

# Successor CEO Functional And Educational Backgrounds: Influence Of Predecessor Characteristics And Performance Antecedents

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## ABSTRACT

*This study seeks to examine if boards consider CEO educational and functional background when choosing a new CEO. It also examines which factors determine whether the board of directors will seek an incoming CEO with a different educational and/or functional background from that of the current CEO. Using a sample of 832 successions between 1992 and 2009, we found that the outgoing CEO characteristics and the firm characteristics influence the selection of the incoming CEO functional backgrounds. We found an increase in the likelihood of firms hiring incoming CEOs with the same functional backgrounds as the outgoing CEOs. Incoming CEOs with functional backgrounds in engineering/manufacturing are more likely to be hired by research-oriented firms.*

*Incoming CEOs with functional backgrounds in accounting/finance are more likely to be hired by poorly performing firms. We also find that firms are more likely to change the functional background of the successor relative to the predecessor when there has been poor prior performance and the firm has higher institutional investor ownership.*

**Keywords:** CEO Succession; Functional Background; Educational Background

## INTRODUCTION

There has been considerable research on the CEO turnover and succession process. However, there has been relatively little research on how boards actually select successors, despite the belief held by many that selecting the CEO is the most important decision that a board of directors makes (Larcker et al., 2014). Most prior research has focused on the choice of outside vs. inside successions (Finkelstein et al., 2009). Parrino (1997) and Custodio et al. (2013) find that boards tend to select outside successors from homogeneous industries where the successor CEOs may have transferable skills. Farrell and Whidbee (2003) and Favaro et al. (2010) find that boards are more likely to choose an outside CEO when the firm is expected to have poor performance and uncertainty is high. Allgood and Farrell (2003) show that boards are more likely to choose an outside CEO when the predecessor has been terminated after a short tenure. Naveen (2006) finds that large multi-division firms with greater organizational complexity tend to choose an inside CEO since in this case firm-specific knowledge is essential and difficult to transfer from any other industry. Taken as a whole, this research suggests that where the hired CEO is from (i.e., industry or inside/outside the firm) matters, so it is reasonable to expect that CEO experience matters (Datta and Rajagopalan, 1998). Thus, CEO background is important to boards when they make succession decisions, but research has not definitively quantified how boards select successors and how they determine if a successor will fit the company's needs.

One of the contributions of our study is that, unlike prior research which has examined CEO characteristics and firm outcomes after the hiring of a new CEO (Koyuncu et al., 2010), we are looking at firm characteristics as being motivators for the CEO hires. That is to say, we take the firm characteristics as the determinants rather than the

outcome of hiring decisions. To the best of our knowledge, our study is one of the first studies to examine the matching of incoming CEO background to firm characteristics. This is important because it allows our research to make a value added contribution in an extensively researched area.

Another contribution of our study is that we highlight the CEO background (functional and educational) instead of focusing on the dichotomous succession origin. According to a 2013 survey by the Rock Center for Corporate Governance and The Miles Group, boards are not necessarily adept or skilled in evaluating the potential incoming CEOs. Our study makes a contribution by attempting to examine how boards can use firm characteristics and outgoing CEO characteristics to motivate the incoming CEO characteristics, such as functional and educational background. We believe that our study will help shed light on how firm characteristics and outgoing CEO characteristics can help in achieving a better CEO-Firm fit. There has been prior research that examined job matching and organizational fit (Javanovic, 1979; Smith and White, 1987; Garen, 1988; Allgood and Farrell, 2003; Ryan and Wang, 2011; Kaplan et al., 2012; Huang, 2014).

We address two research questions. Do boards consider CEO educational and functional background when choosing a new CEO? What factors determine whether the board of directors will seek an incoming CEO with a different educational and/or functional background from that of the current CEO?<sup>1</sup>

In this study we find that the outgoing CEO and the firm characteristics do influence the choice of the successor's functional background and that there is a matching of CEO degrees to firm characteristics. Research and development oriented firms are more likely to hire CEOs with the functional background that would permit them to understand the firm's research process. Riskier firms are less likely to hire CEOs with a degree from an Ivy League institution. Smaller firms are more likely to hire CEOs with lower levels of education. We also find that firms are more likely to change the functional background of the successor relative to the predecessor when there has been poor prior performance and the firm has higher institutional investor ownership.

## **BACKGROUND, MOTIVATION AND DEVELOPMENT OF HYPOTHESES**

### **CEO Educational Background**

There is significant literature on CEO educational background and its effects on the firm. There are two branches of research<sup>2</sup> when it comes to the topic of how CEO education influences the firm. The first branch of research examines the relation between the type of education of the CEO and the behavior of the firm. For example, Finkelstein and Hambrick (1996), Tyler and Steensma (1998), and Barker and Mueller (2002) all find that the type of degree that the CEO holds has an impact on the firm's research and development funding. Graham and Harvey (2001, 2002) and Graham et al. (2005), find that CEOs and Chief Financial Officers (CFOs) holding MBAs were more likely than other executives to use techniques such as net present value for capital budgeting and the capital asset pricing model in cost of capital calculations. CEOs with MBAs tend to be more aggressive, on average, choosing to engage in a higher level of capital expenditures, holding more debt, and paying smaller dividends (Bertrand and Scholar, 2003).

In addition, several studies have shown a relation between education level and rate of corporate innovation, or the likelihood of strategic change (Bantel and Jackson, 1989; Wiersema and Bantel, 1992). Advanced management education, in particular, may solidify common beliefs and taken-for-granted assumptions about normative or proper strategic decision making (Hambrick and Mason, 1984). Hambrick and Mason (1984) also suggest that advanced education both encourages and indicates a preference for administrative complexity.

The second branch of research investigates the relation between the selectivity of the CEO's education and firm performance. Deary (2004) and Frey and Ditterman (2004) both report that entrance exam scores are strongly correlated with intelligence tests, and hence it may be that CEOs from highly selective schools are better run firms due to the fact that they can process more information (Elsaid, 2014). Moreover, Burt (1992) and Belliveau et al. (1996) find that CEOs from more selective schools enjoy stronger ties to government officials which can improve the performance of the firm. Perez-Gonzalez (2006) finds some evidence that firms with CEOs that lack an Ivy

League undergraduate degree may have worse performance. Bertrand and Scholar (2003) find that CEOs who hold MBA degrees are associated with higher operating return on assets. On the other hand, Gottesman and Morey (2010) find no evidence that the type or selectivity of education of the CEO is related to firm financial performance.

Bhagat et al. (2010) show that the decision to replace a CEO has nothing to do with the CEO's education and everything to do with his/her performance. Despite of this result, education is an important factor in the hiring of the incoming CEO. The Bhagat et al. (2010) results lead to the puzzling implication that, while CEO education appears to play an important role in the hiring of CEOs, it does not affect the long-term firm performance.

### **CEO Functional Background**

Career experiences or functional background may be an important characteristic when boards search for a new CEO (Beal and Yasai-Ardekani, 2000; Carpenter et al., 2001), and functional background has attracted the attention of researchers (Hambrick and Mason, 1984; Smith and White, 1987; Datta and Guthrie, 1994; Ocasio and Kim, 1999; Westphal and Fredrickson, 2001; Bunderson and Sutcliffe, 2002; Bunderson, 2003; Herrmann and Datta, 2005; Koyuncu et al., 2010). Functional background is important because the work experiences top managers bring to their jobs has a direct influence on how they define problems (Dearborn and Simon, 1958), how they make strategic choices (Hitt and Ireland, 1985; Smith and White, 1987; Westphal and Fredrickson, 2001), and how they process information (Walsh, 1988). In turn, these factors will likely affect both organizational performance (Gupta and Govindarajan, 1984) and the career outcomes of managers (Sheridan et al., 1990). The CEO's functional background is one of the ways the firm communicates the priorities that it is setting. It reflects the firm's culture, values and potential strategic direction (Smith and White, 1987; Westphal and Fredrickson, 2001; Koyuncu et al., 2010).

Historically, the preferences for CEO functional backgrounds have shifted with the changes in business environment. For example, during the period between 1925 and 1950 CEOs often had a manufacturing and operations background (Newcomer, 1955). This trend shifted in the 1960s and 1970s when the majority of executives who climbed the corporate ladder to the CEO position in large U.S. organizations had a finance background (Fligstein, 1987). In the 1980s and the early 1990s there was a reversal in trends and the majority of CEOs had a functional background in operations (Ocasio and Kim, 1999). The prevalence of CEOs with a functional background in operations continued between 1992 and 2005 (Koyuncu et al., 2010).

Pfeffer (1981) and Useem and Karabel (1986) suggest that functional background provides a salient basis for executive selection. Chaganti and Sambharya (1987), Murray (1989), Michel and Hambrick (1992) and Westphal and Zajac (1995) determine the new CEOs' functional backgrounds by examining the prior job titles and employment history. They define three categories of functional backgrounds. Output functional backgrounds include positions in marketing and sales. Throughput functional backgrounds include positions in operations, R&D and engineering. Peripheral functional backgrounds include positions in law, finance and accounting.

Dearborn and Simon (1958) show that executives selectively perceive and identify company problems depending on their functional area, suggesting that executives with primary experience in a particular functional area tend to have similar viewpoints on the sources of poor performance. Waller et al. (1995) find that top executives were more aware of changes in organizational effectiveness related to their own functional backgrounds; for instance, executives with a functional background in operations were more sensitive to changes in operational efficiency for the organization. Thus, functional background may influence executives' perceptions and beliefs about the most important strategic issues facing the firm (Smith and White, 1987; Westphal and Fredrickson, 2001).

Prior research (e.g., Datta and Guthrie, 1994; Guthrie and Datta, 1997) shows that poorly performing firms tend to prefer CEOs with throughput functional experience. As a result, the value of a CEO's functional experience and expertise may be viewed as contingent on the firm's recent performance history. Hambrick and Mason (1984) argue that throughput functional experience stereotypically indicates an internal orientation and possession of skills necessary to improve efficiency and accounting-based performance measures; skills which are more likely to be favored during times of reduced firm profitability. Koyuncu et al. (2010) find no significant differences between the

influences of an operations background and other backgrounds on post-succession performance. Their results imply that the CEO's functional background is not a strong predictor of firm performance.

Guthrie and Datta (1997) also show a strong relation between investments in marketing and promotion (i.e., advertising intensity) and selected CEOs' functional experience<sup>3</sup>. Higher levels of advertising intensity were associated with hiring CEOs having experience in output rather than throughput functional areas.

### **Testable Hypotheses**

Our testable hypotheses build on the conceptual framework and empirical results of the managerial pedigree literature. Our first hypothesis focuses on CEO selection in the context of matching CEO background to firm characteristics. The match between the CEO and the firm is an important consideration. Firms should choose CEOs with traits that match firm needs since the CEOs' skill set and experience influences firm policies, performance, and value. We propose that the board of directors will seek to hire a new CEO with a background that best fits with the structural or cultural characteristics of the firm. The firm characteristics may be observable, allowing for clear predictions of the requisite background needed to manage the organization. For example, companies with high levels of R&D expenditures may be more likely to hire a CEO with a throughput background (Datta and Guthrie, 1994). On the other hand, important characteristics of the firm, such as organizational culture, may be unobservable. When the former CEO has been successful or when firm-specific knowledge is essential, firms are more likely to hire a successor CEO that possesses similar pedigree as the predecessor (Smith and White, 1987; Vancil, 1987). As such, the best indicator of organizational fit may be the pedigree of the former CEO. Specifically, we propose that the new CEO is more likely to have a functional or educational background similar to the former CEO, on average. So our first hypothesis is:

**Hypothesis 1a:** The new CEO is likely to have a functional background that is similar to the predecessor's background.

**Hypothesis 1b:** The new CEO is likely to have an educational background that is similar to the predecessor's background.

Our second hypothesis examines instances where the board of directors may be more likely to seek a change in CEO pedigree by hiring a new CEO with a different functional or educational background than the outgoing CEO. Here, the board of directors will seek to hire a new CEO with a different functional or educational background than the outgoing CEO when there is greater pressure from shareholders, either actual or perceived, to make a change. For example, while firms may seek to hire new CEOs with similar backgrounds to the outgoing CEO (i.e., those most likely to have greater fit with the firm), the board of directors may want to make a change when past performance is poor or when the CEO succession is forced. In such cases, the hiring of a new CEO with a different functional or educational background than the outgoing CEO may signal to the market that the board of directors is seeking to make a change in strategy and/or culture.

**Hypothesis 2:** The likelihood of a change in CEO functional and/or educational background relative to the incumbent CEO is greater when the board of directors faces greater pressure to make a change.

## **SAMPLE SELECTION AND DATA**

### **Sample Selection**

We identify CEO successions using the Execucomp database. Execucomp includes annual compensation data from proxy statements for the five highest paid executives of firms in the S&P 1500 and contains 3,080 different firms from 1992 to 2009. Following Cremers and Grinstein (2009), we identify the executive who is the CEO using the variable CEOANN. This results in a sample of 27,278 firm years where an executive is identified as the CEO. Execucomp also provides the year in which the CEO was appointed as the CEO (BECAMECEO). This results in a sample of 25,776 firm years with data necessary to determine the year in which the succession occurred and 1,877 firm years in which the current CEO is classified as new.

We then randomly<sup>4</sup> select 940 firm years (~50%) and use firm proxy statements and the Marquis Who’s Who database to collect data for each CEO’s prior job titles and employment history. Overall, we obtain CEO functional and educational background information for 832 CEO successions for 476 Execucomp firms from 1992 to 2009. We lose 4 observations because we are unable to determine the age or tenure of the outgoing CEO. We lose 2 observations because we are unable to determine whether the new CEO joined the company from the outside or whether the succession was voluntary or forced. This reduces our sample to 826 CEO successions from 1992 to 2009.

We then match this data with Compustat for accounting data. This results in a matched sample of 778 CEO successions from 1992 to 2009. We also match with the Center for Research in Securities Prices (CRSP) for stock price data. This results in a matched sample of 682 CEO successions from 1992 to 2009. We also match with the Thomson 13F (13F) database for institutional ownership data. This results in a matched sample of 680 CEO successions from 1992 to 2009. Finally, we match with the RiskMetrics (1995 to 2007) and Equilar (2008 and 2009)<sup>5</sup> databases for board of director characteristics (i.e., board size and the percentage of independent directors).

Due to data limitations in RiskMetrics, board characteristics are only available from fiscal year 1995 onward, which further reduces our sample size when using board of director variables to 420.<sup>6</sup>

**Variable Descriptions**

Our primary dependent variables are the functional and educational background of the new CEO and whether the new CEO has a different functional or educational background than the outgoing CEO. Our primary independent variables are functional and educational background of the outgoing CEO. We also include several additional control variables to proxy for firm specific factors. Table 1 describes the construction of the variables and data sources in more detail.

**Table 1.** Variable descriptions  
This table describes the construction of the variables and data sources

<b>Variable Name</b>	<b>Definition</b>	<b>Data Source</b>
<b>CEO Functional Background</b>		
FDRMAJ	CEO is a founder, co-founder, founding family member, majority shareholder, or member of majority shareholding family.	Proxy Statements and Marquis Who’s Who
OUTPUT	CEO has primary experience in output related functions, such as marketing or sales.	Proxy Statements and Marquis Who’s Who
THRPUT	CEO has primary experience in throughput related functions, such as operations, R&D, or engineering.	Proxy Statements and Marquis Who’s Who
PERIPH	CEO has primary experience in peripheral functions, such as law, finance, or accounting.	Proxy Statements and Marquis Who’s Who
<b>CEO Educational Background</b>		
NODEGR	CEO has no undergraduate degree (university or college).	Proxy Statements, Marquis Who’s Who and Bloomberg
UNDER	Highest degree obtained by the CEO is an undergraduate degree.	Proxy Statements, Marquis Who’s Who and Bloomberg
MASTER	Highest degree obtained by the CEO is masters degree, Juris Doctorate, or LLB. Bachelor of Laws (abbreviated LL.B., LLB or rarely L.I.B.) is an undergraduate, or bachelor, degree in law	Proxy Statements, Marquis Who’s Who and Bloomberg
PHD	Highest degree obtained by the CEO is a Ph.D. degree.	Proxy Statements, Marquis Who’s Who and Bloomberg
IVY	CEO has any degree from an Ivy League school.	Proxy Statements, Marquis Who’s Who and Bloomberg

(Table 1 continued on next page)

(Table 1 continued)

Other CEO Variables		
OTENURE	Number of years the outgoing CEO has held the title of CEO at the firm. Calculated as the difference between the year of the observation and the year in which the executive became CEO. Data source: Proxy statements and Execucomp.	Proxy statements and Execucomp
OAGE	The age of the outgoing CEO at the time of the succession observation.	Proxy statements and Execucomp
Succession Variables		
NUMSUC	The total number of successions within the firm over the sample period.	Proxy statements and Execucomp
FORCED	A binary variable equal to 1 if the succession is forced and 0 otherwise.	News announcements and Execucomp
OUTSIDE	A binary variable equal to 1 if the new CEO is from outside the firm and 0 otherwise.	Proxy statements and Execucomp
Firm Level Control Variables		
RET12	The 12-month cumulative annualized return (the product of one plus the monthly stock returns for the 12 months of the firm's fiscal year).	CRSP
ROA	Operating income before depreciation/total assets = (DATA13/DATA6) x 100.	COMPUSTAT
TD/TA	Total debt/total assets = ((DATA34 + DATA9)/DATA6) x 100.	COMPUSTAT
LNSALES	Natural logarithm of total sales = LN(DATA12).	COMPUSTAT
Q	Tobin's Q = (Market value of equity plus the book value of debt)/total assets = (DATA25*DATA199+DATA6-DATA60)/DATA6. Calculated following Smith and Watts (1992).	COMPUSTAT
R&D/SALES	Research and development expense/total sales = ((DATA46 or 0 if missing)/DATA12) x 100.	COMPUSTAT
ADV/SALES	Advertising expense/total sales = ((DATA45 or 0 if missing)/DATA12) x 100.	COMPUSTAT
CAPX/SALES	Capital expenditures/total sales = (DATA128/DATA12) x 100.	COMPUSTAT, CRSP, Governance Variables
SDRET36	The annualized standard deviation of the firm's monthly stock returns for the prior 36 months.	EXECUCOMP and Proxy Statements
DUALITY	An indicator variable equals to one if the CEO is also the chairman of the board, zero otherwise.	EXECUCOMP and Proxy Statements
BDSIZE	Number of directors on the board.	RiskMetrics and Equilar
PIND	Percentage of independent directors on the board.	RiskMetrics and Equilar
INSTOWN	Percentage of institutional ownership at fiscal year end.	Thomson 13F

*CEO Functional Background*

We follow prior research by Chaganti and Sambharya (1987), Murray (1989), Michel and Hambrick (1992) and Westphal and Zajac (1995) in determining the CEOs' functional backgrounds by examining the prior job titles and employment history. Output functional backgrounds (OUTPUT) include positions in marketing and sales.

Throughput functional backgrounds (THRPUT) include positions in operations, R&D and engineering. Peripheral functional backgrounds (PERIPH) include positions in law, finance, and accounting. We use firm proxy statements and the Marquis Who's Who database to collect data for CEOs' prior job titles and employment history. A caveat of the classifications of CEO functional backgrounds in our study is that the vast majority of CEOs (more than 95%) have had experience in two or more areas as they were rising in the ranks of a company or companies. In these cases, we use the functional area where the CEO spent the most time to determine the CEO's functional background.

#### *CEO Educational Background*

We follow prior research by Westphal and Zajac (1995), Zajac and Westphal (1996) and Elsaid (2014) in determining the CEOs' educational backgrounds. Similar to Elsaid (2014).

*“we divide the CEOs' educational backgrounds into four categories: those with no undergraduate degree (NODEGR), those where the highest degree obtained is an undergraduate degree (UNDER), those where the highest degree obtained is a Masters degree (or its equivalent) (MASTER) and those where the highest degree obtained is a PhD degree (PHD).”*

We combine the categories no degree and undergraduate degree into the category non-graduate degree and the categories masters degree and Ph.D. into the category graduate degree (GRADUATE) due to low cell count in the no degree and Ph.D. categories.<sup>7</sup> We include Ivy League affiliation (IVY) as part of the CEOs' educational background. We use firm proxy statements, the Marquis Who's Who database and Bloomberg to collect data for each CEOs' prior education.

#### *Controls*

We control for the outgoing CEO age and tenure. We use firm proxy statements and Execucomp to collect data on CEO characteristics. The CEO age and tenure could be an indication on how well the CEO manages the firm. Alderfer (1986) suggests that upper level managers with limited experience will likely be less effective in running their companies. Older, more experienced CEOs with longer tenures are more likely to have a better understanding of the firm, its industry, and management practices, in general. This could translate into better firm performance.

We use firm proxy statements and Execucomp to determine the number of CEO successions for each firm over our sample period. Similar to Elsaid (2014)

*“we examine the column “REASON” in the Execucomp database, which explains why the named CEO left the company. It provides four different reasons: resigned, retired, deceased, or unknown. We verify the reason listed in Execucomp by searching the Wall Street Journal Index (WSJI) and the Wall Street Journal (WSJ) for the reasons for the succession. From the news stories, we classify voluntary successions as all CEO successions arising from retirement (CEOs over age 60)<sup>8</sup>, death, illness, or those involving the CEO's departure for a better and more prestigious position in another firm. We set a dummy variable equal to one in cases where the CEO was forced to leave, and zero in cases where the CEO departure was voluntary (FORCED).”*

We determine whether the predecessor CEO joined the company from the outside. Outside succession seems to occur more frequently following poor performance (Boeker and Goodstein, 1993; Cannella and Lubatkin, 1993). Similar to Elsaid et al., (2009) we consider that “by hiring an outsider, the board may be sending “a signal that a major change is necessary and that no insider can bring the fresh perspective that is required” (Vancil, 1987, p. 57). Accordingly, we set a dummy variable equal to one in cases where the CEO joined the company from the outside, and zero otherwise (OUTSIDE).”

We proxy for effective monitoring by the board of directors using three measures:

- 1) Board size (BDSIZE)
- 2) The percentage of independent directors on the board (PIND)
- 3) CEO duality (DUALITY)

First, we measure board size as the number of directors serving on the board during the year. Next, we classify directors as insiders (those who are current employees of the firm) and outsiders (Baysinger and Butler, 1985; Elsaid et al., 2009). We then create a variable for the percent of outside board directors which is calculated as the ratio of outside directors scaled by total directors on the board. Regulators and academics believe that outside (independent) directors are generally more effective monitors than inside (non-independent) directors. For example, the Sarbanes-Oxley Act and the exchange rules in 2002 require that the majority of the board be independent, while numerous studies link the proportion of outside directors to financial performance and shareholder wealth (e.g., Rosenstein and Wyatt, 1990; Byrd and Hickman, 1992; Brickley et al., 1994; Cotter et al., 1997). We also determine whether the CEO holds the title of CEO and COB (Chairman of the Board) and create a dummy variable equal to one in such cases, and zero otherwise. CEO duality may concentrate power in the CEO’s position and allow the CEO to control information available to other directors impeding effective monitoring (Jensen, 1993).

Further, we control for institutional investor ownership percentage. We expect that institutional ownership percentage may proxy for the level of external pressure faced by a firm to change CEO functional or educational background when past performance is poor. We calculate institutional ownership percentage (INSTOWN) as the percentage of common shares outstanding held by institutions during the year.

Lastly, we control for several firm specific factors. We expect that CEO succession and successor choice is highly correlated with firm performance. Therefore, we control for stock performance (RET12) and accounting performance (ROA). We proxy for growth opportunities and information asymmetry using Tobin’s Q (Q), the level of R&D expenditures (R&D/SALES), the level of advertising expenditures (ADV/SALES), and stock return volatility (SDRET36). Jensen (1993) argues that the monitoring of high growth firms is costly, while Fama and Jensen (1983) suggest that firms with higher stock return volatility have higher levels of information asymmetry. We also control for firm size (LNSALES) and total debt to total assets (TD/TA). We lag the measurement of firm specific control variables by one year ( $t = -1$ ) relative to the CEO succession year ( $t = 0$ ).

**Descriptive Statistics**

Table 2, Panel A provides descriptive statistics for our sample. Panel B provides a breakdown of CEO functional backgrounds split by outgoing and new CEO. Panel C provides a breakdown of CEO educational background. Panel D provides a breakdown of CEO Ivy league affiliation. Panel E provides a breakdown of successions by year and Panel F provides a breakdown of the industries in our sample by the 17 Fama and French (1997) industry classifications.

**Table 2.** Summary statistics

<b>Panel A: Descriptive statistics for estimation sample</b>							
<b>Variable</b>	<b>Mean</b>	<b>sd</b>	<b>Min</b>	<b>p25</b>	<b>p50</b>	<b>p75</b>	<b>Max</b>
RET12 <sub>t-1</sub>	0.12	0.43	-0.83	-0.13	0.08	0.30	2.94
ROA <sub>t-1</sub>	13.80	13.63	-166.84	9.79	13.93	19.04	71.85
TD/TA <sub>t-1</sub>	24.35	18.74	0.00	10.46	23.10	35.85	152.38
SALES <sub>t-1</sub>	4421.95	11497.82	0.27	399.44	1206.80	3772.00	160123.00
Q <sub>t-1</sub>	1.89	1.24	0.40	1.20	1.47	2.09	10.98
R&D/SALES <sub>t-1</sub>	5.51	33.93	0.00	0.00	0.00	3.17	675.00
ADV/SALES <sub>t-1</sub>	1.08	2.81	0.00	0.00	0.00	0.85	31.39
SDRET36 <sub>t-1</sub>	0.34	0.16	0.10	0.22	0.31	0.43	1.26
OAGE	59.42	7.82	35.00	54.00	60.00	65.00	84.00
OTENURE	8.92	8.16	0.00	3.00	6.58	12.00	48.00
NUMSUCC	0.32	0.63	0.00	0.00	0.00	0.00	4.00
FORCED	0.10	0.30	0.00	0.00	0.00	0.00	1.00
OUTSIDE	0.35	0.48	0.00	0.00	0.00	1.00	1.00
DUALITY	0.70	0.46	0.00	0.00	1.00	1.00	1.00
BDSIZE	9.95	2.74	4.00	8.00	10.00	12.00	21.00
PIND	0.64	0.18	0.50	0.67	0.78	0.94	1.00
INSTOWN	58.34	21.23	1.75	44.29	60.02	73.05	100.00

(Table 2 continued on next page)



(Table 2 continued)

**Panel B: CEO Functional Background**

Primary Functional	Outgoing CEO		New CEO		Change in Function				Total
	Freq.	Percent	Freq.	Percent	No	Percent	Yes	Percent	
FDRMAJ	139	16.93	46	5.71	28	3.50%	109	13.64%	137
OUTPUT	94	11.45	117	14.52	22	2.75%	69	8.64%	91
THRPUT	413	50.3	444	55.09	238	29.79%	161	20.15%	399
PERIPH	175	21.32	199	24.69	61	7.63%	111	13.89%	172
Total	821	100	806	100	349	43.68%	450	56.32%	799

**Panel C: CEO Educational Background**

Degree	Outgoing CEO		New CEO		Change in Degree				Total
	Freq.	Percent	Freq.	Percent	No	Percent	Yes	Percent	
NODEGR	17	2.26	6	0.8	0	0.00%	12	1.76%	12
UNDER	324	43.03	253	33.91	106	15.54%	182	26.69%	288
MASTER	376	49.93	444	59.52	206	30.21%	143	20.97%	349
PHD	36	4.78	43	5.76	2	0.29%	31	4.55%	33
Total	753	100	746	100	314	46.04%	368	53.96%	682

**Panel D: CEO Ivy League Affiliation**

IVY	Outgoing CEO		New CEO		Change in Degree				Total
	Freq.	Percent	Freq.	Percent	No	Percent	Yes	Percent	
Yes	183	24.37%	182	24.36%	49	7.18%	123	18.04%	172
No	568	75.63%	565	75.63%	386	56.60%	124	18.18%	510
Total	751	100%	747	100%	435	63.78%	247	36.22%	682

**Panel E: Successions by year**

Year	Freq.	Percent
1991	12	1.44
1992	32	3.85
1993	87	10.46
1994	115	13.82
1995	119	14.3
1996	107	12.86
1997	135	16.23
1998	57	6.85
1999	11	1.32
2000	23	2.76
2001	16	1.92
2002	23	2.76
2003	16	1.92
2004	13	1.56
2005	24	2.88
2006	16	1.92
2007	18	2.16
2008	7	0.84
2009	1	0.12
Total	832	100

(Table 2 continued on next page)

(Table 2 continued)

Panel F: Successions by Fama and French (1997) 17 industry classification

Fama-French (17) Industry	Freq.	Percent
Food	26	3.25
Mining and Minerals	8	1.00
Oil and Petroleum Products	22	2.75
Textiles, Apparel & Footware	19	2.38
Consumer Durables	17	2.13
Chemicals	28	3.50
Drugs, Soap, Perfumes, Tobacco	38	4.76
Construction and Construction Materials	27	3.38
Steel Works Etc	22	2.75
Fabricated Products	8	1.00
Machinery and Business Equipment	106	13.27
Automobiles	25	3.13
Transportation	37	4.63
Utilities	67	8.39
Retail Stores	69	8.64
Banks, Insurance Companies, and Other Fin.	34	4.26
Other	246	30.79
Total	799	100.00

## RESULTS

### Determinants of New CEO Pedigree

We begin our analysis by examining the determinants of new CEO functional or educational background. We expect that the board of directors will seek to hire a new CEO with a background that best fits with the structural or cultural characteristics of the firm. Therefore, we examine whether characteristics of the outgoing CEO or firm affect the probability of the new CEO having a specific functional or educational background.

We use a multinomial logit model which simultaneously estimates binary logit models for all comparisons (i.e., CEO pedigree classifications). The multinomial logit model can be written as:

$$\ln \Omega_{m|b}(x'_i) = \ln \frac{\Pr(y=m|x'_i)}{\Pr(y=b|x'_i)} = x'_i \beta_{m|b} \tag{1}$$

for  $m = 1$  to  $J$ , where  $m$  indexes categories,  $b$  is the base category, and  $x'_i$  are case specific regressors (a constant,  $RET_{12,t-1}$ ,  $ROA_{t-1}$ ,  $TD/TA_{t-1}$ ,  $LNSALES_{t-1}$ ,  $Q_{t-1}$ ,  $R\&D/SALES_{t-1}$ ,  $ADV/SALES_{t-1}$ ,  $SDRET36_{t-1}$ ,  $OAGE$ ,  $OTENURE$ ,  $NUMSUCC$ ). As  $\ln \Omega_{b|b}(x) = \ln 1 = 0$ , it must hold that  $\beta_{b|b} = 0$ . Therefore, the log odds of an outcome variable with itself is always 0, as is the effect of any independent variables. The  $J$  equations can be solved to compute the predicted probabilities:

$$\Pr(y = m|x'_i) = \frac{\exp(x'_i \beta_{m|b})}{\sum_{j=1}^J \exp(x'_i \beta_{j|b})} \tag{2}$$

This model ensures that  $0 < \Pr(y = m|x'_i) < 1$ , and  $\sum_{j=1}^J \Pr(y = m|x'_i) = 1$ . We could have estimated each of the categories using a series of individual binary logit models, but the disadvantage of this procedure is that each binary logit comparing the predicted probabilities of one group to another would be based on a different sample (Long and Freese, 2006). For example, a binary logit model comparing the predicted probabilities of OUTPUT to THRPUT would have a different number of observations than one comparing OUTPUT to PERIPH or THRPUT to PERIPH. The remaining observations pertaining to the non-comparison groups in each binary logit would be excluded from analysis. The multinomial logit model allows us to overcome this limitation. Here and throughout we cluster standard errors at the industry level.

Determinants of New CEO Background

Table 3 reports results using CEO functional background as the dependent variable. We report average marginal effects (or discrete changes for binary variables), which describe how each of our independent variables affect the probability of the new CEO being in the functional categories of output, throughput, or peripheral.<sup>9</sup> Here and throughout we cluster standard errors at the industry level. Columns 1 – 4 contain estimated results including dummy variables for the outgoing CEO’s functional background and firm specific control variables.<sup>10</sup>

**Table 3.** Multinomial logit regressions on new CEO functional background

	(1) New CEO = FNDMAJ	(2) New CEO = OUTPUT	(3) New CEO = THRPUT	(4) New CEO = PERIPH
FDRMAJ	0.0546*** (2.98)	0.00705 (0.16)	-0.00262 (-0.04)	-0.0590 (-1.08)
OUTPUT	0.0304 (1.34)	0.0791** (2.11)	0.0571 (0.86)	-0.167** (-2.49)
PERIPH	-0.0526 (-1.48)	-0.0138 (-0.37)	-0.0206 (-0.39)	0.0869** (2.16)
LR Test	$\chi^2 = 28.991***$			
RET12t-1	0.0185 (1.29)	-0.0686* (-1.71)	0.00773 (0.16)	0.0424 (1.02)
ROAt-1	-0.000459 (-0.51)	0.00189 (1.04)	0.00511** (2.15)	-0.00654*** (-3.17)
TD/TA <sub>t-1</sub>	0.000144 (0.23)	-0.00103 (-1.26)	0.000571 (0.50)	0.000319 (0.30)
LNSALESt-1	-0.0173* (-1.90)	0.0134 (1.44)	0.00777 (0.58)	-0.00384 (-0.33)
Qt-1	0.000153 (0.01)	0.0232 (1.50)	-0.0321 (-1.36)	0.00879 (0.39)
R&D/SALESt-1	-0.000572 (-0.49)	-0.00651* (-1.83)	0.0107*** (3.24)	-0.00360 (-1.34)
ADV/SALESt-1	-0.00210 (-0.76)	0.00741* (1.69)	-0.0178** (-2.26)	0.0125** (2.03)
SDRET36t-1	0.0543 (0.92)	-0.0938 (-0.92)	0.186 (1.37)	-0.146 (-1.19)
OAGE	0.00207** (2.00)	-0.00301 (-1.40)	0.00387 (1.30)	-0.00293 (-1.10)
OTENURE	0.000129 (0.15)	0.000682 (0.33)	-0.00582** (-2.04)	0.00501** (2.03)
NUMSUCC	0.0140 (0.86)	0.00358 (0.15)	0.00337 (0.10)	-0.0210 (-0.68)
FORCED	0.0718* (1.66)	0.00415 (0.09)	-0.174*** (-2.65)	0.0978 (1.49)
OUTSIDE	-0.0644*** (-5.18)	0.00521 (0.17)	0.135*** (3.20)	-0.0757** (-2.12)
N	660	660	660	660

Heteroskedasticity robust *t*-statistics clustered at the industry level are given in parentheses.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Our results support H1a, which predicts that the new CEO is likely to have a functional background that is similar to the predecessor’s background. The estimated coefficient on FNDMAJ is positive and significant in column 1, which estimates the predicted probability that the new CEO is a founder, co-founder, founding family member, majority shareholder, or member of majority shareholding family. Firms are more likely to hire a new CEO that is a founder or majority shareholder when the outgoing CEO is also a founder or majority shareholder. The probability that the new CEO is a founder or majority shareholder is 0.05 greater if the outgoing CEO is a founder or majority shareholder, averaged over the estimation sample. The estimated coefficient on OUTPUT is positive and significant

in column 2, which estimates the predicted probability that the new CEO has an output functional background. Firms are more likely to hire a new CEO with an output functional background when the outgoing CEO also has an output functional background. The probability that the new CEO has an output functional background is 0.08 greater if the outgoing CEO also has an output functional background, averaged over the estimation sample. Similarly, the estimated coefficient on PERIPH is positive and significant in column 4, which estimates the predicted probability that the new CEO has a peripheral functional background. The probability that the new CEO has a peripheral functional background is 0.09 greater if the outgoing CEO also has a peripheral functional background, averaged over the estimation sample. Lastly, a likelihood ratio test of the joint significance of the outgoing CEO functional background dummies in the multinomial model is significant ( $\chi^2 = 28.991$ ). This provides additional support that outgoing CEO functional background is a predictor of new CEO functional background. Our results suggest that the pedigree of the former CEO is a predictor of the organizational fit of the new CEO. Firms are more likely to hire new CEOs with functional backgrounds similar to the outgoing CEO.

Our results also provide support for a matching of new CEO background to observable firm characteristics.

The estimated coefficient on RD/SALES is negative and significant in column 2, but positive and significant in column 3, which estimates the predicted probability that the new CEO has a throughput functional background. Firms with higher levels of R&D expenditures are less likely to hire a new CEO with an output background, but more likely to hire a new CEO with the operations, R&D, or engineering background necessary to manage the firm. A one unit change in R&D expenditures is associated with a 0.01 lower probability of the new CEO having an output background and a 0.01 higher probability of the new CEO having a throughput background, averaged over the estimation sample. Conversely, the estimated coefficient on ADV/SALES is negative and significant in column 3, but positive and significant in columns 2 and 4. Firms with higher levels of Advertising expenditures are less likely to hire a new CEO with a throughput functional background, but more likely to hire a new CEO with an output or peripheral functional background. A one unit change in Advertising expenditures is associated with a 0.02 lower probability of the new CEO having a throughput background, a 0.01 higher probability of the new CEO having an output background, and a 0.01 higher probability of the new CEO having a peripheral background, averaged over the estimation sample.

The estimated coefficient on ROA is positive and significant in column 3, which estimates the predicted probability that the new CEO has a throughput functional background. More profitable firms (firms with higher ROA) are more likely to hire a new CEO with a throughput background. A one unit increase in ROA is associated with a 0.005 higher probability of the CEO having a throughput background, averaged over the estimation sample. However, the estimated coefficient on ROA is negative and significant in column 4, which estimates the predicted probability that the new CEO has a peripheral functional background. Firms with lower levels of profitability (ROA) are more likely to hire a new CEO with finance or accounting backgrounds. This may suggest the willingness of the firm to bring in a new CEO with the necessary financial background to improve accounting performance. A one unit increase in ROA is associated with a 0.007 lower probability of the CEO having a peripheral background, averaged over the estimation sample.

We next examine whether the nature of the succession, voluntary versus forced and inside versus outside succession, are predictors of the functional background of the new CEO. The estimated coefficient on FORCED is positive and significant in column 1, which estimates the predicted probability that the new CEO is a founder or majority shareholder. Forced successions are more likely to involve a new CEO that is a founder or majority shareholder. Conversely, the estimated coefficient on FORCED is negative and significant in column 3, which estimates the predicted probability that the new CEO has a throughput functional background. Forced successions are less likely to involve a new CEO with a throughput background. A discrete change from voluntary to forced succession is associated with a 0.17 lower probability of the CEO having a throughput background, averaged over the estimation sample.

Further, the estimated coefficient on OUTSIDE is positive and significant in column 3, which estimates the predicted probability that the new CEO has a throughput functional background. New CEOs with a throughput background are more likely to come from outside the firm. However, the estimated coefficient on OUTSIDE is negative and significant in columns 1 and 4, which estimates the predicted probability that the new CEO is a founder

or majority shareholder or has a peripheral functional background, respectively. Outside successions are less likely to involve a new CEO who is a founder or majority shareholder or has a peripheral background. A discrete change from inside to outside succession is associated with a 0.06 (0.08) lower probability of the CEO being a founder or majority shareholder (having a peripheral background), averaged over the estimation sample.

Lastly, we examine whether outgoing CEO characteristics, such as age or tenure, or the number of successions within the firm over our sample period (NUMSUC) are predictors of the functional background of the new CEO. The estimated coefficient on OTENURE is negative and significant in column 3, which estimates the predicted probability that the new CEO has a throughput functional background. Firms are less likely to hire a new CEO with a throughput background when the outgoing CEO has longer tenure. A one unit increase in outgoing CEO tenure is associated with a 0.006 lower probability of the CEO having a throughput background, averaged over the estimation sample. Conversely, the estimated coefficient on OTENURE is positive and significant in column 4, which estimates the predicted probability that the new CEO has a peripheral functional background. Firms are more likely to hire new CEO with a peripheral background when the outgoing CEO has longer tenure. A one unit increase in outgoing CEO tenure is associated with a 0.005 higher probability of the CEO having a peripheral background, averaged over the estimation sample.

*Determinants of New CEO Degree*

Table 4 reports results for a binary logit model using CEO degree as the dependent variable. Column 1 contains estimated results of a binary logit regression using an indicator for whether the new CEO has a graduate degree as the dependent variable (GRADUATE) and the independent variables are as in model (1). Column 2 contains estimated results of a binary logit regression using an indicator for whether the new CEO has an Ivy League degree as the dependent variable (IVY) and the independent variables are as in model (1). We report average marginal effects (or discrete changes for binary variables), which describe how each of our independent variables affect the probability of the new CEO having a graduate degree or an Ivy League degree.

**Table 4.** Multinomial logit regressions on new CEO degree

	<b>(1) New CEO = Graduate Degree</b>	<b>(2) New CEO = Ivy Degree</b>
GRADUATE	0.0527 (1.35)	
IVY		0.0510 (1.53)
RET12 <sub>t-1</sub>	-0.0104 (-0.20)	-0.0354 (-0.65)
ROA <sub>t-1</sub>	-0.00350 (-1.43)	-0.00258 (-1.60)
TD/TA <sub>t-1</sub>	-0.000977 (-0.94)	-0.00255** (-2.21)
LNSALES <sub>t-1</sub>	0.0203* (1.68)	0.0104 (0.72)
Qt-1	0.0296 (1.60)	0.0104 (0.88)
R&D/SALES <sub>t-1</sub>	0.00634 (1.36)	0.0000735 (0.19)
ADV/SALES <sub>t-1</sub>	0.000867 (0.09)	0.00430 (0.73)
SDRET36 <sub>t-1</sub>	-0.237 (-1.50)	-0.458*** (-2.94)
OAGE	-0.00163 (-0.46)	0.00138 (0.44)
OTENURE	0.00352 (1.06)	-0.00141 (-0.56)
NUMSUCC	0.0281 (0.76)	-0.00643 (-0.15)

(Table 4 continued on next page)

(Table 4 continued)

	(1) New CEO = Graduate Degree	(2) New CEO = Ivy Degree
FORCED	-0.151** (-2.08)	0.111 (1.25)
OUTSIDE	0.0343 (0.89)	0.0362 (0.78)
<i>N</i>	573	560

Heteroskedasticity robust *t*-statistics clustered at the industry level are given in parentheses. \**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Column 1 contains estimated results for change in CEO functional background. The estimated coefficients on the dummy variables for FNDMAJ, OUTPUT, and PERIPHERAL are significant. Firms with outgoing CEOs with these three functional backgrounds are more likely to make a change in functional background. This result is consistent with a majority of CEOs in our sample having a throughput functional background (the reference group). None of the estimated coefficients on board of director characteristics, board size (BDSIZE) and the percentage of independent directors (PIND) are significant with the exception of a negative and marginally significant estimated coefficient on DUALITY. Similarly, the estimated coefficient on the percentage of shares held by institutional shareholders (INSTOWN) is not significant. Examining the performance measures, the estimated coefficients on RET12 and ROA are negative and significant. Worse performing firms have higher probabilities of changing CEO functional backgrounds. For the average firm, a 1 unit increase in prior 12-month cumulative annualized stock return decreases the probability of a change in CEO functional background by 0.15, while a 1 unit increase in prior ROA decreases the probability of a change in CEO functional background by 0.006, holding all other variables at their mean.

As the previous results suggest, a change in CEO functional background may be conditional on firm performance. As such, the board of directors or institutional owners may exert greater influence when the firm exhibits poor prior performance. Therefore, column 2 contains estimated results for change in CEO functional background conditional on the firm having a negative prior 12-month cumulative annualized return (RET12 < 0). Again, none of the estimated coefficients on board of director characteristics (BDSIZE and PIND) are significant. However, the estimated coefficient on DUALITY is now negative and significant at the 0.01 level. For the average firm, a discrete change from a separate CEO and Chairman of the board (COB) to the CEO also holding the title of COB decreases probability of a change in CEO functional background by 0.20. Further, the estimated coefficient on INSTOWN is now positive and significant at the 0.01 level. Firms with higher levels of INSTOWN and poor prior stock performance have a higher probability of changing CEO functional background. For the average firm, a 1 unit increase in institutional ownership percentage increases the probability of a change in CEO functional background by 0.006, holding all other variables at their mean.

Column 3 contains estimated results where change in CEO degree is the dependent variable. The estimated coefficient on the dummy variable for whether the outgoing CEO has a graduate degree (GRADUATE) is negative and significant. This suggests that when the outgoing CEO has a graduate degree firms are less likely to hire a less educated CEO (i.e., one with only an undergraduate degree). None of the estimated coefficients on board of director characteristics (BDSIZE, PIND, or DUALITY) or institutional ownership (INSTOWN) are significant. In contrast to the results of change in functional background, the estimated coefficients on RET12 and ROA are also not significant. Prior performance is not a significant predictor of change in CEO degree. Further, Column 4 contains estimated results for change in CEO degree conditional on the firm having a negative prior 12-month cumulative annualized return. None of the estimated coefficients on board of director characteristics (BDSIZE, PIND, or DUALITY) or institutional ownership (INSTOWN) are significant.

Finally, Column 5 contains estimated results where change in CEO Ivy League affiliation is the dependent variable. The estimated coefficient on the dummy variable for whether the outgoing CEO has a degree from an Ivy League institution (IVY) is positive and significant. This suggests that when the outgoing CEO has a degree from an Ivy League institution the firm is more likely to hire a new CEO without an Ivy League degree. None of the estimated coefficients on board of director characteristics (BDSIZE, PIND, or DUALITY) are significant. However, the estimated coefficient on institutional ownership (INSTOWN) is negative and significant. Firms with higher levels of

institutional ownership are less likely to make a change in CEO Ivy League affiliation. Similar to the results for change in degree, the estimated coefficients on RET12 and ROA are not significant. Prior performance is not a significant predictor of change in CEO Ivy League affiliation. However, the estimated coefficient on FORCED is positive and significant. Firms are more likely to make a change in Ivy League affiliation when the CEO is forcibly removed from office. For the average firm, a discrete change from voluntary to forced succession increases the probability of a change in CEO Ivy League affiliation by 0.14. Lastly, Column 6 contains estimated results for change in CEO Ivy League affiliation conditional on the firm having a negative prior 12-month cumulative annualized return. None of the estimated coefficients on board of director characteristics, board size (BDSIZE) and percentage of independent directors (PIND) are significant with the exception of a positive and marginally significant estimated coefficient on DUALITY. The estimated coefficient on institutional ownership (INSTOWN) remains negative and marginally significant.

## **CONCLUSION AND DISCUSSION**

In this paper, we address two research questions. The first question is whether firm or predecessor characteristics are associated with a board of director's choice of successor CEO functional background or education level. We find evidence that predecessor characteristics influence successor CEO functional background, but no convincing evidence that they influence the successor CEO education level. However, there are several firm characteristics that influence the choice of successor. First, we find a strong and consistent relation between a company's ratio of R&D to sales with the choice of a successor that has a "throughput" functional background.

That is, companies that engage in significant R&D tend to hire CEOs that have come from operations, research and development and engineering. The implications of these findings are that firms that are research driven tend to want CEOs that are familiar with and have the knowledge base to understand the company's research. Also, we find that firms with low prior profitability are more likely to hire a successor CEO with a finance/accounting background.

This is contrary to prior research that shows a tendency for non-profitable firms to hire CEOs with throughput functional backgrounds (Hambrick and Mason, 1984; Datta and Guthrie, 1994; Guthrie and Datta, 1997).

Our second research question is what firm characteristics influence a company to hire a successor with a different functional background than that of the predecessor. We find that changes from successor to predecessor functional background occur more often in firms that are performing poorly and when the firm has higher institutional investor ownership. The implications of these findings are that boards that are unhappy with a predecessor CEO seek successors with different skill sets. This finding is consistent with the body of prior research that has found that firms needing a change hire outside successors. Needing a change also seems to lead firms to hire CEOs with different skill sets than that of the predecessor.

The paper makes a contribution to the management and corporate finance literature by considering firm characteristics as motivators for the CEO hires rather than the outcome of hiring decisions. Another contribution of the paper is examining whether firms match the incoming CEO background with the outgoing CEO background. The paper has implications for the board of directors. Our results should shed light on how boards can use firm characteristics and outgoing CEO characteristics to motivate the incoming CEO characteristics.

### **Future Research**

An area for future research could be the direction of causality between CEO personality and background on one hand and corporate growth and managerial decision making on the other hand. That is to say, do CEOs choose the kind of companies that they are comfortable running or do companies choose CEOs with characteristics that fit the company profile. This issue relates to the prior literature that argues for the existence of a firm's footprint which perpetuates through time (Caves, 1998; Klepper, 2002; Lemmon et al., 2008).

### **Limitations**

The paper does have some limitations. Our sample includes medium and large publicly traded firms. As a result, the sample does not include small and privately held firms. In addition, any classification scheme that codes CEO

successions as voluntary or forced is inherently subjective in nature. Occasionally, it is difficult to state with absolute certainty whether a CEO succession is forced or voluntary.

Another limitation of our paper is that it analyzes only one side of the CEO matching process. For example in Hypothesis 2, we argue that the likelihood of a change in CEO background is greater when the board of directors faces greater pressure to make a change. Let us suppose that a firm has indeed performed poorly in the past and the board has forced out the CEO. It is possible that the board has tried to hire a different CEO with the same background as the previous CEO (contrary to our hypothesis) but none of them would accept. To put it more succinctly, one of the limitations of our paper is that we do not have data on the other side of the match - how many CEOs were approached by the board before one said yes.

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**ENDNOTES**

<sup>1</sup> In unreported tests we do not find evidence that changing the functional background and/or the education level of the successor CEO improves or worsens firm performance.

<sup>2</sup> Unlike prior research, our paper examines the link between the outgoing and incoming CEO educational background.

<sup>3</sup> Guthrie and Datta (1997) find a strong relation between investments in marketing and promotion *after* hiring a CEO with a background in sales and marketing. Our paper examines whether firms with high advertising expense, for example, are more likely *to hire* a CEO with a sales and marketing background.

<sup>4</sup> We attempt to reduce the selection bias issue (Heckman, 1979) by randomly selecting 940 successions of the 1,877 successions available. However, when we generate a sample by selecting firms that have engaged in a succession there will be an unavoidable selection bias. For one thing, successor availability is a critical issue that affects not only successor characteristics, but the existence of the succession event in the first place.

<sup>5</sup> We extend the RiskMetrics data with Equilar data for the S&P 1500 for the last two years of our sample period.

<sup>6</sup> The RiskMetrics IRRC proxy database reports the year using the meeting date. We assume that the proxy date is approximately 3 months after fiscal year end and the meeting date follows by 1 month. So, firms with fiscal years ending in December 1995 will be matched with IRRC observations with meeting dates in April 1996 or earlier.

<sup>7</sup> Only 17 outgoing CEOs and 6 new CEOs are classified as having no college degree, while only 43 outgoing CEOs and 43 new CEOs are classified as having a PhD.

<sup>8</sup> We consider the age 60 to be the normal retirement age for a CEO as in Parrino (1997).

<sup>9</sup> We report average marginal effects rather than marginal effects at the mean because sample means may reflect nonsensical or nonexistent observations, such as in the case of dummy variables (Long, 1997). We report discrete changes for dummy variables which measure the change in the probability as the indicator variable goes from 0 to 1, holding all other variables at their mean.

<sup>10</sup> We exclude board of director characteristics from our analysis in Tables 3 and 4 because including board characteristics dramatically reduces our sample size (by close to 50%). Also, we are unaware of a theoretical justification for board and other governance characteristics influencing the background of the CEO.

**NOTES**