percent more of their firms, firm value will drop by 0.07%.

2.4.3 Robustness checks

Table 2.6 presents OLS results when we use product substitutability to determine the level of product market competition. Low (high) levels of the price-cost margin signify high (low) levels of substitutability. Hence, the greater the intensity of price competition due to higher substitutability, the smaller the price-

cost margin is. We calculate the price-cost margin as sales divided by operating costs, all at the four-digit SIC code level.

The final column of Table 2.6 shows that the coefficient on outside CEO_high price-cost margin dummy is 0.089 and significant at the 1% level. This suggests that the firm value will be increased by 8.9% when a firm operates in a high price-cost margin industry hires an outside CEO when controlling for both governance and economic variables. This result is stronger than the result in Table 2.5 and suggests that again, Schumpeterian theory is supported. In addition, the estimated coefficient on the outside CEO_low price-cost margin dummy is consistently insignificant for all OLS models in table 2.6.

We also estimate the same OLS models with market size as the measure of competition. Market size reflects the density of consumers in a market or industry. We measure an industry's market size by industry sales. The results are consistent and similar to those reported in Table 2.6.

Table 2.7 reports the results of OLS models that predict the percentage change in the Fama-French four-factor risk-adjusted return of a firm from the year of hire to the year of the turnover of the CEO. The dependent variable is the percentage change in return of a firm from the year of hire to the year of the turnover of the CEO. Independent variables include outside CEO_high Herfindahl dummy (equal to 1 if the firm is in a high Herfindahl industry and has an outside CEO and zero otherwise), outside CEO_low Herfindahl dummy (equal to 1 if the firm is in a low Herfindahl industry and has an outside CEO and zero otherwise), inside CEO_high Herfindahl dummy (equal to 1 if the firm is in a high

Herfindahl industry and has an inside CEO and zero otherwise), and other control variables as specified in equation (3).

The final column of Table 2.7 shows that the coefficient on outside CEO_high Herfindahl dummy is 0.005 and significant at the 10% level. This suggests that the firm value will be increased by 0.5% when a firm operates in a high Herfindahl industry hires an outside CEO when controlling for both governance and economic variables. This result is similar to the result in Table 2.5 and suggests that again, Schumpeterian theory is supported.

2.5 Conclusions

We examine the relation between the change in a firm's value and its CEO selection sources: internal promotion versus external hire in both high and low product competition environments. Specifically, we tested the implications of two competing theories. First, we examine increasing incentive theory that suggests firms operate in more competitive product markets will be better off hiring outside CEOs. Second, we examine Schumpeterian theory that suggests firms operate in less competitive product markets will be better off hiring outside CEOs. Our results support Schumpeterian theory. The evidence shows that hiring an outside CEO for a firm in a low product competition environment will increase the firm's value by about 3% for the entire tenure of the CEO.

Therefore, there is no one group of CEOs that can always outperform the other. Which type of CEO to hire in order to increase firm value depends on the level of product market competition of the industry that the firm is in. Aivazian et

al. (2012) document that firms in industries relying on general managerial skills are more likely to hire outside CEOs than firms in industries relying less on such skills. They find that firms relying on outside CEOs have on average higher profits than inside-CEO firms. Our results show that firms will be better off hiring an outside CEO when the firms operate in a low product competition industry. It is possible that firms in a low product competition industry rely on general managerial skills more than do firms in a high product competition industry. The main contribution of this paper is to link the literature on CEO selection and firm performance with the literature of the principal-agent problem to the degree of competition in product markets. Our results are robust to various measures of market competition.

Table 2.1: Variable Definitions

Variable	Description	Definition
Summary Statistics and Correlation Table Variables		
N	Number of Turnover	The number of CEO turnover.
Δ *Tobin's q*	Change in Tobin's q	Percentage change in Tobin's q of a firm from the year of hire to the year of the turnover of the CEO.
$D_{outside\_highH}$	Outside CEO in a high Herfindahl Industry	Binary variable equal to one if the firm is in a high Herfindahl industry and has an outside CEO and zero otherwise.
$D_{outside\_lowH}$	Outside CEO in a low Herfindahl Industry	Binary variable equal to one if the firm is in a low Herfindahl industry and has an outside CEO and zero otherwise.
D_{inside_highH}	Inside CEO in a high Herfindahl Industry	Binary variable equal to one if the firm is in a high Herfindahl industry and has an inside CEO and zero otherwise.
Ln (total assets)	Total Assets	Natural log of total assets of a firm.
Δ Leverage	Change in Leverage	Percentage change in leverage of a firm from the year of hire to the year of the turnover of the CEO.
Δ R&D	Change in R&D	Percentage change in R&D of a firm from the year of hire to the year of the turnover of the CEO.
CEO_chair	CEO Durality	Binary variable equal to one if the CEO is also the chairman of the board and zero otherwise.
Δ pct_outd	Change in Outside Directors	Percentage change in the outside directors from the year of hire to the year of the turnover of the CEO.
Δ board size	Change in Number of Directors	Percentage change in the total number of directors from the year of hire to the year of the turnover of the CEO.
CEO tenure	CEO Tenure	The number of years the CEO had held the position as of the year of the turnover.
Δ CEO ownership	Change in CEO Ownership	Percentage change in the fraction of shares owned by the CEO from the year of hire to the year of the turnover of the CEO.
Δ institution ownership	Change in institution Ownership	Percentage change in the fraction of shares owned by institutions from the year of hire to the year of the turnover of the CEO.

Table 2.2: Summary Statistics

Variable	N	Mean	Median	σ	5th	95th
$D_{outside\_highH}$	461	0.06507	0	0.24692	0	1
$D_{outside\_lowH}$	461	0.24511	0	0.43062	0	1
D_{inside_highH}	461	0.06724	0	0.25071	0	1
Ln (total assets)	461	7.34862	7.35188	1.62284	4.80338	10.0293
CEO_chair	461	0.29501	0	0.45654	0	1
Δ Leverage	461	0.02025	0.01839	0.01753	0	0.0498
CEO tenure	461	9.32104	8	7.71031	1	25
Δ R&D	461	-0.1674	0	0.27218	-0.34	0.06
Δ pct_outd	461	0.24259	0.26666	0.0796	0.08571	0.28888
Δ board size	461	0.09338	0.12457	0.02966	0.05	0.18
Δ CEO ownership	461	0.00201	0	0.00104	0	0.007
Δ institution ownership	461	0.07018	0	0.06041	0	0.118

Descriptive statistics for firms that had voluntary and forced CEO turnovers from 1998 through 2004.

Table 2.3: Frequency Table

	Inside CEO	*outside CEO*	*Total*
High Herfindahl Index	31	30	61
	(50.8%)	(49.2%)	
Low Herfindahl Index	287	113	400
	(71.7%)	(28.3%)	
Total	318	143	461
	(68.9%)	(31.1%)	

The frequency of inside and outside CEO representation under high Herfindahl Index and low Herfindahl Index based on 461 observations of both voluntary and forced CEO turnovers from 1998 through 2004. Numbers in parentheses are percentages.

Table 2.4: Pearson Correlation

	$D_{outside\_highH}$	$D_{outside\_lowH}$	D_{inside_highH}	Ln (total assets)	CEO_chair	Δ Leverage $t-1$	CEO tenure	Δ R&D $t-1$	Δ pct_outd $t-1$	Δ board size $t-1$	Δ CEO ownership $t-1$	Δ Instn ownership $t-1$	Δ Tobin's q $t-1$
$D_{outside\_highH}$	1	-0.15***	-0.07	-0.09**	0.06	0.05	0.001	-0.003	-0.04	-0.16**	-0.004	0.17*	-0.003
$D_{outside\_lowH}$		1	-0.15***	-0.2***	-0.05	-0.02	0.1**	0.03	0.01	-0.28**	0.15**	0.12*	-0.13**
D_{inside_highH}			1	-0.08*	0.01	-0.01	-0.04	0.01	-0.05	-0.02	0.02	-0.11	-0.003
Ln (total assets)				1	0.11***	0.26***	0.07	-0.1**	0.15***	0.6***	-0.1**	0.09	0.29***
CEO_chair					1	0.02	0.11**	-0.06	0.12***	0.06	0.07	0.12**	0.03
Δ Leverage$_{t-1}$						1	0.05	0.02	0.06	0.14***	-0.07	-0.08	0.53***
CEO tenure							1	-0.06	-0.12**	0.11**	0.3***	-0.01	0.04
Δ R&D$_{t-1}$								1	-0.05	-0.1**	0.02	-0.06	0.01
Δ pct_outd $_{t-1}$									1	0.03	-0.24***	0.05	-0.003
Δ board size $_{t-1}$										1	-0.1**	0.03	0.22***
Δ CEO ownership$_{t-1}$											1	-0.22**	-0.1**
Δ Instn ownership$_{t-1}$												1	
Δ Tobin's q $_{t-1}$													1

Correlations are based on 461 observations. See Table 1 for variable definitions.

* p<10%, ** p<5%, *** p<1%

Table 2.5: Estimates of OLS Models

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	0.07***	0.094***	0.061**	0.081***
	(3.26)	(2.8)	(2.38)	(2.8)
$D_{outside\_highH}$	0.036**	0.032*	0.039**	0.034*
	(1.97)	(1.73)	(2.05)	(1.76)
$D_{outside\_lowH}$	0.016	0.012	0.018	0.013
	(1.54)	(1.04)	(1.43)	(1.14)
D_{inside_highH}	0.001	-0.0007	0.001	0.002
	(0.05)	(-0.04)	(0.09)	(0.12)
Ln (total assets)			0.001	0.005
			(0.6)	(1.58)
Δ Leverage$_{t-1}$			-0.013	-0.014
			(-0.39)	(-0.42)
Δ R&D $_{t-1}$			-0.00002	-0.00003
			(-0.19)	(-0.29)
CEO_chair		-0.016		-0.017*
		(-1.57)		(-1.71)
Δ pct_outd $_{t-1}$		-0.029		-0.035
		(-1.1)		(-1.31)
Δ board size $_{t-1}$		-0.001		-0.003*
		(-0.95)		(-1.66)
Δ CEO ownership $_{t-1}$		-0.0007		-0.0007
		(-0.95)		(-0.93)
Δ institution ownership $_{t-1}$		0.0109		0.007
		(1.12)		(1.26)
CEO tenure		0.001*		0.001*
		(1.7)		(1.66)
Δ Tobin's q $_{t-1}$	0.856***	0.857***	0.858***	0.855***
	(35.8)	(31.8)	(29.9)	(29.75)
Inverse Mills ratio	0.005	0.012	0.012	0.378
	(0.56)	(0.34)	(1.09)	(1.23)
R-squared	0.5377	0.5392	0.5362	0.5390

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

This table reports estimates of OLS regression analysis of change in Tobin's q at time t regressed on outside CEO and high Herfindahl dummy variable, outside CEO and low Herfindahl dummy variable, inside CEO and high Herfindahl dummy variable, and other economic and governance control variables for a sample of 461 CEO turnovers.

Table 2.6: Robustness Tests

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	0.067***	0.092***	0.051**	0.070**
	(3.57)	(3.54)	(2.16)	(2.45)
$D_{outside\_high\_PCmargin}$	0.091***	0.087***	0.094***	0.089***
	(4.42)	(4.32)	(4.45)	(4.39)
$D_{outside\_low\_PCmargin}$	0.002	-0.002	0.004	-0.001
	(0.24)	(-0.18)	(0.43)	(-0.1)
$D_{inside\_high\_PCmargin}$	-0.03	-0.028	-0.029	-0.027
	(-1.54)	(-1.41)	(-1.46)	(-1.36)
Ln (total assets)			0.002	0.006*
			(0.77)	(1.74)
Δ Leverage$_{t-1}$			-0.017	-0.018
			(-0.51)	(-0.55)
Δ R&D $_{t-1}$			-0.00001	-0.00002
			(-0.11)	(-0.21)
CEO_chair		-0.016*		-0.018*
		(-1.70)		(-1.85)
Δ pct_outd $_{t-1}$		-0.021		-0.027
		(-0.82)		(-1.06)
Δ board size $_{t-1}$		-0.001		-0.003*
		(-0.94)		(-1.73)
Δ CEO ownership $_{t-1}$		-0.0006		-0.0006
		(-0.79)		(-0.77)
Δ institution ownership $_{t-1}$		0.0113		0.009
		(1.14)		(1.22)
CEO tenure		0.001*		0.001*
		(1.8)		(1.77)
Δ Tobin's q $_{t-1}$	0.868***	0.869***	0.871***	0.869***
	(36.8)	(36.1)	(30.9)	(30.76)
Inverse Mills ratio	0.002	0.028	0.010	0.022
	(0.31)	(1.09)	(1.10)	(0.11)
R-squared	0.5482	0.5502	0.5475	0.5497

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

  This table reports estimates of OLS regression analysis of change in Tobin's q at time t regressed on outside CEO and high price-cost margin dummy variable, outside CEO and low price-cost margin dummy variable, inside CEO and high price-cost margin dummy variable, and other economic and governance control variables for a sample of 461 CEO turnovers.

Table 2.7: Robustness Tests

	(1)	(2)	(3)	(4)
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*
constant	0.014***	0.013***	0.022***	0.012***
	(4.98)	(3.04)	(3.66)	(2.58)
$D_{outside\_highH}$	0.005*	0.005*	0.005	0.005*
	(1.67)	(1.85)	(1.63)	(1.79)
$D_{outside\_lowH}$	0.003	0.002	0.003	0.002
	(1.24)	(1.45)	(1.13)	(1.08)
D_{inside_highH}	-0.003	-0.003	-0.002	-0.003
	(-1.15)	(-1.19)	(-1.16)	(-0.17)
Ln (total assets)			0.0001	0.0001
			(0.70)	(0.15)
Δ Leverage$_{t-1}$			-0.002	-0.0025
			(-0.37)	(-0.45)
Δ R&D$_{t-1}$			0.00001	0.00001
			(0.60)	(0.62)
CEO_chair		-0.002		-0.002
		(-1.33)		(-1.29)
Δ pct_outd$_{t-1}$		0.005		0.005
		(1.31)		(1.33)
Δ board size$_{t-1}$		-0.0002		-0.0003
		(-1.04)		(-0.88)
Δ CEO ownership$_{t-1}$		-0.00001		-0.00001
		(-0.08)		(-0.10)
Δ institution ownership$_{t-1}$		0.004		0.003
		(0.87)		(0.95)
CEO tenure		0.0001		0.00006
		(0.67)		(0.62)
Δ Return$_{t-1}$	0.643***	0.637***	0.633***	0.628***
	(15.8)	(15.2)	(14.1)	(13.88)
Inverse Mills ratio	0.003	0.008	0.010	0.024
	(0.48)	(0.36)	(0.85)	(1.47)
R-squared	0.4773	0.4728	0.4552	0.4568

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

 This table reports estimates of OLS regression analysis of change in risk-adjusted return at time t regressed on outside CEO and high Herfindahl dummy variable, outside CEO and low Herfindahl dummy variable, inside CEO and high Herfindahl dummy variable, and other economic and governance control variables for a sample of 461 CEO turnovers.

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