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Abstract

The generally weak correlation between board independence and firm performance is a major empirical puzzle. One possible explanation is that director independence alone is not enough. To explore this possibility, we examine the full employment histories of independent directors at S&P 1500 companies. We define an independent expert director (IED) as an independent director who has worked in the same 2-digit SIC industry as the company where he/she serves as an independent director. We show that the proportion of IEDs on a board is positively and significantly correlated with firm performance. We find that when the proportion of IEDs is higher, there are fewer earnings restatements and larger cash holdings. Firms with IEDs have higher CEO pay-performance sensitivity, higher CEO turnover-performance sensitivity, and more patents with more citations. Stock market investors react positively to IED appointments. We also find the higher the CEO power, the less likely IEDs will be on board.

Key words: corporate governance, independent directors, experience, restatement, cash holding, executive compensation, CEO turnover, innovation, CEO power

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"Over a span of 40 years, I have been on 19 public company boards and have interacted with perhaps 250 directors. Most of them were 'independent' as defined by today's rules. But their contribution to shareholder well-being was minimal at best. These people simply did not know enough about the business."

---Warren Buffet (Chair, Berkshire Hathaway)

1. **Introduction**

The first decade of the 21st century has witnessed a series of legislative and regulatory efforts to increase the proportion of independent directors on corporate boards. For example, in response to major corporate scandals and to strengthen the corporate governance practices of publicly listed firms in America, the US Congress passed the Sarbanes-Oxley Act (SOX: Public Company Accounting Reform and Investor Protection Act) in 2002, which requires that the audit committees of all publicly listed firms in the US consist solely of independent directors. In 2003, both New York Stock Exchange and NASDAQ announced that it would require all companies listed at NYSE to have a majority of independent directors after 2005. NYSE further required that the nominating, corporate governance, and compensation committees of companies listed at NYSE to consist entirely of independent directors after 2005.

These legislative actions were based on the "conventional wisdom" that a mandatory increase in board independence would lead to better corporate governance, which in turn would provide better protection of shareholders' interests and lead to better corporate decisions and firm performance. Unfortunately, so far, this "conventional wisdom" has not yet found solid empirical evidence to support it. For example, the proportion of independent directors on a board is not robustly correlated with either corporate policies (e.g., Guthrie et al., forthcoming) or firm performance (Bhagat and Black, 2001). Sometimes, the signs of the correlations found in samples are even opposite to what the "conventional wisdom" would predict (e.g., Guthrie et al., forthcoming; Bhagat and Bolton, 2008).

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Based on this evidence, should we infer that board independence does not matter for corporate decisions and firm performance?

We argue that the failure to find robust empirical evidence to support the "conventional wisdom" is due to the fact that previous studies rely on the proportion of independent directors as the measure of board independence. The major problem with this measure is that by treating all independent directors as a homogeneous group, it masks the heterogeneity among them. We argue that researchers have largely overlooked one particularly important dimension of independent directors' heterogeneous qualities: their industry experience.

The intuition behind our argument may be best summarized by a quote from Bob Tricker, the founding editor of *Corporate Governance: An International Review*:

"*Herein lies a dilemma. The more independent directors are, the less they are likely to know about the company, its business and its industry. Conversely, the more directors know about the company's business, organization, strategies, markets, competitors, and technologies, the less independent they become. Yet such people are exactly what top management needs to contribute to its strategy, policy making and enterprise risk assessment.*"[1]

Facing this apparent tradeoff between directors' independence and their industry-specific knowledge, it is not surprising that independence alone would not suffice to make a director a better one. As a result, it is not surprising that the proportion of independent directors is not robustly correlated with either corporate decisions or firm performance. In fact, anecdotal evidence shows that investors pay attention to not only the independence of directors, but also their industry experience. The market reactions to the replacement of independent directors of Bank of America in 2009 provide a case in point. On June 6, 2009, the *Wall Street Journal* reported that "[f]our outside directors with

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[1] See http://corporategovernanceoup.wordpress.com/2010/12/06/is-director-independence-so-important/.

experience in banking or financial oversight joined Bank of America Corp.'s board Friday, a move aimed at satisfying strong suggestions from federal regulators that the Charlotte, N.C., lender improve its corporate governance." The *Wall Street Journal* mentioned that these four new outside directors with experience in the banking industry replaced two incumbent outside directors without experience in the banking industry. Table 1 reports the dramatic market reaction to this news.

Insert Table 1 here

When the 2008 financial crisis broke out, corporate boards at rescued institutions took partly the blame of the collapse. Clearly, SOX was not enough: the banks in trouble were largely in compliance with SOX and had an 80% of independent directors sitting on their boards (Pozen, 2010). Adams (2011), in her research on corporate governance and the financial crisis, also finds that the "most surprising result" was that TARP banks (i.e., bailed-out banks) had boards that were more independent than non-TARP banks. While board independence is indisputably important to ensure right incentives for board directors to perform their roles, especially their monitoring role, directors' abilities and information are at least as important as their incentives for them to effectively perform their monitoring and advisory roles. Board directors develop their industry-specific abilities and information through industry experience.

Based on our above analysis and anecdotal evidence, we propose our fundamental hypothesis: independent expert directors (IEDs), i.e., independent directors with industry experience, have positive and significant effects on firm performance, but independent non-expert directors (INEDs), i.e., the independent directors with no industry experience, do not have significant effects on firm performance. We further investigate how IEDs affect firm performance by influencing major corporate decisions, such as earnings restatement, cash holdings, CEO pay-performance sensitivity, and innovative activities. We hypothesize that "one size does not fit all", i.e., the effects of IEDs on

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firm performance and corporate decisions depend on the nature of the specific firms, such as their complexity and their other external and internal corporate governance mechanisms. We also hypothesize that investors react more positively to the appointments of IEDs versus the appointments of INEDs. Lastly, we hypothesize that powerful CEOs would entrench themselves by deterring appointments of IEDs. Therefore, CEO power is expected to be negatively correlated with the presence of IEDs on the board.

To test the above hypotheses, we collect information on the full employment histories of board directors of S&P 1,500 companies between 2000 and 2008 from the BoardEx database of Management Diagnostics Ltd., a professional human resources management company. This database has been used by Fracassi and Tate (2012) in their analysis of external network connections between directors and CEOs. In contrast with other databases that only record the current employment affiliations of board directors (such as *RiskMetrics* and *Board Analyst*), BoardEx carefully records the full employment history of board directors, thus allowing us to accurately classify independent directors into IEDs and INEDs. We define an IED as an independent director who has worked in the same 2-digit SIC industry as the company where he/she serves as an independent director. BoardEx also meticulously records the announcement dates of new director appointments, thus allowing us to conduct event studies to contrast the market reactions to IED appointment announcements with the market reactions to INED appointment announcements.

To estimate the effects of IEDs and INEDs on firm performance, we use Heckman's (1979) two-step procedure to produce consistent estimates that account for self-selection (similar to Masulis and Mobbs, 2011). For the first step estimation, inspired by Knyazeva et al. (2011), we use the number of firms in the same industry in the neighborhood (defined as the first 3 digits of the ZIP code) as an exogenous determinant of IEDs. To alleviate the concern regarding the direct competition

between firms in the same industry, we only count firms in the same 2-digit SIC industry but not in the same 4-digit SIC industry as the exogenous determinant of IEDs.

Our first step estimation in the Heckman two-step procedure shows that in more complex firms, as measured by their R&D intensity, IEDs are more likely to be present. This result is intuitive because more complex firms have greater need for industry-specific knowledge for decision making. Our second step estimation in the Heckman two-step procedure shows that the proportion of IEDs, but not INEDs, is positively and significantly correlated with industry-adjusted logarithm market-to-book ratio. This confirms our hypothesis that IEDs significantly enhance firm performance, while INEDs do not have significant effects on firm performance. We also find that for firms that report positive R&D expenditures, IEDs significantly enhance firm performance, but for firms that report zero R&D expenditures, IEDs do not have significant effects on firm performance. Further, we find that for firms with higher information costs, defined as those with more analyst forecast dispersion, or fewer analysts following them, IEDs significantly boost firm performance, while for firms with lower information costs, IEDs do not have significant effects on firm performance.

Our investigation into the effects of IEDs on key corporate decisions show that the proportion of IEDs, but not the proportion of INEDs, on the board, is negatively and significantly correlated with the probability of earnings restatements, especially for firms with less entrenched CEOs, i.e., firms with an E-index below the median. This suggests that as the CEOs become more entrenched, IEDs may be less likely to challenge the CEOs. As the result, the effectiveness of IEDs' monitoring role diminishes as the CEOs become more entrenched.

Further, we show that the proportion of IEDs, but not the proportion of INEDs, on the board, is positively and significantly correlated with firm's cash holdings, especially for firms with positive R&D expenditures. We show that the presence of IEDs on a board significantly enhances the CEO

pay-performance sensitivity. It also significantly boosts the innovative activities of the firm, as measured by the number of patents and citations.

Finally, we show that the more CEO power, the less likely that IEDs would be present on a board. This confirms our hypothesis that powerful CEOs tend to deter appointments of IEDs on the board so that they may capture the board more easily.

To the best of our knowledge, our paper is the first to systematically examine the effects of independent directors' industry experience on key corporate decisions and firm performance. It is puzzling why there is no robust correlation between board independence, corporate decisions and firm performance. We tackle the puzzle from the angle of the industry experience of independent directors. Our results show that IEDs are more likely to contribute to higher firm performance by making better key corporate decisions.

Our paper complements the literature on the expertise and experience of board directors. For example, Guner et al. (2008) and Kroszner and Strahan (2001) examine the impact of the financial expertise of directors on firm decisions. McDonald et al. (2008) examine the effects of outside director acquisition experience on firm acquisition performance. Knyazeva et al. (2009) investigate the impact of board heterogeneity on firm value and key decisions. On the other hand, Kor and Fredrickson (2008) examine the difference in outside directors' industry-specific experience between young and old firms from a demand-side perspective. Dass et al. (2011) examine the roles of "directors from related industries" and find evidence that such directors help bridge the information gap between supplier firms and customer firms.

The remainder of the paper is organized as follows. We review the related literature on board directors, corporate decisions and firm performance and develop hypotheses in Section 2. Section 3 reports the data and estimation results. Section 4 concludes.

2.   **Literature Review and Hypothesis Development**

Even though independent directors are expected to generate significant improvements in firm performance through their monitoring and advisory activities, the existing literature shows mixed empirical evidence that puzzles researchers, investors and regulators. For example, Bhagat and Black (2001) find "no convincing evidence that greater board independence correlates with greater firm profitability or faster growth", and even "some evidence that firms with supermajority-independent boards are less profitable than other firms." Bhagat and Bolton (2008) examine updated data and actually find that board independence is negatively correlated with contemporaneous and subsequent operating performance. On the other hand, Nguyen and Nielsen (2010) find that the stock market reacts negatively to sudden deaths to independent directors in the US (very short-term changes in firm value) and they conclude that this provides some evidence that the independent directors provide a valuable service to shareholders.

The current literature offers explanations of the mixed results from different angles. These angles include: (1) Endogeneity: Hermalin and Weisbach (1998, 2003), Harris and Raviv (2008), and Adams et al. (2010) argue that the lack of a robust relationship between board independence and firm performance is due to the endogeneity of board composition; (2) The strategic information transfer from the CEO to board directors: Adams and Ferreira (2007) show in theory that board directors need sufficient information about the firms to effectively perform their advisory and monitoring roles, but the CEOs may choose to disclose different amount of information when they consider directors' dual roles; whereas Faleye et al. (2011) show empirically that as the board becomes more independent, the negative advising effects outweigh the benefits of improved monitoring; (3) The definition of "independent directors:" Hwang and Kim (2009) and Fracassi and Tate (2012) argue that "independent directors" may not be truly independent, and find that quite a few "independent

directors" have strong social ties with directors, and that those social ties tend to significantly reduce firm value; (4) The heterogeneity of firms: Coles et al. (2008), for example, find that the optimal board size varies with the complexity of firms, and the optimal board size tends to be larger for more complex firms; and Masulis et al. (2012) find that the impact of foreign independent directors (FDIs) on firm performance depends on whether the firm has much business presence in its FID's home region.

We offer a new explanation for the empirical puzzle of why board independence has no robust correlation with firm performance. Specifically, we hypothesize that IEDs, instead of all independent directors, have significant and positive effects on firm performance. This is because IEDs have both the incentives and industry-specific expertise to effectively perform their advisory and monitoring roles. The industry-specific expertise can help IEDs alleviate the information asymmetry between independent directors and corporate insiders such as the CEO. Ravina and Sapienza (2010) show that firm information asymmetry can be a serious problem. They contrast the profitability of trades in their companies' stocks made by independent directors and corporate insiders, respectively. They find that although both groups make profits in their trades, independent directors make significantly less profit than corporate insiders, which shows that the information asymmetry between them can be really severe.

We also hypothesize that for more complex firms, such as firms with positive R&D expenditures, IEDs are particularly important because their industry-specific knowledge would be more useful there; whereas for less complex firms, such as firms with zero R&D expenditures, IEDs may not be as important. This is because for more complex firms, the cost of acquiring information is higher than for less complex firms, so the marginal contributions made by IEDs are greater than those made by INEDs. Duchin et al. (2010) empirically show that the marginal contributions of independent

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directors to firm performance depend on the cost of acquiring information. They find that the effectiveness of outside directors depends on the cost of acquiring information about the firm. Specifically, they show that when the cost of acquiring information is low and outside directors are added to the board, firm performance improves. However, when the cost of acquiring information is high and outside directors are added to the board, firm performance deteriorates. We hypothesize that IEDs can make more positive contributions to firm performance when information costs are higher. The above analysis leads us to our first hypothesis:

Hypothesis 1: IEDs, but not INEDs, have significant and positive effects on firm performance. Such effects are more important for complex firms. Such effects are more important for firms with higher information costs.

To address endogeneity concerns in testing Hypothesis 1, we use the Heckman 2-step estimation procedure as well as 2SLS estimation. We also conduct an event study of the market reactions to appointments of IEDs versus INEDs and contrast these market reactions.

We further investigate the channels through which IEDs may have significant and positive effects on firm performance. Specifically, we propose the following hypotheses related to how IEDs influence corporate decisions:

Hypothesis 2: IEDs, but not INEDs, can effectively deter earnings restatements. Such effects are expected to be stronger for firms with less entrenched CEOs.

Agrawal and Chadha (2005) show that board independence is unrelated to the probability of earnings restatements. We hypothesize that IEDs, instead of all independent directors, can significantly lower the probability of earnings restatements, because their industry-specific expertise will allow them to be effective monitors. Even if they are not financial experts, their intuition developed through industry experience can allow them to detect abnormal accounting numbers and prevent earnings misreporting and subsequent restatements more easily than independent directors without relevant industry experience. IEDs may be able to perform their monitoring role more easily if the CEO is less entrenched, because the board may have more bargaining power with a less entrenched CEO, and receive more firm-specific information as the result.

Hypothesis 3: A higher proportion of IEDs on the board will significantly increase cash holdings. Such effects are expected to be stronger for "complex" firms.

If managers' use of cash reserves is poorly monitored, then these holdings are likely to be used by managers to pursue unnecessary investments (Jensen and Meckling, 1976), to conduct mergers and acquisition and build business empires (Moeller et al, 2005), or simply to increase spending on perks (Yermack, 2006). All these would result in lower cash holdings than the optimal amount. Consistent with this "agency view", Dittmar and Mahrt-Smith (2007) find that firms with poor corporate governance dissipate cash quickly in ways that significantly reduce operating performance. Harford et al. (2008) find that firms with weaker governance, as indicated by low insider ownership and weaker shareholder rights (a high G-index), are associated with lower cash holdings. On the other hand, firms with strong governance would permit a larger buildup of cash to allow rapid investment as profitable opportunities unexpectedly arise. We argue that boards that exercise greater oversight and have better

knowledge of firm operations can closely monitor both the buildup and use of cash reserves, limiting the misuse of funds.

Harford et al. (2008) find that board independence is not significantly correlated with cash holdings. We argue that IEDs are in a better position than INEDs to monitor cash holdings because their industry expertise will allow them to prevent value-destroying acquisitions and capital expenditures, and keep sufficient cash within the firms so that profitable investment opportunities will not be missed. These effects may not be uniform across firms. Coles et al. (2008) argue that "complex" firms have more advising and monitoring needs than "simple" firms, and thus may require different features of boards (different board sizes in their paper). We hypothesize that the effects of IEDs on cash holdings are stronger for "complex" firms than for "simple" firms.

Hypothesis 4: The presence of IEDs increases CEO-pay-performance sensitivity for "complex" firms.

Chhaochharia and Grinstein (2009) estimate that CEO pay decreases 17% more in firms that were not compliant with the recent NYSE/NASDAQ board independence requirement than in firms that were compliant. These results suggest that more independent boards tend to lower CEO compensation. However, these results have recently been challenged by Gutherie, et al. (forthcoming), who find that the compensation committee independence requirement actually increases CEO total pay. Conyon and Peck (1998) show that in the UK, when the proportion of outside directors on the board reaches at least 40%, CEO compensation is significantly and positively correlated with the firm's stock return.

Different from Chhaochharia and Grinstein (2009) and Gutherie et al. (forthcoming), but similar to Conyon and Peck (1998), we examine the effect of IEDs on the CEO's pay performance

sensitivity. We choose to focus on CEO pay performance sensitivity instead of the level of CEO compensation because, as Hermalin (2005) shows, a rise in board independence may increase the intensity of monitoring and decrease the CEO's job security. As a result, in equilibrium, a CEO may receive higher compensation to reflect the higher risk of dismissal. Second, although the level of CEO compensation captures the agency costs of CEOs to some degree, higher pay-performance sensitivity may be more effective in aligning the incentives of CEOs with shareholder value.

Hypothesis 5: The presence of IEDs increases the probability of CEO turnover following poor firm performance.

The effects of independent directors on CEO turnover following poor firm performance seem to be mixed. On the one hand, Weisbach (1988) reports that there is a stronger association between prior performance and the probability of a resignation for companies with outsider-dominated boards than for companies with insider-dominated boards. Laux (2008) develops a theoretical model that predicts that the trend toward greater board independence is associated with subsequent trends toward higher CEO turnover. Jenter and Lewellen (2010) find that boards aggressively fire CEOs for poor performance, and that the turnover-performance sensitivity increases substantially with board quality. However, Jenter and Kannan (forthcoming) find that in their sample of 1,627 CEO turnovers between 1993 and 2001, CEOs are significantly more likely to be dismissed due to bad industry or market returns, instead of bad firm-specific (industry-adjusted) return.

Motivated by the above studies, we hypothesize that the industry experience of IEDs enables them to more accurately attribute firm performance to CEO decisions versus the general trend in the

industry. As a result, IEDs can make CEO turnovers more highly correlated with firm performance that is below the industry median performance.

Hypothesis 6: Distinct from independent directors, IEDs can better evaluate and implement innovative projects, leading to increased firm innovation.

Innovative activities such as new product development and R&D investments are characterized by high riskiness and long-term time horizons, and their short-term gains often tend to be quite limited. These characteristics make innovative projects hard to evaluate. With industry experience, IEDs may be in a better position to evaluate and implement those projects. For example, INEDs, because of their lack of understanding of the nature of the industry, may tend to reward the CEO only on the basis of short-term financial performance of the firm, but such practice may result in "skewing the direction of managerial effort away from the optimally, risky strategies that many shareholders prefer" (Baysinger and Hoskisson, 1990). IEDs, on the other hand, may have longer time horizons, be able to pick the most promising innovative projects, and create proper incentives for the CEO to undertake those risky projects.

Hypothesis 7. Powerful CEOs tend to avoid IEDs on the board.

It has long been recognized that CEOs have strong influence on the selection of board members. Generally, CEOs attempt to reduce pressure from active monitoring by reducing board independence (Hermalin and Weisbach, 1998). For example, Shivdasani and Yermack (1999) show that when the CEO serves on the nominating committee or no nominating committee exists, firms

appoint fewer independent outside directors and more gray outsiders with conflicts of interest. Stock price reactions to independent director appointments are significantly lower when the CEO is involved in director selection. Fracassi and Tate (2012) find that firms with more powerful CEOs are more likely to appoint directors with social ties to the CEO. We hypothesize that CEO power has a negative and significant impact on the presence of IEDs on the board.

The current literature has well documented the influence of powerful CEOs on board selection and decisions. For example, Westphal and Zajac (1995) find that when incumbent CEOs are more powerful than their boards of directors, new directors are likely to be demographically similar to the firm's CEO, and greater demographic similarity between the CEO and the board is likely to result in more generous CEO compensation contracts. Ryan and Wiggins (2004) find that, as the tenure of a CEO grows, the CEO pay-equity performance sensitivity decreases. Morse et al. (2011) find that powerful CEOs induce boards to shift the weight on firm performance measures toward the better performing measures, thereby rigging CEO incentive pay. In a similar vein, we hypothesize that powerful CEOs would avoid IEDs because with their industry-specific knowledge, they may be able to monitor CEOs more intensely. For example, as Hypothesis 5 states, they may increase the CEO-pay performance sensitivity, and also make it more difficult for the CEO to "rig the incentive pay."

3. **Data and Results**

3.1. Data

Our sample consists of S&P 1500 firms between 2000 and 2008. Data on board directors' industry experience are from BoardEx database. We carefully go through the employment history section of BoardEx database and match-merge with Compustat Global to find out the industry information of the firms that appear in the employment history section. Compustat Global covers over

56,000 publicly traded companies in 112 countries, representing 98% of the world's market capitalization. All financial data are from Compustat, and all stock return data are from CRSP. Following the literature, we drop finance and regulated utilities industries.

Insert Figure 1 and Table 2 here

Figure 1 illustrates that the average proportion of independent directors has steadily risen during our sample period, as firms attempted to comply with the new legal and regulatory requirement on board independence. It is interesting to notice that the steady rise in the independence ratio mainly came from the increase in the average proportion of IEDs (independent directors with industry experience) on a board, while the average proportion of INEDs (independent directors with no industry experience) on a board stays roughly constant after 2003. The proportion of IEDs more than doubled between 2000 (14%) and 2008 (29%), while the proportion of INEDs only increased by about 26% between 2000 (38%) and 2008 (48%). Table 2 reports the summary statistics for the full sample in our subsequent regression analysis.

3.2. The determinants of IEDs

Insert Table 3 here

Table 3 reports the results when we examine the determinants of IEDs. Knyazeva et al. (2011) find that firms located near larger pools of prospective directors have a higher proportion of independent directors on their boards. Inspired by Knyazeva et al. (2011), we use the number of firms in the same industry in the neighborhood (defined as the first 3 digits of the ZIP code) as an exogenous determinant of IEDs. To alleviate the concern regarding the direct competition between firms in the same industry, we only count firms in the same 2-digit SIC industry but not in the same 4-digit SIC industry as the exogenous determinant of IEDs. Since firm location is pre-determined and

relatively stable (the relocation of firm headquarters is rare), our measure is arguably a valid exogenous determinant of IEDs. Model 1 and Model 4 confirm our conjecture that the number of neighboring firms in the same industry is positively and significantly correlated with the presence of IED (Model 1) and proportion of the IEDs (Model 4) on a board.

To differentiate between "complex" firms and "simple" firms, we split our sample into a subsample consisting of firms with positive R&D expenditure, and a subsample consisting of firms with zero R&D expenditure. Models 2, 3, 5 and 6 show that for "complex" firms, the number of neighboring firms in the industry is significantly and positively correlated with the presence of IED (Model 2) and the proportion of IEDs (Model 5) on a board, but these results no longer hold when we examine "simple" firms. Also, we find that for the full sample as well as for "complex" firms, R&D/Sales is positively and significantly correlated with both the presence of IED and the proportion of IEDs on a board. On the other hand, when CEO and board chairman are the same person ("CEO-chair duality"), both the likelihood of having at least one IED and the actual proportion of IEDs on the board is significantly lower. This is consistent with Hypothesis 7 that more powerful CEOs can more easily avoid IEDs so that he/she can capture the board.

3.3. The impact of IEDs on firm performance

Insert Table 4 here

When we estimate the impact of IEDs on firm performance, to tackle the endogeneity issue caused by sample selection, we employ a Heckman (1979) two-step procedure. The first-stage estimation results are reported in Table 3, and the second-stage estimation results are reported in Table 4A. Table 4A shows that the proportion of IEDs on a board is positively and significantly correlated with industry-median-adjusted ln(Market/Book), but the proportion of INEDs is not. These results

hold when we examine firms with positive R&D but do not hold when we examine firms with zero R&D. These results are consistent with Hypothesis 1 and seem to echo Mr. Pozen's comment on Citigroup's board in 2008. With only one independent director who had ever worked in the financial services industry, the board was unable to prevent Citigroup from making suboptimal corporate decisions leading to poor firm performance.

In our regression equations, most control variables have the expected signs. For example, R&D/Sales and Capital Expenditures/Sales both are positively and significantly correlated with firm performance. The number of business segments is negatively and significantly correlated with firm performance, which is consistent with some evidence of "diversification discount" reported in the literature, such as in Stow and Xing (2006). Board size is negatively and significantly correlated with firm performance, which is consistent with Yermack (1996). For robustness check, we also use the number of neighboring firms in the same industry as the instrumental variable to estimate 2SLS regressions. The results are qualitatively similar to our results from Heckman two-step estimations. We also run simple OLS regressions, and the results are qualitatively similar.

To test whether the effects of IEDs on firm performance depends on information costs, we merge our data with IBES database. We measure the information costs by the standard deviation of analyst forecast and the number of analysts following the company's stock (both measures are taken within 30 days before the earnings announcements). Specifically, based on the standard deviation of analyst forecast, we split our sample into two subsamples: a subsample with "more dispersion" of analyst forecast if the standard deviations of analyst forecast are above the median standard deviation in the sample, and the other subsample with "less dispersion" of analyst forecast. Based on the number of analyst forecasts, we split our sample into two subsamples: a subsample with "more analysts" if the

number of analysts following the company's stock is above the median number in the sample, and the other subsample with "fewer analysts."

Table 4B reports the results of distinguishing firms by transparency. Models 1 and 4 show that when firm information costs are higher, IEDs make significant positive contributions to firm performance. Models 2 and 5 show that when firm information costs are lower, IEDs do not make significant contributions to firm performance. Model 3 shows that, when we measure information costs by the standard deviation of analyst forecast, for firms with higher information costs, IEDs make positive and significant contributions to firm performance, but INEDs do not make significant contributions. These results lend support to our hypothesis that for firms with higher information costs, IEDs play more important roles in mitigating information asymmetries between managers and shareholders.

3.4. The impact of IEDs on earnings restatements

Insert Table 5 here

To examine the effects of IEDs on earnings restatements, we merge our data with GAO (Government Accountability Office) financial restatement database, which records 1,390 restatement announcements between July 1, 2002 and September 30, 2005. Table 5 shows, for the full sample, that the higher the proportion of IEDs on a board, the less likely a firm would restate its earnings (Model 1 and Model 4). However, the proportion of INEDs on the board is not significantly correlated with the probability of earnings restatement (Model 4). To examine how CEO entrenchment influences the effects of IEDs on earnings restatements, we split our full sample into two subsamples: firms in the first subsample are characterized by values of E-index (Bebchuk et al., 2009) below the median (E-index<3), while firms in the second subsample are characterized by value of E-index above the

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median (E-index>=3). For the first subsample, CEOs are less entrenched, and we find that IEDs can effectively deter earnings restatements. However, for the second subsample, CEOs are more entrenched, and we find IEDs can no longer effectively deter earnings restatements. These results suggest that more entrenched CEOs tend to lower the effectiveness of the monitoring function of IEDs, which is consistent with Hypothesis 7.

3.5. The impact of IEDs on cash holdings

Insert Table 6 here

In Table 6, we report that, for the full sample, the proportion of IEDs on the board is positively and significantly correlated with cash holdings, measured by ln(cash holdings/sales+1) (Model 1 and Model 4). On the other hand, the proportion of INEDs on the board is not significantly correlated with cash holdings (Model 6). To examine the effects of IEDs on cash holdings in "simple" versus "complex" firms, we split our sample into firms with positive R&D and firms with zero R&D, and find that the results for the full sample still hold for firms with positive R&D, but not for firms with zero R&D (Models 2, 3, 5 and 6). These results are consistent with Hypothesis 3 and show that IEDs can effectively monitor the cash holdings of firms.

3.6. The impact of IEDs on CEO pay-performance sensitivity

To test Hypothesis 4, we merge our data with ExecuComp database. Similar to Conyon and Peck (1998), we split our sample into two subsamples: firms with at least one IED on the boards, and firms without any IED on the boards. We examine the CEO pay-performance sensitivity for these two subsamples, respectively. We measure CEO compensation by ln(Total Compensation) and industry-median-adjusted ln(Total Compensation). Following Chhaochharia

and Grinstein (2009), we measure firm performance by its stock return in year (t-1). We do not use industry-adjusted stock return to measure firm performance because as Jenter and Kanaan (forthcoming) show, firms do set CEO pay on the basis of absolute stock return instead of relative stock return.

Insert Table 7 here

Table 7 shows that for firms with at least one IED on the board, CEO pay is significantly and positively correlated with its stock return (Model 1) and industry-median-adjusted stock return (Model 3), while for firms with no IED on their boards, CEO pay is not significantly correlated with its stock return (Model 2) or industry-median-adjusted stock return (Model 4). These results support Hypothesis 4. It is interesting to notice that even for firms with at least one IED on their boards, CEO-Board Chairman duality has positive and significant effects on CEO total pay, suggesting that the influence of CEO power still effectively boosts CEO compensation, despite the presence of IEDs on their boards.

3.7. The impact of IEDs on CEO turnover-performance sensitivity

To test Hypothesis 5, we infer CEO turnovers from the identities of CEOs recorded in ExecuComp database. We include all CEO turnovers instead of just "forced" turnovers. This is because Jenter and Lewellen (2010) used several algorithms, including the popular classification scheme proposed by Parrino (1997), to classify turnovers into "voluntary" and "forced" turnovers, and found that supposedly "voluntary" turnovers are substantially more likely to occur after bad performance. Based on this result, they conclude that "many of these turnovers would not have occurred had performance been better, and the misclassification of these performance-induced

turnovers as voluntary creates a large downward bias in the estimated turnover-performance sensitivities."

In view of Jenter and Lewellen's (2010) critique of "forced" turnovers, and following Bebchuk et al. (2011), we examine all CEO turnovers instead of just "forced" turnovers. We acknowledge that some turnovers may be voluntary. For example, the CEO may reach the retirement age and voluntarily step down. To control for the retirement effect, following Goyal and Park (2002), we include a dummy variable that equals one if the CEO is between 62 and 66 years old, and 0 otherwise. We also divide the CEO tenure into three segments: less than 3 years, 3 to 5 years, more than 5 years but less than 13 years. Bebchuk et al. (2011), who show that when CEO tenure is less than 3 years, the CEO is significantly more likely to be dismissed. Jenter and Lewellen (2010) find that "[i]n the first five years of tenure, CEOs who perform in the bottom quintile are 42 percentage points more likely to depart than CEOs in the top quintile." Brookman and Thistle (2009) show that the "risk of termination increases for about thirteen years before decreasing slightly with CEO tenure." Therefore, we include three dummy variables corresponding to three segments of CEO tenure, and interact them with the firm's stock return.

Insert Table 8 here

Table 8 shows that, for firms with positive R&D expenditure, the presence of IED on the board significantly increases the probability that a CEO will be dismissed following poor industry-median adjusted stock return. These results support Hypothesis 5. The dummy variable "CEO age between 62 and 66" is significantly and positively correlated with CEO turnover, which shows that this variable captures voluntary turnovers to some extent. It is interesting to note that CEO-board chairman duality significantly reduces the likelihood of CEO turnover, which is consistent with the results reported in Goyal and Park (2002).

3.8. The impact of IEDs on firm innovation

Insert Table 9 here

To test Hypothesis 6, we merge our data with U.S. patent data from the National Bureau of Economic Research (NBER) Patents File (Hall, et al., 2001). NBER documents patents and citations filed by firms in the US between 1976 and 2006. In view of the fact that the number of patents and citations are censored at 0, we estimate Tobit models. Table 9 shows that firms with at least one IED on the board successfully file for significantly more patents and those patents receive significantly more citations. These results support Hypothesis 6 and show that IEDs can better help firms innovate, which leads to higher firm value, as Table 4 shows.

3.9. The market reactions to the appointments of IEDs

In the Introduction section of the paper, we presented a case study of the strongly positive market reactions to the appointment of IEDs to the board of Bank of America. To see if such a pattern holds for a larger sample, we collect announcements of IEDs from BoardEx database. After tackling the contamination effect by checking the announcements with other major corporate announcements such as earnings and mergers and acquisitions, we are left with 334 announcements of directors, including 66 announcements of IED appointments, 208 announcements of INED appointments, and 60 announcements of inside director appointments.

Insert Table 10 here

In panel A of Table 10, we report event study results. The mean and median cumulative abnormal returns over the event window [-2, +2] are significantly positive for IED appointments, but insignificantly different from 0 for INED or inside director appointments. In panel B, we report

multivariate regression results, which show that even after controlling for other firm characteristics, IED appointments still have significantly higher average abnormal returns than INED or inside director appointments.

3.10. CEO power, IED presence and firm value

To test Hypothesis 7, we use Principal Component Analysis to derive indexes of CEO power. To construct CEO power index 1, we aggregate the CEO-chair duality, CEO ownership of the firm, the natural logarithm of CEO tenure, the CEO entrenchment index (Bebchuk et al, 2009), the ratio of the CEO compensation over the compensation of the second-highest paid executive. We find that the coefficients for CEO duality, CEO ownership, CEO tenure, and E-index have expected signs (positive for the first three, and negative for the last one), but the coefficient on the relative compensation ratio has a negative sign, which suggests that we may drop relative compensation for robustness check. We then drop relative compensation and compute CEO power index 2. Similar to Morse et al. (2011), we use a dummy variable to indicate firms with the same person serving as the CEO, board chairman and company president. As Morse et al. (2011) argue, when the CEO and the board chairman is the same person, the CEO can direct board initiatives. When the CEO-chairman also serves as the company president, the board will not be able to have an in-training successor whom they may resort to if they disagree with CEOs.

We aggregate the CEO-chair-president dummy with CEO ownership, E-index, and ln(CEO tenure) to get CEO power index 2. In our Principal Component Analysis for this index, all coefficients on the variables have expected signs. Data on CEO ownership, CEO-Chairman duality, and CEO-Chairman-President dummy are from *RiskMetrics*, executive compensation and CEO tenure data are from CompuStat, and CEO entrenchment index is from Lucian Bebchuk's website.

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Insert Figure 2 and Table 11 here

Figure 2 reports that both CEO power indexes indicate a sharp decline in CEO power between 2003 and 2006/2007, and a rise of CEO power towards the end of our sample period. The sharp decline in CEO power coincided with the rise in IED ratio on the board. Table 11 reports the Heckman 2-step results. Models 1 and 3 show that CEO power is negatively and significantly correlated with the presence of IEDs on the board, which lends support to Hypothesis 7. These results are consistent with casual observation. For example, Pollock (2009) reports that a very successful retired CEO of a Fortune 100 company said, "[y]es, from the point of view of the CEO, the ideal board is 100 percent independent directors except for the CEO. That's the board I'd like to have! I'd be the only one who actually knows anything, and I'd be able to do whatever I want.*"*

3.11. Relationship between IEDs and institutional ownership

Together with IEDs, we have considered the impact of institutional ownership. Similar to Chhaochharia and Grinstein (2009), we find that for firms with lower institutional ownership concentration (i.e., the total ownership of the top 5 institutional investors is in the bottom quartile), the fraction of IEDs on the board has positive and significant impact on firm performance, but for firms with higher institutional ownership concentration (i.e., the total ownership of the top 5 institutional investors is in the top quartile), the fraction of IEDs on the board has no significant impact. These results suggest that IEDs and institutional ownership appear to be substitutes in corporate governance.

4. Conclusion

Conventional wisdom holds that a higher proportion of independent directors on a corporate board will contribute to better corporate policies and firm performance. The rationale is that,

compared with insider directors, independent directors will have fewer conflicts of interest with corporate executives. As a result, they may better align their interests with shareholders' interests, and more effectively monitor and advise CEOs to maximize shareholder value. This "conventional wisdom" was the foundation of a series of legal and regulatory changes aiming at strengthening corporate governance practices in the US in the first decade of the 21st century.

However, this "conventional wisdom" is not supported by empirical evidence. Researchers have not found a robust correlation between the proportion of independent directors on a board and major corporate decisions as well as firm performance. We argue that for an independent director to effectively perform her monitoring and advising roles, she not only needs to be independent, but also needs to have sufficient knowledge and information about the industry and the firm. We hypothesize that IEDs (independent expert directors), i.e., independent directors with industry experience, make significant contributions to firm performance by making better corporate decisions. On the other hand, INEDS (independent non-expert directors), i.e., independent directors without industry experience, despite being independent from the influence of CEOs, may not be able to make significant contributions.

To test this hypothesis, we use newly available data on the full employment history of directors from the BoardEx database, which covers all directors of S&P 1,500 firms between 2000 and 2008. We carefully merge this database with CompuStat, CRSP, GAO financial restatement database and US patent database. We find that the proportion of IEDs on a board is positively and significantly correlated with firm performance, but the proportion of INEDs on a board is not significantly correlated with firm performance. IEDs make significant and positive contributions to firm performance when the information costs are higher, but not when the information costs are lower. These results hold even after controlling for endogeneity and sample selection.

We further investigate how IEDs influence firm performance by affecting major corporate decisions. We find that a higher proportion of IEDs is associated with significantly less earnings restatements, especially for firms where the CEOs are less entrenched. A higher proportion of IEDs is positively correlated with cash holdings, especially for firms with positive R&D expenditure. When a board has at least one IED, CEO pay is significantly correlated with stock return, while when a board has no IED, CEO pay is insensitive to stock return. For firms with positive R&D expenditure, the presence of IED also significantly increases the probability that a CEO will be dismissed following poor performance, as measured by the firm's stock return. Such effects vanish for firms with zero R&D expenditure. We find that when a firm's board has IED, the firm successfully files more patents, and the patents also receive more citations. To estimate the market reactions to the appointments of IEDs, INEDs, and inside directors, we conduct an event study. Our event study results show that market reactions to IED appointments are positive and significant, but market reactions to INED and inside director appointments are insignificantly different from zero.

In summary, our results show that IEDs boost firm performance by improving major corporate decisions such as earnings management, cash holdings, CEO pay, CEO turnover, and innovative projects. Our evidence suggests that IEDs have both the incentives and the industry-specific knowledge to more effectively monitor and advise CEOs than INEDs. What is the preference of CEOs regarding the appointments of IEDs versus INEDs? We show that more powerful CEOs tend to avoid IEDs. This is likely due to the fact that even though CEOs may like the improved firm performance due to better advising of IEDs, they do not like the increase in the monitoring intensity associated with the appointments of IEDs. Our evidence shows that on average, the latter effect seems to dominate the former effect.

We feel that current research on board directors seems to focus more on their incentives than on their ability and information. As a result, the independence of directors seems to have received much more attention than the qualifications of directors. We hope that our research can highlight the importance of director qualifications, such as their past work experience.

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Table 1

Markets Reaction to Bank of America's Replacement of Two Outside
Directors without Banking Industry Experience with Four Outside Directors
with Banking Industry Experience on June 5, 2009

This table reports the CARs for Bank of America's announcement of replacement of two outside directors without banking industry experience with four outside directors with banking industry experience. The market model is estimated using the value-weighted CRSP index as a proxy for the market returns over days [-210,-10]. The abnormal return is computed for each day in the event window by subtracting the expected return from the market model from the actual return.

Event window	Cumulative Abnormal Return (CAR)
(0,+1)	2.16%
(-1,+1)	6.67%
(-2,+2)	6.18%

Table 2. Summary Statistics

The sample is a panel of S&P 1,500 companies between 2000-2008. Independent directors are classified as IED if they have worked in the same industry as the firm where they serve as directors.

Variable	Mean	Q1	Median	Q3	Observations
IED/Board size	0.23	0.08	0.2	0.36	7856
INED/Board size	0.45	0.3	0.46	0.62	7836
Assets (million USD)	7416.74	559.38	1453.8	4263.03	7856
Leverage	0.2	0.03	0.19	0.31	7856
R&D Expenditure/Sales	0.06	0	0	0.05	7856
Capital Expenditure/Sales	0.06	0.02	0.04	0.07	7856
Firm Age	23.49	9	17	34	7856
Number of business segments	2.43	1	1	4	7856
Board size	7.83	6	8	9	7856
CEO-Chairman Duality	0.6	0	1	1	7856
Industry competition (Herfindal Index)	0.08	0.04	0.05	0.08	7856

Table 3. Determinants of IED

The sample is a panel of S&P 1,500 companies during 2000-2008. Independent directors are classified as IED if they have worked in the same industry as the firm where they serve as directors. Robust standard errors are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	Presence of IED (Probit Model)			IED (%) (Tobit Model)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Full Sample	Positive R&D	Zero R&D	Full Sample	Positive R&D	Zero R&D
Number of Neighboring	0.008***	0.025***	0.001	0.001**	0.002*	0.001
Firms in the Same Industry	[0.002]	[0.000]	[0.765]	[0.036]	[0.071]	[0.315]
R&D/Sales	0.842***	0.739***		0.066***	0.056***	
	[0.000]	[0.000]		[0.003]	[0.003]	
Ln(Assets)	-0.011	0.029	-0.081***	-0.002	0.003	-0.010
	[0.520]	[0.230]	[0.002]	[0.660]	[0.678]	[0.213]
Leverage	-0.095	-0.273	-0.044	-0.039	-0.014	-0.040
	[0.407]	[0.113]	[0.797]	[0.264]	[0.762]	[0.450]
Capital Expenditure/Sales	0.411	1.215	-0.025	-0.115	-0.169	-0.090
	[0.310]	[0.154]	[0.959]	[0.273]	[0.354]	[0.493]
Ln(Age)	0.011	-0.018	0.014	-0.020***	-0.017	-0.020*
	[0.643]	[0.610]	[0.667]	[0.009]	[0.117]	[0.053]
Number of	-0.007	-0.008	0.001	-0.008**	-0.013***	0.002
Business Segments	[0.544]	[0.643]	[0.962]	[0.014]	[0.001]	[0.755]
Ln(Board Size)	0.771***	1.041***	0.642***	0.022	-0.006	0.047
	[0.000]	[0.000]	[0.000]	[0.323]	[0.845]	[0.126]
CEO-Chair Duality	-0.096***	-0.017	-0.155***	-0.023**	-0.033**	-0.012
	[0.010]	[0.766]	[0.00279]	[0.024]	[0.019]	[0.413]
Industry Competition	1.214	-0.805	1.609	0.109	-0.308	0.221
	[0.158]	[0.692]	[0.106]	[0.478]	[0.297]	[0.219]
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7856	4210	3646	7856	4210	3646
Pseudo R-squared	0.207	0.227	0.188	0.685	0.948	0.566

Table 4A. Industry Experience of Independent Directors and Firm Performance

The sample is a panel of S&P 1,500 companies during 2000-2008. Independent directors are classified as IED if they have worked in the same industry as the firm where they serve as directors. This table reports the second stage results from the Heckman 2-step procedure. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	Dependent variable: Industry-adjusted Ln(Market/Book)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Full Sample	Positive R&D	Zero R&D	Full Sample	Positive R&D	Zero R&D
IED/Board size	0.133***	0.147***	0.077	0.161***	0.183***	0.014
	[0.001]	[0.001]	[0.171]	[0.003]	[0.005]	[0.847]
INED/Board size				0.038	0.048	-0.090
				[0.434]	[0.432]	[0.132]
Ln(Assets)	0.012*	0.034***	-0.041***	0.012*	0.034***	-0.041***
	[0.077]	[0.000]	[0.000]	[0.078]	[0.000]	[0.000]
Leverage	-0.427***	-0.422***	-0.409***	-0.429***	-0.424***	-0.402***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
R&D Expenditure /Sales	0.040*	0.035*		0.040*	0.036*	
	[0.095]	[0.065]		[0.089]	[0.0603]	
Capital Expenditure/Sales	0.959***	1.925***	0.605***	0.967***	1.939***	0.590***
	[0.000]	[0.000]	[0.000]	[0.000]	[0]	[0.000]
Ln(Firm Age)	-0.037***	-0.053***	-0.021*	-0.038***	-0.053***	-0.019*
	[0.000]	[0.000]	[0.051]	[0.000]	[1.41e-06]	[0.079]
Number of Business Segments	-0.032***	-0.041***	-0.024***	-0.032***	-0.041***	-0.024***
	[0.000]	[0.000]	[0.000]	[0.000]	[0]	[0.000]
Ln(Board Size)	-0.164***	-0.125***	-0.034	-0.167***	-0.130***	-0.029
	[0.000]	[0.007]	[0.516]	[0.000]	[0.00519]	[0.583]
CEO-Chair Duality	0.037**	0.012	0.047**	0.035**	0.009	0.052***
	[0.017]	[0.481]	[0.014]	[0.024]	[0.591]	[0.008]
Industry Competition	-0.738*	-0.687	-0.235	-0.736*	-0.690	-0.248
	[0.085]	[0.339]	[0.547]	[0.085]	[0.337]	[0.528]
Lambda	-0.591***	-0.312***	-0.213	-0.589***	-0.310***	-0.228
	[0.000]	[0.002]	[0.128]	[0.000]	[0.00166]	[0.104]
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7856	4210	3646	7856	4210	3646
Prob>Chi2	0.000	0.000	0.000	0.000	0.000	0.000

Table 4B. Industry Experience of Independent Directors, Information Costs and Firm Performance

The sample is a panel of S&P 1,500 companies during 2000-2008. Independent directors are classified as IED if they have worked in the same industry as the firm where they serve as directors. This table reports the second stage results from the Heckman 2-step procedure. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	Dependent variable: Industry-adjusted Ln(Market/Book)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	More Dispersion	Less Dispersion	More Dispersion	Fewer Analysts	More Analysts	Fewer Analysts
IED/Board Size	0.112**	0.114	0.187***	0.173***	0.004	0.110
	[0.016]	[0.172]	[0.005]	[0.001]	[0.948]	[0.103]
INED/Board Size			0.094			-0.087
			[0.115]			[0.136]
Ln(Assets)	0.009	-0.006	0.009	-0.093***	-0.010	-0.092***
	[0.220]	[0.662]	[0.231]	[0.000]	[0.391]	[0.000]
Leverage	-0.221***	-0.548***	-0.225***	-0.238***	-0.518***	-0.237***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
R&D Expenditure/Sales	0.085***	0.219	0.086***	0.030	0.297**	0.029
	[0.000]	[0.347]	[0.000]	[0.202]	[0.029]	[0.218]
Capital Expenditure/Sales	0.270	1.799***	0.288*	0.732***	0.606**	0.708***
	[0.103]	[0.000]	[0.0818]	[0.001]	[0.023]	[0.002]
Ln(Firm Age)	-0.037***	0.038*	-0.038***	-0.049***	0.023	-0.048***
	[0.001]	[0.061]	[0.001]	[0.000]	[0.202]	[0.000]
Number of Business Segments	-0.027***	-0.028***	-0.028***	-0.028***	-0.025***	-0.028***
	[0.000]	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]
Ln(Board Size)	-0.087*	-0.151**	-0.095**	-0.156***	-0.138**	-0.145***
	[0.068]	[0.028]	[0.046]	[0.004]	[0.016]	[0.008]
CEO-Chair Duality	0.027	0.057*	0.022	0.098***	-0.017	0.101***
	[0.101]	[0.051]	[0.191]	[0.000]	[0.491]	[0.000]
Industry Competition	-0.249	-0.799	-0.248	0.020	-1.611**	0.006
	[0.599]	[0.355]	[0.600]	[0.968]	[0.034]	[0.991]
Lambda	-0.217**	-0.763***	-0.215*	-0.399***	-0.626***	-0.399***
	[0.048]	[0.000]	[0.051]	[0.001]	[0.000]	[0.001]
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3565	3679	3565	3655	3589	3655
Prob>Chi2	0.000	0.000	0.000	0.000	0.000	0.000

Table 5. IED and Earnings Restatement

The sample is a panel of S&P 1,500 companies during 2002-2005. Independent directors are classified as IED if they have worked in the same industry as the firm where they serve as directors. This table reports the Logit model estimation results. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	Dependent variable: Dummy=1 if Earnings Restatement Occurred (Logit Model)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Full Sample	Less Entrenched CEO	More Entrenched CEO	Full Sample	Less Entrenched CEO	More Entrenched CEO
IED/Board size	-1.817**	-2.239**	-0.848	-2.535***	-2.726***	-2.204
	[0.020]	[0.019]	[0.446]	[0.004]	[0.008]	[0.223]
INED/Board size				-1.307	-0.895	-2.051
				[0.119]	[0.328]	[0.382]
ROA	-3.506**	-3.626**	-6.027*	-3.464**	-3.649**	-5.744
	[0.010]	[0.022]	[0.075]	[0.010]	[0.019]	[0.115]
Ln(Assets)	0.013	0.144	-0.642***	0.020	0.155	-0.624***
	[0.917]	[0.327]	[0.004]	[0.874]	[0.298]	[0.005]
Leverage	0.750	0.656	-0.603	0.784	0.683	-0.762
	[0.234]	[0.382]	[0.504]	[0.196]	[0.346]	[0.392]
R&D Expenditure/Sales	-0.144	-0.069	-4.520	-0.169	-0.089	-4.192
	[0.672]	[0.808]	[0.253]	[0.640]	[0.763]	[0.262]
CEO-Chair Duality	0.045	0.249	-0.483	0.122	0.295	-0.351
	[0.864]	[0.432]	[0.468]	[0.637]	[0.337]	[0.629]
Ln(Firm Age)	0.054	0.120	-0.129	0.070	0.128	-0.104
	[0.771]	[0.579]	[0.728]	[0.709]	[0.557]	[0.769]
Ln(Board Size)	0.095	-0.274	1.640	0.191	-0.235	1.778
	[0.867]	[0.662]	[0.191]	[0.740]	[0.714]	[0.161]
Market-to-Book	-0.367*	-0.404**	-0.280	-0.356*	-0.397**	-0.313
	[0.058]	[0.046]	[0.666]	[0.058]	[0.044]	[0.637]
Number of Business Segments	0.084	-0.011	0.325**	0.100	0.000	0.363**
	[0.269]	[0.899]	[0.032]	[0.168]	[1.000]	[0.021]
Industry Competition	-28.043	-14.003	-103.447***	-25.029	-12.962	-94.108***
	[0.213]	[0.547]	[0.003]	[0.252]	[0.551]	[0.006]
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3360	2177	705	3357	2174	705
Pseudo R-squared	0.104	0.125	0.215	0.108	0.128	0.220

Table 6. Cash Holdings

The sample is a panel of S&P 1,500 companies during 2000-2008. This table reports the OLS model estimation results. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	Dependent variable: Ln(Cash Holding/Sales+1)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Full Sample	Positive R&D	Zero R&D	Full Sample	Positive R&D	Zero R&D
IED/Board size	0.198***	0.280***	-0.003	0.172***	0.233***	-0.022
	[0.000]	[0.000]	[0.938]	[0.000]	[0.000]	[0.633]
INED/Board size				-0.035	-0.061	-0.029
				[0.214]	[0.205]	[0.210]
Ln(Assets)	-0.006	-0.005	-0.002	-0.005	-0.004	-0.002
	[0.238]	[0.492]	[0.784]	[0.251]	[0.546]	[0.789]
Leverage	-0.144***	-0.142**	-0.138***	-0.142***	-0.139**	-0.136***
	[0.001]	[0.024]	[0.000]	[0.001]	[0.025]	[0.000]
R&D Expenditure/Sales	0.457***	0.426***		0.457***	0.425***	
	[0.000]	[0.000]		[0.000]	[0.000]	
Capital Expenditure/Sales	-0.621***	-1.269***	-0.257**	-0.626***	-1.283***	-0.258**
	[0.000]	[0.000]	[0.012]	[0.000]	[0.000]	[0.012]
Ln(Firm Age)	-0.013**	-0.021**	0.002	-0.013*	-0.021**	0.004
	[0.046]	[0.040]	[0.740]	[0.055]	[0.038]	[0.630]
Number of Business Segments	-0.015***	-0.019***	-0.005	-0.015***	-0.019***	-0.005
	[0.000]	[0.000]	[0.206]	[0.000]	[0.000]	[0.196]
Ln(Board Size)	-0.024	-0.052**	0.010	-0.020	-0.047*	0.013
	[0.137]	[0.045]	[0.482]	[0.232]	[0.085]	[0.382]
CEO-Chair Duality	-0.003	-0.016	0.009	-0.001	-0.013	0.010
	[0.731]	[0.230]	[0.200]	[0.905]	[0.342]	[0.158]
Industry Competition	-0.037	0.275	-0.030	-0.038	0.292	-0.033
	[0.570]	[0.143]	[0.558]	[0.556]	[0.125]	[0.524]
E-index	-0.018***	-0.023***	-0.009**	-0.018***	-0.022***	-0.009**
	[0.000]	[0.000]	[0.032]	[0.000]	[0.001]	[0.038]
Observations	6421	3565	2856	6408	3559	2849
Adjusted R-squared	0.509	0.549	0.262	0.509	0.549	0.263

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Table 7. Industry Experience of Independent Directors
and CEO Pay-Performance Sensitivity

The sample is a panel of S&P 1,500 companies between 2000 and 2008. This table reports the OLS model estimation results. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	ln(Total Compensation)		Industry-adjusted ln(Total Compensation)	
	Model 1	Model 2	Model 3	Model 4
	With IED	Without IED	With IED	Without IED
Stock return(t-1)	0.129***	0.067	0.101***	0.025
	[0.000]	[0.277]	[0.000]	[0.592]
ln(sales)	0.462***	0.505***	0.453***	0.477***
	[0.000]	[0.000]	[0.000]	[0.000]
CEO age	0.014	0.061**	0.004	0.058**
	[0.604]	[0.032]	[0.867]	[0.035]
CEO age squared	-0.000	-0.001**	-0.000	-0.001**
	[0.551]	[0.040]	[0.798]	[0.043]
CEO tenure	-0.007*	-0.009	-0.007*	-0.008
	[0.063]	[0.111]	[0.053]	[0.134]
R&D Expenditure/Sales	0.676***	3.109*	0.658***	2.503
	[0.000]	[0.066]	[0.000]	[0.134]
Capital Expenditure/Sales	-0.158	0.981	-0.471	0.590
	[0.742]	[0.103]	[0.329]	[0.284]
CEO Duality	0.194***	0.052	0.181***	0.038
	[0.000]	[0.496]	[0.000]	[0.610]
Ln(Geographic Segments)	0.037	-0.003	0.043	0.016
	[0.218]	[0.951]	[0.157]	[0.775]

ln(firm age)	-0.034	-0.017	-0.033	-0.020
	[0.230]	[0.768]	[0.237]	[0.732]
Industry competition	0.003	-0.895	0.311	-0.769
	[0.996]	[0.303]	[0.580]	[0.449]
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4616	1316	4616	1316
Adjusted R-Squared	0.508	0.502	0.508	0.502

Table 8. CEO Turnover-Performance Sensitivity

The sample is a panel of S&P 1,500 companies during 2000-2008. This table reports the Logit model estimation results. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	Dependent variable: CEO Turnover			
	Model 1	Model 2	Model 3	Model 4
	Positive R&D	Zero R&D	Positive R&D	Zero R&D
IED presence dummy*industry-adjusted stock return (t-1)	-0.829**	-0.045	-0.850**	0.144
	[0.017]	[0.911]	[0.032]	[0.800]
CEO age between 62 and 66			1.759***	1.366***
			[0.000]	[0.000]
CEO tenure between 1 and 2 years*industry-adjusted stock return(t-1)			-1.324**	0.326
			[0.027]	[0.685]
CEO tenure between 3 and 5 years*industry-adjusted stock return(t-1)			-0.021	0.177
			[0.963]	[0.791]
CEO tenure between 6 and 12 years* industry-adjusted stock return(t-1)			0.210	0.328
			[0.645]	[0.611]
CEO tenure between 1 and 2 years			-1.147***	-1.429***
			[0.000]	[0.000]
CEO tenure between 3 and 5 years			-0.675***	-0.792***
			[0.000]	[0.000]
CEO tenure between 6 and 12 years			0.301*	-0.220
			[0.084]	[0.254]
IED Presence dummy	0.193	0.085	0.357*	0.291
	[0.219]	[0.545]	[0.096]	[0.132]
Industry-adjusted stock return(t-1)	0.123	-0.360	0.197	-1.061*
	[0.680]	[0.283]	[0.616]	[0.053]
ln(Assets)	0.127***	0.102*	0.157***	0.117*
	[0.000]	[0.054]	[0.001]	[0.099]
Leverage	0.237	-0.051	0.291	0.101
	[0.512]	[0.893]	[0.524]	[0.847]
R&D/Sales	-1.509**	.	-1.995*	.
	[0.036]	.	[0.061]	.

Number of business segments	0.016	0.040	0.031	0.056
	[0.584]	[0.317]	[0.409]	[0.259]
CEO-Chairman Duality	-1.530***	-1.175***	-1.902***	-1.712***
	[0.000]	[0.000]	[0.000]	[0.000]
Industry competition	-2.251	-0.367	-4.480	-0.559
	[0.591]	[0.893]	[0.306]	[0.853]
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	3808	3229	3599	3022
Pseudo R-squared	0.096	0.066	0.176	0.128

Table 9. IED and Firm Innovation

The sample is a panel of S&P 1,500 companies during 2000-2006. This table reports the Tobit model estimation results. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively.

	(1) ln(Patents+1)	(2) ln(Citations+1)
IED Presence Dummy	0.343***	0.380**
	[0.010]	[0.035]
Market/Book	0.207***	0.240***
	[0.000]	[0.000]
ln(Asset)	0.791***	0.945***
	[0.000]	[0.000]
Firm Age	0.013***	0.014***
	[0.001]	[0.003]
Leverage	-0.521	-1.052*
	[0.206]	[0.089]
Ln(Business Segments)	0.088	0.013
	[0.320]	[0.909]
Ln(Geographic Segments)	0.080	0.130
	[0.373]	[0.260]
CEO-Chair Duality	0.081	0.102
	[0.457]	[0.486]
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Observations	7856	7856
Adjusted R-squared	0.323	0.364

Table 10. Shareholder Wealth Effects of Director Appointments

This table reports event study results for announcements of director appointments. The market model is used. The estimation window is [-255,-40], and the return on the Value-Weighted CRSP proxies Market Return. For Panel B, robust standard errors are estimated. P-valued are reported in the brackets. ***, **,* refer to 1%, 5% and 10% significance levels, respectively.

Panel A. CAR[-2,+2]

	N	Mean	Median	%>0
IED	66	0.59%**	0.93%**	58%*
		(0.045)	(0.034)	(0.096)
INED	208	0.08%	0.30%	52%
		(0.896)	(0.79)	(0.282)
Insider	60	0.17%	-0.17%	47%
		(0.576)	(0.697)	(0.322)

Panel B. Multivariate Regression

	CAR[-2,+2]
IED Dummy	0.009*
	(0.070)
INED Dummy	0.002
	(0.692)
ln(Asset)	0.001
	(0.448)
Leverage	0.002
	(0.862)
R&D Expenditure/Sales	-0.014
	(0.595)
Capital Expenditure/Sales	0.011
	(0.776)
ln(Firm Age)	0.002
	(0.290)
Industry competition	0.016
	(0.537)
Observations	320

Table 11. CEO Power, IED and Firm Value

The sample is a panel of S&P 1,500 companies during 2000-2008. Heckman 2-step estimation procedures are used. Robust standard errors clustered at firm level are estimated. P-values are reported in the brackets. ***, ** and * refer to significance at 1%, 5% and 10% levels, respectively

	Step 1	Step 2	Step 1	Step 2
	Presence of IED	Industry-adjusted ln(M/B)	Presence of IED	Industry-adjusted ln(M/B)
CEO Power Index1	-0.085***			
	[0.000]			
CEO Power Index2			-0.086***	
			[0.000]	
Number of neighboring	0.014***		0.014***	
Firms in the Same Industry	[0.000]		[0.000]	
IED/Board size		0.196***		0.197***
		[0.010]		[0.009]
INED/Board size		0.083		0.084
		[0.208]		[0.198]
CEO-Chair Duality		-0.016		-0.023
		[0.452]		[0.271]
Ln(Assets)	-0.008	0.041***	-0.009	0.041***
	[0.735]	[0.000]	[0.719]	[0.000]
Leverage	-0.241	-0.458***	-0.250	-0.458***
	[0.166]	[0.000]	[0.152]	[0.000]
R&D Expenditure/Sales	5.175***	0.045	5.180***	0.045
	[0.000]	[0.315]	[0.000]	[0.312]
Capital Expenditure/Sales	0.465	0.967***	0.455	0.970***
	[0.457]	[0.000]	[0.467]	[0.000]
Ln(Firm Age)	-0.015	-0.010	-0.016	-0.010
	[0.685]	[0.503]	[0.670]	[0.509]
Number of	-0.025	-0.025***	-0.025	-0.026***
Business Segments	[0.111]	[0.000]	[0.110]	[0.000]
Ln(Board Size)	0.817***	-0.205***	0.813***	-0.204***
	[0.000]	[0.000]	[0.000]	[0.000]
Industry Competition	1.970*	-0.527	1.939*	-0.515
	[0.093]	[0.367]	[0.098]	[0.375]
Lambda		-0.586***		-0.582***
		[0.000]		[0.000]

Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Observations	4691	4691	4691	4691
Pseudo R-squared/Prob>Chi2	0.236	0.000	0.236	0.000

Figure 1. Time Series Trends of IEDs vs. INEDs

The sample is a panel of S&P 1,500 companies between 2000-2008. This figure illustrates the time series trends of the proportion of IEDs (i.e., IDIEs: independent directors with industry experience), INEDs (i.e., IDNIEs: independent directors with no industry experience) and independent directors on the board.
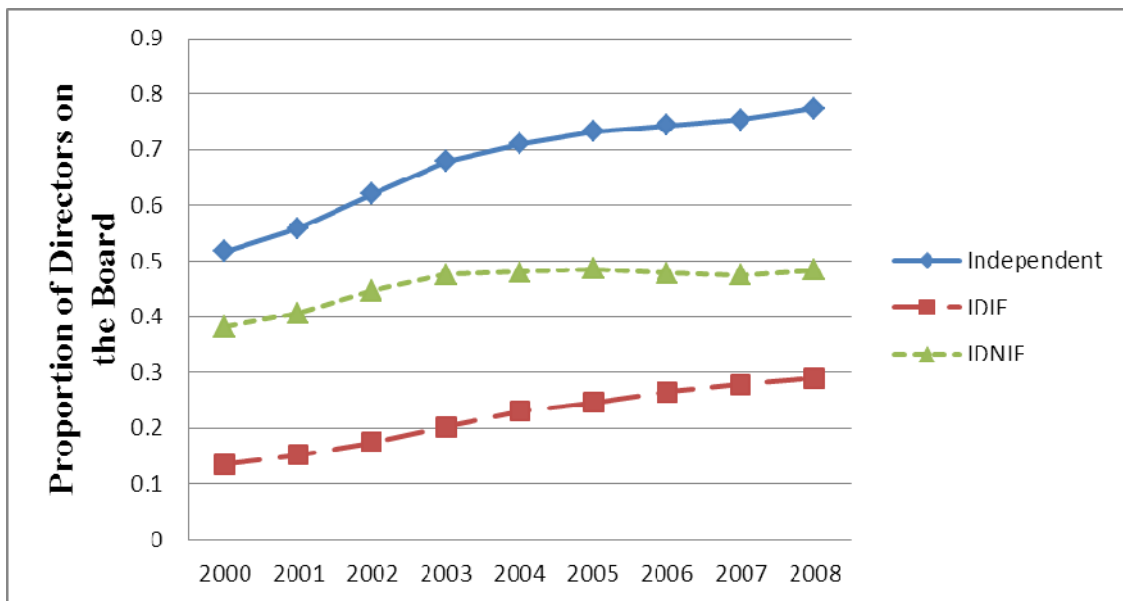
Figure 2. Time Series Trends of CEO Power and IED Ratio

The sample is a panel of S&P 1,500 companies between 2000-2008. This figure illustrates the time series trends of average CEO power and the proportion of IEDs (i.e., IDIEs: independent directors with industry experience) on the board.