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journal homepage: www.elsevier.com/locate/jfecThe value of independent directors: Evidence from sudden deaths[☆]Bang Dang Nguyen^{a,*}, Kasper Meisner Nielsen^b^a Accounting and Finance Group, Judge Business School, University of Cambridge, Cambridge, UK^b Department of Finance, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

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ABSTRACT

We investigate contributions of independent directors to shareholder value by examining stock price reactions to sudden deaths in the US from 1994 to 2007. We find, first, that following director death stock prices drop by 0.85% on average. Second, the degree of independence and board structure determine the marginal value of independent directors. Third, independence is more valuable in crucial board functions. Finally, controlling for director-invariant heterogeneity using a fixed effect approach, we identify the value of independence over and above the value of individual skills and competences. Overall, our results suggest that independent directors provide a valuable service to shareholders.

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1. Introduction

Do independent directors provide a valuable service to shareholders? The dominant view on this question seems to be that independent directors are beneficial to shareholder value. This view is emphasized by an abundance of international guidelines for corporate governance and in regulatory initiatives following the corporate scandals of recent years.¹ Surprisingly, in spite of a rich body of academic literature on the topic of boards of directors, direct empirical evidence on the value of independent directors is scant. This paper attempts to fill this void by examining the stock price reaction to sudden deaths of corporate directors. Overall, we find that the sudden death of an independent director significantly reduces firm value by 0.85% and that the contribution to firm

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¹ Examples include the Cadbury report in the UK, the Vienot reports in France, and the Sarbanes-Oxley Act in the US, which have all called for greater independence of the board of directors.

value depends on his or her very independence as well as on individual and firm characteristics.

The emphasis on the value of independence in both academic and practitioner work reflects the notion that independent directors are better at monitoring the management because they are not, or are less, subject to the classic agency problem. In recognizing directors' competence and incentives to perform this monitoring task, Fama and Jensen (1983) note that the majority of independent directors are managers or decision makers who care about their reputation.

Conflicting evidence exists, however, on whether the supposedly effective monitoring by independent directors materializes. The majority of prior papers shows that the contribution of independent directors to firm performance is insignificant (MacAvoy, Cantor, Dana, and Peck, 1983; Bhagat and Black, 1999, 2002; Hermalin and Weisbach, 1991; Klein, 1998) or even negative (Agrawal and Knoeber, 1996). Exceptions are Rosenstein and Wyatt (1990), who show that stock price reacts positively to the nomination of independent directors to the board, and Core, Holthausen, and Larcker (1999), who find a positive relationship between the fraction of outside directors and market-to-book ratio.

Several potential explanations exist for these conflicting and inconclusive insights. First, as noted by Hermalin and Weisbach (1998, 2003), the board of directors is an endogenously determined institution. Specifically, Hermalin and Weisbach (1988, 1998) provide theoretical and empirical evidence that poor performance leads to increases in board independence. In the cross-section, the potentially beneficial effect of independent directors might therefore be overshadowed by poor historic performance. Thus, empirically it is difficult to identify any causal relationship between board composition and firm performance, or firm value. A second potential explanation is that not all independent directors effectively monitor management. Shivdasani and Yermack (1999) argue, for instance, that chief executive officers (CEOs) might be involved in the selection of independent directors. Third, if prior literature does not find a significant relationship between independent directors and firm value, this circumstance could reflect an absence of any contribution of independent directors to firm value at all.

In this paper, we use sudden death of independent directors as a natural experiment to analyze their contribution to firm value. Our underlying hypothesis is that the stock price should decline following the sudden death if an independent director properly monitors or provides managers with pertinent advice. The stock market reaction is expected to remain negative even when the market expects the deceased to be replaced by another independent director because of search costs and learning curves for new directors. The expected replacement is also less valuable if the market expects the firm to appoint a gray or inside director or if it decides not to replace the deceased at all. In addition, we exploit cross-sectional variation in stock price reactions to examine how the degree of independence, position on the board, and individual characteristics contribute to value.

Compiling a sample of 229 suddenly deceased directors holding 279 directorships in the United States from 1994 to 2007, we identify 108 independent directors. We find considerable variation in the stock price reaction following the death of an independent director. The stock price drops by 0.85% on average. These negative abnormal returns are significantly different from zero and important in economic terms. Given an average market capitalization of \$4 billion, the sudden death of an independent director reduces firm value by almost \$35 million.

Consistent with the view that independence is valuable, we find that stock prices react less negatively when the independent director has long tenure. Controlling for the effect of tenure, the stock price reacts less negatively when the director is appointed during the tenure of the current CEO. The marginal value of independence is higher when there are fewer outside directors or in cases in which the deceased independent director serves crucial board functions, such as chairmanship or audit committee membership. Independence is particularly valuable when the deceased director holds the swing vote that secures a majority of independent directors on the board.

Although our results collectively support the argument that independence is valuable, these findings might be driven by independent directors' ability and skills instead of by their independent stands in decision making. We thus isolate the effect of independence from ability and skills by focusing on individuals with multiple directorships. For this group, we compare the stock price reaction across director types (independent, gray, and inside) while effectively controlling for director-invariant heterogeneity, using a fixed effect approach. Holding the individual effect constant, the stock price reaction is significantly more negative for independent directorships than for other directorships.

Our paper contributes to the literature on corporate boards along several lines. First, it provides direct empirical evidence for the contribution of independent directors to shareholder value. Second, in terms of methodology, our use of sudden deaths allows us to avoid potential endogeneity problems, a common issue in the literature on boards of directors (Hermalin and Weisbach, 2003). Given that board composition is hardly exogenous, it has been a challenge to convincingly confirm an association between board or director characteristics and firm value. Third, the use of sudden deaths of directors with multiple directorships also helps us in separating the issue of skills and competence from the issue of independence. Controlling for director-invariant heterogeneity, we confirm the value of independence over and above the value of individual skills and competence.

While we provide evidence of the benefit of having independent directors on a corporate board, conclusions should be drawn with caution. Adding more independent directors to a board might not always be beneficial. As Fama and Jensen (1983) find, inside directors are more likely to possess superior information that, together with their experience, allows them to contribute to firm value. A board might be most value-enhancing when it allows both independent directors and inside directors to perform their roles optimally.

The remainder of the paper is organized as follows: Section 2 reviews related literature. Section 3 describes the data collection and empirical strategy. In Section 4, we report our main empirical findings. Section 5 provides an interpretation of the results. Several robust checks of the results are presented in Section 6. In Section 7 we conclude.

2. Prior literature on independent directors and sudden death

Prior literature, both theoretical and empirical, has focused on one of the many facets of the board of directors as a monitor or as an adviser or both.² For several reasons, outside independent directors have been seen as the most able to assume both roles inside the board.³ First, outside independent directors are not, or are less, subject to potential conflicts of interest that reduce their monitoring capacity. In any firm the ultimate decisions on crucial issues, such as setting executive compensation or searching for replacements of top managers, fall strictly under board authority and, in most cases, are in the hands of independent directors. Second, outside directors typically also serve as experienced professionals in other firms or large organizations and, therefore, care about their reputation. Fama and Jensen (1983) hypothesize that this reputation effect, not large compensation, induces outside directors to monitor. Third, outside independent directors possess technical expertise both in management and decision making, which allows them to be effective monitors (Fama and Jensen, 1983).

Abundant evidence exists to suggest that independent directors are better monitors of management. Weisbach (1988) reports that outsider-dominated boards are more likely to fire CEOs for poor performance. Byrd and Hickman (1992) provide evidence that bidding firms with outsider-dominated boards have significantly higher announcement-date abnormal returns. Cotter, Shivdasani, and Zenner (1997) find similar results for target firms. Brickley, Coles, and Terry (1994) show that stock markets react positively when a firm with an outsider-dominated board announces adoption of poison pills.⁴

² Prior literature originally concentrated on the monitoring role of the board and only recently started focusing on the expertise and the advisory role. See, for example, Adams and Ferreira (2007) for a theoretical model showing interaction between monitoring and advisory roles and Güner, Malmendier, and Tate (2008) and Dittmann, Maug, and Schneider (2010) for empirical evidence on the financial expertise of directors.

³ Directors who are not current or former employees, and who do not have dealings with the firm, are designated as (independent) outside directors. Weisbach (1988) and Shivdasani and Yermack (1999) provide a succinct review of the measures of board independence in the literature. Hermalin and Weisbach (1998) and Carter and Lorsch (2003) also consider relative and absolute tenure of the CEO in comparison to directors' tenure as alternative measures of independence.

⁴ Recently, several papers point out some limits to the effectiveness of monitoring by independent directors. Fich and Shivdasani (2006) show that independent directors can be good monitors only if they are not "too busy." In contrast, Ferris, Jagannathan, and Pritchard (2003) find that outside directors with multiple directorships do not harm firm performance, while Perry and Peyer (2005) show that outside directors with multiple directorships, in some circumstances, enhance firm value.

The evidence on the value of independent directors to shareholders is thin. Little is known about whether all independent directors are equally good or whether there are other determinants of the value of independent directors. This is partially due to the conflicting evidence in prior studies. Rosenstein and Wyatt (1990) show that stock prices react positively to the nomination of independent directors to the board, and Core, Holthausen, and Larcker (1999) find a positive relationship between firm value and the fraction of outside directors. Meanwhile, MacAvoy, Cantor, Dana, and Peck (1983), Bhagat and Black (1999, 2002), Hermalin and Weisbach (1991), and Klein (1998) show that independent directors are not value-increasing. By contrast, Agrawal and Knoeber (1996) show that independent boards are value-decreasing.

In terms of research question, Rosenstein and Wyatt (1990) is the closest to our paper. However, as argued by Hermalin and Weisbach (1998, 2003), board composition and nominations are unlikely to be exogenously related to firm performance. The positive market reaction to appointments of independent directors could be driven by the need for change, not the contribution of independence. In comparison to Rosenstein and Wyatt (1990), our choice of event allows us to better alleviate the endogeneity concerns related to board changes to identify the very value of independence.

In terms of methodology, we rely on an existing literature using sudden deaths as identification strategy. In a seminal study, Johnson, Magee, Nagarajan, and Newman (1985) use sudden deaths of executives to estimate the value of their continued employment. Using a sample of 53 executives' sudden deaths between 1971 and 1982, they find positive stock price reaction to the death of founder-CEOs and negative reaction to that of professional CEOs. The attractiveness of this approach is that sudden, unexpected deaths occur randomly and are exogenous to current firm and market conditions. In later studies this approach has been used to examine interaction between characteristics of executives and the stock price reaction to sudden death announcements. Worrell, Davidson, Chandy, and Garrison (1986), analyzing the market reaction to 127 announcements of executive deaths, show negative reaction to the deaths of CEOs and positive to that of chairmen. Slovin and Sushka (1993) find positive stock price reactions to the death of 85 inside blockholders. Hayes and Schaefer (1999) find positive reaction to 29 sudden deaths of CEOs, and they compare this to the negative stock reaction when managers are raided. They attribute this difference in stock reactions to differences in ability, because raided managers are likely to have high ability, whereas suddenly deceased CEOs possess average ability. Borokhovich, Brunarski, Donahue, and Harman (2006) use a sample of 161 executive deaths and show that stock price reactions to sudden executive death is related to board characteristics. Salas (2010) examines 184 sudden deaths and shows that stock price reactions are positive for entrenched CEOs. Finally, Bennedsen, Pérez-González, and Wolfenzon (2007) study the event of the deaths of CEOs and of their relatives and show that CEOs are instrumental for corporate performance.

A growing body of literature has also used sudden death to identify the value of political connections. Roberts (1990) examines the stock reaction to the announcement of the sudden death of a US senator for firms that made contributions to his campaign and finds that firm value decreases, especially for those from his constituency. Fisman (2001), who studies the market reaction for Indonesian firms connected to President Suharto when rumors of his declining health were circulating in the media, shows that the negative reaction is closely related to the level of connection. Faccio and Parsley (2009) develop this approach further by identifying sudden deaths of 192 politicians from 35 countries and show that political ties are valuable to firms. Subsequent to the sudden death, stock prices fall, followed by a drop in the rate of growth rates and access to credit.

We extend this line of research by studying the stock market reaction to sudden deaths of independent directors. To the best of our knowledge, this paper is the first to exploit sudden deaths to overcome endogeneity problems in identifying and measuring the value of directors. This is surprising, as the approach introduced by Johnson, Magee, Nagarajan, and Newman (1985) has been recognized for more than two decades.

3. Sample and data

In this section we present our sample selection, definition of sudden deaths, and descriptive statistics.

3.1. Sample selection and definition of sudden deaths

The sample consists of 229 sudden deaths of corporate directors holding 279 directorships between January 1, 1994 and December 31, 2007, of which 108 are classified as independent. A gross sample of 772 deceased directors of firms listed on Amex, Nasdaq, and NYSE was identified by searching Factiva, Lexis-Nexis, and Edgar Online, using keyword search terms on directors (“board member”, “director”, etc.) and death (“passed away”, “died”, “deceased”, etc.). Our search terms do not include keywords designed to capture sudden deaths (e.g., “sudden” or “unexpected”).⁵ This omission is important, as many newspaper articles report the medical cause of death without explicitly mentioning that the death is sudden, e.g., cerebral hemorrhage (stroke). Thus, by conducting a general search designed to identify all deceased directors, we identify cases of sudden deaths that would not show up in a search with keywords focusing on identifying sudden deaths.⁶ The cost of the

general keyword search design is that the search returns a significant number of newspaper articles. In fact, our sample of 772 director deaths was identified from more than 20 thousand newspaper articles. Our efforts also involve the examination of more than two thousand corporate filings to the Securities and Exchange Commission (SEC) related to deaths of directors and executives.

For the purpose of our paper, it is important that our sample includes only deaths that are truly sudden and unexpected by the stock market. Prior research has not provided a unique definition of sudden death. Johnson, Magee, Nagarajan, and Newman (1985, p. 157) identify their sample of 53 executive deaths from a gross sample of 210 deaths by excluding deaths in which the cause was not attributed to “prolonged illness,” “complications following surgery,” or indeterminate, whereas Slovin and Sushka (1993) do not seem to impose any restriction on their sample of deceased blockholders. Recent papers (Hayes and Schaefer, 1999; Faccio and Parsley, 2009; Salas, 2010) provide more precise information on the selection of sudden deaths.

For the selection of sudden deaths, we partly rely on the medical literature, which defines sudden death as an unexpected and non-traumatic death that occurs instantaneously or within a few hours of an abrupt change in the person's previous clinical state.⁷ In addition to such deaths, we include accidental and traumatic deaths that are unanticipated by the stock market and unrelated to firm conditions. Although our ability to follow a stringent definition is limited by our use of newspaper articles to classify causes of death, we have tried to be careful to ascertain that the deaths in our sample were sudden and unanticipated.

To classify the deaths as sudden, the cause of death was verified by an additional search on news containing the name of the director in a one-year period surrounding his death. In cases of inconsistency in the reported cause of death across different sources (e.g., one newspaper reports the death as sudden whereas another reports cancer as the cause of death), our approach is to be conservative and include only events in which we have no conflicting evidence that the death is sudden and unexpected. As a result, death caused by, for example, heart attack is only classified as sudden if we cannot find any evidence of declining health 24 hours prior to the heart attack. Similarly, deaths described as “sudden” or “unexpected” with no cause listed are included only if we could find no news indicating that the director was ill or suffered from declining health.

From the gross sample of 772 deceased directors, we identify 229 individual directors who according to our

⁵ This approach is similar to Johnson, Magee, Nagarajan, and Newman (1985) and Faccio and Parsley (2009), but it is different from Hayes and Schaefer (1999) and Salas (2010), who rely on keyword search terms directly related to “sudden deaths.”

⁶ Our search shows large variations across media outlets in the description of the causes of death. For example, strokes are also referred to as aneurysm and cerebral hemorrhage, and accidents are cited by type without employing the word “accident” (e.g., airplane or helicopter crash, fall incident, shooting incident, or death caused by leisure

(footnote continued)

activities). Inherently, the large variation makes it difficult to sample all sudden deaths by including keywords such as “accident,” “sudden,” and “stroke” tailored to capture sudden deaths only. Thus, conducting a general search and subsequently classifying the causes of death increases the sample size significantly.

⁷ One example is sudden cardiac death, which, according to the American Academy of Pediatrics, is defined as a non traumatic, nonviolent, unexpected event resulting from sudden cardiac arrest within six hours of a previously witnessed state of normal health.

Table 1

Cause of director deaths.

This table reports the composition of our sample of directors of Amex-, Nasdaq-, and NYSE-listed firms who suddenly died between January 1, 1994 and December 31, 2007. Based on the cited cause of death in newspaper reports, Panel A classifies the cause of deaths into cancer; complications from diseases (other than cancer); complications from surgery; sudden death (accidents, heart attacks, strokes, and deaths described as sudden and unexpected with no other cause cited); suicide (self-inflicted gunshots, death from carbon-monoxide poisoning); unspecified illness (cause of death described as brief or long illness); and undisclosed (in cases in which no cause is reported but the death is not described as sudden or unexpected). Panel B shows the reported cause of death for the subsample of sudden deaths from Panel A. Panel C reports the number of directorships held by each suddenly deceased director, and Panel D reports the total number of suddenly terminated directorships. In Panels A–C, each individual is counted once irrespective of the number of directorships held.

	N	Share of total
<i>Panel A: Cause of death</i>		
Cancer	156	0.202
Complications from specified diseases	67	0.087
Complications from surgery	20	0.026
Sudden death	229	0.297
Suicide	6	0.008
Unspecified illness	97	0.126
Undisclosed	197	0.255
All	772	1.000
<i>Panel B: Cause of sudden death</i>		
Heart attack	89	0.389
Stroke	18	0.079
Accident or murder	45	0.197
Sudden and unexpected death, but unspecified cause	77	0.336
All	229	1.000
<i>Panel C: Number of directorships per suddenly deceased individual</i>		
1	194	0.847
2	26	0.114
3	5	0.022
4	3	0.013
5	0	0.000
6	1	0.004
All	229	1.000
<i>Panel D: Total number of suddenly terminated directorships</i>		
	279	

strict definition suddenly died. We include heart attacks, stroke, and accidents, as well as deaths for which the cause is unreported, but the death is described as unanticipated. Thus, our sudden death sample does not include causations such as cancer, complications from illness, past strokes, surgery, or suicides.⁸ Panel A of Table 1 shows the reported causes of death for all deceased directors, and Panel B reports the causes for sudden deaths.

Panel A shows that, out of the 772 deceased directors in our gross sample, 229 (29.7%) of the deaths were, according to our definition, sudden. Of the remaining decedents, 156 directors died of cancer; 67 died from

complications related to various specified diseases (of which complications from past strokes account for 27 cases); 20 died from complications related to surgery; six committed suicide; and 97 were reported to have died from unspecified illnesses, with the cause of death unreported for the remaining 197 cases.

Panel B of Table 1 shows that 38.9% of the directors who suddenly died suffered from heart attack and 7.9% died from a stroke. Accidents, including plane or helicopter crashes (20 cases), traffic accidents (15 cases), fall accidents (five cases), drowning (two cases), murder (two cases), and shooting incidents (one case) account for 19.7% of our sample.⁹ Finally, a total of 77 deaths (33.6%) are described as sudden and unexpected without specific details provided about the medical cause of death.¹⁰

Several of the suddenly deceased directors held multiple directorships. Panel C in Table 1 shows the distribution of suddenly terminated directorships for the 229 deceased directors. In total, the 229 individuals held 279 directorships, as is shown in Panel D of Table 1.

For the sample of sudden deaths, the death date and news date were verified by an additional search of news containing the name of the director. In cases in which the death is reported by multiple news agencies, the earliest date is assigned as the news date. The time lag between death and news dates is on average 2.3 days, with a median of 1 day. The average is affected by a few extreme cases in which a firm held back the announcement for several weeks. If these cases are excluded, the average drops to 1.5 days. Otherwise, the delay is mainly caused by intervening weekends. The mean time lag between death and news dates is 1.7 trading days for the entire sample and 1.0 if we exclude the few extreme cases.

We also check the possibility of confounding news surrounding the event. Whenever there is important corporate news from day -1 to day $+2$ around the deaths, the events are eliminated from the sample. We thus drop 17 cases, reducing our original sample from 296 directorships to 279. Examples of confounding news include announcements of quarterly earnings (seven cases), merger and acquisition decisions (five cases), discoveries of new drugs (two cases), stock repurchases (two cases), and major strike (one case).

Table 2 shows the composition of the sample across time and director types. Following Weisbach (1988) and Shivdasani and Yermack (1999), we classify directors as inside, gray, or independent. Inside directors are current employees of the firm. Board members who are retired employees of the firm, relatives of the CEO, or persons with conflicts of interest or related to the firm's business are classified as gray (outside) directors. Directors who are not current or former employees, and who do not have

⁸ All of the suicides are inside directors. We exclude these cases because they might be related to the current situation surrounding the firm.

⁹ In supplementing the medical definition of sudden death, we also include accidental and traumatic deaths (murder and violence) in our definition of sudden death because these events are unanticipated by the stock market.

¹⁰ In a robustness check in Section 6, we show that our results are not affected in any meaningful way by excluding the cases reported as "sudden" or "unexpected" from our sudden death sample.

Table 2

Timing of director deaths.

This table reports the composition of our sample of directors of Amex-, Nasdaq-, and NYSE-listed firms who suddenly died between January 1, 1994 and December 31, 2007. We define sudden death as an unexpected death that occurs instantaneously or within 24 hours of an abrupt change in the person's previous clinical state. Our definition includes accidents, heart attacks, strokes, and deaths described as sudden and unexpected with no other cause cited. We report the number of suddenly terminated directorships per year, as well as the number of deceased independent, gray, and inside directors. Inside directors are current employees of the firm. Board members who are retired employees of the firm, relatives of the chief executive officer or persons with conflicts of interest or related to the firm's business are classified as gray (outside) directors. Directors who are not current or former employees, and who do not have dealings with the firm, are designated as independent (outside) directors.

Year	Director type						All
	Independent		Gray		Inside		
	N	Percent	N	Percent	N	Percent	
1994	7	0.318	2	0.091	13	0.591	22
1995	1	0.111	5	0.556	3	0.333	9
1996	5	0.185	6	0.222	16	0.593	27
1997	2	0.182	4	0.364	5	0.455	11
1998	1	0.059	6	0.353	10	0.588	17
1999	3	0.250	2	0.167	7	0.583	12
2000	1	0.100	1	0.100	8	0.800	10
2001	4	0.222	3	0.167	11	0.611	18
2002	4	0.267	4	0.267	7	0.467	15
2003	13	0.619	2	0.095	6	0.286	21
2004	19	0.633	2	0.067	9	0.300	30
2005	17	0.548	6	0.194	8	0.258	31
2006	18	0.600	7	0.233	5	0.167	30
2007	13	0.500	7	0.269	6	0.231	26
All	108	0.387	57	0.204	114	0.409	279

dealings with the firm, are designated as independent (outside) directors. The classification is based on the information provided in proxy statements (SEC Def 14A files) and annual reports (SEC 10-K files) as well as biographical information from newspaper articles related to the deceased director.

Table 2 shows that, out of the 279 directorships held by 229 suddenly deceased directors, 40.9% are inside, 20.4% are gray, and 38.7% are independent. Across time we observe significantly fewer independent director deaths in the beginning of our sample than in recent years. We attribute this pattern to the introduction of the Sarbanes-Oxley Act in July 2002, which, among other things, has increased the number and the ratio of independent directors on corporate boards.

3.2. Descriptive statistics

Table 3 gives descriptive statistics for our sample of deceased directors. Panel A reports director characteristics. The average independent (gray and inside) director suddenly died at the age of 64.2 years (62.4 years), with a sample average of 63.1 years. There is substantial variation in independent director age, with a range from 40 to 90 years, at the time of death. Our sample is male-dominated, as 91% of our independent

directors are male.¹¹ The average independent director had served on the board for 7.8 years. Almost all directors held a bachelor's degree. A relatively modest fraction also held a professional, postgraduate, M.B.A., or Ph.D. degree. Finally, more than 50% of the deceased independent directors were members of the audit or compensation committee, and 38% were serving on the nomination committee. These figures reflect the probability that independent directors are members of key governance committees.

Panel B of Table 3 reports firm characteristics. The average firm in our sample has \$4 billion in market capitalization, market-to-book ratio of assets equal to 2.1, and an average age of 46 years. For the same period, Standard & Poor's (S&P) 500 firms have an average (median) market capitalization of \$22.4 (\$9.2) billion and an average market-to-book ratio of assets equal to 2.1. Thus, our random sample of listed firms in the United States is smaller than the average firm in the S&P 500 index.

Panel C shows board characteristics. Average board size is 8.9, lower than the average board size of 12.3 and 10.4, reported in Yermack (1996) for Forbes 500 firms and in Coles, Daniel, and Naveen (2008) for firms covered by the Execucomp database, respectively. On average, around 66% of the directors (5.9 board members) are classified as outsiders, as compared with 78% reported in Coles, Daniel, and Naveen (2008). Finally, 38% of the sample firms maintain a separation between the CEO and chairman positions.

4. The value of independent directors

In this section, we use two empirical tests to investigate the stock price reaction to the sudden death of independent directors. First, we examine the stock return in the period coincident with the sudden death of independent directors. Second, we exploit the cross-section of stock price reactions to examine the impact of different measures of independence, controlling for individual and firm characteristics.

4.1. Event study of the stock price reaction to sudden director deaths

To examine the stock price reaction to sudden deaths, we access daily returns from the Center for Research in Security Prices (CRSP) for each of our 108 events for an 11-day period around the death (from day -5 to day $+5$), as well as a 255-day pre-event estimation period (from day -300 to day -46). The event day is defined as the trading day of the director's death or the first trading day following the death, if it occurred on a non-trading day.¹² To calculate the abnormal return, we follow the standard event study approach and assume a single factor model,

¹¹ This is similar to the 91% male ratio reported by Adams and Ferreira (2009) for a large sampling of US firms.

¹² In a robustness check in Section 6, we propose many alternative event windows, including one anchored around the news date. Our results are not affected in any meaningful way by the definition of the event date.

Table 3

Descriptive characteristics of directors who suddenly died.

This table reports descriptive statistics for our sample of directors of Amex-, Nasdaq-, and NYSE-listed firms who suddenly died from January 1, 1994 to December 31, 2007. We define sudden death as an unexpected death that occurs instantaneously or within 24 hours of an abrupt change in the person's previous clinical state. Our definition includes accidents, heart attacks, strokes, and deaths described as sudden and unexpected with no other cause cited. Panel A reports the following director characteristics: Age (measured in years), Gender (indicator taking the value one if the director is male), Tenure (measured in years), Education indicators equal to one if the director holds a Professional degree, Bachelor's degree, Postgraduate degree, M.B.A., or Ph.D., as well as indicator variables taking the value one if the director is the Chairman of the board or is a Audit committee member, a Compensation committee member, or a Nominating committee member. Panel B shows the following firm characteristics: Market capitalization (millions of dollars), Market-to-book ratio of assets, and Firm age (measured in years). Panel C reports board characteristics: Board size, number of outsiders (Outsiders) on board, the ratio of outsiders (Outside ratio) on the board, and an indicator variable (Separation of power) taking the value one if there is separation of power between the chief executive officer and chairman positions. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Type of director			Difference (1)–(2)	t-Stat.
	All	Independent (1)	Gray and inside (2)		
<i>Panel A: Director characteristic</i>					
Age (years)	63.09	64.23	62.37	1.86	1.40
Gender (1= male)	0.950	0.907	0.977	–0.069	–2.60**
Tenure (years)	11.17	7.84	13.27	–5.43	–4.30***
Education					
Professional degree	0.150	0.198	0.118	0.080	1.76 [^]
Bachelor's degree	0.937	0.960	0.922	0.039	1.25
Postgraduate degree	0.157	0.178	0.144	0.034	0.74
M.B.A.	0.130	0.089	0.157	–0.068	–1.57
Ph.D.	0.087	0.089	0.085	0.004	0.11
Board and subcommittee functions					
Chairman of board	0.301	0.093	0.433	–0.340	–6.45***
Audit committee member	0.284	0.570	0.089	0.481	9.95***
Compensation committee member	0.299	0.551	0.127	0.424	8.26***
Nominating committee member	0.197	0.383	0.070	0.313	6.78***
<i>Panel B: Firm characteristic</i>					
Market capitalization (millions of dollars)	3923.3	4052.1	3842.0	210.1	0.11
Market-to-book ratio	2.142	2.101	2.168	–0.067	–0.19
Firm age (years)	43.58	46.00	42.04	3.97	0.82
<i>Panel C: Board characteristic</i>					
Board size	8.65	8.87	8.50	0.370	0.96
Outsiders	5.15	5.94	4.61	1.324	4.14***
Outsider ratio	0.584	0.663	0.529	0.133	6.54***
Separation of power	0.395	0.380	0.405	–0.025	–0.42
N	279	108	171		

where beta is estimated using the data from the pre-event window. We obtain virtually identical results using market-adjusted returns and, therefore, present results only from the market model.

Panel A in Table 4 presents the time series of abnormal returns for the 11 trading days around the death date. We report the mean abnormal return and the number of positive and negative abnormal returns for each of the trading days. Panel A indicates that, on average, a small and negative share price adjustment is associated with the unexpected loss of independent directors. In particular, the stock price reaction on the days surrounding the death is negative for four straight days from day –1 to +2. This pattern suggests that deaths are incorporated into market prices in the period from the death until the event becomes publicly known to all market participants.

In Panel B we report event study results for valuation effects of sudden deaths of independent directors. Cumulated average abnormal returns are calculated for the two-, three-, and four-day event windows from day –1 to 0, –1 to +1, and –1 to +2, respectively (day 0 is

the death date). This approach is motivated by two observations. First, our definition of sudden death allows for a 24-hour time interval from the change in the prior clinical state until sudden death. In our sample we do observe cases in which the media reports that a director has been hospitalized due to a heart attack, stroke, or accident occurring on day –1, resulting in death the following day. Second, it takes, on average, 1.7 trading days before the death is reported and covered in the news.

Panel B shows that for independent directors the cumulated abnormal returns (CAR) are systematically negative and significantly different from zero. Two-day (–1,0), three-day (–1,+1), and four-day (–1,+2) CARs are –0.4%, –0.63%, and –0.85%, respectively, and all are significantly different from zero. Using a sign-rank test, we even find a significantly negative effect at the 10% levels for the (–1,+2) event window. Panel B also shows considerable variation in the stock price reaction to sudden deaths. Although the average CAR is negative, CARs are not always negative. In particular, 43 out of 108 deaths (39.8%) are associated with positive stock price

Table 4

The stock price reaction to sudden death of independent directors.

This table shows the stock price reaction to the sudden death of independent directors. Panel A reports the mean abnormal return for each trading day from five days before the death date to five days after. Panel B shows the cumulative abnormal return for various event windows surrounding the death date. In addition to the mean abnormal return, we report the corresponding Patell Z and the number of positive and negative stock price reactions. Our sample includes independent directors of Amex-, Nasdaq-, and NYSE-listed firms who died suddenly between January 1, 1994 and December 31, 2007. Independent directors are not current or former employees and have no dealings with the firm. We define sudden death as an unexpected death that occurs instantaneously or within 24 hours of an abrupt change in the person's previous clinical state. Our definition includes accidents, heart attacks, strokes, and deaths described as sudden and unexpected with no other cause cited. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Trading day/event window	N	Mean abnormal return	Patell Z	Number of positive: negative	Median return	Sign-rank test
<i>Panel A: Daily abnormal returns</i>						
–5	108	0.55	2.479***	61:47	0.28	2.519***
–4	108	0.45	2.572***	60:47	0.10	1.726**
–3	108	–0.18	0.272	44:64	–0.26	–0.461
–2	108	–0.18	–0.637	51:57	–0.20	–0.634
–1	108	–0.31	–1.569*	41:67	–0.32	–1.407*
0	108	–0.09	–0.628	59:49	0.10	0.276
+1	108	–0.22	–0.603	45:63	–0.13	–0.556
+2	108	–0.23	–0.578	46:62	–0.21	–1.017
+3	108	0.06	0.415	58:50	0.26	1.095
+4	108	0.26	1.111	58:50	0.11	1.482
+5	108	0.14	–0.655	53:55	0.00	–0.221
<i>Panel B: Cumulative abnormal returns</i>						
(–1,0)	108	–0.40	–1.554*	47:61	–0.28	–0.800
(–1,+1)	108	–0.63	–1.616*	51:57	–0.28	–0.973
(–1,+2)	108	–0.85	–1.689**	43:65	–0.45	–1.352*

reactions over the four-day event window. Thus, we study potential determinants of the stock price reaction to the death of independent directors.

Overall, the results in Table 4 show that stock prices drop significantly following the death of independent directors. This result is consistent with our main hypothesis that independent directors are valuable to shareholders.

4.2. Independence as determinant of the stock price reaction to the sudden death

To study whether the degree of independence of directors is a determinant of their contribution to shareholder value, the following subsection exploits the cross-section of stock price reactions to sudden deaths. We proceed with a multivariate approach that allows us to control for observable director and firm characteristics. In all regressions, we value-weight stock returns to alleviate the possibility that our results are driven by small firms in which the stock price is likely to vary considerably more when corporate talent is lost.¹³ We include as control variables, director age, market capitalization, market-to-book ratio of assets, firm age, and industry indicators. We also control for board size to alleviate the concern that reduced board effectiveness drives the results. If sudden death causes the board to work less effectively, we should expect to see a larger negative effect for small boards.

¹³ This is important because a simple control for firm size cannot counterbalance the fact that small firms are subject to greater variance in the stock price irrespective of the sign of the stock market reaction to firm size.

Table 5 outlines our main results using the stock price reaction for the (–1,+2) four-day window. In Columns 1 and 2, we examine the impact of the degree of independence of independent directors. To proxy for different degrees of independence, we follow recent literature on boards of directors. Carter and Lorsch (2003) argue that board independence is driven by the director's absolute tenure, because directors become emotionally more attached to the firm and its management the longer they stay. Thus, our first proxy for the independence of directors is the length of the tenure of independent directors measured by years of board service. In contrast, long board tenure can be potentially beneficial to shareholders if directors become more competent over time because they better understand the CEO and the business. In such a case, long tenure implies a more negative stock price reaction. Consequently, it becomes more difficult to establish that tenure should reduce the value of independent directors.

In addition, Hermalin and Weisbach (1998) and Shivdasani and Yermack (1999) argue that relative tenure of the CEO as compared with director tenure should be considered an alternative measure of director independence. Shivdasani and Yermack (1999) further show that the CEOs might be involved in the selection of directors. Our second proxy is an indicator variable for whether the independent director is appointed during the tenure of the current CEO.

In Column 1, we include the deceased director's tenure on the board (years). We find that directors with short tenure, who are considered more independent, are valued more by investors. The coefficient on tenure indicates that the stock price reaction is 0.16% higher per year of service

Table 5

The degree of independence and stock price reaction to sudden director death. This table shows the determinants of the stock price reaction to the sudden death of independent directors. We use cross-section of stock price reactions from Table 4 weighted by market capitalization as dependent variable. The reported results are based on the event period from -1 to $+2$, where 0 is the death date. Tenure is the years of tenure on the board. Appointed by CEO is an indicator taking the value one if the independent director was appointed during the tenure of the current chief executive officer (CEO). Outsider ratio is the ratio of independent (outside) directors on the board. Majority change is an indicator variable taking the value one if the deceased independent director held the swing vote and secured a majority of independent directors on the board. Separation of power is an indicator taking value one if the chairman and CEO positions are separated. Board size is the number of directors on the board. Director age is measured in years. Market capitalization is log of the firm's market capitalization. Market-to-book is the market-to-book ratio of assets, which is defined as market value of equity plus book value of debt over book value of assets. Firm age is log of firm age measured in years. Industry effects are Fama and French's five industry classification. t -Statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tenure	0.0016*** (3.56)	0.0024*** (4.20)				0.0018*** (3.17)	0.0025*** (4.51)
Appointed by CEO		0.0180** (2.20)				0.0219*** (2.87)	0.0256*** (2.87)
Outsider ratio			0.0879*** (4.73)			0.0787*** (3.90)	
Majority change				-0.0094* (-1.82)			-0.0126** (-1.99)
Separation of power					-0.0092 (-0.95)	-0.0112 (-1.33)	-0.0122 (-1.37)
Board size	-0.0028*** (-3.22)	-0.0026*** (-2.93)	-0.0015 (-1.64)	-0.0031** (-2.20)	-0.0034*** (-3.63)	-0.0010 (-1.06)	-0.0019** (-2.11)
Director age	0.0008 (1.48)	0.0007 (1.34)	0.0010** (2.10)	0.0012 (0.88)	0.0012** (2.22)	0.0007 (1.44)	0.0007 (1.44)
Market capitalization	0.0047* (1.95)	0.0034 (1.38)	0.0049** (2.19)	0.0073 (1.61)	0.0063** (2.30)	0.0007 (0.26)	0.0011 (0.42)
Market-to-book	-0.0015 (-0.66)	-0.0028 (-1.26)	-0.0007 (-0.32)	-0.0016 (-0.40)	-0.0022 (-0.93)	-0.0030 (-1.39)	-0.0040* (-1.78)
Firm age	-0.0058 (-1.12)	-0.0018 (-0.33)	-0.0052 (-1.05)	-0.0040 (-0.75)	-0.0020 (-0.37)	-0.0004 (-0.07)	0.0004 (0.01)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.341	0.373	0.395	0.274	0.262	0.470	0.409
N	108	108	108	108	108	108	108

on the board. This evidence supports the conjecture that the degree of independence of an independent director is reduced with the length of his tenure. In Column 2 we include our second proxy for independence, which measures the tenure of the deceased independent director relative to the tenure of the CEO. We control for tenure because directors who are appointed during the tenure of the current CEO have, by definition, shorter tenure. Controlling for the positive effect of tenure, we find a positive and significant stock price reaction for directors who are appointed during the tenure of the current CEO. The marginal effect is large, as the cumulative abnormal return is 1.80% higher. Independent directors are thus less valuable when they have long tenure or are appointed during the tenure of the current CEO. This bolsters the case for our interpretation of the event study results because we show that within variation in the degree of independence affects the value of independence.

If the negative stock price reaction is caused by independence, it is natural to expect that the marginal effect is larger whenever the board includes fewer outside directors. In Column 3, we test this hypothesis by including the ratio of outside directors on the board. Our results confirm the conjecture that the marginal effect of independent directors is larger in boards with few outsiders. In an unreported regression, we obtain the same result when the specification includes the number of outside directors instead of the ratio of outsiders.

The marginal value of independent directors is also likely to be affected by the possibility that the loss of a director would influence the power structure within the board. In Column 4 we identify cases in which the deceased director held the swing vote that secured a majority of independent directors on the board. In such cases, shareholders might fear that the loss of an independent director could lead to a majority change against their interest. Column 4 shows that the cumulative abnormal return is 0.94% lower.

The separation of CEO from the chairman position might also affect the power structure within the board (Brickley, Coles, and Jarrell, 1997) and, thereby, the potential contributions of independent directors. We thus examine this effect by including an indicator variable for separation of power. In Column 5 we find no significant effect of being an independent board member in firms that separate the CEO and chairman positions. In Columns 6 and 7 we jointly test the insights from Columns 1 to 5. Generally, the results confirm the prior findings.

In summary, Table 5 provides evidence of the value of independent directors to shareholders: Independence matters within the group of independent directors. Absolute and relative board tenure, two of the most scrutinized proxies for the degree of independence, do explain the variation in stock price reaction. The value of independent directors is also larger when there are few outsiders or when the death threatens independent majority on the board.

4.3. Value of independence in crucial board functions

The prior subsection provides evidence that independent directors are valuable to firms. In this subsection we continue to explore potential channels of their contributions to firm value. In listed companies, either by legal requirements or by shareholders' demand, independent directors assume critical functions in areas where insiders have potential conflicts of interest. The Sarbanes-Oxley Act, for example, requires that chairmen and members of audit committees be independent and have competence in accounting and auditing. As a result, outside directors currently occupy important board committees (audit, nomination, compensation), which are supposed to monitor the management.

We hypothesize that if these crucial board functions provide a valuable service to shareholders, the stock price reacts more negatively when independent chairmen or members of such committees suddenly die. We test this hypothesis empirically by creating indicators that take the value of one if the suddenly deceased independent director is chairman or a member of the audit, compensation, nomination, or other committees.

Table 6 reports results. Column 1 shows that the effect of being an independent chairman is negative but insignificant. However, we also note that the power of the test is affected by the limited number of observations, as we have only ten independent chairmen in the sample. Column 2 shows that if the deceased director served on the audit committee, the negative stock price reaction is significantly larger. Audit committee membership causes the stock price to drop by 2.01%. This is consistent with the findings of DeFond, Hann, and Hu (2005), who show that abnormal returns resulting from nominations of directors with accounting financial expertise to the audit committee are more than 1.5% higher than for those resulting from the nominations of non-expert directors. In contrast, we do not find additional effects of serving on the compensation and nominating committees. The coefficient on the indicators for compensation and nominating committees are 0.70 and -0.48% , respectively. Both effects are insignificant at conventional levels. One potential explanation for the difference in the value of being an independent audit instead of a compensation and nomination committee member is provided by Shivdasani and Yermack (1999). They show that CEOs are actively involved in the selection of board members and that the stock price following such nominations drops by more than 1%. Because audit committee members must possess auditing experience and skills, it might prove more difficult for CEOs to place candidates on this committee. Meanwhile, it might be easier for CEOs to influence the choice of compensation and nomination committee members. We find that members of the audit committee have shorter board tenure (7.4 years) than compensation and nomination committee members (8.8 years), which, according to the prior literature, is one proxy for independence.

In Column 5 we include an indicator variable for directors serving on other committees. On average, 28% of the independent directors serve on subcommittees other

than audit, compensation, and nominating. For these directors we find an additional -2.52% cumulative abnormal return.

Some independent directors can sit on many committees of the same board. This possibility is not taken into account in regressions from Columns 1 to 5. Thus, we pool all variables into one regression in Column 6. The joint specification shows similar results. The deaths of independent chairmen and members of the audit, nominating, and other committees are associated with CARs of -3.70% , -1.62% , -1.78% , and -2.44% , respectively. All effects are significant at the 5% level. The effect of serving the compensation committee is insignificant, which perhaps, given the controversy surrounding executive compensation, is not surprising.

In summary, we find that although independence matters for ordinary board members, an additional value is associated with having independent directors perform crucial board functions. Our results demonstrate that having an independent chairman or audit committee member is particularly valuable to shareholders.

4.4. Isolating the effect of independence from ability, expertise, and skills

One could argue that independent directors are valuable for shareholders, not only because of their independent stands in decision making, but also for their abilities, expertise, and skills. Econometrically, the problem is that competence is difficult to identify, let alone quantify. It is even more challenging to separate ability, expertise, and skills from firm-specific factors. To address this concern, we first include measurable and observable proxies for skills related to directors' educational backgrounds, as obtained from biographical information.¹⁴ Second, we isolate the effect of independence from ability, expertise, and skills, using director fixed effects on the subsample of directors with multiple directorships.

From Table 3 we know that 96% of the independent directors in the sample hold at least a bachelor's degree. Taken at face value this seems to suggest that board members have at least an adequate minimum level of formal education. We therefore control for skill by including three indicator variables: Postgraduate degree, M.B.A., and Ph.D. The core motivation for including these variables is that a M.B.A. degree provides the relevant training in understanding the business model to provide executives with advice, and a Ph.D. degree signals that the director possesses high ability and, therefore, is likely to be skillful.

Table 7 reports the relationship between the degree of independence proxied by tenure and stock market reaction while attempting to control for director ability and skills. When we include education indicators

¹⁴ We lack educational background variables for seven independent directors mainly because the proxy statements do not include the information or because the SEC Def 14A form itself is unavailable prior to the death.

Table 6

The value of independence in crucial board functions.

This table shows the determinants of the stock price reaction to the sudden death of independent directors. We use cross-section of stock price reactions from Table 4 weighted by market capitalization as dependent variable. The reported results are based on the event period from -1 to $+2$, where 0 is the death date. Chairman is an indicator taking the value one if the deceased independent director is chairman of the board. Audit committee, Compensation committee, Nominating committee and Other committees are indicators taking the value one if the deceased independent director served on the audit, compensation, nominating, or other committees of the board, respectively. Tenure is the years of tenure on the board. Board size is the number of directors of the board. Director age is measured in years. Market capitalization is log of the firm's market capitalization. Market-to-book is the market-to-book ratio of assets, which is defined as market value of equity plus book value of debt over book value of assets. Firm age is log of firm age measured in years. Industry effects are Fama and French's five industry classification. *t*-Statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Chairman	-0.0282 (-1.61)					-0.0370** (-2.25)
Audit committee		-0.0201*** (-2.93)				-0.0162** (-2.35)
Compensation committee			0.0070 (1.27)			-0.0013 (-0.23)
Nominating committee				-0.0048 (-0.63)		-0.0178** (-2.41)
Other committees					-0.0252*** (-3.71)	-0.0244*** (-3.04)
Tenure	0.0015*** (3.40)	0.0011** (2.34)	0.0017*** (3.70)	0.0017*** (3.55)	0.0018*** (4.17)	0.0016*** (3.40)
Board size	-0.0028*** (-3.25)	-0.0017* (-1.85)	-0.0029*** (-3.26)	-0.0031*** (-3.19)	-0.0019** (-2.17)	-0.0019** (-2.05)
Director age	0.0008 (1.61)	0.0008 (1.59)	0.0006 (1.25)	0.0009 (1.59)	0.0001 (0.17)	0.0009 (1.65)
Market capitalization	0.0040 (1.65)	0.0028 (1.15)	0.0044* (1.82)	0.0054** (2.03)	0.0042* (1.85)	0.0044* (1.78)
Market-to-book	-0.0013 (-0.61)	-0.0002 (-0.09)	-0.0016 (-0.73)	-0.0015 (-0.68)	-0.0009 (-0.45)	0.0001 (0.04)
Firm age	-0.0046 (-0.89)	-0.0008 (-0.15)	-0.0047 (-0.89)	-0.0064 (-1.21)	0.0026 (0.48)	0.0056 (1.06)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.359	0.395	0.352	0.344	0.424	0.496
N	108	108	108	108	108	108

among the controls in Column 1 of Table 7, we find little impact on the overall result of the value of being independent. Controlling for education, we find the same effect of tenure on the stock price reaction as is given in Table 5.

Although Column 1 attempts to control for differences in ability, expertise, and skills, indicators for education might be imperfect proxies for competences. Using a cross-sectional approach, we, thereby, cannot reject the conjecture that our results are explained by omitted factors related to directors' abilities and skills. In Columns 2, 3, and 4, we therefore run fixed effect estimations of the relationship between independence and the market reaction to sudden deaths. The advantage of this approach is that we effectively control for any director-invariant heterogeneity (e.g., ability, experience, and skills) in relation to shareholder value. The disadvantage is, however, that the specification restricts the sample to directors who serve on at least two boards and have variation in the independence status. In total, 30 directors with a total of 74 directorships satisfy these criteria. The magnitude of our fixed effect estimates should therefore be interpreted with caution.

For comparative purposes, we run the regression on this subsample without director fixed effects in Column 2. We find a -3.52% negative stock price reaction to sudden deaths of independent directors. The effect is economically large and statistically significant at the 1% level. Column 3 confirms these results when we also control for director fixed effects. We find a larger negative stock price reaction to the sudden death of independent directors. The stock price drops on average by 5.01% following the death. Moreover, the adjusted R-square reveals that the indicator for independence, together with the fixed effects, explain 74% of the variation in the stock price reaction. We add more control variables in the regression reported in Column 4. Again, we find a large negative stock price reaction to the sudden death of independent directors. The stock price drops on average by 4.85% following the death.

Overall, the director fixed effects estimation confirms our main result that independent directors provide a valuable service to shareholders. As the fixed effect approach effectively controls for differences in director ability and skills, this result bolsters the case for our interpretation of the event study and cross-sectional

Table 7

Isolating the effect of independence from ability and skills.

This table shows the determinants of the stock price reaction to the sudden death of directors. We use cross-section of stock price reactions from Table 4 weighted by market capitalization as dependent variable. The reported results are based on the event period from -1 to $+2$, where 0 is the death date. In Column 1 the sample includes all independent directors. In Columns 2, 3, and 4, the sample also includes non-independent directorships held by a deceased independent director. In Columns 3 and 4 the specification further includes a fixed effect for each director. Independent director is an indicator equal to one if the director is independent. Tenure is the years of tenure on the board. Postgraduate, M.B.A., and Ph.D. are indicators equal to one if the director holds the degree. Board size is the number of directors of the board. Director age is measured in years. Market capitalization is log of the firm's market capitalization. Market-to-book is the market-to-book ratio of assets, which is defined as market value of equity plus book value of debt over book value of assets. Firm age is log of firm age measured in years. Industry effects are Fama and French's five industry classification. *t*-Statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Variable	(1)	(2)	(3)	(4)
Independent director		-0.0352*** (-3.97)	-0.0501*** (-3.96)	-0.0485*** (-3.45)
Tenure	0.0018*** (4.26)			
Postgraduate	-0.0013 (-0.19)			
M.B.A.	0.0178 (1.64)			
Ph.D.	-0.0086 (-0.53)			
Board size	-0.0033*** (-3.50)			-0.0038 (-1.27)
Director age	0.0012** (2.34)			
Market capitalization	0.0043 [†] (1.85)			0.0021 (0.37)
Market-to-book	-0.0003 (-0.14)			0.0030 (0.46)
Firm age	-0.0028 (-0.53)			0.0099 (0.72)
Industry effects	Yes	Yes	Yes	Yes
Director fixed effects	No	No	Yes	Yes
R-squared	0.428	0.248	0.736	0.749
N	101	74	74	74

results being related to the status of independence in relation to shareholder value.

4.5. Corporate governance, firm characteristics, and value of independence

In this subsection we investigate the impact of governance characteristics by investigating whether independence is particularly valuable in firms with powerful insiders and complex operations.

Independent directors are supposed to monitor the managers and provide an independent stand in decision making. In firms with powerful insiders, the potential value of such effort is likely to be higher. The effect, however, might not materialize if effective monitoring is

limited by dominating insiders. Because of this tradeoff, whether independence is more valuable in firms with high monitoring needs remains an open question. In Columns 1–3 of Table 8 we examine whether the stock price reaction is different for family firms, firms with high managerial ownership, and firms in which the largest blockholder is an institutional investor. Family ownership is present in 18 firms with an average ownership stake of 39.5%. We find a positive, but insignificant effect of family ownership in Column 1. Management holds on average 17.6% of the firm, with a median of 7.6%. In Column 2 we find a positive and significant correlation between managerial ownership and the value of independent directors. Thus, independent directors appear to be more valuable for low levels of managerial ownership. In half of our sample the largest blockholder is an institutional investor with an average ownership of 13.0%. In Column 3 we find a negative and significant correlation between the stock reaction and the ownership of institutional blockholders. The value of independent directors appears to be increasing with institutional ownership.

The beneficial effect of independent directors in complex firms, where monitoring costs are high, might be reduced because of their inferior information relative to insiders (Raheja, 2005; Harris and Raviv, 2008; Duchin, Matsusaka, and Ozbas, forthcoming). We use three proxies for monitoring costs due to complexity. First, we construct an indicator equal to one if the firm has a ratio of intangible to total assets above median.¹⁵ Second, we use industry share of total research and development (R&D) expenses from the Organization for Economic Cooperation and Development (OECD) Stan database. Finally, industry growth is captured by an indicator that takes the value one if growth was above the median of the two-digit SIC level. Firms with a high level of intangible assets in R&D-intensive or high-growth industries are considered to have higher monitoring costs. Columns 4–6 of Table 8 report our results. For two out of three measures, we find a positive and significant correlation between monitoring costs and stock market reaction. This suggests that independent directors' monitoring capacity is reduced when firm-specific information is costly.

5. Interpretation

In this section we consider alternative interpretations of our results.

5.1. Director replacement and long-term performance

Our result on the stock market reaction could be attributable to the expectation that a replacement is less valuable if the search costs and the learning curve for new

¹⁵ Instead of constructing an index of asset intangibility and research and development (R&D) expenses as in Ahn, Goyal, and Shrestha (2008), we use asset intangibility and industry-level R&D separately, because few firms in our sample report R&D data in Compustat. In addition to the reported median specification, we obtain consistent results if we identify firms in the top quartile of asset intangibility.

Table 8

Corporate governance, firm characteristics, and value of independence.

This table shows the determinants of the stock price reaction to the sudden death of directors. We use cross-section of stock price reactions from Table 4 weighted by market capitalization. The reported results are based on the event period from -1 to $+2$, where 0 is the death date. Family ownership and inside ownership are the percentage ownership held by families and insiders, respectively. Institutional blockholder measures the ownership stake of the largest shareholder if it is an institutional investor. Asset intangibility is an indicator equal to one if the firm has above median ratio of intangible to total assets. Industry R&D share is the two-digit standard industrial classification (SIC) industry's share of total research and development (R&D) expenses from the Organization for Economic Cooperation and Development (OECD) Stan Database. High industry growth is an indicator equal to one if the two-digit SIC industry-level growth is above median. Tenure is the years of tenure on the board. Board size is the number of directors of the board. Director age is measured in years. Market capitalization is log of the firm's market capitalization. Market-to-book is the market-to-book ratio of assets, which is defined as market value of equity plus book value of debt over book value of assets. Firm age is log of firm age measured in years. Industry effects are Fama and French's five industry classification. t -Statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Family ownership	0.0003 (0.99)					
Inside ownership		0.0006** (2.33)				
Institutional blockholder			-0.0003** (-2.26)			
Asset intangibility				0.0164* (1.90)		
Industry R&D share					0.746*** (3.42)	
High industry growth						-0.0003 (-0.04)
Tenure	0.0018*** (3.68)	0.0020*** (4.24)	0.0015*** (3.48)	0.0015*** (3.08)	0.0010** (2.26)	0.0016*** (3.44)
Board size	-0.0030*** (-3.35)	-0.0035*** (-3.84)	-0.0020** (-2.15)	-0.0031*** (-3.42)	-0.0021** (-2.37)	-0.0029*** (-2.97)
Director age	0.0007 (1.26)	0.0005 (1.03)	0.0005 (0.92)	0.0006 (1.16)	0.0004 (0.80)	0.0008 (1.47)
Market capitalization	0.0036 (1.34)	0.0049** (2.08)	0.0039 (1.63)	0.0034 (1.29)	0.0038 (1.63)	0.0047* (1.93)
Market-to-book	-0.0010 (-0.46)	-0.0004 (-0.19)	-0.0008 (-0.36)	-0.0011 (-0.51)	0.0007 (0.31)	-0.0014 (-0.65)
Firm age	-0.0033 (-0.56)	-0.0031 (-0.60)	-0.0026 (-0.49)	-0.0084 (-1.59)	-0.0034 (-0.68)	-0.0059 (-1.12)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.348	0.377	0.375	0.347	0.413	0.341
N	108	108	108	100	108	108

directors are high. The expected value might also be lower because the market is not assured that the new director will be independent. In fact, the firm might choose to appoint a gray or inside director or not replace the deceased director at all. Even if the firm is expected to appoint a competent independent director, the stock price reaction might still be negative, if the CEO is expected to be involved in the nomination, as shown in [Shivdasani and Yermack \(1999\)](#). In fact, our result on the stock price reaction to independent directors who are appointed during the tenure of the current CEO supports this argument. On the value of an independent replacement, [Rosenstein and Wyatt \(1990\)](#) show that stock price increases by 0.22% on average following the announcement.

To better understand our result, we collect information on the event firm's reaction to the vacant board seat from current statements (SEC form 8-K) and proxy statements (SEC form Def 14a) following each event. Out of the 108 sudden vacancies identified, 59 firms (55%) replace the deceased director, and 49 firms (45%) do not make replacements, within the following year. If the firm does

replace, it takes on average 185 days (six months) before the new director is nominated. Interestingly, almost all replacements are independent directors (93%), which suggest that benchmarking the value of independent directors to zero is appropriate.

Assuming that investors can predict the replacement choice upon death, we examine the cumulative abnormal return to the sudden death across the type of replacement. A firm's decision to replace independent directors by another independent director is partially anticipated by the stock market, as we find a smaller, but still negative, average (median) stock market reaction of -0.11% (-0.28%). This effect might capture replacement costs, learning curve, and the potential lower value of a newly appointed independent director. Finally, firms that do not choose to replace the deceased directors, and in which board independence subsequently decreases, experience an average (median) CAR of -1.77% (-0.69%), more than twice of the average effect.

Another way to examine the value of independent directors and the subsequent replacement decision is to analyze long-term performance. The underlying

hypothesis is that if independent directors are valuable, then firms with a vacant independent seat should underperform its peers. In an unreported attempt to address this issue we examine CARs from day +3 to up to +6 months without detecting meaningful differences. However, the effect on long-term performance is hard to identify because of the potentially endogenous replacement decision and confounding news.

5.2. Comparison with prior literature using sudden death

On average our results suggest that independent directors' contribution to firm value equals 0.85 percentage point. In comparison, [Rosenstein and Wyatt \(1990\)](#) find that announcements of appointments of independent directors to the board are associated with a 0.22% increase in stock prices. Despite their considerable effort in the event selection, a possibility still exists that the nomination is either anticipated by the market or contaminated by contemporaneous events. In addressing this issue, the sudden death approach might provide a better estimate of value of independent directors.

Compared with the prior literature on the value of CEOs, the estimated value of independent directors seems less extreme. [Johnson, Magee, Nagarajan, and Newman \(1985\)](#) find that the sudden death of founder-CEOs increases the stock price by 3.5%, while the death of non-founding CEOs causes the stock price to drop by 1.16%. [Hayes and Schaefer \(1999\)](#) find even larger effects, as sudden CEO death increases the stock price by 2.84%. [Salas \(2010\)](#) finds that stock prices increase by 0.9% following the sudden death of top executives on average, and by 6.76% for entrenched CEOs, but that prices decrease by 1.81% following the deaths of non-entrenched CEOs. The large value reduction of entrenched CEOs provides indirect support for our arguments. As one of the main tasks of an independent director is to limit potential executive entrenchment, his death might further entrench the CEO. Collectively these papers suggest that the magnitude of stock price reactions for founders and executives tend to be larger and more variable. Prior papers also demonstrate that many factors affect stock reactions including ownership, compensation, and entrenchment. Our study of independent directors is, by contrast, less subject to these issues.

Another reference point is the literature on the impact of deaths of politicians on politically connected firms. [Roberts \(1990\)](#) examines the stock price reaction of firms connected to US senator Henry M. Jackson when he suddenly died and finds a 1.33% decline. [Fisman \(2001\)](#) shows that rumors of Indonesian President Suharto's declining health caused stock prices of connected firms to drop by 0.59%. [Faccio and Parsley \(2009\)](#) analyze a large sample of sudden deaths of politicians around the world and find a 1.7% decline in share price of geographically connected firms. At first glance, the magnitude of our result appears relatively large in comparison to lost political connections, which are arguably more important. However, the sudden death approach estimates the net contribution to firm value. Firms have to compensate a

politician in an exchange of favors, either directly (in a corrupt jurisdiction) or indirectly through campaign contributions. By contrast, firms remunerate independent directors through reputation effects, not through pecuniary pay. In equilibrium, independent directors are paid less than their contribution to firm value to preserve their independent stands in decision making. Precisely because the sudden death approach estimates the net contribution to firm value, the estimate for independent directors appears relatively large.

5.3. Alternative interpretation and comparison to sudden death of inside and gray directors

An alternative interpretation is that our results could have less to do with the director's independence than with reduced board effectiveness. Our empirical framework has followed the prior literature by benchmarking the market reaction to zero. Evidence on director replacement decisions appears to support this benchmark. Our fixed effect approach identifies the value of independence beyond individual ability and skill. In this case, we effectively compare the stock price reaction following sudden deaths of inside, gray, and independent directors while holding individual effects constant.

To interpret our results it might be interesting to generalize this approach and compare the stock price reaction with different types of directors. In comparison to the fixed effect approach, differences in stock market reactions can be due to differences in individual ability and skills and a function of managerial responsibility and entrenchment.

[Table 9](#) presents the stock price reaction across director types. Panel A reports four-day (−1,+2) abnormal returns for independent, gray, and inside directors. For the 57 gray directors in our sample, mean (median) CAR equals −0.22% (0.17%). For the 114 insiders we find a mean (median) CAR equal to −1.09% (−0.04%), but with large variation within the group. We find a large negative effect of −2.25% for founders and smaller CARs of −0.73% for non-founders. Among non-founders, the sudden deaths of top executives are associated with an average CAR equal to −0.82%, whereas the stock price reaction to other executives (chief financial officer, vice presidents) equals −0.21%. For all types of gray and inside directors the stock price reactions are statistically insignificant, both for the mean and median.

In the comparison across director types we exclude founder inside directors to alleviate the concern that this group is special, as shown in [Johnson, Magee, Nagarajan, and Newman \(1985\)](#) and [Adams, Almeida, and Ferreira \(2009\)](#).¹⁶ When we perform a *t*-test of the difference in the stock market reaction between independent directors and gray and inside directors, we generally find that the difference is insignificant. In relation to these tests, we note that the large variation in the stock price reactions to gray and inside directors makes it difficult to establish

¹⁶ Our finding of a negative founder effect is the opposite of [Johnson, Magee, Nagarajan, and Newman \(1985\)](#).

Table 9

Stock price reaction to the sudden death of directors.

This table shows the stock price reaction to the sudden death of a corporate director of Amex-, Nasdaq-, and NYSE-listed firms between January 1, 1994 and December 31, 2007. Panel A reports the cumulative abnormal return (CAR) of the four day (−1; +2) window around the death of independent, gray, inside, inside founders, insider non-founders, inside non-founder chief executive officers (CEOs), presidents and chairman, and inside non-founder other executives, respectively. Panel B shows the determinants of the CAR for the (−1; +2) event window from Panel A weighted by market capitalization. Independent director is an indicator equal to one if the director is independent. Board size is the number of directors on the board, and Outsider ratio is the ratio of independent (outside) directors on the board. Separation of power is an indicator equal to one if the chairman and CEO positions are separated. Control variables include Director age, Market capitalization, Market-to-book, and Firm age. Industry effects are Fama and French's five industry classification. *p*-Values from test of differences are reported in brackets. *t*-Statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Director type	N	(Positive: negative)	Mean	Patell Z	Median	Sign rank
<i>Panel A: Cumulative abnormal return by type of director</i>						
Independent	108	(43:65)	−0.85	−1.689**	−0.45	−1.352*
Gray	57	(29:28)	−0.22	−0.145	0.17	−0.155
Inside	114	(55:59)	−1.09	0.502	−0.04	−0.155
Founders	27	(10:17)	−2.25	1.246	−2.37	−0.896
Non-founders	87	(45:42)	−0.73	1.268	0.21	0.311
CEOs, president and chairman	75	(40:35)	−0.82	1.235	0.01	−0.784
Other executives	12	(5:7)	−0.21	0.326	0.26	0.035
Difference: independent versus gray			−0.64	[0.486]	−0.62	[0.182]
Difference: independent versus gray and inside non-founders			−0.49	[0.571]	−0.62	[0.112]
Difference: independent versus gray and other executives			−0.68	[0.430]	−0.62	[0.145]
<i>Panel B: Independence and stock price reactions to sudden director deaths</i>						
Variable	Director type					
	Independent versus gray (1)	Independent versus inside non-founders (2)	Independent versus gray and other executives (3)	Independent versus gray and inside non-founders (4)		
Independent director	−0.0151*** (−3.21)	−0.0252*** (−5.73)	−0.0200*** (−5.02)	−0.0200*** (−5.57)		
Board size	−0.0003 (−0.52)	−0.0016* (−1.85)	−0.0005 (−1.06)	−0.0006 (−1.03)		
Outsider ratio	0.0890*** (7.28)	0.0943*** (5.96)	0.0942*** (8.29)	0.0918*** (7.63)		
Separation of power	0.0079* (1.67)	−0.0140** (−2.04)	0.0056 (1.29)	0.0064 (1.45)		
Control variables	Yes	Yes	Yes	Yes		
Industry effects	Yes	Yes	Yes	Yes		
R-squared	0.372	0.381	0.392	0.312		
N	165	195	177	252		

significance in the univariate setting. We also note that board characteristics differ across the groups. Table 3 shows that deceased independent directors serve on boards with significantly more outsiders both in absolute and relative terms. This difference is important because our prior analysis shows independence to be particularly valuable in firms with few outside directors. In addition, board effectiveness might be a function of board characteristics. Thus, a multivariate test might be better at capturing whether our result is driven by reduced board effectiveness.

In Panel B of Table 9, we estimate the value of independence by regressing the stock price reaction on an indicator variable taking the value one if the director is independent, while controlling for board characteristics. Column 1 compares the stock price reaction to the death

of independent directors with that to the death of gray directors. We find a difference of −1.51%. When we include inside non-founder directors into the control group in Column 2, we find a difference of −2.52% in stock price reaction to independent directors. In Column 3, where we benchmark to gray and inside other executives, we find a 2.00% lower stock price reaction to independent directors. Finally, Column 4 shows a 2.00% lower stock price reaction to independent directors when compared with gray and inside non-founder directors. All effects are significant at the 5% level.

In summary, we do not find a significant difference in the raw stock price reaction to the sudden death of independent, gray, and inside directors. When we include control variables for differences in board and firm characteristics, however, we find a significant difference

in the stock market reactions, indicating that our results are not driven by reduced board effectiveness.

6. Alternative specifications and robustness checks

This section summarizes alternative specifications and robustness checks.

6.1. Confounding news

In our sample selection procedure, we pay particular attention to confounding news by excluding firms with important corporate events surrounding the sudden deaths. Examples of confounding news include announcements of quarterly earnings, merger and acquisition decisions, discovery of new drugs, and news on a major strike. The results we report in the above sections come from the final sample that already excludes events with confounding news.

6.2. Alternative specifications of the event study

In this subsection we provide additional evidence, using alternative specifications of our event study. Our robustness analysis focuses on two important issues: the event dates and our sample of sudden deaths. Table 10 summarizes this exercise.

The focus of our analysis on the four-day event window, from -1 to $+2$, is motivated by three observations. First, although we use a strict definition of sudden deaths, news about heart attacks, strokes, and accidents can occur on day -1 . Second, the announcements of deaths in local and regional newspapers are, as noted by Johnson, Magee, Nagarajan, and Newman (1985), likely to precede announcements in national newspapers such as the *New York Times* and *Wall Street Journal*. Thus, the share price reaction might occur before the news date obtained from search engines such as Factiva and LexisNexis. Third, the average death is reported with a time lag of 1.7 trading days (reduced to one day if we exclude outliers), which means that the stock price reaction on average occurs fairly close to the actual date of death. As the

chosen event date specification simply was one among several possibilities, Table 10 reproduces our main result using four alternative approaches. Specifications 1, 2, and 3 report our event study results using alternative event windows from -1 to 0 , -1 to $+1$, and 0 to $+2$ around the death date, respectively. We find similar results to those of the previous section.

We also follow the approach suggested by Johnson, Magee, Nagarajan, and Newman (1985) and focus the empirical tests on a firm-specific announcement period, defined as the trading period from the event date to the news date. As about 70% of our events have an announcement period of one trading day or less, and more than 89% of the deaths are reported within three trading days, the announcement period is short for the majority of the sample. As reported in Specification 4, we find a negative and statistically significant stock market reaction of similar magnitude of the estimated effect using windows around the date of deaths. Specification 5 shows the results when we use the three-day event window surrounding the news announcement date. Again, we find a negative and statistically significant stock price reaction to the sudden death of independent directors.

In summary, our results appear to be consistent and robust to alternative specifications of the event window. Sudden deaths of independent directors are associated with a drop in stock prices, and stock price reaction is statistically significant across the specifications.

6.3. Age of directors

Another valid concern with the sudden death literature relates to the sample selection. To be able to measure empirically the stock price reactions, deaths are required to be both sudden and unexpected by the stock market. Although our definition of sudden deaths attempts to secure that these two conditions are satisfied, director age implies an increased probability of mortality and discontinuation of service. Simply put, a sudden death of an 80-year-old director might not be as surprising as the sudden death of a 50-year-old. Similarly, the probability

Table 10

Additional evidence using alternative event study specifications.

This table shows the stock price reaction to the sudden death of independent directors for alternative specifications of the event samples and event window. Specifications 1, 2, and 3 report the cumulative abnormal return (CAR) to sudden deaths for alternative event windows from -1 to 0 , -1 to $+1$, and 0 to $+2$ around the death date, respectively. Specification 4 reports CARs for the period from death date (day -1) to the news date. The sample in Specification 4 is restricted to events in which the death is reported in the news within five trading days of the death. Specification 5 shows the CARs around the news date. Specifications 6–8 report CARs from -1 to $+2$ around the death date. Specification 6 restricts the sample to directors aged 75 or below at the time of death, and Specification 7 includes only directors aged 70 or below. Specification 8 includes only directors with a known cause of sudden death. Patell Z-scores and are in parentheses. * and * denote significance at the 5% and 10% level, respectively.

Specification	Event sample	Event date	Event window	CAR	Patell Z	N
(1)	All	Death	$[-1,0]$	-0.0040^*	(-1.554)	108
(2)	All	Death	$[-1,+1]$	-0.0063^*	(-1.616)	108
(3)	All	Death	$[0,+2]$	-0.0054^*	(-1.291)	108
(4)	News in one week	Death	$[-1,\text{news date}]$	-0.0066^*	(-1.300)	94
(5)	All	News	$[-1,+1]$	-0.0069^*	(-1.295)	108
(6)	Age ≤ 75	Death	$[-1,+2]$	-0.0093^{**}	(-1.842)	98
(7)	Age ≤ 70	Death	$[-1,+2]$	-0.0077^*	(-1.294)	86
(8)	Known cause of death	Death	$[-1,+2]$	-0.0094^*	(-1.489)	88

of retirement from the board also provides a negative bias to the stock market reaction.

We address this concern by doing complementary tests that take age into consideration. We first restrict the sample to directors who are 75 or below and who are 70 or below at the time of death. Our choice of cut off levels parallels the existence of bylaws amendments that block directors from being older than, for example, 70 years in some firms. Specifications 6 and 7 of Table 10 show that on average the stock price drops by 0.93% following sudden deaths of independent directors aged 75 or below. The corresponding reaction for the sample of directors who are 70 or below is -0.77% . Both effects are statistically significant despite the reduction in the sample size. We take the robustness exercise one step further by requiring that these directors' causes of death are known. In this subsample, we find a -0.94% stock price reaction to the death of the average independent director, as is reported in Specification 8.

In summary, Table 10 provides evidence that our results are robust to alternative specifications of the event study and to our sample selection of sudden and unexpected deaths.

7. Conclusions

This paper attempts to investigate the contributions of independent directors to firm value. Our underlying argument is that if independent directors are beneficial to shareholders – as purveyors of advice to, and monitors of, top managers – then stock prices should react negatively to their sudden deaths. While being tragic events, sudden deaths offer exogenous identification of how the markets value independent directors and alleviate endogeneity concerns related to appointment and composition of the board of directors.

Compiling a sample of 229 directors holding 279 directorships who suddenly died in the United States from 1994 to 2007, we identify 108 independent directors. Following the death of independent directors, stock prices drop by 0.85%. Because the average capitalization of firms in our sample is \$4 billion, firm value on average decreased by almost \$35 million.

More important the magnitude of negative stock price reaction varies cross-sectionally. We show that, consistent with the value of being independent, stock prices react less negatively when directors are appointed during the tenure of the current CEO or have long board tenure. We also show that the marginal value of independence is higher when there are few independent directors or when directors perform crucial board functions, such as serving as chairman or audit committee member. Using a director fixed effect approach that effectively controls for differences in director ability and skills, we confirm that independence contributes positively to shareholder value.

Overall, the results demonstrate that independent directors provide a valuable service to shareholders. However, our results also show that the value of their contribution depends on their very independence and could be vulnerable to the actions of powerful CEOs.

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