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The Monitoring and Advisory Functions of Corporate Boards: Theory and Evidence*

Dong Chen[†]

August 1, 2008

Abstract

I develop and test a model of the two primary functions of the board of directors of a public corporation: monitoring and advising management. The model shows that higher advising intensity is associated with lower monitoring quality and higher agency costs. To test the model, I use the number of independent directors who are at the same time executive board members of other corporations as an empirical proxy for the board's advising intensity. I test and find evidence for the validity of this empirical proxy, by contrasting the corporate policies independent executives (IEs) choose for their own firms with those they advocate as outside directors. Consistent with the predictions of the model, I find that IEs are associated with proxies for higher agency costs. I also find that IEs are positively, significantly, and causally associated with firm performance. Finally, I argue that the significant relation between IEs and firm performance is due to the scarcity of IEs, and use the passage of Sarbanes-Oxley Act as a natural experiment to demonstrate the validity of this argument.

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“...In short, we cannot describe the job we have given a modern corporate board without using such terms as *paradox*, *conflict*, *contradiction*, and *oxymoron*...”—Ralph D. Ward

Saving the Corporate Board-Why Boards Fail and How to Fix Them

1 Introduction

Monitoring and advising management are the two primary functions of corporate boards of directors (Monks and Minow (2004)). The monitoring function requires the board to play a “watchdog” role in order to align the incentives of the management with the interests of the shareholders. In the advisory function, however, the board takes a more hands-off approach regarding monitoring and uses the expertise of its members to counsel management in establishing corporate strategies and policies.

The monitoring function has been featured prominently in both the popular press and academic literature, especially after the passage of the Sarbanes-Oxley Act (SOX) and the new exchange listing standards. Hermalin and Weisbach (2003) review the economic literature on corporate boards and conclude that boards, in particular independent directors, are generally effective in the traditional monitoring function, such as decisions regarding CEO succession and CEO compensation, but are generally uncorrelated with firm performance.¹ In contrast, the board’s advisory function, though considered very important in the popular press, has received far less attention in the academic literature. Financial economists only recently have begun to consider the advisory role of the board, and how it impacts the monitoring role.²

This paper develops a theoretical model to analyze the tradeoff between the monitoring and advisory functions of the board, and makes the first attempt to test this tradeoff empirically. I first derive a simple model incorporating the two functions. In the model the board chooses whether to

¹Independent directors are the directors who are not affiliated with the firm except for their directorships. The literature generally uses the proportion of independent directors to board size to proxy for the monitoring intensity of the board, and to study its relation with firm performance.

²For the discussion of boards’ advisory role in the popular press, see Mace (1986), Lorsch and MacIver (1989), Ezzamel and Watson (1997), PricewaterhouseCoopers (2001), Carter and Lorsch (2004), and Ward (2003) as quoted above. For recent academic research on the advisory role, see Booth and Deli (1999), Agrawal and Knoeber (2001), Song and Thakor (2006), Coles, Daniel, and Naveen (2006), Güner, Malmendier, and Tate (2007), and Graham, Hazarika, and Narasimhan (2007). For theoretical work on both roles and their potential conflict, see Adams and Ferreira (2007) and Harris and Raviv (2007).

advise the CEO and whether or not to replace the incumbent CEO by inferring his ability from the firm's profit realization. The board is assumed to have the same utility function as the shareholders, and has the incentive to make the right replacement decision since such a decision affects firm value.³ The CEO in the model takes an unobservable action that increases his utility at the expense of shareholders. I interpret the reduction of firm value that comes with such actions as agency costs. Importantly, the CEO benefits from imposing these costs on the firm only if he can retain his job. If the board does not advise the CEO, realized profit will equal the CEO's ability net of agency costs. Similar to [Holmström \(1999\)](#), the CEO's career concern motivates him not to choose the action that results in the maximum level of agency costs, in an effort to make the board infer a higher ability and to reduce the probability of replacing him, though in equilibrium such ability is perfectly revealed. If the board does advise the CEO, the firm's profit will equal the board's ability net of agency costs, hence making it impossible for the board to infer his ability. Without career concerns, the CEO always chooses the action that generates the maximum level of agency costs. The model thus predicts that when the board advises, the quality of the replacement decision is lower and agency costs are higher. As a result, the model further predicts that unless its ability is sufficiently high to overcome such costs, it is not optimal for the board to advise.

To empirically test the model I focus on independent directors because they are the directors who are more likely to possess both functions. In contrast, inside directors and grey directors generally are not expected to play much of a monitoring role since they are the party or are directly affiliated with the party being monitored.⁴ Focusing on independent directors also enables me to reevaluate the findings in the vast literature on independent directors, which only considers their monitoring function, and study the implications of recent regulations that impose higher requirements for the proportion of independent directors.⁵

³As a recent example of such decision affecting firm value, Merrill Lynch's stock price jumped 8.5% upon circulation of the rumor to fire the CEO Stanley O'Neal.

⁴Inside directors are the directors who are employees of the firm, such as CEO, CFO, etc., also called executive board members. Grey directors are the directors who are not employees but have some business relation with the firm, such as suppliers, investment bankers, etc., sometimes called affiliated or linked directors.

⁵SOX requires all public firms to have audit committees made up of all independent directors. Major exchanges (NYSE, NASDAQ, AMEX) further require all listed firms to have majority of the board composed of independent directors, and all independent nomination and compensation committees, if they exist. NYSE further enforces that all listed firms have those two committees.

To test the model, I use the director database from Investor Responsibility Research Center (IRRC) to construct an empirical measure of the number of independent directors who are at the same time executive board members of other firms covered in the database. Indeed, [Kaplan and Reishus \(1990\)](#), [Booth and Deli \(1996\)](#), Fich (2005), and Perry and Peyer (2005) find that such directors have the expertise and incentives to advise management of the receiver firms.⁶ I hypothesize that independent executives (IEs) possess the required knowledge and skills to advise management. As a result of their more active advisory role, such boards are not expected to perform as well in their monitoring function, resulting in lower monitoring quality and higher agency costs. Furthermore, using IEs as the empirical proxy enables me to potentially identify their advisory function directly, by contrasting the corporate policies they choose for their own firms with those they advocate as independent directors on the receiver firms' boards.

I first test whether IEs are associated with lower monitoring quality as predicted by the model. I examine the relation between the quality of the traditional governance functions and IEs. These functions include making CEO succession decisions, setting CEO compensation, and influencing the degree of financial transparency. Consistent with the predictions of the model, I find that conditioned on other economic determinants of these governance variables, IEs are associated with lower CEO turnover and turnover-to-performance sensitivity, higher CEO compensation, larger increases in CEO compensation, lower pay-for-performance sensitivity, and lower earnings quality which proxies for the degree of financial transparency.

I then test whether IEs indeed advise management, and whether such advice benefits the firm. [Kaplan and Reishus \(1990\)](#) and Fich (2005) find that the probability of executives receiving outside directorships increases with the firm's performance. If performance is affected by corporate policies, it is likely that IEs would advise the receiver firm's management using insights from their own firms' policies. As a result, I expect the receiver firm's corporate policies to resemble those of the sender firm, controlling for other firm-specific determinants of such policies.⁷ I follow Bertrand

⁶A receiver firm is a firm who hires executives from other firms as independent directors. In the context of this paper, the executives are confined to those who also sit on boards as inside directors.

⁷A sender firm is a firm who has at least one executive board member serving as independent directors in other firms.

and Schoar (2003) and test three types of corporate policies: investment policy, financial policy, and organizational strategy. Consistent with this hypothesis, I find that the correlation between the sender and receiver firm is positive for each of the ten policy variables examined. In addition, such correlation is highly significant for capital expenditure, cash holdings, dividend payout ratio, R&D expenses and selling, general, and administrative (SG&A) expenses, suggesting IEs might advise more intensively on these policies than others. These results provide the first direct and comprehensive evidence for the board's advisory function.

I then assess the effect that IEs have on the firm's corporate policies. I find that firms whose board include more IEs have lower capital expenditure and leverage, higher dividend payout ratio, R&D expenses, advertising expenses, and SG&A expenses.

To test whether the IEs' advice benefits the firm, I measure the relation between the number of IEs on the board and the firm's performance. I find IEs are positively and strongly associated with performance as proxied by Tobin's Q. Furthermore, several robustness checks suggest that such correlation is causal. In addition, the correlations of IEs with corporate policies generally have the same signs as the policies' correlations with firm performance, suggesting that on average IEs are good advisors. I also find that the positive relation between IEs and firm performance is driven by those IEs who come from firms larger than the receiver firm. If the firm size that an executive can manage serves as a proxy for his ability as argued by [Rosen \(1982\)](#) and documented in [Hayes and Schaefer \(1999\)](#), this evidence is consistent with the prediction of my model: only when IEs' abilities are high enough to overcome the associated agency costs will it be optimal for them to advise. These results are consistent with the board acting optimally in balancing the two functions on average, and that the benefit of the IEs' advising management exceeds the associated higher agency costs that they engender.

Demsetz and Lehn (1985) argue that no significant relation should be expected between a governance variable and firm value if firms behave optimally and there are no market frictions. I test whether a particular friction could potentially explain IEs' significant relation with firm performance. I use SOX and the associated change in the corporate environment as a natural experiment,

and find that the evidence is consistent with a scarcity hypothesis in which such significant relation is due to the limited supply of qualified executives on the market for directors.

This paper makes several novel contributions to the literature on corporate governance and the policy debate regarding the role that boards of directors should play. First, it offers the first direct and comprehensive empirical evidence on the board's advisory function. By using the number of IEs on a firm's board as a proxy for its ability to advise management, I can estimate the effect of this advice on the receiver firm's corporate policies by comparing them with those of the IEs' own firms. In contrast, Agrawal and Knoeber (2001) use the presence of politically-affiliated directors and firm's demand for political connections to identify their advisory function. Similarly, Coles, Daniel, and Naveen (2006) and Graham, Hazarika, and Narasimhan (2007) use the firm's sales revenue, leverage and the number of business segments as proxies for the complexity of the firm and hence the firm's advising demand to identify outside directors' advisory function. The empirical methodology used in this paper is similar to that of Booth and Deli (1999) and Güner, Malmendier, and [Tate \(2007\)](#), in which they use the link between the sitting of financial experts on the board and the firm's external funding to identify their advisory function. Unlike their single variable identification strategy, using executives who are responsible for all the corporate policies as an empirical measure enables me to examine a much broader category of policies.

Second, to the best of my knowledge, this paper is also the first to argue and provide evidence that the scarcity of directors drives their significant relation with firm performance. This has important implications for our understanding of the operations of the market for directors. Most of the literature on boards of directors relies on the reputational concerns of the independent directors to align their interests with those of shareholders (Fama (1980), [Fama and Jensen \(1983\)](#)). Such concern should only be relevant when the market for directors operates through a demand-driven mechanism based on homogenous and unlimited supply of qualified independent directors. In light of the limited supply of such directors (see also Linck, Netter, and [Yang \(2007\)](#)), the means to align their interest with that of shareholders have not been explored formally in the literature, which raises an issue for future research.

Third, this paper adds to the early stage of the theoretical work on the potential conflict between the boards' two major functions, as initiated by Adams and Ferreira (2007) and Harris and Raviv (2007). Although my model shares some similarities with these two papers by analyzing the dual role of monitoring and advising that corporate boards should play, the underlying tradeoff between the two roles is different. Adams and Ferreira (2007) and [Harris and Raviv \(2007\)](#) propose that the board may have to be less independent (or controlled by insiders) to induce management to reveal the private information that may improve the quality of advice. In contrast, my model predicts a lower monitoring quality as a consequence of advising management. This implies that even apparently independent directors can have lower monitoring qualities. Furthermore, in contrast to the prediction of Adams and Ferreira (2007) that the advisory function is always beneficial to the firm, my model implies that the board should not advise unless it is sufficiently skilled.

Fourth, regarding the post-SOX regulations requiring more independent directors on the board based on the assumption that they may perform a better monitoring function, I show that apparent independence may not translate into effective monitoring. Similarly, Coles, Daniel, and [Naveen \(2007\)](#) argue that apparently independent directors who joined the board after the CEO had assumed office are not effective monitors, since they tend to be sympathetic to the CEO. In contrast, lower monitoring quality in this paper comes from independent directors' optimal balance of the two functions. In terms of the attempt to link independent directors' monitoring quality with firm performance as in most of the literature, I show that inferior monitoring does not translate directly into worse firm performance, because superior advice may accompany weak monitoring, with a net positive effect on firm value. Conversely, my approach highlights that effective monitoring does not necessarily suggest improved firm performance. This may offer an explanation to the conclusion reached in Hermalin and Weisbach (2003), that independent directors are generally effective monitors but uncorrelated with firm performance.

Finally, this paper adds to the growing literature that seeks to evaluate the economic benefits and costs of SOX and the new exchange regulations ([Grinstein and Chhaochharia \(2005\)](#) and [Wintoki \(2007\)](#), among others). I show that regulations that force firms to include more independent direc-

tors on their boards may have backfired by simultaneously reducing the supply of such directors.⁸ To make matters worse, executives in large firms have become more reluctant to join the boards of other firms, as the legal liability and time commitment that now come with board membership have increased considerably since SOX. This resulted in a dramatic shift of the demographics of IEs: pre-SOX executives sat on slightly smaller firms as IEs on average, while post-SOX the trend is dramatically reversed. As a consequence, the association between IEs from larger firms and receiver firm's performance is stronger post-SOX. This evidence is most consistent with firms preferring executives from larger- or similar-sized firms, and when the firms were unable to keep the preferred IEs the average size of all IEs' sender firms shrank dramatically. This reduced talent pool imposes a cost for the firms desiring the service of IEs, a cost that has yet to be explored in the literature.

The remainder of the paper is arranged as follows. Section 2 models the tradeoff between the monitoring and advisory functions of the board. Section 3 describes the data and proxies used in the empirical tests, and provides the summary statistics. Section 4 examines IEs' monitoring function. Section 5 examines IEs' advisory function. Section 6 examines the relation between IEs and firm performance. Section 7 uses SOX to test several competing hypotheses to explain the significant relation between IEs and firm performance. Section 8 examines the robustness of the results. Finally, Section 9 concludes.

2 The Model

I consider a simple one-period model. The shareholders of a firm elect a board to represent their interests. For simplicity, the board is assumed to have the same preferences as the shareholders.⁹ A CEO is hired by the board to run the firm. Both the board and the CEO are assumed to be risk-neutral. The CEO's primary job is to choose the corporate policy that maximizes firm value. His ability to do so is initially unknown to both the board and the CEO, as in Holmström (1999), but is

⁸See Lucchetti and Langley (2007) for a recent related article in Wall Street Journal about the thin talent pool for top jobs in financial firms, due to firms' eagerness to fire executives based on short-term performance.

⁹For example, the alignment of the incentives between the board and the shareholders could be achieved via stock compensation.

known to have a prior distribution $a \sim N(a_0, \sigma_a^2)$. As in [Jensen and Meckling \(1976\)](#), the CEO's interests may not be completely aligned with those of the shareholders, and he may conduct some activities that are beneficial to himself at the expense of shareholders. Such activities may include empire building, setting excessive corporate perquisites, and so on. I assume that such an action reduces the firm's value by C and increases the CEO's utility by $2C$. I assume that the action is taken today but the benefit can only be enjoyed in the future, if the CEO retains his job. In effect, C can be interpreted as an agency cost for the firm. Since the CEO's action is unobservable, the value of C cannot be contracted upon. However, in equilibrium, by solving the CEO's optimization problem the board can infer C with certainty.

The profit of the firm is assumed to be the difference between the CEO's ability and the agency cost:

$$\pi = a - C$$

The CEO's utility is assumed to be

$$\begin{aligned} U_c &= \alpha\pi + \Theta 2C \\ &= \alpha a + (2\Theta - \alpha)C \end{aligned}$$

where $0 \leq \alpha < 1$ is a proxy for the degree of the alignment between shareholders and the CEO's interests,¹⁰ and

$$\Theta = \begin{cases} 1 & \text{if the CEO keeps his job at the end of the period} \\ 0 & \text{if the CEO is replaced at the end of the period} \end{cases}$$

This utility function implies that without any concern for job security ($\Theta = 1$), the CEO would always choose the maximum level of agency cost. I assume $0 \leq C \leq \bar{C}$. The upper bound for C (\bar{C}) can be interpreted as the point at which litigation risk and other unmodelled costs reach excessive levels for the CEO. To ensure that the expected profit is always positive, I assume that $a_0 > \bar{C}$.

The board has two functions: monitoring and advising the CEO. I assume the board always monitors the CEO but can choose whether or not to advise him. Monitoring is manifested through

¹⁰Such alignment could be in the form of shareholdings, option awards, long term incentive payments, etc.

the board's replacement decision regarding the CEO by inferring his ability based on the profit realization, and the effect their decision has on the CEO's choice of the agency cost.

Advising the CEO may include activities such as suggesting a new investment project, proposing to increase cash holdings, and so on. I assume that the quality of the advice depends on the board's ability, which is initially unknown to both the CEO and the board, and has a prior distribution $b \sim N(b_0, \sigma_b^2)$. I assume a and b are independent so the board cannot infer a through b . I also assume that if the board advises the CEO, the profit is its own ability net of the agency cost:¹¹

$$\pi = b - C$$

Acting in the best interest of shareholders, the board is assumed to maximize expected profits by choosing whether or not to advise the CEO and deciding whether the incumbent CEO needs to be replaced by a new one, whose ability a' is independent from a , but is drawn from the same prior distribution $a' \sim N(a_0, \sigma_a^2)$. I assume that if the board does not make the right replacement decision, the firm profit suffers an additional loss resulting from either a less capable incumbent CEO running the firm or a more capable one being fired pre-maturely. The board's utility function is assumed to be

$$U_b = \pi - \Lambda P,$$

where Λ is a dummy variable defined as

$$\Lambda = \begin{cases} 1 & \text{if the board does not make the right replacement decision} \\ 0 & \text{if the board makes the right replacement decision.} \end{cases}$$

$P > 0$ is the value lost due to future managerial incompetence. This assumption eliminates the uninteresting case in which the board commits to fire the incumbent CEO regardless of its ex-post assessment of his ability, as such commitment perfectly aligns the CEO's interest with that of the shareholders. In the event that the incumbent CEO's posterior ability is the same as a replacement's

¹¹This assumption makes the profit dependent on the board's own ability and the agency cost, not on the CEO's ability. In general, as long as the quality of the replacement decision increases with the precision of the board's inference of the CEO's ability as in a dynamic setting (unlike the model's one period setting), and the board's advice influences the decision making and hence decreases such precision, the conclusions will be similar.

prior ability, I assume that the board keeps the incumbent CEO. I also assume that if the board is indifferent between advising or not, it will choose to advise.

The timeline of the model is as follows:

- Shareholders choose advisory intensity θ ;
- The CEO takes a hidden action that results in reduction of firm value by C ;
- Profit π is realized;
- The board makes the replacement decision for the incumbent CEO;
- At the end of the period the firm is liquidated and proceeds are distributed accordingly.

Since the prior distribution of a is symmetric around a_0 , the probability that the CEO gets fired is $\frac{1}{2}$. This means that the expected value of Θ is $\frac{1}{2}$ and the expected value of $2\Theta - \alpha$ is positive. Hence, the assumption that the CEO gains $2C$ (rather than simply C) from choosing C implies that the CEO always prefers setting C equal to \bar{C} when his choice does not affect any of the board's decisions. Because the effect of C on the board's decision is the focus of this model, this assumption simplifies the analysis further by assuming away the (uninteresting) case that simple incentive alignment is sufficient to induce the CEO to choose a lower level of agency cost.

To ensure that the board has to balance between the monitoring and advisory functions, the agency cost has to be sufficiently high. I make the following assumption regarding the maximum level of the agency cost \bar{C} :

$$\bar{C} > \frac{(1 - \alpha)\sigma_a}{2\phi(0)},$$

where $\phi(\cdot)$ is the pdf of standard normal distribution. This technical assumption guarantees that there is an interior solution for C in the CEO's optimization problem.

I use backward induction to solve the model. All the formal proofs are in the Appendix. It is clear that the board cannot infer the CEO's ability a under the advisory-scenario, since the profit π is not dependent on a , hence the incumbent CEO is always retained by assumption. This also suggests that the sensitivity of turnover to performance is zero. In contrast, the board can infer a if it does not advise, since π then depends on both a and C . In equilibrium the board will know C and hence a with certainty by observing π and solving the CEO's optimization problem. Therefore

there is a possibility for the CEO to be replaced, and the replacement decision depends on π . As a result, the sensitivity of turnover to performance is positive.

Proposition 1. *The incumbent CEO is less likely to be replaced, and the turnover-to-performance sensitivity is lower, if the board advises him.*

Since the CEO's job is secure under the board's advisory scenario, he will always choose the maximum level of the agency cost \bar{C} . If the board does not advise, career concerns motivate him not to choose too high a C in an effort to convince the board to retain him through higher values of π . In equilibrium, however, the board learns C and a perfectly. But the CEO is "trapped" to this level of C as any other choice of C will negatively bias the board's assessment of his ability.

Proposition 2. *The agency cost C is higher if the board advises the CEO.*

Since the board acts in the best interests of shareholders, it will choose whether or not to advise by balancing the higher agency cost associated with advising, against the benefit from its potentially higher ability. The board will thus choose the advisory function only if such benefit is sufficiently high to overcome the cost. This is formally established in Proposition 3.

Proposition 3. *It is not optimal for the board to advise the CEO unless*

$$b_0 - a_0 \geq \bar{C} - \frac{(1 - \alpha)\sigma_a}{2\phi(0)} > 0.$$

The key to test the model is to identify the type of boards that are more likely to play the advisory function than other boards. Because boards consist of more than one decision-maker, it is expected that boards play more of an advisory role when they include more members who are qualified to advise management.

3 Data and Summary Statistics

This section describes the data and proxies used in the empirical analysis to test the model above, and reports the summary statistics for the key variables.

3.1 Data and Empirical Proxies

The data for directors are taken from IRRC, covering mostly S&P 500, S&P MidCap 400 and S&P SmallCap 600 between 1996 and 2005.¹² For each firm in a given year, IRRC lists the information for each director such as its type (inside director, grey director, or independent director), age, tenure as director, title, share holdings.

Financial data are from the COMPUSTAT annual industrial file and stock price data are from CRSP. Business segments data are from COMPUSTAT/SEGMENTS. CEO compensation data are from EXECUCOMP. Institutional blockholders data are from Thomson Financial Institutional Holdings 13d. Mergers & Acquisitions data are from SDC/Platinum. The data for shareholder rights proxy G-Index as in Gompers, Ishii, and Metrick (2003) are from Andrew Metrick. After merging these sources of data there are 15957 firm-year observations from 1996 to 2005. The particular sample size, however, will depend on different model specifications and data availability. The sample is based on firm-calendar years rather than firm-fiscal years, as in the IRRC data.

As discussed in the introduction, I use IEs as the empirical proxy to test the model of Section 2, as they may possess the required knowledge/ability to advise the management, and their independence status also implies the monitoring function.¹³

I note one potential bias to use this variable as the proxy: some firms may have independent directors who are executive board members of the firms not covered in the IRRC database hence not coded as IEs. Such bias is unlikely to be severe based on two observations. First, since the focus of this study is on those independent directors who may possess high ability to be able to advise the management, and to the extent that executives from smaller firms not covered by IRRC may not possess such required ability, such bias will not be significant. Second, executive board members are more likely to sit as IEs in a smaller- or similar-sized firms as their own firms, and their outside directorships decrease with firm size as I will document later. This further alleviates

¹²The coverage is slightly over 1500 firms. IRRC also selectively covers some firms not in the S&P 1500 but with significant institutional ownership.

¹³One observation from this choice of empirical proxy is that I do not argue ex-ante that no other board members except for IEs will advise the management. In fact, many of them, such as retired executives or academicians may also possess the required ability to advise the management. In a work in progress, I find the rest of independent directors other than IEs seem to advise the management less intensively but monitor better.

the bias.

Proposition 1 and 2 imply that the quality of the CEO turnover decision is lower and the agency costs higher if the board advises. In addition to examining the relation between CEO turnover and the presence of IEs on boards, I use two other measures to proxy for the level of agency costs: CEO compensation and earnings quality as in Ecker, Francis, Kim, Olsson, and Schipper (2006).

CEO turnover is calculated from the IRRC database. A CEO has experienced turnover in a given year (CEO turnover=1) if he no longer serves as the CEO of the same firm at the next annual meeting. To study the influence of corporate boards on the CEO succession decision it would be ideal to focus on forced CEO turnovers. Data availability prevents me from conducting such an analysis. I follow Kaplan and Minton (2006) and use dummy variable for whether the CEO is over 60 to approximate all voluntary resignations such as retirement.¹⁴ Since I focus on the board's internal monitoring function, I also exclude firm-years for which the firm is a takeover target from the sample.

I examine both the level of CEO compensation and the change of compensation, as in Coles, Daniel, and Naveen (2007). For the level of CEO compensation I examine the CEO annual total pay (Total pay, EXECUCOMP data item TDC1) and two of its components: the cash part of CEO annual pay (Cash pay, salary plus bonus, EXECUCOMP data item TCC) and the Black-Scholes value of the option part of CEO annual pay (Options, EXECUCOMP data item BLK_VALU). I take the logs of these variables to alleviate the concern for outliers. For the change of CEO compensation, I examine the change in CEO annual total pay (Δ Total pay).

For earnings quality I use the variable in Ecker, Francis, Kim, Olsson, and Schipper (2006) as the proxy. Dechow and Dichev (2002) use the standard errors from the firm-specific regressions of working capital accruals on last year, this year, and next year's cash flow from operations to proxy for the earnings quality (AQ). Ecker, Francis, Kim, Olsson, and Schipper (2006) augment the Fama and French (1992) three-factor model with this AQ factor and argue that the loading on this factor (Eloading) is a better proxy for earnings quality than other contenders. To the extent that

¹⁴Results using 65 as the cutoff retirement age are qualitatively similar.

Eloading includes both the innate part of the earnings quality and the management discretionary part, it is a noisy measure to examine the board's monitoring function. But as long as Eloadings are associated with lower firm performance, as evidenced in Bradley, Chen, Dallas, and Snyderwine (2007), it still gives some signal for the board's monitoring quality. I take the inverse of Eloading to proxy for the earnings quality since the higher the loading on AQ factor, the more exposure the firm is to earnings risk, hence the lower earnings quality.

To study IEs' advisory function I estimate the link between the corporate policies of the IEs' sender firms and those of the receiver firms. I follow Bertrand and Schoar (2003) and study three types of corporate policies: investment policy, financial policy, and organizational strategy. For investment policy I focus on capital expenditure (Invest) and the number of acquisitions in a given year (Aqr). For financial policy I focus on leverage (Lev), interest coverage ratio (Intcov), cash holdings (Cash), and dividend/earnings (payout) ratio (Div). For organizational strategy I study the firm's number of diversifying acquisitions made in a given year (Daqr), the firm's R&D expenses (R&D), advertising expenses (Adver), and SG&A expenses. Diversifying acquisitions are defined as acquisitions in which the target firm operates in a different industry as the acquirer. I use the 48 industry classifications in Fama and French (1997) throughout the paper.¹⁵ There are large amount of missing values for R&D and Adver. I follow Coles, Daniel, and Naveen (2007) and replace the missing values of R&D by zero. I also replace the missing values of Adver by zero.

For firm performance I follow the convention in the literature and use Tobin's Q as the proxy. It is defined as the ratio of the market value of the firm's assets to their replacement cost. Accounting convention prevents a precise measure of replacement costs. It is therefore approximated by the book value of the firm's asset. I take the log of this variable in the regression analysis. I also use accounting performance measures such as return on assets (ROA), return on equity (ROE), return on sales (ROS), sales to assets (STA), and operating return to assets (OPROA) to check the robustness of IEs' performance effect.

To rule out the decreasing-demand as an explanation for the increasingly significant relation

¹⁵Results using two-digit SIC code as the industry classifications are similar.

between IEs and firm performance, I study the difference for the change of director compensation for firms adding IEs versus firms losing IEs after SOX. I use the director annual retainer from EXECUCOMP (data item ANNDIRRET) as the compensation proxy.¹⁶

Table 1 lists the definition and data source for each variable used in the study.

3.2 Summary Statistics

To alleviate the concern of outliers, the CEO compensation variables and all the financial ratios, including corporate policy variables, are winsorized at 1% percentile. Panel A of Table 2 provides the winsorized summary statistics for the key variables in the study. As can be seen from the table, the median firm's board does not include any IE. In fact, only around one third of the firms have IE(s) on their board. The average number of IEs is 0.542, with a standard deviation of 0.933, suggesting that the presence of IEs on corporate boards is not a common phenomenon and that there are large variations across firms for such presence. The average (median) board also includes 5.59 (5) independent non-executives (INEs), and a total number of 9.5 (9) members. The latter matches the sample mean and median values in Denis and Sarin (1999) closely (9.35 and 9 respectively). On average, directors earn \$23,246 for retainer annually, which is merely 0.5% of average CEO's annual total compensation (\$4.7 million), suggesting that the main incentive for executives to serve as IEs may not be pecuniary, which is consistent with survey evidence ([Neff and Heidrick \(2006\)](#)).

The fraction of sender firms is 33%, and 34% for that of receiver firms. The fact that these numbers are similar raises the concern for whether the mutual sitting of executives on each other's boards (interlocking directorships) is a common practice and may drive the potentially low monitoring quality, as in Hallock (1997) and Graham and Wu (2006). Yet the more recent coverage of this sample alleviates such a concern. As argued in [Graham and Wu \(2006\)](#), a consequence of IRS Section 162(m) is the dramatic reduction of interlocking practices among corporate boards, as interlocking directors are characterized by IRS as insiders, so the \$1 million cap for the tax deductibility of top executives' compensations applies. Consistent with this argument and other

¹⁶This difference-in-difference approach also alleviates the concern for the imprecise director compensation data documented in Farrell, Friesen, and Hersch (2007).

potential forces such as shareholder activism, I find only 9.3% of the firms with IEs have interlocking directorships, which is less than half of the value in Hallock (1997)'s 1992 sample (20%).

Panel B of Table 2 provides a more detailed description of the distribution of IEs by firm size quartiles. Not surprisingly, board size increases monotonically with firm size, and so does board independence. The fraction of IEs on boards also increases with board size. The fraction of receiver firms and the fraction of sender firms also increase with firm size, and the two numbers are very close to each other, suggesting that firms may be inclined to seek executives from similar or larger-sized firms to be independent directors.¹⁷ I confirm this observation in Panel C.

The last column of Panel B lists the average number of outside directorships for executive board members by size quartiles. This number also increases monotonically with firm size, which further alleviates the bias in using IE as an empirical proxy as discussed in Section 3.1, since it suggests executives from smaller firms not in the IRRC database are less likely to take outside directorships.

In Panel C, I compare the characteristics of the sender firms, including their executive board members' characteristics, to those of the receiver firms. As shown, IEs have a much longer tenure as executive board members than the receiver firms' CEOs (10.4 versus 5.8 years); they are also slightly older (57 versus 55 years old), and they have far more outside directorships (1.9 versus 0.9). These figures are consistent with IEs being knowledgeable directors and being in a good position to advise the management.

Consistent with the observations made from Panel B, Panel C indicates that sender firms are similar to receiver firms in terms of size, number of business segments, and performance as measured by Tobin's Q. Sender firms perform slightly better in terms of ROA. In Section 7 I document that the similarity in size between sender and receiver firms is the product of SOX and the effect it had on the number and origin of IEs. In particular, before SOX executive board members sat on slightly smaller firms' boards as IEs. After SOX, this trend is dramatically reversed.

I also compare the corporate policies for the sender and receiver firms. I average a given firm's

¹⁷If a firm seeks IEs from larger firms, and since the largest firms can only seek IEs from their comparable-sized firms, this will also generate the pattern observed in Panel B if I assume executives cannot take too many outside directorships, which is quite plausible given their full-time job in the sender firms.

IEs' sender firms' policy values. It can be seen that for majority of these variables sender firms are significantly different from receiver firms (6 out of 10).

Figure 1 portrays the time trend for the fraction of IEs and INEs to board size over 1996 and 2005. Interestingly, there is generally a downward trend of the fraction of IEs over the sample period. Such a trend seems to flatten right before the passage of SOX in 2002, but resumes afterwards. In contrast, the fraction of INEs has been generally rising during this time period. In Section 7 I argue that these trends are best explained by the increasingly limited supply of executives on the market for directors.

4 IEs and the Monitoring Function

I first test for the potential cost of having IEs on boards by examining their monitoring function. If IEs indeed advise the management, as I argued above, Proposition 1 in Section 2 implies that CEO turnover and turnover-to-performance sensitivity will be lower. I test this prediction by running logit regressions for CEO turnover on the number of IEs and other relevant variables. Following [Kaplan and Minton \(2006\)](#), I use the annual stock return as the performance measure and break this measure into three components: the firm stock return relative to industry median stock return, the industry median stock return relative to value-weighted market return, and the value-weighted market return. I also control for proxies for CEO's power relative to the board. I use two such proxies: CEO shareholdings, and a dummy for whether the CEO is also the chairman of the board. As discussed in Section 3, I control for a dummy for whether the CEO is older than 60 to proxy for the voluntary departure (such as retirement) of the CEO. As my focus is on the internal monitoring of the board, I drop the firm-years for which the firm is a takeover target. Following Coles, Daniel, and Naveen (2007) I control for firm size, since large firms' CEO turnover pattern may be quite different from that of small firms. I also control for board size to make sure that the effects of IEs are not driven by IEs' proxying for other type of directors. Throughout the paper I control for Fama and French (1997) 48 industry dummies, year dummies, and a constant term. As suggested in Petersen (2007) and due to the strong auto-correlations of corporate governance variables, standard

errors are adjusted for heteroscedasticity and clustered at the firm level for all the models in the paper.

The first two columns at Table 3 report the results. Model 1 shows the association between CEO turnover rate and IEs. The coefficient on IE is negative and significant at 10% level, suggesting that IEs are associated with lower CEO turnover rate, consistent with the model prediction. Unlike [Kaplan and Minton \(2006\)](#), who find that CEO turnover is sensitive to all three measures of firm performance, I find CEO turnover is only sensitive to the industry-adjusted firm returns and not to market-adjusted industry returns or the market returns. This is consistent with relative performance evaluation (RPE) of CEOs, however ([Morck, Shleifer, and Vishny \(1989\)](#), [Parrino \(1997\)](#), [Engel, Hayes, and Wang \(2003\)](#)). Model 2 studies the relation between CEO turnover-to-performance sensitivity and IEs by including an additional control variable: the interaction of a dummy for whether the firm's fraction of IEs to board size is larger than the median value of such fraction for all the firms in a given year (High IE), and the industry-adjusted firm return ([Weisbach \(1988\)](#), [Coles, Daniel, and Naveen \(2007\)](#)). The coefficient on this interaction term is positive and significant at 10% level, suggesting that IEs are associated with lower CEO turnover-to-performance sensitivity, consistent with the model prediction.

The model in Section 2 predicts that if IEs advise the management agency costs will be higher. I use four proxies for agency costs to examine their associations with IEs: CEO compensation level, the increase of CEO compensation, CEO pay-for-performance sensitivity, and earnings quality.

Since governance variables are typically varying slowly across time, the group-demeaned fixed effect regressions tends to reduce the significance of an independent variable, even though such variable may have explanatory power for the dependent variable ([Zhou \(2001\)](#)). I thus follow [Coles, Daniel, and Naveen \(2007\)](#) and use pooled OLS regressions to study three measures of CEO compensation: Total pay, Cash pay, and Options, as discussed in Section 3.1. Control variables are based on the survey by [Murphy \(1999\)](#): firm performance, firm size, and CEO tenure. I also control for board size. Performance variables include the three performance variables as in Model 1 & 2, and ROA. As in [Coles, Daniel, and Naveen \(2007\)](#) I drop the firm-years in which the CEO

has experienced turnover and require the CEO's tenure be at least 1 year to eliminate the concern for fractional pay. Columns 3 to 5 in Table 3 report the results. IEs are positively associated with all three measures of CEO compensation. The results are significant at at least 5% level for Total pay and Cash pay, and marginally significant (at 15% level) for Options. The coefficient of 0.04 on IE for the Total pay regression suggests that addition of one IE on board, controlling for other relevant factors, increases the CEO total pay by 4%, since the dependent variable is in log term. Using the median value of CEO compensation \$2.5 million in Table 2, this amounts to an increase of \$100,000. This is an economically large increase, suggesting that IEs are associated with higher, and statistically and economically significant compensation levels for CEOs.

Obviously, correlation does not suggest causality. It is possible that because of the excessive CEO pay levels shareholders recruit more IEs on boards to solve such problem. In undocumented regressions I use the predicted values based on the coefficients on IE of the regressions in Table 3 to study their associations with future firm performance (Tobin's Q), and find the associations are negative as in Core, Holthausen, and Larcker (1999). These results suggest that IEs indeed cause higher CEO compensation, and such agency costs are negatively associated with future performance.

For CEO pay increase I follow Jensen and Murphy (1990) and use Δ Total pay as the dependent variable, and use pooled OLS regressions to study its association with IEs and total shareholder dollar return in a given year. As in Coles, Daniel, and Naveen (2007) I also control for board size, CEO tenure, and drop firm-years in which the CEO has experienced a turnover in the current or previous year, and if the CEO's tenure is less than 2 years from the sample. Columns 6 and 7 provide the results.

Column 6 shows that IEs are not only associated with higher CEO total pay, but also larger increase of such pay. The coefficient on IE suggests that addition of one IE on the board, controlling for other factors, is associated with \$83,910 pay increase for the CEO. This is a dramatic increase based on the median value of Δ Total pay: \$136,471 in Table 2.

To study the relation between pay-for-performance sensitivity and IEs, in column 7 I control for

an additional variable, the interaction term between the High IE dummy as defined above and the dollar return. Though the coefficient on this variable is negative, consistent with IEs decreasing the pay-for-performance sensitivity, it is not significant.

Finally, I study the association between IEs and earnings quality as proxied by the inverse of Eloading. I use pooled OLS regression and control for board size, firm size and firm risk. I use the volatility of stock price over the past 60 months to proxy for the firm risk. The result is presented in the last column in Table 3. It suggests that IEs are negatively and significantly associated with earnings quality.

Overall the results for IEs' monitoring function suggest that IEs are not effective monitors in reducing the agency costs, consistent with their potential advisory role as predicted by the model in this paper. I thus examine whether they indeed advise the management in the next section, and whether this potential advisory benefit exceeds the associated higher agency costs in Section 6.

5 IEs and the Advisory Function

As documented in [Kaplan and Reishus \(1990\)](#), [Booth and Deli \(1996\)](#), [Perry and Peyer \(2005\)](#) and [Fich \(2005\)](#) the probability of executives taking outside directorships increases with their firms' performance. Fich (2005) further suggests that firms hire executives as outside directors to utilize their expertise. If such expertise is manifested through proper choice of corporate policies in managing their sender firms, it is quite natural to hypothesize that they may choose to advise the receiver firm's management using insight from their own firms' policies. This is also consistent with IEs being very busy people as I will document later, since busyness means they may not be able to exert much effort to advise the management on a firm-specific basis. I thus test the correlations between the sender firms' corporate policies and those of the receiver firms' to identify their advisory function. The arguments above suggest that these correlations should be positive. Table 4 reports the results.

Since only firms with an IE are included in the sample for the test, the sample size is dramatically reduced as compared with Table 3. Each dependent variable in the table is a corporate policy

variable as discussed in Section 3.1. I use OLS regressions to study the correlations between the firm's corporate policy and the corresponding average policy values of all the IEs' own firms (AveIEX, where X is the corporate policy variable), controlling for other firm-specific determinants of the policy. These control variables follow Bertrand and Schoar (2003). I consider the possibility that interlocking of directorships might generate mutual advising hence making the OLS estimates inconsistent, so I dropped all the firm-year observations with interlocking directorships.¹⁸ All the coefficients on AveIEX in Table 4 are positive, consistent with expectations. Furthermore, the coefficients on Invest, Cash, Div, R&D, and SG&A are significant, suggesting that IEs may have stronger influence on these corporate policies than others.

Other potential hypotheses may also explain these positive correlations. First, if IEs conduct their monitoring function on these corporate policies effectively, as Raheja (2005), Adams and Ferreira (2007), and Harris and Raviv (2007) suggest, they could also potentially influence these values chosen by the management which may not be in the best interest of shareholders (such as conducting too many acquisitions for empire building). I call this the "monitoring hypothesis". Yet the key feature of the monitoring function as identified in these literature is the active involvement of the board in the determination of key corporate strategies.¹⁹ Such involvement will require exerting effort which is implausible especially for IEs due to their busyness. I thus test the "monitoring hypothesis" by examining the busyness of IEs using two measures: the total number of outside directorships and whether they miss 75% of the board meetings, in addition to the evidence in Panel C of Table 2, where I document that the number of outside directorships for sender firms' executives is more than twice the number of outside directorships for receiver firm's CEOs. I compare these two measures for IEs vs. INEs. Panel A of Table 5 reports the results. IEs on average hold 1.91 outside directorships, compared with only 1.20 for INEs. Their fraction to miss at least 75% of the board meetings is twice as many as such fraction for INEs. This evidence confirms the busyness of IEs. Furthermore, using the classification of three total board memberships as "busy"

¹⁸This may not fully eliminate the concern, however, since directors can have influence on each other's corporate policies through a chain of networks. I thus also use 3SLS to study the simultaneous determination of the sender and receiver firm's corporate policies and obtain similar results as OLS.

¹⁹The literature uses a cost function to proxy for such involvement.

in Fich and Shivdasani (2006), IEs' average total number of directorships 2.91 (1.91+1) also puts them in the category of "busy" directors. Such busyness is inconsistent with their potential influence on corporate policies through the monitoring function, but still consistent with the advisory function which allows for a more hands-off approach.

Second, the positive correlations between sender and receiver firms' policies may come from executives from the same industry and policy similarities for firms within the same industry. I term this as the "industry hypothesis". This is related to the monitoring hypothesis, since one could argue that IEs from the same industry are familiar with the business that they do not have to spend much effort to monitor the management. First, I note that only 17.3% of the receiver firms have at least one IE from the same industry (in terms of his/her sender firm), which suggests that the vast majority of IEs cannot be too familiar with the business of the firm to make the effort exertion less of a concern. But it could still be possible that the positive correlations are driven by this group of IEs from the same industry. I then test this hypothesis formally by including an additional variable for the models of Table 4, an interaction term between a dummy for whether at least one IE on the board comes from the same industry (Same industry) and AveIEX as defined above. If the industry hypothesis holds, the positive correlations documented above should be fully captured by this interaction term. Yet the results in Panel B of Table 5 suggest that the coefficients on AveIEX which are significant in Table 4 (Invest, Cash, Div, R&D, and SG&A) are still significant after the interaction term is included. The interaction terms are also significant, which might suggest that IEs from the the same industry advise the management differently from other IEs.²⁰

Third, the positive correlations between sender and receiver firms' policies may come from a matching of IEs based on firms' corporate policies. It is possible that a CEO brings a colleague on the board who shares with him the same view on corporate policies, but the latter may not bring additional insight into the decision making process. I term this the "matching hypothesis". First, as noted in Güner, Malmendier, and [Tate \(2007\)](#), it might be plausible for an IE to share the same

²⁰One may naturally imagine that IEs from the same industry may advise more intensively than other IEs. This suggests the interaction term should be positive. But it is also possible that IEs from the same industry advise less intensively because of the potential competition between their sender firms and the receiver firms. This suggests that the interaction term should be negative. The results in Panel B of Table 5 give evidence for both hypotheses.

view with the CEO on a single or limited number of corporate policies, but it is not very likely that they would share the same view on the scope of the corporate policies documented in Table 4. In fact, even if this hypothesis holds for a single policy, such scope of corporate policies suggests that IEs still influence other corporate policies once they are recruited. Second, it is harder for this “matching hypothesis” to explain the more senior profiles of IEs as managers than the receiver firms’ CEOs, and the evidence that a majority of the corporate policies are significantly different for the sender and receiver firms as documented in Panel C of Table 2. Third, it is also harder for this hypothesis to explain much of the survey evidence that firms seem to desire the service of the directors who would broaden the management’s perspective. I nevertheless formally test this hypothesis by testing the strength of the correlations between the sender and receiver firm’s corporate policies, depending on whether the executive sits on the board as an IE or not.

To conduct this test, I use director-firm-year observations rather than firm-year observations to run the OLS regressions. This means for a single firm in a given year there can be multiple observations if the firm has more than one IE. To construct the sample, I track every executive board member who served as an IE within the period from 1996 to 2005, and delete those IE-firm-year observation for which the executive switches firms to be the manager (to make sure that the potential different strength of the correlation is not due to two different sets of firms), and those IE-firm-year observations for which the executive sits as an IE for the whole period. In effect, the sample includes those IE-firm-year observations for which either initially the executive did not sit as an IE but later joined the board, or initially the executive sat as an IE but later departed from the board, or both. I regress each corporate policy value on the corresponding value of each IE’s sender firm (IEX). I control for an interaction term for whether the executive is on the board (Executive sits as IE) and IEX. Results are reported in Panel C of Table 5. If the matching hypothesis fully explains the positive correlations between sender and receiver firms’ corporate policies, one should not expect the interaction term to be significant. But the results in the table suggest the interaction term on Cash and Div are marginally significant and the coefficient on IEX is not significant, which suggests that the correlations between sender and receiver firms’ policies are not significant unless

the executives sit on boards as IEs. This is clearly inconsistent with the matching hypothesis. The results for R&D and SG&A, however, give some support for this hypothesis. But as noted above, this might simply suggest that IEs may be recruited on the board based on the matching of some policies between the receiver and sender firms, but they still influence other policies through their advisory function.

Overall, the results in Table 5 are not consistent with alternative hypotheses fully capturing the positive correlations between sender and receiver firms' corporate policies. These results together with the evidence in Table 4 are most consistent with IEs' advisory function.

The remaining question is how the presence of IEs affects the corporate policies on average out of the advisory pattern as documented above. This will ultimately determine whether IEs indeed bring benefit to firms through their advisory function. To answer this question, I use pooled OLS regressions to examine the effect of the number of IEs on the policy variables, controlling for board size and the same set of variables as in Tables 4 and 5.²¹ Table 6 lists the results. Since I'm using the number of IEs to run the regressions, the samples include those firms without any IEs, which are much larger than those reported in Tables 4 and 5. The results in the table suggest that the more IEs, the lower Invest and Lev, the higher Div, R&D, and SG&A.²² These results suggest that IEs' advisory function has significant effects on some corporate policies. Whether such effects are beneficial to the firm, however, is not clear from these regressions. I thus examine in the next section whether the documented advisory function for IEs brings benefit to the firm, and whether such benefit exceeds the associated higher agency costs.

6 IEs and Firm Performance

The results in Table 3 suggest that IEs are ineffective monitors and are associated with higher agency costs. Table 6 documents that IEs influence several corporate policies through their advisory function.

²¹One may question whether this average effect is indeed due to such pattern of advice. As long as on average IEs' sender firms are associated with certain direction of policy values, and such direction agrees with the sign on the average effect of IEs on such policy (for example, on average IEs come from firms with higher dividend payout ratio, and the average effect of IEs on receiver firm's dividend policy is also positive), as I confirm is generally the case, this average effect is still due to such pattern of advice.

²²The result for Invest is not robust excluding finance & utility firms from the sample, as I discuss in Section 8.4.

sory function. To determine whether the potential benefit of IEs' advisory function exceeds the costs, I examine the relation between IEs and firm performance. I use Tobin's Q as the performance measure. Control variables are based on a survey of prior literature (Gompers, Ishii, and Metrick (2003), Coles, Daniel, and Naveen (2006), Graham, Hazarika, and Narasimhan (2007)), which include board size, Lev, ROA, number of institutional blockholders with at least 5% holdings (Block holders), G-Index, the incentive part of the CEO compensation (CEO incentive), firm size (Firm size), R&D, Invest, intangible assets (Intangible assets), firm age (Firm age), the number of business segments (Business segments), and a dummy for whether the firm is in the S&P 500 index (S&P 500 index). I use pooled OLS regressions and take the log of Tobin's Q to run the regression. Model 1 of Table 7 presents the result.

The result in Model 1 suggests that IEs are strongly (at 1% level) and positively associated with firm performance. Since the dependent variable is in log term, the coefficient on IE (0.024) suggests that adding one more IE on the board, with other variables fixed, increases Tobin's Q by 2.4%, which is also economically significant. It is also notable that the coefficients on Lev and R&D have the same signs as the correlations between IEs and these two variables as in Table 6, which suggests that IEs' advice on these two policies are beneficial to the firm. The coefficient on Invest, however, is positive and strongly significant which is opposite to the correlation between IE and this variable. This result seems to suggest that IEs' advising is detrimental to the firm. I will document two pieces of evidence that is not consistent with this argument in Section 8. First, the significant impact of IEs on Invest disappears when I exclude finance & utility firms from the sample. Since these firms generally have quite different investment patterns as noted in Bertrand and Schoar (2003), this result suggests IEs' influence on this variable is not robust. Second, when I include the lagged value of Tobin's Q in the performance regression to control for endogeneity of Tobin's Q in the performance regression, the coefficient on Invest becomes negative and significant. Since investment might respond to Tobin's Q (which also proxies for the incentive for firms to invest), this result suggests that firms might over-invest by observing Tobin's Q. If this holds, then IEs' negative effect on investment is not harmful, but beneficial after all. The result in

Model 1 suggests that IEs' advisory function brings benefit to the firm, and such benefit exceeds the associated higher agency costs.

Since IEs also significantly influence the firms' Div, Adver, and SG&A, I control for these additional variables in Tobin's Q regression to examine further whether IEs' associations with these variables bring benefits to the firm. Model 2 of Table 7 reports the results. The coefficients on these three variables are all positive, which agree with the signs of their correlations with IE in Table 6. These results further suggest that IEs on average are good advisors. It is also notable that even after all the corporate policy variables that are significantly influenced by IEs have been controlled for, IE is still significant. I test alternative hypotheses in the next section to explain this significant relation.

Proposition 3 in the theory suggests that unless IEs' abilities are sufficiently high they should not advise. To test this prediction, I use firm size that an executive can manage to proxy for his ability, as argued in Rosen (1982) and evidenced in Hayes and Schaefer (1999). In Model 3 of Table 7 I include an interaction term for whether the average size of all IEs' sender firms is greater than the receiver firm (Dummy(IE_Firm size > Firm size)) and IE. I expect this interaction term to be positive if IEs with higher abilities improve firm performance better. Indeed, the result confirms this prediction: the interaction term is positive and highly significant (at 5% level). In addition, IE loses significance after this interaction term has been controlled for, which suggests that the positive effect of IEs on performance is driven by those IEs with high abilities, if firm size which they can manage proxies for such ability. This is consistent with the prediction of the model, but inconsistent with the proposition in Adams and Ferreira (2007), that it is always desirable for the board to have an advisory function.

7 Explaining The Significant Relation Between IEs and Firm Performance

Demsetz and Lehn (1985) argue that if firms behave optimally, all the relevant variables have been controlled for, and there are no market frictions (such as transaction costs and limited supply of qualified directors), no significant relation should be expected for a governance variable and

firm performance. IEs' positive relation with firm performance suggests that the board might act optimally in balancing the two functions. I document evidence in Section 8.1 that suggests firms seem to understand the tradeoff between the two functions that they place more IEs on their boards when their demand for outside advice is higher. I test for other hypotheses that could potentially explain the significant relation between IEs and firm performance.

I use the passage of SOX and its associated change in corporate environment as a natural experiment for this test. As much survey evidence suggests (Daum and Neff (2005)), post-SOX it is harder for firms to recruit qualified directors due to the heightened litigation risk to serve as directors. Many companies limit the number of outside directorships for their executives to make them focus on managing their own business. As a result, the supply of executives to be potential IEs may be (further) limited post-SOX. If the scarcity of IEs drives their significant relation with firm performance, I should expect such relation to be even stronger post-SOX. In contrast, SOX does not imply a significant change of the relation between IEs and firm performance based on other hypotheses, such as transaction costs and missing relevant variables. Hence, it offers an ideal environment to differentiate between these hypotheses.

Though the survey evidence suggests that the argument for the limited supply of executives is quite plausible, it is theoretically possible that the generally downward trend for IEs observed in Figure 1 is due to firms' decreasing demand for IEs, especially in light of the model and evidence above, that IEs are not effective monitors. If post-SOX risk increases dramatically for not being effective monitors, firms may find it optimal to remove IEs from their boards to avoid the potential larger loss of firm value due to shareholder litigations. I test this shrunken-demand hypothesis by examining the change of director compensation for firms losing IEs ($\Delta IE < 0$) versus those adding IEs ($\Delta IE > 0$) post-SOX. I use the annual director retainer to proxy for director compensation. I match these two groups of firms by industry and size. I set 2002 as the last pre-SOX year since SOX was passed in August, 2002. I calculate the change of the annual director retainer between 2002 and 2005, and calculate the t-statistic for the difference of such change across the two groups of firms. Panel A of Table 8 lists the results. Both sets of firms increase the compensation to attract

the directors. But the firms with $\Delta IE > 0$ increases significantly more compared with firms with $\Delta IE < 0$ (at 2% level), which is not consistent with the shrunken-demand of IEs.

I then document a dramatic shift of the demographics of IEs post-SOX. As the evidence in Panel B of Table 2 suggests, executives from larger firms take significantly more outside directorships than executives from smaller firms. This implies that the former may decrease their directorships more than the latter, since they were busier pre-SOX. In Panel B of Table 8 I test this hypothesis by examining the difference between the change of the number of outside directorships for executive board members from the largest size quartile compared with executive board members from the smallest size quartile. As can be seen, executive board members from large firms decreases their outside directorships significantly (at 5% level), compared with the insignificant change for those from small firms, which is consistent with this hypothesis.

This pattern of the change of outside directorships would imply that the average size of IEs' sender firms should shrink post-SOX relative to the receiver firms, as I document in Panel C of Table 8. It is interesting to note that before SOX, executives sit on slightly smaller boards to be IEs (significant at 13% level), but such pattern is dramatically reversed post-SOX (significant at 2% level).

As I argued in Section 6, if the firm size that an executive can manage serves as a proxy for his ability, this change of the demographics of IEs suggests that on average the talent pool of all IEs shrank post-SOX, which implies an even stronger relation between IEs from larger firms and firm performance. I formally test this prediction in Panel D of Table 8, by including an additional interaction term as Model 3 of Table 7, the product of Dummy(IE_Firm size > Firm size), IE and a dummy for whether the year is post-SOX (after 2002, SOXyear). Indeed, this interaction term is positive and significant at 5% level, consistent with the prediction.

These results suggest that the significant relation between IEs and firm performance is driven by the scarcity of IEs on the market for directors, particularly those whose abilities are high as proxied by their sender firms' sizes. SOX and its associated corporate environment further discourages the supply of those executives to serve as IEs, which imposes a cost for all the firms desiring their

service.²³

8 Robustness Checks

I run additional regressions to confirm the robustness of the results established in the former sections.

8.1 IEs and Firms' Demand for Advice

This section gives further evidence for IEs' advisory function, by examining the relation between the number of IEs and firms' demand for outside advice. Given IEs' advisory function as documented in Section 5, the results also suggest that firms understand the tradeoff between the higher agency costs associated with them and their advisory benefit, and bring more IEs to their boards only when they need their advice the most. I use the three measures as in Coles, Daniel, and Naveen (2006) to proxy for firms' demand for advice: the firm's sales revenue, Lev, and Business segments. Coles, Daniel, and Naveen (2006) argue that the higher these values the more complex the firm is, hence the higher the demand for advice. Since these variables tend to be positively correlated with each other, I follow Coles, Daniel, and Naveen (2006) and use factor analysis to reduce the three variables to a single factor score (Advice). I use OLS regression to study the relation between the number of IEs and Advice, controlling for other relevant variables. I follow the current literature on the determinants of the composition of the board (such as Boone, Field, Karpoff, and [Raheja \(2007\)](#)) to control for board size, firm performance (Tobin's Q and ROA), R&D, G-Index, CEO tenure and age, intangible assets and firm age. Column 1 in Table 9 reports the result.

²³One may argue that IEs should capture all the economic rents due to their scarcity, rendering the receiver firms no net benefits in recruiting IEs. If the economic rents are in terms of director compensation, the rising trend of such compensation as documented in Panel A of Table 8 seems to be consistent with this argument. In undocumented analysis I control for director annual retainer as an additional variable in the Tobin's Q regression and find IE is significant. To possibly explain this result, I note that each director receives the same annual retainer for a given firm. This suggests that firms may have to balance between directors with different abilities and set the compensation accordingly (see, e.g., the model in Farrell, Friesen, and Hersch (2007)). If IEs are at the high end of the ability spectrum this practice implies IEs cannot capture all the rents. A second explanation for IEs' inability to capture all the rents is that the incentive for executives to serve as IEs is not pecuniary for the most part. As many survey evidence suggests (e.g. [Neff and Heidrick \(2006\)](#)), the biggest reasons for them to take outside directorships include reputation of the company and its financial condition, and the experience that can be applied to their own firms. If this is true, then serving as IEs for executives may be beneficial for both the receiver firms and themselves, which suggest they do not capture all the rents.

The coefficient on Advice is positive and strongly significant (at better than 1% level), which suggests that when firms demand more outside advice they recruit more IEs to their boards. This provides further evidence for IEs' advisory function. It also suggests that firms seem to understand the tradeoff between the two functions and bring more IEs when their demand for their advice is higher. In column 2 I examine whether the positive effect of IEs on performance is significant only when their advisory function brings the highest benefit to overcome their potential costs, by including an interaction term for a dummy of whether the firm's Advice is greater than the median value of Advice for all the firms in a given year (Advice dummy) and IE, in the Tobin's Q regression as Model 2 of Table 7. Consistent with expectations, this interaction term is positive and significant at 5% level. Furthermore, the coefficient on IE becomes negative and insignificant.

Since governance variable and firm performance tend to be mutually determined (Hermalin and Weisbach (2003)) the estimates in Tables 7 and 9 may be biased. To overcome this issue, I use 3SLS to study the simultaneous determinations of Tobin's Q and IE. The last two columns in Table 9 report the results. Advice is still positive and strongly significant in the IE regression, so is IE in the Tobin's Q regression, confirming IE's positive impact on firm performance with the potential endogeneity considered. As is well known, this structural estimation methodology is sensitive to model specifications. I thus examine further the endogeneity issue between performance and IE in Section 8.2.

8.2 Causality Between IEs and Tobin's Q

The endogenous determination of board composition and its causal relation with firm performance has been the focus of recent study on corporate boards ([Hermalin and Weisbach \(1991\)](#), [Bhagat and Black \(2002\)](#), [Duchin, Matsusaka, and Ozbas \(2007\)](#)). I thus run additional tests to examine the causality between IEs and Tobin's Q. In Model 1 of Table 10 I use the lagged values of IE and board size in the Tobin's Q regression. The coefficient on the lagged value of IE is still positive and significant (at 10% level). In Model 2 I follow Klein (1998) and control for the lagged value of Tobin's Q to alleviate the concern for endogeneity. The effect of IEs on firm performance is still positive and strongly significant (at 1% level). It is also notable that the sign on capital expenditure

changes to negative. Since Tobin's Q can also be interpreted as firm's incentive to invest, this result suggests that firms may overinvest after observing last period's Tobin's Q. If this is the case, the negative impact of IEs on capital expenditure as documented in Table 6, does not imply that IEs' advising on this policy is detrimental to firm performance, but to the contrary.

Finally, I use SOX and its associated corporate environment as a natural experiment to further test the positive effect of IEs on firm performance (see Duchin, Matsusaka, and Ozbas (2007) for related work on using SOX to test the relation between independent directors as a whole and firm performance). As argued in Section 7, SOX may have forced executives to reduce their outside directorships. But since SOX and the exchange listing standards also impose a higher requirement for the independence of the board, firms may demand more executives to serve as IEs to satisfy the independence requirement. I thus compare the difference for the change of Tobin's Q for the firms with $\Delta IE > 0$ compared with firms with $\Delta IE < 0$, with the implicit assumption that both changes might be exogenous. For that purpose I run OLS regression for all the firms with changing number of IEs between 2002 and 2005, for their change of Tobin's Q on the change of IEs. I only include firms with changing number of IEs to potentially increase the power of the test. Since the sample size is small (only 210 observations) I only include two additional control variables: the change of board size and the change of firm size during this time period, since I also control for Fama-French 48 industry effects. Model 3 of Table 10 gives the result. The coefficient on ΔIE is positive and marginally significant at 10% level, suggesting that adding IEs improves firm performance compared with losing IEs.

To alleviate the concern for whether the change of IEs is indeed exogenous since the regulations do not directly impose requirements for the composition of IEs, I run similar regression for firms pre-SOX. To be more comparable with the result in Model 3, I consider a three-year interval between 1999 and 2002 as the pre-SOX period. If firms face less exogenous constraints to recruit IEs pre-SOX, the change of IEs on firm performance should be less significant or insignificant. This is confirmed in Model 4 of Table 10. As shown, the coefficient on ΔIE is almost zero and insignificant, consistent with firms' facing less outside constraints in adjusting their IEs.

8.3 IEs and Accounting Performance

To further check the robustness of the positive relation between IEs and firm performance, I run regressions for accounting performance on IEs. I check ROA, ROE, ROS, STA, and OPROA. Formal definitions of these variables are in Table 1. As in Bertrand and Schoar (2003) I control for firm size. I use OLS regressions. I also control for board size, Fama-French 48 industry effects and year effects, and a constant term. The results are omitted for space concern.

IEs are positively correlated with all five measures of accounting performance. Four of the correlations are significant. Specifically, ROA is significant at the 10% level, ROE is significant at the 5% level, and STA and OPROA both are highly significant at the 1% level. These results further confirm that IEs improve firm performance.

8.4 Results Without Finance & Utility Firms

As is well known, finance & utility companies make quite different investment decisions. Much of the literature on corporate governance also exclude finance & utility firms from their analysis based on the argument that the governance functions may be quite different for these companies due to their closely regulated environment. I thus run all the regressions deleting finance & utility firms (2-digit SIC code 49 or 1-digit SIC code 6). All the results qualitatively remain the same and are omitted to save space. Some notable differences include:

1. For Panel C of Table 5 the significance for the interaction term “IEX * Executive sits as IE” disappears for cash holdings and dividend policy. However, when I run less restrictive regressions for the two samples depending on whether executives are on the boards as IEs or not (instead of using one sample but including an interaction term) the results are more robust.
2. The average effect of IEs on Invest (Table 6) becomes insignificant. This is not surprising since finance & utility firms generally make quite different investment decisions.

8.5 Alternative Econometric Models

Finally, I check the robustness of the results by using alternative econometric models other than OLS.

Since IE is defined as the number of independent executives, a Poisson model might be more preferable than OLS in the regressions of IEs on firms' advising demand. I thus use a Poisson model to run regression for Model 1 of Table 9 but did not find any qualitatively different results. Similarly, I run Poisson regressions for Aqr and Daqr in Table 4, 5, and 6. All the results are similar except for the model for Daqr in Table 4, where the coefficient for AveIEDaqr becomes marginally significant at 10% level.

Since the other corporate policy variables are all positive I run a Tobit model together with bootstrap method (with 50 replications) to calculate the standard errors in Table 4, 5, and 6. The results are similar and generally stronger. In particular, Adver becomes significant at 1% level in Table 4, and significant at 5% level in Panel B of Table 5. The interaction term "IEX * Executive sits as IE" in Panel C of Table 5 becomes insignificant for Cash but strongly significant at 1% level for Div. The results in Table 6 are also stronger. In particular, interest coverage ratio is negatively and significantly (at 5% level) affected by IEs with a Tobit model.

9 Conclusion

This paper derives the optimal tradeoff between the two primary functions of the board of directors: monitoring and advising management. The model predicts that advising management results in lower monitoring quality and higher agency costs. Therefore, independent directors should not advise unless their abilities are sufficiently high.

Using IEs as the empirical proxy for the board's ability to advise management, I test the predictions of the model and find supportive evidence. I find that more IEs on boards is associated with lower CEO turnover and turnover-to-performance sensitivity, higher CEO pay and pay increase, and lower pay-for-performance sensitivity and earnings quality. I then document IEs' advisory function directly by correlating the corporate policies between their own firms and the receiver firms. I rule out alternative hypotheses that could potentially explain such positive correlations, and find IEs' presence on boards is associated with several corporate policy variables. I also find IEs are positively, significantly, and causally associated with firm performance, suggesting that

their advisory benefit exceeds the associated higher agency costs. Finally, I argue that the significant relation between IEs and firm performance is due to the scarcity of IEs on the market for directors, and use SOX as a natural experiment to demonstrate the validity of this argument.

Two caveats are noted for interpretations of these results. First, though I have argued in the paper that the evidence fits well with the economic model described in Section 2, other potential theories may also be able to explain the evidence. For example, since IEs are executives themselves, their sympathy for the receiver firm's management may drive the low monitoring quality, consistent with the sociological view as in Westphal and Zajac (1997).

Second, I have used the size of the firm that the executive manages to proxy for his/her ability, as in Rosen (1982) and Hayes and Schaefer (1999). But this variable can be interpreted multiple ways. For example, the variable `Dummy(IE_Firm size > Firm size)` may also capture the relative size of the receiver firm. A dummy that equals 1 may simply mean the receiver firm's size is small and since smaller firms have higher performance controlling for other variables as in Table 7, the interaction term for this dummy and IE may capture this "small size" effect. In undocumented analysis I explored an alternative specification by directly controlling for the average size of all IEs' sender firms and found a positive and significant coefficient for this variable. Since this variable is positively correlated with the receiver firm's size (correlation coefficient around 0.3), this suggests that a "small size" effect cannot explain all the significance on the interaction term. To completely rule out such an explanation, however, requires a more direct measure of an executive's ability, which is hard to assess in general.

The paper can be extended in several directions. First, one of the reasons to use IEs as the empirical proxy is to take advantage of the potential identifiability for their advisory function. This identification strategy can be extended to other types of independent directors. For example, since a significant part of INEs are retired executives, one may compare the corporate policies they chose for the firms where they served as the managers to those of the firms they are IEs, to identify their potential advisory function.

Second, I have focused on one type of independent directors (IEs), and use it as the empirical

proxy to test my theory. A more powerful test might be to compare the monitoring quality and advisory effect of different types of independent directors. Of course, identification of the advisory function in general is hard. In an ongoing project along this line of research, I compare different behaviors of IEs and INEs and the evidence suggests that IEs are worse monitors than INEs but are more intensive advisors than the latter, consistent with the tradeoff between the two functions.²⁴ More work needs to be done to draw any conclusions, however.

²⁴The results are based only on their differential effects on corporate policies as in Table 6, since identification of the direct advising pattern as in Table 4 and 5 is hard for INEs in general.

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Appendix: Proofs for Propositions

Proof for Proposition 1

If the board does not advise the CEO, it will base the replacement decision on the profit realization $\pi = a - C$. Since the board cannot observe C directly, it can only infer the value of C by solving the CEO's maximization problem. Suppose the inferred value is \hat{C} . So the board effectively observes $\pi = a - \hat{C}$. The inferred CEO's ability conditional on profit is $a(\pi) = \pi + \hat{C}$. Thus the incumbent CEO is fired if and only if $a(\pi) < a_0$ or $\pi < a_0 - \hat{C}$. And it is trivial to observe that the lower the performance, the more likely the CEO is to be fired.

Proof for Proposition 2

Since under the advisory scenario the CEO will choose the maximum level of agency cost \bar{C} , it is equivalent to proving that under the no-advisory scenario the CEO will choose a level of agency cost lower than this level. The CEO's problem is to maximize EU_c by choosing C . Since

$$\begin{aligned} EU_c(C) &= \alpha(a_0 - C) + P(\text{CEO not fired})2C \\ &= \alpha(a_0 - C) + \left(1 - P(\pi < a_0 - \hat{C})\right) 2C \end{aligned}$$

and since $\pi \sim N(a_0 - C, \sigma_a^2)$, CEO maximizes

$$\begin{aligned} EU_c(C) &= \alpha(a_0 - C) + \left(1 - P\left(\frac{\pi - a_0 + C}{\sigma_a} < \frac{a_0 - \hat{C} - a_0 + C}{\sigma_a}\right)\right) 2C \\ &= \alpha a_0 + (2 - \alpha)C - 2\Phi\left(\frac{C - \hat{C}}{\sigma_a}\right) C, \end{aligned}$$

where $\Phi(\cdot)$ is the CDF of the standard normal distribution. Taking the first derivative of this function with respect to C , equating the result to zero, and noting that in equilibrium $C = \hat{C}$ one obtains the optimal level of C :

$$C^* = \frac{(1 - \alpha)\sigma_a}{2\phi(0)}$$

One could also easily check the second order condition is satisfied at $C = \hat{C}$. By assumption $C^* < \bar{C}$ hence the proposition is established.

Proof for Proposition 3

Since under the advisory scenario the CEO will choose the maximum level of C the expected profit is $E\pi_a = b_0 - \bar{C}$, where the subscript a stands for “advisory”. Under the no-advisory scenario the expected profit is $E\pi_n = a_0 - C^*$, where the subscript n stands for “no-advisory”. By comparing $E\pi_a$ with $E\pi_n$ one obtains that the board should advise the CEO if and only if $b_0 - a_0 \geq \bar{C} - C^* > 0$.

Table 1: Variable Definitions

Variable	Definitions/Calculations	Data source
Board-related variables		
IE	Independent executives, the number of independent directors who are active executive board members from firms in the IRRC database	IRRC
INE	Independent non-executives, the number of independent directors who are not IEs	IRRC
Independent directors	The number of independent directors	IRRC
Board size	The total number of directors on the board	IRRC
Interlocking	The mutual sitting of executives on each other's boards (INTERLOCK)	IRRC
Annual director retainer	The annual director retainer (ANNDIRRET)	EXECUCOMP
CEO-related variables		
CEO Turnover	Dummy equals to 1 if CEO at this year's annual meeting is no longer the CEO at next year's annual meeting, 0 otherwise	IRRC
Total pay	Log of the sum of all CEO annual payments (Log(TDC1))	EXECUCOMP
Cash pay	Log of the sum of CEO salary and bonus (Log(TCC))	EXECUCOMP
Options	Log of the CEO annual Black-Scholes options value (Log(BLK.VALUE))	EXECUCOMP
Δ Total pay	Change in the sum of all CEO annual payment relative to last year	EXECUCOMP
CEO shares	CEO share ownership over the number of shares outstanding	IRRC
CEO age	Age of CEO	IRRC
CEO is chairman	Dummy equals to 1 if CEO is also the chairman of the board, 0 otherwise	IRRC
CEO age over 60	Dummy equals to 1 if CEO's age is over 60, 0 otherwise	IRRC
CEO tenure	CEO's tenure in years	EXECUCOMP
CEO tenure on the board	CEO's tenure for board service in years	IRRC
CEO incentive	The incentive part of CEO compensation as a fraction of the total pay ((BLK.VALU+RSTKGRNT+LTIP)/TDC1)	EXECUCOMP
CEO outside directorships	CEO's number of outside directorships (PROXYBSC)	IRRC
Corporate policy variables		
Invest	Capital expenditure over net property, plant, and equipment at the beginning of the calendar year (data128/lagged data8)	COMPUSTAT
Aqr	The total number of acquisitions in the calendar year	SDC
Lev	Long term debt plus debt in current liabilities over total assets ((data9+data34)/data6)	COMPUSTAT
Intcov	The income before depreciation, interest, and tax over interest expenses (data13/max(data15, data339))	COMPUSTAT
Cash	Cash and short-term investments over net property, plant, and equipment at the beginning of the calendar year (data1/lagged data8)	COMPUSTAT
Div	The ratio of the sum of common dividends and preferred dividends over income before depreciation, interest, and tax ((data21+data19)/data13)	COMPUSTAT
Daqr	The number of acquisitions during the calendar year involving firms in different Fama-French 48 industries	SDC
R&D	The ratio of R&D expenditures over total assets, code missing data46 as 0 (max(0, data46)/data6)	COMPUSTAT
Adver	The ratio of advertisement expenditures over total assets, code missing data45 as 0 (max(0, data45)/data6)	COMPUSTAT
SG&A	The ratio of selling, general, and administrative expenses over sales (data189/data12)	COMPUSTAT
AveIEX	The average value of variable X for a given firm's IEs' sender firms	COMPUSTAT
IEX	The value of the variable X for a given IE's sender firm.	COMPUSTAT

Continued on Next Page...

Table 1 – Continued

Variable	Definitions/Calculations	Data source
Firm-level variables		
Tobin's Q	The market value of asset divided by its replacement cost, in log term ($\text{Log}(\text{data6}-\text{data60}-\text{data74}+\text{data199}*\text{shrout})/\text{data6}$)	COMPUSTAT/CRSP
Eloading	The factor loading on the AQ factor as in Ecker et al. (2006). AQ is a proxy for total earnings quality (Dechow and Dichev (2002))	COMPUSTAT/CRSP
Industry-adjusted firm return	The difference between the firm's annual stock return and median firm's annual stock return in the same industry	CRSP
Market-adjusted industry return	The difference between the median firm's stock return in a given industry and the annual value-weighted market return.	CRSP
Value-weighted market return	The annual value-weighted market return	CRSP
Dollar return	The dollar value change of total shareholder wealth relative to last year ($\text{RET} * \text{lagged}(\text{data199}*\text{shrout})$)	CRSP/COMPUSTAT
Firm size	Log of total assets ($\text{log}(\text{data6})$)	COMPUSTAT
Sales	Log of total sales revenues ($\text{log}(\text{data12})$)	COMPUSTAT
ROA	Return on assets, defined as the income before extraordinary items over total assets ($\text{data18}/\text{data6}$)	COMPUSTAT
ROE	Return on equity, defined as the income before extraordinary items over common equity ($\text{data18}/\text{data60}$)	COMPUSTAT
ROS	Return on sales, defined as the income before extraordinary items over total sales revenue ($\text{data18}/\text{data12}$)	COMPUSTAT
STA	Sales to assets ratio, defined as the total sales revenue over total assets ($\text{data12}/\text{data6}$)	COMPUSTAT
OPROA	Operating return on assets, defined as the ratio of operating cash flow over total assets ($\text{data308}/\text{data6}$)	COMPUSTAT
Volatility	Standard deviation of stock return over the past 60 months	CRSP
Block holders	The number of institutional block holders with at least 5% holdings	Thomson Financial
G-Index	Gompers, Ishii, and Metrick (2003) governance index, sum of 24 provisions proxying for the strength of shareholder rights	Andrew Metrick
Intangible assets	Ratio of intangible assets to total assets ($1-\text{data8}/\text{data6}$)	COMPUSTAT
Firm age	Log of total months since the firm was first listed in CRSP	CRSP
Business segments	Total number of business segments of the firm	COMPUSTAT/SEGMENTS
S&P 500 index	Dummy equals to 1 if the firm is included in S&P 500 index, 0 otherwise	COMPUSTAT
Advice	Factor score from factor analysis for sales, lev, and business segments	
Cash flow	Sum of income before extraordinary items and depreciation over net property, plant, and equipment at the beginning of the calendar year ($(\text{data18}+\text{data14})/\text{lagged data8}$)	COMPUSTAT
Acquirer	Dummy equals to 1 if the firm is the acquirer of an acquisition in a given year, 0 otherwise	SDC
Target	Dummy equals to 1 if the firm is the target of an acquisition in a given year, 0 otherwise	SDC

Table 2: Summary Statistics

This table gives the summary statistics of the sample, with IRR database merged with COMPUSTAT, CRSP, EXECUCOMP, SDC, and Thomson Financial Institutional Holdings databases from 1996 to 2005. Panel A provides the summary statistics for the key variables used in the study for the overall sample. Panel B gives the summary statistics for IE-related variables by size quartiles. Panel C compares IEs' characteristics and those of receiver firms' CEOs, as well as IEs' sender firms' characteristics and the receiver firms'. The CEO compensation data and the financial ratios, including all the corporate policy variables are winsorized at the 1% percentile. Firm size and Tobin's Q are not in log terms. In panel B, the average fraction of IEs is the mean fraction of the number of IEs to board size for all the firms in the size quartile. Average number of outside directorships is the mean number of outside directorships for all the executive board members of all the firms in the size quartile. In Panel C the average X of IEs either refers to the average value of X for all the IEs based on the receiver firms, or the average value of X for all the IEs' receiver firms, depending on whether X is an executive-related variable or firm-level variable. Definitions for other variables are in Table 1. * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Summary Statistics for the Overall Sample							
Variable	Observations	Mean	Median	Standard Deviation			
Board-related variable							
IE	15,957	0.542	0	0.933			
INE	15,957	5.594	5	2.458			
Independent directors	15,957	6.136	6	2.723			
Board size	15,957	9.544	9	2.997			
Annual director retainer (\$Thous)	13,416	23.246	20	15.830			
CEO-related variable							
CEO Turnover	12,773	0.066	0	0.249			
Total pay (\$Thous)	13,378	4,741	2,527	6,286			
Cash pay (\$Thous)	13,449	1,424	1,021	1,315			
Options (\$Thous)	13,378	2,258	735	4,207			
ΔTotal pay (\$Thous)	13,033	384	136	5,039			
CEO age (Years)	15,956	55.1	55	7.7			
CEO tenure (Years)	12,639	7.0	5	7.4			
Firm-level variable							
Tobin's Q	12,914	1.978	1.467	1.797			
Firm size (\$Mills)	15,119	11,984	1,554	57,903			
Business segments	13,283	2.87	3	2.13			
Sender firm	15,957	0.33	0	0.47			
Receiver firm	15,957	0.34	0	0.47			
Panel B: Summary Statistics for IEs by Size Quartiles (1:largest, 4:smallest)							
Quartile	Average firm size (\$Mills)	Average board size	Average fraction of independent directors	Average fraction of IEs	Fraction of receiver firms	Fraction of sender firms	Average number of outside directorships
1	43,661	12.094	0.683	0.081	0.532	0.507	0.789
2	3,004	9.789	0.648	0.055	0.366	0.385	0.571
3	988	8.598	0.615	0.042	0.267	0.262	0.398
4	323	7.616	0.606	0.030	0.188	0.157	0.268
Mean	11,984	9.913	0.624	0.058	0.379	0.360	0.606

Continued on Next Page...

Table 2 – Continued

Panel C: Comparison Between Receiver and Sender Firms			
Variables/Values		Difference	p-value For
Receiver firm (1)	Sender firm (2)	(2)-(1)	Difference
Executive-related variables			
CEO tenure on the board (Years)	Average tenure of IEs on sender firms' boards (Years)		
5.8	10.4	4.6	0.000***
CEO age (Years)	Average age of IEs (Years)		
55	57	2	0.000***
CEO outside directorships	Average outside directorships of IEs		
0.9	1.9	1.0	0.000***
Firm-level variables			
Firm size (\$Mills)	Average Firm size of IEs (\$Mills)		
22,466	21,563	-903	0.565
Business segments	Average Business segments of IEs		
3,268	3,260	-0.009	0.850
Tobin's Q	Average Tobin's Q of IEs		
2.003	2.016	0.013	0.725
ROA	Average ROA of IEs		
0.041	0.043	0.003	0.085*
Invest	Average Invest of IEs		
0.252	0.244	-0.008	0.040**
Aqr	Average Aqr of IEs		
0.914	0.882	-0.033	0.291
Lev	Average Lev of IEs		
0.248	0.255	0.007	0.015**
Intcov	Average Intcov of IEs		
25.545	21.721	-3.823	0.020**
Cash	Average Cash of IEs		
1.892	1.463	-0.429	0.000***
Div	Average Div of IEs		
0.108	0.111	0.003	0.093*
Daqr	Average Daqr of IEs		
0.461	0.449	-0.012	0.547
R&D	Average R&D of IEs		
0.025	0.025	-0.000	0.723
Adver	Average Adver of IEs		
0.011	0.014	0.002	0.003***
SG&A	Average SG&A of IEs		
0.237	0.241	0.004	0.140

Table 3: IEs and the Monitoring Function

This table examines the monitoring function of IEs by studying the relation between the quality of three major governance functions: making CEO succession decision, deciding CEO compensation levels and changes, and influencing the earnings quality (as a rough proxy for audit quality), and the number of IEs on boards. High IE is a dummy variable for whether the firm's fraction of IEs to board size is above such median value for all the firms in a given year. All other variables' definitions follow Table 1. Models for CEO turnover use logit regressions. All other models use pooled OLS regressions. Firm-years that are takeover targets are dropped from the sample for CEO turnover study. Firm-years with CEO turnover in current year, or CEO tenure less than 1 year are dropped from the samples for CEO compensation study. Firm-years with CEO turnover in either current or previous year, or CEO tenure less than 2 years are dropped from the sample for CEO pay increase and pay-for-performance studies. All the models include a constant term and Fama-French 48 industry and year dummies. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	CEO Turnover		CEO Compensation			CEO Pay Increase		Pay-For-Performance		Earnings Quality	
	(1)	(2)	Total pay	Cash pay	Options	Δ Total pay	Δ Total pay	Δ Total pay	Δ Total pay	-Eloading	
IE	-0.10* (-1.80)	-0.09 (-1.59)	0.04*** (3.15)	0.02** (1.97)	0.03 (1.58)	83.91* (1.88)	102.32** (2.15)			-0.01*** (-3.31)	
Board size	0.05*** (2.58)	0.05** (2.57)	-0.01 (-0.98)	0.02*** (3.07)	-0.07*** (-7.02)	30.45* (1.72)	31.12* (1.75)			-0.00 (-1.51)	
Industry-adjusted firm return	-0.56*** (-4.96)	-0.68*** (-5.27)	0.23*** (9.71)	0.21*** (10.9)	0.10*** (2.99)						
Market-adjusted industry return	-0.24 (-1.25)	-0.22 (-1.16)	0.15*** (4.22)	0.15*** (6.22)	0.10* (1.87)						
Value-weighted market return	-0.68 (-1.44)	-0.69 (-1.46)	-0.02 (-0.22)	0.06 (1.16)	-0.25** (-2.06)						
High IE * Industry-adjusted firm return		0.40* (1.71)									
Dollar return						0.09*** (4.05)	0.12*** (4.48)				
High IE * Dollar return							-0.04 (-1.27)				
Firm size	-0.02 (-0.63)	-0.02 (-0.60)	0.44*** (31.9)	0.28*** (24.2)	0.53*** (30.5)					-0.04*** (-12.2)	
CEO shares	-5.11*** (-3.49)	-5.14*** (-3.50)									
CEO is chairman	-0.44 (-0.75)	-0.44 (-0.77)									
CEO age over 60	0.46*** (4.57)	0.46*** (4.57)									
CEO tenure			-0.01** (-2.55)	0.00 (1.21)	0.00 (0.71)	-3.17 (-0.68)	-3.19 (-0.68)				
ROA			0.92*** (5.69)	1.16*** (9.33)	1.15*** (5.38)						
Volatility										-0.85*** (-25.3)	
Observations	7,916	7,916	10,865	10,866	8,188	7,586	7,586			12,894	
Pseudo/Adjusted R2	0.04	0.04	0.46	0.45	0.41	0.03	0.03			0.25	

Table 4: IEs and the Advisory Function

This table uses pooled OLS regressions to examine the advisory function of IEs by correlating the average corporate policy value for all of a given firm's IEs' sender firms, and that of the receiver firm's. The dependent variable is the receiver firm's corporate policy variable. AveIEX refers to the average corporate policy variable X for all of a given firm's IEs' sender firms, where X is the corresponding dependent variable. Three categories of corporate policy variables are studied: investment policy (Invest, Aqr), financial policy (Lev, Intcov, Cash, Div), and organizational strategy (Daqr, R&D, Adver, SG&A). Firm-years with interlocking directorships are dropped from the samples to alleviate the concern of simultaneous determination of policy variables between sender and receiver firms. Refer to Table 1 for the definitions of all the variables. All the models also include a constant term, and Fama-French 48 industry and year dummies. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Investment Policy			Financial Policy			Organizational Strategy			
	Invest	Aqr	Lev	Intcov	Cash	Div	Daqr	R&D	Adver	SG&A
AveIEX	0.12*** (3.98)	0.05 (1.18)	0.03 (1.21)	0.09 (1.16)	0.14*** (2.84)	0.14*** (6.99)	0.05 (1.44)	0.28*** (7.81)	0.01 (0.78)	0.20*** (7.66)
Cash flow	0.04*** (3.41)		0.00 (0.28)	2.62 (0.59)	1.77*** (5.53)	-0.01*** (-2.00)	0.00 (0.044)	0.00 (0.14)	0.00 (0.28)	0.00 (0.82)
Lagged Tobin's Q	0.16*** (10.0)									
Lagged firm size	-0.02*** (-7.54)	0.18*** (4.65)	0.02*** (5.87)	-8.40*** (-4.21)	-0.03 (-0.31)	0.01*** (6.48)				
ROA		2.00*** (4.29)	-0.37*** (-5.66)	218.97*** (6.17)	-13.45*** (-6.52)	0.11*** (3.56)	0.21 (1.01)	-0.10*** (-5.67)	0.01 (0.70)	-0.28*** (-4.90)
Firm size							0.07*** (4.32)	-0.00*** (-4.34)	-0.00 (-0.35)	-0.02*** (-6.13)
Acquirer							1.02*** (22.8)			
Observations	3,469	4,492	4,319	3,938	4,281	4,307	4,369	4,339	4,339	3,260
Adjusted R^2	0.41	0.09	0.29	0.09	0.43	0.33	0.28	0.53	0.30	0.49

Table 5: Tests for Alternative Hypotheses for the Advisory Function

This table examines alternative hypotheses to explain the results in Table 4. Panel A tests whether the results are due to IEs' monitoring function, rather than advisory function, by testing the busyness of IEs. Panel B uses pooled OLS regressions to test whether the correlations documented in Table 4 are driven by IEs from the same industry. AveIEX refers to the average corporate policy variable X for all of a given firm's IEs' sender firms, where X is the corresponding dependent variable. "Same industry" is a dummy for whether there is any IE on the board coming from the same industry, by comparing the industry classification of each IE's sender firm and that of the receiver firm. Other control variables corresponding to each dependent variable follow Table 4 and are omitted to conserve space. Panel C uses pooled OLS regressions to test the strength of the correlations in Table 4 depending on whether an executive sits on the board as an IE or not. The sample is based on director-firm-year rather than firm-year observations. Only those executives who change their status as IEs during 1996 and 2005, and who do not change the firms to be executive board members are included in the sample. IEX is the value of corporate policy variable X for the IE's sender firm, where X is the corresponding dependent variable. "Executive sits as IE" is a dummy for whether the executive sits on the board as IE or not. Other control variables corresponding to each dependent variable follow Table 4 and are omitted to save space. All the models also include a constant term, and Fama-French 48 industry and year dummies. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Monitoring Hypothesis									
	Investment Policy			Financial Policy			Difference (IE-INE)		p-value for Difference
	Invest	Aqr	Lev	Intcov	Cash	Div			
Outside Directorships							1.91	1.20	0.00***
Miss 75% Meetings							0.04	0.02	0.00***
Panel B: Industry Hypothesis									
	Investment Policy			Financial Policy			Difference (IE-INE)		p-value for Difference
	Invest	Aqr	Lev	Intcov	Cash	Div			
AveIEX	0.08*** (2.79)	0.00 (0.17)	0.04* (1.67)	-0.01 (-0.15)	0.09** (2.28)	0.15*** (7.23)	0.04 (1.17)	0.71	0.00***
AveIEX * Same industry	0.13*** (2.71)	0.14* (1.68)	-0.07** (-2.40)	0.32 (1.46)	0.16* (1.75)	-0.08** (-2.52)	0.02 (0.24)	0.22*** (3.79)	0.07 (0.76)
Observations	3,469	4,492	4,319	3,938	4,281	4,307	4,369	4,339	4,339
Adjusted R^2	0.41	0.10	0.30	0.10	0.43	0.33	0.28	0.54	0.30
Panel C: Matching Hypothesis									
	Investment Policy			Financial Policy			Difference (IE-INE)		p-value for Difference
	Invest	Aqr	Lev	Intcov	Cash	Div			
IEX	0.16 (1.23)	-0.01 (-0.22)	0.02 (0.65)	-0.00 (-0.84)	0.01 (0.23)	-0.01 (-0.52)	-0.00 (-0.21)	0.15*** (4.05)	0.01 (0.50)
IEX * Executive sits as IE	-0.00 (-0.0080)	0.03 (0.71)	0.02 (0.93)	0.13 (0.80)	0.07* (1.67)	0.09* (1.73)	0.01 (0.48)	0.01 (0.34)	-0.04 (-1.56)
Observations	4,078	5,600	5,384	4,938	5,267	5,340	5,410	5,397	5,397
Adjusted R^2	0.71	0.11	0.29	0.02	0.12	0.00	0.28	0.51	0.36

Table 6: IEs and Corporate Policies

This table uses pooled OLS regressions to examine the average effects of IEs on corporate policies. Refer to Table 1 for all the variables' definitions. Firm-years with interlocking directorships are dropped from the sample to be consistent with the regressions in Table 4. All models include a constant term, and Fama-French 48 industry and year dummies. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Investment Policy		Financial Policy				Organizational Strategy			
	Invest	Aqr	Lev	Intcov	Cash	Div	Daqr	R&D	Adver	SG&A
IE	-0.01** (-2.01)	0.03 (1.02)	-0.01*** (-3.41)	-0.88 (-0.61)	-0.01 (-0.072)	0.01*** (5.40)	0.01 (0.85)	0.00*** (4.83)	0.00** (2.18)	0.01*** (4.08)
Board size	-0.00*** (-3.65)	0.01 (0.65)	-0.00 (-0.70)	-2.75*** (-3.61)	-0.16*** (-3.61)	0.01*** (8.02)	0.00 (0.42)	-0.00*** (-2.80)	0.00 (0.88)	-0.00 (-0.90)
Cash flow	0.03*** (7.01)		0.00* (1.78)	5.96** (2.04)	1.85*** (10.9)	-0.00 (-1.35)	-0.01 (-0.85)	0.00 (0.12)	0.00 (1.29)	-0.00 (-0.61)
Lagged Tobin's Q	0.17*** (22.1)									
Lagged firm size	-0.02*** (-7.06)	0.17*** (6.09)	0.03*** (11.7)	-16.94*** (-8.69)	0.03 (0.26)	0.00** (2.06)				
ROA	1.32*** (6.22)		-0.43*** (-11.3)	349.47*** (10.9)	-15.71*** (-11.8)	0.09*** (5.72)	0.25** (2.20)	-0.15*** (-7.32)	-0.00 (-0.31)	-0.39*** (-12.2)
Firm size							0.06*** (5.17)	-0.00*** (-5.90)	-0.00* (-1.68)	-0.02*** (-8.93)
Acquirer							0.85*** (30.1)			
Observations	11,349	13,836	13,274	12,045	13,318	13,299	13,319	13,319	13,319	11,119
Adjusted R^2	0.37	0.08	0.29	0.11	0.35	0.28	0.25	0.44	0.20	0.43

Table 7: IEs and Firm Performance

This table uses pooled OLS to examine the impact of IEs on performance. Dummy(IE_Firm size>Firm size) is a dummy for whether the average size of all the IEs' sender firms is larger than the size of the receiver firm. Refer to Table 1 for all other variables' definitions. All models include a constant term, and Fama-French 48 industry and year dummies. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Tobin's Q		
	(1)	(2)	(3)
IE	0.024*** (3.27)	0.020** (2.46)	0.001 (0.11)
Lev	-0.140** (-2.43)	-0.092 (-1.42)	-0.127 (-1.33)
R&D	2.426*** (10.6)	1.963*** (8.64)	2.353*** (5.02)
Invest	0.355*** (10.2)	0.379*** (10.0)	0.330*** (4.51)
Div		0.245*** (2.88)	0.178 (1.25)
Adver		0.497* (1.73)	0.301 (0.77)
SG&A		0.233*** (2.98)	0.468*** (3.19)
Dummy(IE_Firm size>Firm size) * IE			0.023** (2.16)
Board size	-0.004 (-1.20)	-0.005 (-1.25)	0.005 (0.93)
ROA	2.121*** (16.9)	2.082*** (16.7)	2.209*** (10.5)
Block holders	-0.050*** (-11.6)	-0.051*** (-11.0)	-0.042*** (-5.84)
G-Index	-0.005* (-1.81)	-0.006* (-1.95)	-0.007 (-1.64)
CEO incentive	0.169*** (7.51)	0.166*** (6.99)	0.145*** (3.82)
Firm size	-0.064*** (-7.30)	-0.044*** (-4.52)	-0.030** (-2.20)
Intangible assets	0.015 (0.27)	-0.003 (-0.054)	-0.035 (-0.39)
Firm age	-0.025*** (-2.58)	-0.037*** (-3.54)	-0.024* (-1.70)
Business segments	-0.011*** (-3.24)	-0.015*** (-4.11)	-0.013** (-2.55)
S&P 500 index	0.268*** (11.8)	0.292*** (11.2)	0.233*** (7.09)
Observations	9,263	7,677	2,563
Adjusted R^2	0.52	0.51	0.56

Table 8: Explaining the Significant Relation between IEs and Firm Performance

This table uses the post-SOX environment to test the hypothesis that the scarcity of IEs drives their significant relation with firm performance. Panel A tests the difference between the change of director compensation for firms increasing the number of IEs ($\Delta IE > 0$) versus firms decreasing the number of IEs ($\Delta IE < 0$) over 2002 and 2005. The sample is based on matching these two groups of firms by industry and size. Panel B examines the change of the number of outside directorships for executives post-SOX across the size quartiles (largest Quartile 1 vs. smallest Quartile 4). Panel C examines the changing demographics of IEs post-SOX compared with pre-SOX. Firm size is the total assets and is not in log term. Average size of IEs' sender firms refers to the mean of the average size of all the IEs' sender firms. Panel D tests the scarcity hypothesis formally by running pooled OLS regressions over the sample from 1996 to 2005. Dummy(IE.Firm size>Firm size) is a dummy for whether the average size of all the IEs' sender firms is larger than the receiver firm's size. SOXyear is a dummy for whether the year is after 2002, the year when SOX was enacted. Other control variables follow Model 3 in Table 7 and are omitted to conserve space. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: T-test for the Change of Director Compensation for $\Delta IE < 0$ vs $\Delta IE > 0$ Between 2002 and 2005				
	$\Delta IE < 0$	$\Delta IE > 0$	p-value for Difference	
Δ Annual Director Retainer (\$)	9035.21	14572.79	0.02**	
Observations	62	63		
Panel B: Changing Number of Outside Directorships Post-SOX for Executives by Size Quartiles				
	Mean	Quartile 1	Quartile 4	
Before SOX	0.52	0.81	0.27	
After SOX	0.50	0.75	0.27	
Difference	0.02	-0.06	-0.00	
p-value for Difference	0.16	0.05**	0.98	
Panel C: Changing Demographics of IEs Post-SOX				
	Firm size (\$Mills) (1)	Average size of IEs' sender firms (\$Mills) (2)	Difference (2)-(1)	p-value for Difference
Before SOX	18196.64	20423.12	2226.48	0.13
After SOX	35387.06	25013.24	-10373.82	0.02**
Panel D: Test for the Scarcity of IEs				
	Tobin's Q			
IE	-0.00 (-0.21)			
Dummy(IE_Firm size>Firm size) * IE	0.02 (1.52)			
Dummy(IE_Firm size>Firm size) * IE * SOXyear	0.04** (2.14)			
Observations	2,564			
Adjusted R^2	0.57			

Table 9: IEs and Firm's Demand for Advice

This table examines the relation between the firm's demand for advice and the number of IEs on boards. It also examines whether IEs are more valuable when firm's advising demand is higher, and the simultaneous determination of IEs and firm performance. Advice dummy is a dummy for whether the firm's Advice is greater than the median value of this variable for all the firms in a given year. Refer to Table 1 for all the variables' definitions. Other control variables for Tobin's Q follow Model 3 in Table 7 and are omitted to conserve space. All models include a constant term, and Fama-French 48 industry and year dummies. Standard errors for the pooled OLS regressions are adjusted for heteroscedasticity and clustered at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Pooled OLS		3SLS	
	IE	Tobin's Q	IE	Tobin's Q
Advice	0.27*** (9.96)		0.29*** (17.7)	
IE		-0.00 (-0.18)		0.34*** (7.22)
IE * Advice dummy		0.03** (2.13)		
Tobin's Q	0.10*** (3.26)		0.39*** (7.42)	
Board size	0.05*** (5.97)	-0.00 (-1.27)	0.05*** (9.81)	-0.02*** (-5.94)
ROA	-0.04 (-0.37)	2.08*** (16.7)	-0.75*** (-4.62)	2.06*** (35.9)
R&D	0.68*** (2.67)	1.96*** (8.62)	-0.20 (-0.70)	1.74*** (12.4)
G-Index	0.03*** (4.33)	-0.01* (-1.93)	0.03*** (7.98)	-0.02*** (-6.29)
CEO tenure	-0.01*** (-5.67)		-0.00*** (-3.78)	
CEO age	-0.00*** (-2.58)		-0.00*** (-3.43)	
Firm age	0.14*** (6.15)	-0.04*** (-3.62)	0.15*** (11.5)	-0.08*** (-8.39)
Intangible assets	-0.10 (-0.89)	-0.00 (-0.056)	-0.06 (-0.91)	0.01 (0.30)
Observations	9,393	7,677	7,361	7,361
Adjusted R^2	0.23	0.51	0.23	0.29

Table 10: Robustness of the Relation Between IEs and Firm Performance

This table examines the robustness of the positive relation between IEs and firm performance. Model 1 & 2 use pooled OLS to run regressions for Tobin's Q. Other control variables follow Model 2 in Table 7 and are omitted to conserve space. The models also include a constant term, and Fama-French 48 industry and year dummies. Standard errors are adjusted for heteroscedasticity and clustered at the firm level. Model 3 & 4 use OLS to regress the change of Tobin's Q on the change of IE over two three-year intervals, from 2002 to 2005 (post-SOX) and from 1999 to 2002 (pre-SOX), respectively. To increase the power of the test firms without any change for the number of IEs are dropped from the samples. Model 3 & 4 also include two other control variables: the change of board size and the change of firm size over the three-year intervals and are omitted to conserve space. They also control for a constant term and Fama-French 48 industry dummies. Standard errors are adjusted for heteroscedasticity. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Tobin's Q		Δ Tobin's Q	
	(1)	(2)	(3)	(4)
			2002-2005	1999-2002
IE		0.011*** (2.75)		
Board size		-0.000 (-0.25)		
Lagged IE	0.014* (1.69)			
Lagged board size	-0.007* (-1.81)			
Lagged Tobin's Q		0.653*** (46.0)		
Δ IE			0.03* (1.67)	0.00 (0.14)
Observations	6,630	7,565	210	219
Adjusted R^2	0.52	0.73	0.12	0.08

Figure 1: Time Trend for IEs and INEs 1996-2005

