CEO Succession Gap and Firm Performance

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Abstract

In this study, we examine the effect of succession-induced gaps in CEO characteristics on subsequent firm performance. We show that a gap index constructed using differences in CEO attributes between the predecessor and the successor leads to deteriorating subsequent firm performance when the succession event itself is characterized as disruptive. However, under non-forced succession and when pre-succession performance has been good, a change in characteristics contributes positively to enhancing subsequent firm performance. Further analysis of the channels suggests that radically different CEOs are more likely to bring with them a higher proportion of co-opted directors, make downsizing and business divesting decisions, and lead firms characterized by higher levels of post-succession strategic instability when there is a mandate for change. Overall, our findings demonstrate that tapping successors who bring in a new set of attributes that are markedly different from those of their predecessors are not always value-enhancing. This is especially the case under forced succession and when the pre-succession firm performance is poor.

JEL Classification: G30, G32, J62, J63

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1. Introduction

CEO succession is a topic of considerable interest to academics and practitioners alike; it has been the subject of intense scholarly research in both the finance and management literature. Boards worldwide spend considerable time and effort ensuring that the succession process identifies the right skill set that the incoming CEO should have. Extant research has invested considerable effort in exploring the topic of CEO succession, seeking to underpin CEO succession planning, the reasons behind leadership changes, and whether such changes add value to the enterprise.[1] For example, Zhang and Rajagopalan (2004) show that the relay succession method allows the heir apparent the opportunity to learn firm and position-specific skills which leads to better post-succession performance, especially when performance leading up to the succession is poor and when firm and/or industry strategic instability has been high. In a related study, Naveen (2006) finds that a firm's probability of grooming an internal candidate is positively related to firm size and organizational complexity.

We step back from the value-implications of the *process* of succession and focus instead on the *outcome* of succession planning, i.e. on the differences in personal traits of the person who is finally chosen relative to the outgoing CEO. In other words, we are interested in the value-implications of a shift in corporate culture brought about by CEO turnover. Our interest in studying the impact of a turnover-driven shift in corporate culture is motivated by the recent burgeoning literature that links CEO personal characteristics to firm policy choices and performance.[2] Given that boards scouting for talent look for indicators, any association between personal traits/experiences and firm performance is likely to provide invaluable insight into hiring the right person to help take the firm forward. There is, however, a significant void in the CEO succession literature. The literature hitherto has limited its

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[1] See, for example the following: Friedman and Saul (1991); Denis and Denis (1995); Parrino (1997); Huson et al. (2004); Hermalin (2005); Agrawal et al. (2006); Naveen (2006); Karaevli (2007); Cucculelli and Micucci (2008); Ballinger and Marcel (2010); Inderst and Mueller (2010); Campbell et al. (2011); Mobbs and Raheja (2012); Eisfeldt and Kuhnen (2013); Schepker et al. (2017); Gao and Xie (2018); McConnell and Qi (2018); and Merz and Weidemann (2018).

[2] There is a large volume of literature investigating how a CEO's past experience and characteristics translate into corporate policy choices. Examples include: CEO military experience and firm risk-taking (Malmendier & Nagel, 2011; Benmelech & Frydman, 2015), CEO early-life experience and professional behaviors (Malmendier & Nagel, 2011; Custódio et al., 2013; Bernile et al., 2017), CEO fitness and firm profitability (Limbach & Sonnenburg, 2014), CEO golfing and firm performance (Biggerstaff et al., 2016), and pilot CEO and innovation (Cain & McKeon, 2016; Sunder et al., 2017).

attention to examining the cross-sectional association between CEO characteristics and future firm risk and performance. To the best of our knowledge, almost no study has investigated how differences in personal traits between the predecessor and successor ("succession gaps" hereafter) could affect firm performance.[3]

However, notwithstanding the commonly held belief that change is good, the consequences of leadership change on firm performance have been reported as largely inconclusive in prior literature. As such, there is reason to believe that the performance of new CEOs with large succession gaps could either help or hurt firm performance. On one hand, successors with large succession gaps may introduce different management philosophies and succeed, given that a shake-up is necessary to move the firm forward to keep up with competitors. Examples include the United States' first female Fortune 500 CEO - Washington Post's Katharine Graham and Xerox's Ursula Burns, who in July 2009 became that country's first Fortune 500 African-American female CEO and the first woman to succeed a female predecessor.[4] Both these women are serving as long-lasting role models for other top women executives in a predominantly male-dominated business world. Another example is Alan Mulally, who was tapped as CEO of Ford and ended speculation that an airplane expert could not lead an automobile manufacturing company.[5]

On the other hand, the succession process could be fraught with risks of hiring the wrong person who could potentially do more harm than good. This can be particularly deleterious when the outcome of the hiring process cannot easily be reversed. For instance, some new CEOs bring with them their own management team when taking over the top leadership position and make efforts to shake up the, culture which may further exacerbate an already poor level of morale. Some are just not suitable for running a different business, such as Gap's Paul Pressler, the Disney veteran who was ousted after failing to save the floundering business due to his lack of appreciation and creativity of the fashion

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[3] Very few papers examine how the difference between the predecessor and the successor could affect a firm's risk-taking rather than firm value following a succession. For example, Huang and Kisgen (2013) document that a transition from male to female CEO is associated with a lower rate of asset growth, fewer acquisitions, lower leverage, and reduced debt issuance frequency. Recently, Serfling (2014) and Faccio et al. (2016) find that young-to-old and male-to-female transitions lead to substantially reduced firm risk, respectively.

[4] See online news article: https://www.biography.com/news/first-female-ceos-in-history.

[5] See Bloomberg Businessweek news article: https://www.bloomberg.com/news/articles/2009-03-04/alan-mulally-the-outsider-at-ford.

industry.[6] Johnson & Johnson's former CEO William Perez is another example, who resigned after a short stint at the world's largest shoemaker Nike following disagreements with the firm's founder over management philosophy.

In this paper, we seek to identify characteristics of succession events when the impact of hiring a CEO with radically different personal traits could benefit the firm and conditions when such differences could potentially be harmful to firm value. A natural subset of successions potentially more prone to adverse cultural shocks are the ones in firms already reeling under disruptive conditions while the reverse would be true for the complementary subset. These include successions where the outgoing CEO is forced out and when the succession was preceded by poor firm performance. Therefore, given this dichotomy in the possible outcome of the succession process, we add to this literature by examining whether succession-induced gaps in CEO characteristics have any influence on post-succession firm performance.[7]

To test our hypotheses, we use data on a sample of S&P 500 companies spanning the period 1996 to 2016. We construct an index of CEO characteristics comprising hand-collected data on CEO gender, age, career variety, cultural background, highest education level, and social status ('eliteness') of undergraduate school. Each of these has already been individually shown to impact on firm performance. We construct the index by adding +1 for every difference between the predecessor and the successor with reference to the aforementioned six attributes. Index values therefore range from zero to six, with zero indicating close alignment between the personal traits/experiences of the successor and the predecessor, while six suggests that the outgoing and incoming CEOs are totally different along these six dimensions. Future performance of the firm undergoing a succession (i.e., a treatment firm) is measured relative to others that do not experience such an event (i.e., a matched sample). To minimize the effect of any sample selection bias, we use a propensity score matching methodology, where for every firm experiencing a leadership change (i.e., in the treatment group), five

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[6] See Bloomberg Businessweek news article: https://www.bloomberg.com/news/articles/2007-02-25/paul-presslers-fall-from-the-gap.
[7] Hereafter we use the terms 'pre-succession' and 'post-succession' to deal with the period before and after the predecessor is replaced by a new CEO, respectively. Those terms are used in several papers, including Friedman and Singh (1989), Friedman and Saul (1991) and Zhang and Rajagopalan (2004).

matching firms that did not go through such an event, but share similar pre-succession characteristics, are identified among the matched firms. In other words, the treatment and matched samples have similar pre-succession firm characteristics, with the only difference being that treated firms have a change in top management.

Our main findings can be summarized as follows. For the full sample of CEO successions, we do not find evidence that the succession gap index impacts on future firm performance. Shifts in cultural mores can be beneficial or harmful to performance, and in a portfolio, the positive effect in some firms is neutralized by the adverse effect in others. We next split the sample into firms that were the subject of disruptive changes leading up to the succession event and those that were not. Interestingly, we find that when the succession involves a forced removal of the CEO, or when pre-succession firm performance has been poor, an attempt to further shake up the status quo through a radical shift in the personal traits/experiences of the CEO leads to subsequently worse firm performance. This outcome is even stronger in the long-term. Consistent with our assertion, the adverse impact of the succession is limited only to the set of successions that are either disruptive or had poor pre-succession performance while firms in the complementary subsample (i.e. non-disruptive successions) showed significant improvement in performance in the years following the succession event. In our further tests, we find that successor CEOs who differ considerably from their predecessors tend to co-opt a greater proportion of the board one year after assuming office, have greater discretion to make far-reaching changes regarding downsizing and business divesting, and lead firms characterized by higher levels of post-succession strategic instability. This suggests that successor-induced personnel, structural and strategic alterations are likely to be higher when the event itself signals a change in firm policy or post-succession redirection.

Overall, we find evidence that appointing a successor with a gap in characteristics is not always value-enhancing. In fact, it can be harmful when the succession event is disruptive in nature. Our empirical findings have strong implications for how firms manage the succession especially when the succession is forced or when a leadership change is preceded by poor firm performance. In particular, our findings suggest that under disruptive circumstances a firm should not appoint a new CEO who wants to stamp a mark on the firm by being different (i.e., by having a high succession gap). Instead,

what such firms truly need is a newcomer who possesses an in-depth industry knowledge and has a good understanding and appreciation of the corporate culture. Such successors will be less likely to demand drastic changes and will experience less resistance within the organization thereby enhancing rather than disrupting the existing relationships. Such a successor can proactively seek help from incumbent board members and top managers to successfully implement value-adding reforms.

To the best of our knowledge, this is the first paper that: firstly, considers the combined effect of various differences in CEO characteristics between the predecessor and successor simultaneously in a succession context; and secondly, examines whether such succession gaps have any influence on subsequent firm performance. This is also the first paper that looks into the difference between the predecessors' and successors' characteristics by distinguishing between different types of succession events. Our research is associated with the growing body of literature that examines the importance of a change in leadership on subsequent firm performance and the implications for firms' hiring and firing decisions in the labor market.

The remainder of the paper is organized as follows. Section 2 provides a comprehensive literature review surrounding CEO succession events and firm performance and our hypotheses development. Section 3 describes our sample and methodology, while section 4 presents the empirical results, robustness tests, and further tests. Finally, section 5 concludes our paper.

2. Literature Review and Hypothesis Development

A neoclassical view of the firm is that top management is homogeneous and provides selfless inputs into the production process. According to this view, different managers are regarded as perfect substitutes for one another. Two firms sharing similar technologies, factors and product market conditions will make similar choices, whether or not they share the same management team. An even more extreme assumption is that top managers simply do not matter for the operational activities within a firm. Existing empirical studies typically rely on firm, industry, or market-level characteristics to explain corporate behavior and performance. Yet they largely ignore the role that individual managers could play in shaping these outcomes. While executives may differ in their preferences and levels of risk-aversion or skills, none of this will translate into actual corporate policy if individuals cannot easily

influence these policies. Gamson and Scotch's (1964) Ritual Scapegoating Hypothesis supports this argument by stating that a succession event serves as a means to provide a target when a decline in a firm's performance is evident. Therefore, rather than actually enhance post-succession performance, a succession event simply gives the public the illusion that a change in leadership could determine and improve the company's fortune. Furthermore, in some circumstances, the hiring of incoming CEOs with succession gaps might be mere tokenism. For instance, a firm's corporate social responsibility may be called into question following a scandal. In response to this, female executives may be installed strategically as a signal that the firm is attempting to become more "socially responsible". Skaggs (2009) finds that after a racial discrimination lawsuit, firms respond to external pressure by becoming disproportionately more likely to promote African-Americans into management positions. The visibility of a scandal and the public perception of mismanagement should act as a threat to executive office holders, and thus create opportunities for appointment of CEOs with succession gaps. Under such circumstances, the effect of CEO succession gaps on subsequent firm performance would be inconclusive.

In contrast, others insist succession is adaptive since CEO succession is an error-correcting process serving as a response to sagging profitability. Therefore, a change in leadership is an indication of the firm's effort in improving its performance and a favorable shift in firm-environment fit (Pfeffer & Salancik, 1978; Allen et al., 1979; Brown, 1982). Other studies, however, argue that succession is a vicious circle whereby poor firm efficiency causes such events to happen in the first place (Grusky, 1963; Cannella & Lubatkin, 1993). Instead of improving efficiency, a change in leadership could in fact trigger more disruptions and further destabilize the firm (Ballinger & Marcel, 2010). As such, the consequences of CEO succession on post-succession firm performance remain an open empirical issue.

From a radical ecological perspective, succession is an event that indicates a more fundamental underlying structural/strategic change which is substantial enough to result in a deleterious misalignment with a firm's environment. From a bureaucratic theory point of view, successions could disturb internal stability, disrupt relationships and work patterns within a firm (Friedman & Singh, 1989). CEO succession gaps would be more disruptive than adaptive when the succession event itself is already disruptive in nature. Under such circumstances, when someone with succession gaps is

tapped as CEO, reactions inside the organization could range from suspicion to outrage. Discontent in the management team could set in, especially in those who were fighting for the top executive job themselves. For companies that are bureaucratic, hostile to new ideas, and have a history of resisting external candidates, the incoming CEO with succession gaps is highly likely to be isolated. Besides, it takes time: (1) for the incoming CEO, especially with succession gaps, to learn about how the system works as well as his/her roles and responsibilities in the new position; and (2) for internal and external stakeholders to get familiar and bond with the new leader (Karaevli, 2007). As such, a loss in firm value is expected because a succession event would not only result in the loss of firm-specific knowledge and human capital, but the difficulty in managing internal and external relationships which also makes it harder for the successor to garner support from the top management team, build a power-base, and understand how to establish alliances with external forces (e.g. regulatory bodies, suppliers, customers) to achieve performance goals (Greiner et al., 2003; Zhang & Rajagopalan, 2004). This is especially true when the incoming and outgoing CEOs differ widely in characteristics and backgrounds. Miller (1993) argues that a decline in firm integration would be expected following a succession event and the incoming CEO's ideas are less likely to be precisely articulated and converted into actions. This is more pronounced when the incoming CEO differs significantly from the previous one.

Succession events serve as a means for breaking with the past and regime and management styles, existing structures, as well as cultures, procedures and customs within an organization. As a consequence, turnaround strategies would be expected (Schepker et al., 2017). From a personnel perspective, if the managerial succession rate is low and the original management team is left in place, it is possible that the existing management team may romanticize the past (a strong conservative force influencing peoples' behavior) and may be reluctant to accept radical changes, so that the new CEO would find it difficult to push through his/her ideas (Schepker et al., 2017). The successor would be in for an uphill battle to overcome this handicap. In addition, for incoming CEOs with a succession gap, their functional expertise could be quite different from the skill sets and background deemed essential in the traditional promotion channel, leading to negative reactions by employees. Company morale would also be adversely affected if radical changes are made by the incoming CEO (which is more likely in the existence of succession gaps). Such drastic changes may upset the perceived probability

of company goals being reached, and a perception that employees' efficiency may not improve. The complexities of the company, the sheer number of internal and external vested interests, and the various stakeholders involved could collectively prevent effective strategic changes (Dalton & Kesner, 1983). As a result, worse subsequent firm performance is likely to ensue under such circumstances.

On the other hand, if successors with succession gaps bring with them a group of managers and the rate of executive turnover is high, existing managers might find it hard to accommodate new practices and policies introduced by the incoming CEO. For example, they might feel that opportunities for promotion have become unattractive under the new CEO, where he/she will be highly likely to make drastic personnel changes in the top executive team, or the promotion channel would change if the leader possesses a skill set that is quite different compared to the traditional criteria (Friedman & Saul, 1991). The vacancies left by departing executives and the uncertainties created as new ones replace them lead to instability, insecurity, and disruptions in relations and work patterns within a firm, which would only exacerbate the existing disruptions.

Prior literature suggests that more disruptions would be expected when: (1) the CEO is forced out, and (2) when firm performance is poor before the succession event. Forced succession reflects the board's intention to engage in drastic organizational change (Friedman & Singh, 1989; Hutzschenreuter et al., 2012). Compared with non-forced successions, a forced removal is more likely to result in more successor-induced changes and therefore more disruptions within the organization (Friedman & Saul, 1991), especially when the successor differs markedly from his/her predecessor. In addition, it would be unlikely for the predecessor to offer suggestions and assistance for the successor if the predecessor is forced out.

Similarly, succession gaps, introduced as a 'shock' into the firm in the wake of the new leader, would be more likely to result in drastic changes following a poor pre-succession performance. As a result, disruptions caused by structural or strategic changes introduced by the incoming CEO will be higher when performance has been poor. Previous studies show that unstable or turbulent conditions (deteriorating organizational performance, plummeting stock price, fraud, scandal, restatement of financial statements, etc.) could provide opportunities for firms to break away from the current enterprise habitus and alter hiring and promotion practices (Reskin & McBrier, 2000; Khurana, 2004;

Ryan & Haslam, 2005; Haslam & Ryan, 2008),[8] and thus create opportunities for appointments of CEOs with succession gaps. This is consistent with Reskin and Roos's (2009) queuing theory which argues that instability or scandal can make top leadership positions less desirable (less job security/earnings) to candidates who have a high level of competence. Since a pattern of continuous poor performance is an indication of a mismanaged company resisting improvements, viable successors may be unwilling to take charge and put their reputation at risk if they fail in their attempt to save the declining business. As such, competition from highly competent candidates would be less intense, allowing those less capable to move ahead in the queue to fill these vacancies. Under such circumstances, incoming CEOs with succession gaps might not possess the human capital that is significantly higher than their predecessors and their hiring might not lead to better firm performance as the board intended. The aforementioned two circumstances not only indicate a mandate for change, but also allow the successor enough room and abundant discretion to affect drastic changes. Moreover, the selection process under disruptive circumstances might not be rational enough, so that a successor with gaps might not possess more extensive human capital than his/her predecessor or industry peers. This leads to our first hypothesis as follows:

H1: *CEO succession gaps are disruptive under turbulent conditions (forced removal and when pre-succession firm performance has been poor) and will produce worse subsequent firm performance relative to an otherwise similar firm that does not experience a succession event.*

Conversely, under non-forced successions or when pre-succession financial performance has been good, there is a premium on continuity (Friedman & Singh, 1989; Shen & Cannella, 2002), and there is no need to select a new CEO who is radically different from the predecessor. When company performance improves, traditional hiring and promotion norms that have historically tended to favor successors with similar characteristics would be expected. Zajac and Westphal (1996) developed an organizational demography model where they use age, functional background, and educational background as demographic similarity measures and conclude that boards tend to hire a

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[8] For instance, the corporate social responsibility of a firm may be called into question following a scandal. As a response, female executives may be installed strategically as a signal that the firm is attempting to become more 'socially responsible'. Similarly, Skaggs (2009) finds that after a racial discrimination lawsuit, firms respond to external pressure by becoming disproportionately more likely to promote African-Americans into management positions.

'demographically similar' CEO, indicating there is a mutual attraction between firms and employees sharing similar characteristics. Thus, in order to overcome 'glass ceiling' barriers and to attract the attention of director selectors, an incoming CEO with a succession gap when pre-succession firm performance is good may be driven by the needs to acquire more extensive human capital than his/her counterparts. Besides, the selection process is expected to be well-planned under such conditions, which gives the successor enough time to become familiar with the business and allows firms to leverage firm-specific knowledge and resource bases in determining post-succession organizational success. Moreover, Miller (1991) asserts that the fit between a firm's structure and strategies with its environmental contingencies is a declining function of CEO tenure.

CEOs are known to cling to policies and actions that were previously successful but would not probably work under current situations, commonly known as 'competency traps' (Levitt & March, 1988). These 'competency traps' will lead to the incumbent CEO's technical and political obsolescence that is unable to provide suitable solutions to new issues or maintain a stable political environment within the firm (Ocasio, 1994). Incoming CEOs with succession gaps, however, would alter the firm's strategies and directions that better suit environmental demands by giving rise to strategic and social novelty and bringing about diverse social and professional networks. Transformational strategies are more likely to be observed in the existence of succession gaps, which would result in strategic actions that are supposed to fundamentally address organizational challenges and improve performance. Non-forced succession and/or good pre-succession firm performance provide a company with a stable internal environment that could serve better in capitalizing on environmental opportunities. This leads to our second hypothesis as follows:

H2: *Succession gaps are adaptive under non-forced turnover or when pre-succession performance has been good, and will display a positive relationship with firm performance compared to an otherwise similar firm that does not experience a succession event.*

11

3. Research Design

3.1. Data

Our starting sample comprises all S&P 500 firms between 1996 and 2016. CEOs' basic information (including name, gender, age, stock ownership, compensation structure, and tenure) was extracted from Compustat's ExecuComp database. Additional demographic information (including career history, educational background, and cultural background) was hand-collected from the S&P Capital IQ database, Bloomberg's online executive profile webpage, NNDB.com, Ancestry, and Wikipedia in the last instance. The classification of succession events into forced and non-forced follows the method described in Parrino (1997)[9], which has been widely adapted in recent CEO succession studies (Huson et al., 2004; Hazarika et al., 2012; Guo & Masulis, 2015; Jenter & Kanaan, 2015). The demographic information on S&P 500 top executives was then merged with Compustat's annual fundamental data and BoardEx's Director and Director Legacy database, with the latter containing information on board size and board independence. We dropped financial services firms and utilities from the sample (two-digit SIC Code 60-69 and 49), given that firms in these sectors are heavily regulated which may lead to performance outcomes following a succession different from those of non-regulated companies. We also excluded all cases followed by merger & acquisition or spin-offs, since it is difficult to separate the impact of leadership change from a major organizational restructure on subsequent firm performance after the succession event. After dropping firms without the CEO's full name in the given fiscal year, to conduct our analyses the final sample contains 7,141 firm-year observations.

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[9] Related news articles, whether published in mainstream media or industry-specific journals and magazines, were retrieved through Factiva. The classification takes the following steps: (1) if the press clearly states that the outgoing CEO is forced out, being fired by the board of directors, or the departure is caused by policy differences or pressure imposed by stakeholders, then the succession event is classified as forced. (2) All other departures for CEOs above and including age 64, succession events caused by death or health-related disability and CEO-initiated successions are classified as non-forced. (3) Departures for CEOs under 64 are re-examined further and classified as forced if there are no signs of decease or health-related disability announced by the press, the press does not report an acceptance of another position (either external positions or chairmanship of the company's board) by the outgoing CEO, or the press does not announce the retiring of the predecessor at least six months before the event. (4) If a CEO serves as interim CEO and is replaced later, we classify it as non-forced. (5) Cases classified as forced are reclassified if the reports convincingly state that the succession event has nothing to do with the company's activities.

3.2. Variable Construction

The dependent variable -firm performance- is the return on total assets (ROA) over the year following the succession event. To construct our primary explanatory variable, a measure for the succession-induced gap in CEO characteristics, we draw upon prior literature that has demonstrated that a CEO's gender, age, career variety, cultural background, highest education level, and social status (eliteness) of undergraduate school affect firm performance. First, as suggested by Adams and Funk (2012), women on boards of publicly listed companies emphasize different values in that female directors are more open to change and less conservative than both male directors and women in the general population. Moreover, female directors are particularly stakeholder-oriented (Adams et al., 2011; Matsa & Miller, 2013). Carol (1982) documents that men tend to address rules, justice, and individual rights when considering moral dilemmas whereas women are more likely to consider the impact of relationships when facing such issues. However, a feminine leadership style characterized by empathy, effective communication, and sharing of information and power could be effective in mid-level management, but may not necessarily work when serving as CEOs of large companies. Therefore, a change in gender in the top leadership assumes significance with regard to subsequent firm performance. We create a dummy variable, GENDER_GAP, which takes the value one if there is a gender difference between the predecessor and the successor, and zero otherwise.

Second, we hypothesize that the age difference between the predecessor and successor would greatly affect firm value since younger CEOs emphasize things differently compared to older managers. Younger CEOs are more energetic in terms of physical and mental prowess (Child, 1974), and hence better able to grasp new ideas and learn new behaviors (Chown, 1961). Moreover, younger managers tend to be less risk-averse as they put less emphasis on career and financial security (Barker & Mueller, 2002). Innovative and risky strategies are more likely to be considered by young leaders (Serfling, 2014) leading to higher growth and variability in profitability compared with their older counterparts in the same industry (Hambrick & Mason, 1984). On the other hand, younger leaders may be more conservative and may not deviate from industry benchmarks as they have greater reputational and job concerns (Hirshleifer & Thakor, 1992; Zwiebel, 1995; Holmström, 1999). Chevalier and Ellison (1999), and Hong et al. (2000) find evidence that due to a more sensitive termination-performance relationship,

13

younger managers are encouraged to take on less unsystematic risk, and generally tend to exhibit higher levels of career concern-motivated herding behaviour. As well, older CEOs may have higher intellectual skills and make corporate policies based on experience, skills, and knowledge gained from the position and/or advanced education (Sitthipongpanich & Polsiri, 2015). We calculate the standard deviation of the age distribution of all CEO in our sample and then create a dummy variable AGE_GAP that takes the value one when there are at least two standard deviations of age difference between the predecessor and the successor, and zero otherwise.[10]

Third, career variety can also impact on firm value, since it represents personal biases favoring experimentation and change and is positively related to personality traits such as extraversion and openness to experience (Judge et al., 2002; Judge et al., 2004). A multi-industry career experience could possibly contribute to future feasible strategic and social novelty within a company thereby directing the firm down novel paths. However, replacing an 'industry specialist' with a 'general manager' might not necessarily be beneficial, since drifting from job to job could result in superficial cognitive breadth instead of being proficient in a certain area. In addition, career variety may be positively related to a person's degree of anxiety, avoidance of commitment, and/or lack of contentment (Mowday & Spencer, 1981; Barrick & Mount, 1996; Judge & Bono, 2001). We therefore create a dummy variable CAREER_VARIETY_GAP which takes the value one if either one of the outgoing and the incoming CEOs is a 'general manager' (i.e., had previously worked in another GICS sector and/or moved across different functional areas), while the other one is an 'industry specialist' (had spent his/her entire career in one industry and/or even in just one company), and zero otherwise.

Fourth, CEOs from different ethnicities or cultural backgrounds may see things differently compared to CEOs born and raised in the U.S., especially regarding knowledge of global markets and the skills to target customers in different cultural settings. Similar to career variety, cultural variety helps to shape managers' cognitive map and conveys a broad cognitive and experiential stock which the CEO could draw upon. Multicultural experience has been shown to be positively associated with

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[10] In our case, there is an age gap if the predecessor is at least 13.84 years older or younger than the successor. Our definition of age gap is consistent with Serfling (2014), who defines 'successors are 13 to 40 years younger than incumbents' as 'much younger' and 'successors are 6 to 12 years younger than incumbents' as 'younger'.

creativity (Maddux & Galinsky, 2009; Tadmor et al., 2009). On the other hand, Graham et al. (2013) argue that compared with their native American counterparts, non-US CEOs are more conservative with regard to sure losses, are less optimistic and less willing to take chances. Furthermore, the potential clash between global economic interests and local political interests and the loss of connection to local political parties/suppliers/business partners could be challenging when a non-native CEO takes charge of the firm. We capture this through a dummy variable - CULTURAL_GAP - that equals one if either one of the predecessor or the successor is a native American and the other is not born and raised in the U.S., and is set equal to zero otherwise.

Fifth and finally, given the last two attributes refer to educational quality, they serve as a component of a person's cognitive ability and signal a person's ability to persevere in challenging intellectual activities. We distinguish high education gap from the 'eliteness' education gap given that the former gap measure emphasizes the difference between the knowledge base and mind-set of the incoming and outgoing CEOs, while the latter measure emphasizes the CEO's social capital. Kish-Gephart and Tochman Campbell (2015) postulate that for CEOs with highly placed parentage, an elite education makes them better connected to people across different industries, gives them more exposure to new business opportunities, and easier access to cutting-edge technologies which encourages the CEOs' risk-taking behavior. Their assertion is consistent with Cao et al. (2015) who contend that while both internal and external social capital matters, CEOs' outside connections ('bridging capital') function better than their internal network ('bonding capital') in promoting entrepreneurial innovation and firms' strategic risk-taking. Moreover, wide connections create a safety net for potential failure, which allows CEOs to take on more risks and therefore influence subsequent firm performance. On the other hand, Antonakis et al. (2017) document that CEOs with high IQs tend to adopt less effective leadership methods, and they generally exhibit lower levels of transformational and instrumental leadership skills. Furthermore, CEOs with lower educational qualifications would over-compensate through superior performance when compared with their counterparts with more prestigious educational backgrounds. A higher educational profile may make it easier for someone to win a CEO slot due to a stronger social network and the board's perception of a superior education as an appropriate proxy for managerial ability. Executives with no advanced degree, however, must work their way up through a

hierarchy in a process that does better at weeding out good CEOs from bad ones than any other superior education ever could.

As such, we create two dummy variables associated with CEO educational background: the first dummy, HIGHEST_EDUCATION_GAP, takes the value of one if there is a difference in the level of educational qualifications between the predecessor and the successor. We set 'level' to zero if the CEO does not attend university or college, to one if the CEO's highest qualification is 'LLB/Bachelor', to two if the CEO has a 'LLM/Master/MBA' degree and to three if he/she has achieved a 'Juris Doctorate/PhD' qualification. Any difference in the level between the incoming CEO and the outgoing one is regarded as a 'highest education gap'. The second dummy, ELITE_EDUCATION_GAP, takes the value of one if either one of the predecessor's or the successor's undergraduate school is in the top-20 list of the Best National/Global University rankings as defined by U.S. News & World Report's 2016 rankings, while the other's undergraduate school is not on the list.[11]

We also construct a succession gap index (GAP_INDEX) to illustrate the aggregate measure of difference between the predecessor and successor. We add one point for every difference between the predecessor and the successor with reference to the aforementioned six attributes. The maximum value for the index is six if the outgoing and incoming CEOs are different in every one of the six attributes. Likewise, the minimum value is zero if the outgoing and incoming CEOs share similar characteristics in all those traits. The GAP_INDEX in our sample has a mean value of 1.817 and a median value of 2. Among all of the 659 succession events, 32 cases involve a gender gap (23 cases are female replacing male and 9 are male replacing female), 193 successions result in an age gap (185 cases involve younger successors replacing older predecessors and 9 cases where older successors replace younger predecessors), 275 cases involve a career variety gap (146 cases are generalists replacing industry specialists and 129 cases are industry specialists replacing generalists), 106 are characterized as successions that lead to significant cultural gap (63 successors born or raised outside the U.S. replacing native Americans and 43 American CEOs replacing non-Americans), in 355 successions there was a

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[11] We use the latest U.S. News & World Report university rankings, as top-20 national/global university rankings largely remain stable over time. (e.g., U.S. News National University Rankings spanning the period 2008–2015 could be found at the following URL: http://publicuniversityhonors.com/2015/06/13/u-s-news-national-university-rankings-2008-present/).

significant education gap (193 successors with higher educational qualification replacing predecessors with lower qualification and 162 cases being the other way around), 178 successions are characterized by a significant shift in the 'eliteness' of the CEOs' undergraduate education (78 cases are successors with elite undergraduate degree replacing those without, and 100 cases where successors without elite undergraduate degree replace those with elite undergraduate degrees).

To examine the first and second hypotheses, we construct two additional independent variables. The first is a dummy variable, FORCED, that equals one if the predecessor was forced out (board-initiated succession) and zero otherwise (customary, CEO-initiated, or death/health-related disability-initiated succession). Our second variable, POOR_PRE_PERF, is a dummy variable that takes the value of one if the firm's pre-succession firm performance is lower than its industry median in the given fiscal year and zero otherwise, with industry defined at the two-digit SIC code. Of the 659 succession events, 179 are forced turnovers (27.2%)[12] and 309 are turnovers characterized by pre-succession firm performance that was below the industry median (46.9%). We expect to find a negative coefficient on GAP_INDEX for forced succession and when performance leading up to the succession is poor, and a positive coefficient on GAP_INDEX for non-forced turnover and those with good pre-succession performance, according to our first and second hypotheses, respectively.

We control for firm characteristics (Himmelberg et al., 1999; Frank & Goyal, 2009), corporate governance mechanism (Coles et al., 2006; Guest, 2009), and CEO characteristics (Boyd, 1995; Fahlenbrach, 2009; Fahlenbrach & Stulz, 2009) in our models, since these variables have been shown to influence firm performance. For firm characteristics, we include eight variables: past firm performance (PRE_PERFORMANCE); the number of years since the firm was established (FIRM_AGE); leverage (LEV); firm size (SIZE); market-to-book ratio (MTB); capital expenditure ratio (CAPEX); free cash flow ratio (FCF); and fixed tangible assets (TANG). Corporate governance-related control variables include board size (BOARD_SIZE) and board independence (BOARD_INDEPENDENCE). Control variables that capture CEO characteristics include the

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[12] The forced turnover ratio is close to that reported by Zhang and Rajagopalan (2004) for all COMPUSTAT-listed manufacturing firms for 1993-1998 and Guo and Masulis (2015) for all listed firms in RiskMetrics database spanning the years 1996-2010.

17

percentage of outstanding shares owned by the CEO (OWNERSHIP), the proportion of total annual CEO compensation that derives from option grants and stocks (EQUITY_INTENSITY), CEO-chairman indicator (DUALITY), founder-CEO indicator (FOUNDER), and family-member-CEO indicator (FAMILY_MEMBER). All control variables are winsorized at the top and bottom 1% level to minimize the influence of potential outliers. The definitions of control variables are explained in Appendix A.

3.3. Methodology – Propensity Score Matching (PSM) Regression

By comparing the outcome of firms that experienced succession in a given fiscal year with those that did not, we could estimate the actual effect of the succession on firm performance. This approach could only work in the scenario where firms that went through a succession are randomly assigned, but this is not the case in our sample. Firms, for example, with worse past performance are more likely to replace their CEOs. Should the trend continue, 'treated' firms (firms that experienced CEO successions) would be expected to produce worse subsequent performance than their counterparts, on average, regardless of whether they actually go through a change in their top executive or not. Under such circumstances, the estimated coefficient would be incorrect due to potential sample selection bias, which arises when the key determinants of why a firm goes through a succession are also related to firm performance.

To address this potential sample selection bias, our identification strategy relies on the propensity score matching (PSM) method to investigate the influence of CEO succession gaps on subsequent firm performance. We follow Malmendier and Tate (2009) by matching treated and untreated observations based on the estimated probability of being treated. We adopt this method where we match each firm that goes through a succession event with firms possessing otherwise similar characteristics but did not experience CEO turnover. In our study, instead of matching one to one, we match each treatment firm to five nearest match firms, so that the coefficient will be less sensitive to the matching criteria chosen. Once matches are made, the impact is then calculated by comparing the means of outcomes across treated observations and their matched pairs.

Guided by economic theory and prior literature (Brown, 1982; Friedman & Singh, 1989; Coles et al., 2014), several variables are used as matching criteria. This includes the conditions of the firm during pre-succession periods, such as performance, firm age, firm size, leverage, market-to-book ratio, tangibility, board size, board independence, industry sector, and fiscal year dummies. In addition, we include the characteristics of the predecessor, such as age, ownership, and CEO duality indicator. We require that no leadership change occurs in the match firms within one year after the transition year. The PSM method then uses a logit model to estimate matching firms as a function of the aforementioned matching criteria.

The following regression model was estimated for subsample analysis:

$$PERFORMANCE_{i,t+1} = \alpha + \beta_1 GAP\_INDEX_{i,t} + \sum_{n=1}^{N} \gamma_n FIRM_{n,i,t} + \sum_{k=1}^{K} \vartheta_k GOVERNANCE_{k,i,t} +$$

$$\sum_{r=1}^{R} \delta_r CEO_{r,i,t} + \epsilon_{i,t} \tag{1}$$

where PERFORMANCE is the difference in subsequent performance between the treatment firm and the average performance of the matching group i in year $t+1$, GAP_INDEX is succession gap index for firm i in year t, FIRM is a vector of N firm characteristics control variables, GOVERNANCE is a vector of K corporate governance control variables, and CEO is a vector of R CEO characteristics control variables.

We estimate three separate models with different forms of fixed effects. The first model includes two-digit SIC industry and year fixed effects to control for unobserved heterogeneity across different industries and firms. The second model incorporates industry fixed effects, year fixed effects, and the interactions between industry dummies and year dummies, as industry-specific fixed effects during a particular year could be the driving force behind the negative relationship between our interaction terms and subsequent firm performance. Including the interaction term makes our gap index and the measures of subsequent firm performance comparable across industries in any given year. The third model controls for year and firm-fixed effects due to a possibility that firms under crisis might favour successors with gaps or candidates with high levels of succession gaps might ultimately decide to take the leadership position. Thus, the negative relationship between the CEO gap measure and subsequent firm performance could be driven by time-invariant firm characteristics.

4. Empirical Results

4.1. Summary Statistics and Correlations

Table 1 displays the descriptive statistics of firm characteristics as well as CEO characteristics that can potentially influence firm performance after the CEO succession. As shown in columns (1) to (3), firms that experienced a succession event do not differ much from those that did not go through such an event (we call this the non-succession group) with regard to subsequent firm performance. Compared to their counterparts, treated firms (i.e., succession firms) are more established as indicated by an older firm age, and have fewer growth opportunities as suggested by a lower market-to-book ratio. For firms belonging to the succession group, their incumbent CEOs have lower ownership but enjoy a higher proportion of equity-based compensation, suggesting better incentive alignment in firms which experienced a change in leadership (Mehran, 1995). Besides, the incoming CEOs in the succession group are less likely to be both the CEO and chairman of the board compared to their counterparts, suggesting firms do make efforts to reduce potential agency problems and strengthen internal control (Westphal & Zajac, 1995). We also find evidence that firms led by founder- or family member-CEOs are less likely to experience succession events.

However, when comparing firm-year descriptive statistics of forced and non-forced succession firms (as shown in columns (4) to (6)), it is clear that firms experiencing forced succession are generally less profitable as evidenced by a lower ROA one year prior to the succession event. Such firms tend to pursue riskier financial but conservative investment policies as suggested by a higher leverage ratio and lower capital expenditure (Coles et al., 2006). Moreover, firms are more likely to hire an outsider to introduce strategic changes when the removals are board-initiated or the outgoing CEO departed due to pressure from shareholders. In columns (7) to (9), we compare firms that have performed poorly in the past with those having a pre-succession financial performance that is above the industry average. We find that poorly performing firms are larger in size and possess lower growth opportunities. Moreover, poorly performing firms are associated with higher leverage, which confirms March and Shapira's (1987) assertion that riskier policies are more likely to be introduced when the business falls into a decline than when the firms are doing well.

< Insert Table 1 here >

We construct the correlations matrix of the key independent variables that are subsequently used in the regression models. The results show that most of the independent variables have correlation coefficients less than 0.15. Among all the variables, only the estimated coefficients on (1) pre-succession firm performance and market-to-book ratio, and (2) tangibility and capital expenditure have a correlation of more than 0.5. We further use a variance inflation factor (VIF) to evaluate multi-collinearity which has an advantage over pairwise correlations as it simultaneously looks at the correlation between one variable and the rest of the independent variables used in our regression models. The highest value of VIF for each independent variable is 2.70, suggesting that multi-collinearity is not a major concern.[13]

4.2. Gap Index and Subsequent Firm Performance

Table 2 presents the results from PSM regression examining the effect of CEO succession gaps on subsequent firm performance. For the full sample, we do not find any meaningful relationship between succession gaps across all three regression models. These results are not surprising given that the consequence of succession on firm performance has been reported as largely inconclusive in past literature, stating that shifts in cultural mores can be both beneficial as well as harmful to performance with the positive effect in some firms being neutralized by the adverse effect of the cultural shift in others.

Most of the control variables in the baseline model display expected signs. For example, PRE_PERFORMANCE contributes negatively to subsequent performance at less than the 5% level of significance across all models. Indeed, prior performance indicates how efficiently a firm has used its resources. Good pre-succession performance suggests that the firm is able to actively seize environmental opportunities and overcome environmental constraints; hence a change in leadership is not desired. Consistent with this, our results show that firms with good pre-succession performance

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[13] For brevity, we do not report the correlation table in this paper.

experience a performance decline following a CEO turnover relative to an otherwise similar firm that has not seen a change in leadership.

Our results provide evidence that effective monitoring would be essential in adding value to subsequent firm performance in succession contexts. As shown in Table 2, LEV is positively related to subsequent firm performance at least at the 5% level of significance, which is consistent with the assertion in Jensen (1986) that pre-commitment of interest payments and the risk of potential bankruptcy due to debt financing could discipline managers from shirking, appropriating perquisites, and/or investing in value-destroying projects. Also, we find high market-to-book ratio to be negatively related to subsequent firm performance following a leadership change at least at the 5% statistical significance level across three regression models, which confirms Boone et al. (2007)'s argument that firms with higher growth potentials have high monitoring costs. We find founder-CEOs are associated with negative subsequent firm performance in model (1) at the 10% level. Adams et al. (2009) assert that founders are less likely to retain the CEO title when firm performance has been good. As such, founders are more likely to reassume office when the firm is experiencing a crisis. Furthermore, founder-CEOs concentrate more on employees and creditors than on shareholders, and they are more reluctant to bring about strategic changes than their counterparts (Mullins & Schoar, 2016). Thus, the reengagement of founder-CEOs might not be ideal and could lead to subsequent performance declines in a succession context.

Consistent with the monitoring role of incentive compensation, we find positive coefficients for both OWNERSHIP and EQUITY_INTENSITY. Aligning CEOs' compensation to firm performance by giving them higher share ownership or making their compensation more equity-based could motivate top executives to make value-maximizing decisions.

< Insert Table 2 here >

Given the commonly held belief that change is good, our findings on the lack of association between change in CEO characteristics and firm performance for the full-sample are intriguing. There is, however, the possibility that the value-implications of a radical shift in CEO characteristics differ across subsamples which get annulled in a portfolio setting. To test for this possibility, we next analyse the full-sample results further by splitting the sample into firms that were the subject of disruptive

changes leading up to the succession event and those that were not. Table 3 illustrates the effect of CEO gap index on subsequent firm performance when the succession is forced relative to firms that experienced a non-forced succession. Once again we estimate three separate regression models: models (1) and (4) controlling for year and industry fixed effects; models (2) and (5) controlling for year, industry, and year-industry fixed effects; and models (3) and (6) controlling for year and firm fixed effects. In sharp contrast to the full-sample results presented in Table 2, results for forced removal strongly suggest that the larger the difference in attributes between the outgoing and incoming CEOs, the worse the firm's subsequent financial performance would be when compared to an otherwise similar firm that does not experience a succession event.

On the other hand, when the succession event is routine, CEO-initiated, or death/health-related disability-initiated, a radical shift in the personal traits/experiences of the predecessor and the successor leads to better subsequent firm performance. These results are consistent with our first and second hypotheses. Unlike non-forced removals, forced successions only allow a very limited time for the incoming CEO to conduct on-the-job training, digest the essence of the business, and bond with internal and external stakeholders. Besides, under forced succession, more successor-induced structure and strategic changes would be expected, which could disturb internal stability and disrupt relations and work patterns within a firm. Moreover, a company's morale will go down when the incoming CEO's characteristics and functional expertise differ widely from the skill sets and backgrounds that are deemed very important in the traditional promotion channel.

As discussed earlier, subsequent firm performance depends largely on the ease of monitoring and CEO's incentive alignment in succession contexts. Firms characterized by a higher total debt ratio and lower growth opportunities are easier to monitor, and therefore produce better firm financial performance following a leadership change. The use of equity-based compensation on the successor again proves to be essential in adding firm value.

< Insert Table 3 here >

CEO turnover following poor performance is another set of successions that could potentially destabilize the top management and internal order further. Table 4 presents the sub-sample results (i.e. Poor and Good Pre-Performance) from PSM regression of CEO succession gaps on subsequent firm

23

performance. Again, we adopt year and industry fixed effects for models (1) and (4); year, industry, and year-industry fixed effects for models (2) and (5); and year and firm fixed effects for models (3) and (6). Consistent with our hypotheses, we find succession gaps lead to deteriorating subsequent firm performance when pre-succession firm performance has been poor. In sharp contrast, a drastic difference in the personal traits/past experience between the outgoing and incoming CEOs positively impacts on performance in firms that previously did well. Similar to forced removals, poor past performance indicates a need for a change in mission, vision, and strategy. Successors with gaps are given the motivation and latitude of action to introduce drastic personnel and structural changes, which lead to more disruptions within the organization. Unlike when pre-succession performance is good, an incoming CEO with succession gaps under poor past performance may not be driven to acquire more extensive human capital than their counterparts in order to overcome 'glass ceiling' barriers and to attract the attention of director selectors. The instability or scandal not only provides a chance for firms to break away from the traditional recruiting process and end up tapping a successor with a large characteristic-gap which might be mere tokenism, but for acceptable candidates with high competence the top leadership position might actually be less desirable. This allows those who are less capable to move ahead in the queue to fill these vacancies.

< Insert Table 4 here >

4.3. Robustness Tests

4.3.1. CEO Gap index and subsequent long-term firm performance

We next conduct a series of robustness tests to ensure stability of our primary results reported so far. First, all of the results presented relate our succession-gap measure to firm performance over the one-year period subsequent to the turnover. However, successor-induced structural and strategic changes can take longer than a year and consequently their impact on firm value and financial performance may not show when performance is measured over the twelve months post succession. We, therefore, re-estimate all our regression models using a three-year pre- and post-succession time frame (Cucculelli & Micucci, 2008) and present our results in Table 5. Panel A of this table reports

24

estimates of the impact of gap index on long-term post-succession firm performance, Panel B reports results for sub-sample of forced/non-forced successions and Panel C reports results for sub-sample when the pre-succession performance is good and bad. Note that firms now belong to the poor pre-succession group if their three-year average pre-succession firm performance is lower than industry median in the given fiscal year in our sample and zero otherwise. As shown in Table 5, results are largely consistent with our previous findings. Consistent with the expectation that changes can take time to show results, the coefficients on the GAP_INDEX become more significant both in terms of economic and statistical significance compared to results when performance is being measured over a year. These results support the arguments of our first and second hypotheses.

< Insert Table 5 here >

4.3.2. Alternative performance measures

To test for the robustness of our findings to our primary measure of performance, we next use the following alternative measures of performance: (1) ROA redefined as net income scaled by total assets; and (2) return on equity (ROE) measured as net income divided by common equity. Results using these alternative performance measures over a one-year and three-year post-succession window are reported in Table 6. Columns 1 and 3 report the estimates of treatment effect on subsequent performance using a one-year post-succession window while Columns 2 and 4 report the estimates of treatment effect on subsequent performance by adopting a three-year post-succession time frame. Results for these alternative performance measures are largely consistent with those obtained using ROA, our primary measure of performance albeit being marginally weaker in statistical significance. For example, the importance of succession gaps under forced turnover in explaining subsequent firm performance does not show up one year following the succession event when using ROE as our performance measure. However, the negative relationship becomes economically and statistically significant in the long-term.

<Insert Table 6 here>

4.3.3. Endogeneity

A limitation in our propensity matching process is that even after accounting for selection bias by comparing treatment and matched firms, there is a potential endogeneity issue concerning a firm's decision to choose a successor with different personal and professional backgrounds. As mentioned earlier, a crisis could give opportunities for firms to break away from the current enterprise habitus and alter hiring and promotion practices (Reskin & McBrier, 2000; Khurana, 2004), thereby creating opportunities for appointments of CEOs with succession gaps. If such a trend continues, the subsequent performance of firms with high succession gaps will be lower than firms with no succession gaps on average. Under such circumstances the PSM estimator will produce biased estimates.

We perform a mean-comparison test of pre-succession firm characteristics between firms with high relative to those with low succession gaps (as shown in Appendix B). Our results demonstrate that the differences in pre-succession firm age, firm size, tangibility, and CEO duality between these two groups are statistically significant. Firms belonging in the high-gap group are generally younger in age and smaller in size, and that older and more established firms are more bureaucratic and resistant to change (Hannan & Freeman, 1984). Besides, firms belonging in the high-gap group have a lower predecessor duality ratio than their low-gap counterparts. However, the difference is negligible in scale. Other variables, especially pre-succession firm performance, do not have a significant impact on the successor-selection process. Although firms with both high and low levels of succession gaps share similar pre-succession performance trends, the existence of potential endogeneity problems would still hamper the interpretation of the PSM regressions.

To address such concerns, we adopt an instrumental variable approach using the gap index between potential candidates and the outgoing CEO as our main instrument. We calculate the average value of other CEOs in the same industry (defined by two-digit SIC code), state, and fiscal year for each of the six components of our Succession Gap Index, as they are potential candidates for the CEO position. We then calculate a Gap Index between the departing CEO and industry average characteristics (termed as Candidate Gap Index). Our assumption is that such a Candidate Gap Index will be related to our realized Succession Gap Index, but should be reasonably exogenous to the firm's performance.

We first regress our gap index on the previously used set of control variables and the instrument: Candidate Gap Index (CANDIDATE_GAP). Next, we use the instrumented GAP_INDEX (i.e., the fitted value of the succession gap index from the first-stage regression for firm i in year t) in the second-stage regressions. We then test our two hypotheses by using this two-stage least squares (2SLS) regression. In Table 7, the dependent variable for the second stage regressions in panel A is peer-adjusted subsequent firm performance (i.e., the difference in subsequent performance between the treatment firm and the average subsequent performance of the matching group of each firm i in year $t+1$) and in panel B is peer-adjusted subsequent long-term performance. We find that the regression coefficients of the CANDIDATE_GAP variable in the first-stage OLS regression are positive and statistically significant at the 1% level, suggesting that the Candidate Gap Index has a strong explanatory power on the incoming CEO's level of succession gaps. As shown in Table 7, we find that GAP_INDEX consistently leads to worse subsequent performance when the predecessor was forced out or when pre-succession performance has been poor. In contrast, when pre-succession performance has been good, successors with drastically different personal traits and past experience from their predecessors lead to enhanced subsequent performance. However, there is not much evidence on GAP_INDEX affecting subsequent firm performance when firms experience non-forced successions. Overall our PSM results remain robust.

< Insert Table 7 here >

4.4. Further Tests

4.4.1. Gap Index and Post-Succession Board Co-option

In this section, we examine the channels through which high levels of succession gaps lead to worse subsequent firm performance. We first examine whether successors with gaps would lead to lower monitoring power. Our dependent variable, CO_OPTED, denotes the proportion of board members appointed within a year after the predecessor CEO is replaced.[14] Board co-option diminishes

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[14] We gather board co-option data from Lalitha Naveen's personal website: https://sites.temple.edu/lnaveen/data/. The original co-option variable ranges from 0 to 1. It remains at a constant level/increase within a CEO's tenure, and starts from 0 again when the next person assumes office. We changed the original co-option variable from accumulated proportion of board

27

board monitoring effectiveness (Coles et al., 2014) and therefore leads to higher management discretion.[15] Our main independent variable, HIGH_GAP, is a dummy variable that takes the value of one if the firm has a GAP_INDEX greater than the sample mean of 1.82 and zero otherwise. Guided by Linck et al. (2008) among others, our control variables include firm size (SIZE), leverage (LEV), number of business segments (NUM_SEGMENTS), firm age (FIRM_AGE), market-to-book ratio (MTB), research and development expense (RND), annualized standard deviation of monthly stock return over the year (STKVOL), firm profitability (ROA), free cash flow ratio (FCF), board size (BOARDSIZE), successor origin (OUTSIDER), CEO share ownership (OWNERSHIP), CEO age (AGE), and CEO duality (DUALITY). We also control for firm and year fixed effects. Results presented in Table 8 show that HIGH_GAP and/or higher levels of GAP_INDEX contribute significantly to a higher fraction of co-opted directors one year after the succession event. Our results show that the incoming CEOs with larger gaps would have more discretion in shuffling the firms' personnel and bring with them newcomers from their previous contacts (Friedman & Saul, 1991). Not only can those CEOs exert influence on the management shake-up, they are also able to affect the selection of board members, even independent directors (Coles et al., 2014). Such a practice not only intensifies disruptions within the organization (Shen & Cannella, 2002), but also undermines board independence if board co-option increases in the wake of a new leader (Coles et al., 2014).

< *Insert Table 8 here* >

4.4.2. Gap Index and Structural Change

Next, we examine the relationship between gap index and successor-induced structural changes. We follow Denis and Serrano's (1996) approach in determining firm structural change after a leadership change. The first dependent variable, STRUCTURE_CHANGE, takes the value of one if an asset sale is announced and a firm's book value of total assets is reduced by more than 10% during the two-year period after the CEO is replaced and zero otherwise. We also test whether there is a difference in post-

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changes to the annual proportion of board changes to make the value comparable across both succession firms and non-succession firms.

[15] Coles et al. (2014) document that board co-option is associated with higher CEO pay, lower pay-to-performance compensation schemes, and suboptimal investment decisions.

succession employee reduction for the high-gap group and their low-gap counterparts. We capture this through a dummy variable, EMPLOYEE_REDUCTION which is set equal to one if a firm's number of employees is reduced by more than 10% during the two-year period after the CEO is replaced and zero otherwise.

We estimate a logit regression by controlling for successor origin (OUTSIDER), firms' industry-adjusted debt capacity (LOW_DEBT_CAPACITY), interest coverage (INTEREST_COVERAGE), dividend coverage (DIV_COVERAGE), dividend cut indicator (DIV_CUT), return on assets (ROA), size (SIZE), leverage (LEV), market-to-book ratio (MTB), number of business segments (NUM_SEGMENTS), and sales-based Herfindahl Index (HERF). These variables have been documented in the prior literature as determinants of asset sales (Kruse, 2002; Yang, 2008). We further control for the median industry sales growth rate within which the firm operates (IND_SALES_GROWTH) (Kruse, 2002).

Table 9 illustrates the effect of gap index on subsequent structural changes after the CEO is replaced. Panel A reports the results when we use STRUCTURE_CHANGE as our dependent variable, and Panel B reports the results when we use EMPLOYEE_REDUCTION as our dependent variable. As shown in Table 9, the HIGH_GAP variable does not have any explanatory power on our post-succession structural change measures. However, the positive and significant coefficients on the interactions between FORCED and HIGH_GAP as well as POOR_PRE_PERF and HIGH_GAP indicate that successors with high gap levels have a higher probability of making post-succession downsizing decisions under forced successions and/or when pre-succession performance has been poor. Our findings confirm Lang et al.'s (1995) assertion that poorly performing firms are more likely to make the decision to downsize and divest, since the proceeds from selling existing assets could be used as a cheap way of financing. They argue that managers would be reluctant to divest the firm's business if they have a vested interest in the firm. In addition, successors, especially those with high succession gaps, might sell some of the firm's business just to make their mark on the firm so that it is different when there is a mandate for change (i.e., under the circumstances of forced successions and poor prior firm performance), even if such moves are value-destructive (Miller, 1993). In such cases, restructuring

is conducted to meet the incoming CEO's personal ambitions rather than enterprise interests, and therefore would be detrimental to subsequent firm performance.

< Insert Table 9 here >

4.4.3 Gap Index and Strategic Instability

Finally, we examine the relationship between gap index and post-succession firm strategic instability. We follow Finkelstein and Hambrick (1990) in constructing our Strategic Instability (SI) variable by using only four individual strategic dimensions due to missing a lot of data in advertising intensity and R&D intensity.[16] Our individual strategic measures are as follows: (1) plant and equipment newness (net PPE/gross PPE), (2) nonproduction overhead (selling, general and administrative expenses/sales), (3) inventory level (inventories/sales), and (4) financial leverage (total debt/common equity). We first compute the pre-succession three-year variance $\frac{\Sigma(t_i - T)^2}{(n-1)}$ for each of the aforementioned strategic dimensions. Then we standardize the variance for each dimension by industry at the four-digit SIC code level, using data points from sample firms only. Finally, the strategic instability measure is generated by summing the four standardized variance scores. Guided by Finkelstein and Hambrick (1990) and others, we control for pre-succession firm strategic instability (PRE_SI), size (SIZE), firm age (FIRM_AGE), market-to-book ratio (MTB), free cash flow (FCF), return on assets (ROA), board size (BOARD_SIZE), board independence (BOARD_IND), CEO age (AGE), CEO share ownership (OWNERSHIP), CEO duality (DUALITY) and CEO origin (OUTSIDER). We also control for firm and year fixed effects.

As shown in Table 10, the HIGH_GAP variable does not have explanatory power on post-succession firm strategic instability. However, the interaction terms between HIGH_GAP and FORCED and HIGH_GAP and POOR_PRE_PERF significantly contribute to a higher level of firm strategic instability one year after the succession event. Our empirical results suggest that under forced succession and/or when pre-succession firm performance has been poor, successors with high gaps are more likely to make decisions that would lead to an elevated level of subsequent firm strategic

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[16] Koh and Reeb (2015) show that the percentage of missing R&D firms which file and receive patents is 14 times greater than firms with zero R&D, and missing R&D firms are more likely to report R&D after an exogenous auditor change. As such, it would be inappropriate when conducting our empirical analysis to treat missing value as zero.

instability. Prior literature shows that the effect of strategic change on firm performance is the net effect of both its adaptive (Hambrick & Schecter, 1983; Haveman, 1992; Zajac & Kraatz, 1993) and disruptive side (Jauch et al., 1980; Singh et al., 1986; Kor & Leblebici, 2005). Zhang and Rajagopalan (2010) assert that firm performance increases when the level of strategic change rises from low to moderate but decreases when the level of strategic change increases from moderate to high. Compared to successors with low succession gaps, those with high gaps can amplify either the adaptive or disruptive effect of strategic change when the succession event itself signals underlying strategic and structural changes. As the ever-changing business environment makes inaction the riskiest strategy (Farjoun, 2007) and demands change within an organization, a moderate level of strategic change that a successor with high gaps could bring in is highly appreciated under non-forced successions and/or when past performance has been good. However, successors are more motivated to make drastic changes under forced succession and/or when pre-succession firm performance has been poor (Friedman & Singh, 1989; Hutzschenreuter et al., 2012; Schepker et al., 2017). This scenario leads to greater organizational disturbance when successors with gaps have limited understanding of their firms' external conditions and internal capabilities. The changes induced by successors with high gaps, which are built on new competencies rather than relying on existing competencies, will lead to worse immediate performance and a greater chance of business failure (Haveman, 1992; Sastry, 1997).

< Insert Table 10 here >

5. Conclusions

Value-implications of a shift in corporate culture brought about by CEO turnover are examined in this study. We employ an evaluation technique that examines the potential interactions between the effect of both the succession event itself and the shift in CEO characteristics it engenders. By employing a propensity score matching approach, the partial effect of succession gaps on the performance of firms experiencing a CEO succession could be analysed relative to their matched peers.

Focusing on the nature of the succession event and the differences between the personal traits/experiences of the outgoing and incoming CEOs in large S&P 500 companies over the period 1996-2016, we do not find any relationship between succession gap and firm performance for our full

31

sample. Results, however, are dramatically different when a similar association is examined for subsamples of the data. For example, under forced succession and when pre-succession performance of the firm has been poor, succession gaps are disruptive and lead to worse subsequent firm performance, and this result becomes stronger in the long-term. In stark contrast, however, when the succession itself is not forced or when the pre-succession performance has been good, a drastic change between the predecessor and the successor's personal traits and past experience contributes towards stability or enhanced subsequent performance. Consistent with the prediction that more successor-induced personnel and structural alterations would be expected when the event itself signals a change in firm policy or post-succession redirection, we find that successors who considerably differ from their predecessors co-opt a greater proportion of the board one year after assuming office. Furthermore, they have greater discretion to make far-reaching changes regarding business downsizing and strategic business shift.

Overall, we find evidence that appointing a successor with gaps in characteristics is not value-enhancing when the succession event is disruptive in nature. Our findings have strong implications for how firms manage the succession of CEOs, particularly when dealing with either forced succession or a leadership change under poor pre-succession firm performance. Especially, firms should avoid appointing new CEOs who are likely to stamp their authority on the firm in order to signal a change or simply just to be different (more likely to occur when the succession gap is high). Instead, what such firms truly need is a newcomer who possesses an in-depth industry knowledge and has a good understanding of the corporate culture. In doing so, successors will be less likely to demand drastic changes and suffer less resistance within the organization which would minimize the disruption on the firm's structure and existing relationships. Consequently, the successor is able to: firstly, figure out the exact cause and appropriate treatment for the organization; and secondly, could proactively seek help from incumbent board members and top managers instead of only giving lip service to reforms.

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Appendix A: Description of Variables

Variables	Definition
ROA	Return on total assets, defined as earnings before interest, taxes, depreciation and amortization over total assets.
PRE_PERFORMANCE	For succession firms, pre-succession performance is measured as ROA (return on total assets) in the year prior to the succession for short-term measurement. For non-succession matched pairs, PRE-PERFORMANCE denotes ROA measured at time (t-1). We take the three-year average pre-succession ROA measured at time (t-1) as long-term pre-performance measure for robustness check.
FIRM_AGE	Number of years since the firm's foundation.
LEV	Total debts divided by total assets.
SIZE	Natural logarithm of the book value of total assets.
MTB	Market capitalization divided by book value of total assets.
CAPEX	Capital expenditures divided by sales.
FCF	Free cash flow ratio, which equals free cash flow divided by the total assets of the company, where Free Cash Flow = EBITDA – CAPEX – change in working capital.
TANG	Fixed tangible assets (property, plant and equipment) divided by total assets.
BOARD_SIZE	Total number of directors.
BOARD_IND	The proportion of independent directors on the board.
OWNERSHIP	The percentage of outstanding shares owned by the CEO.
EQUITY_INTENSITY	The proportion of total annual CEO compensation that comes from option grants and stocks. This is the value of annual option awards plus the value of annual stock grants scaled by the amount of total annual compensation. The specific calculation formula is as follows: [option_awards_blk_value + rstkgrnt]/tdc1 (before 2006) and [option_awards_fv + stock_awards_fv]/tdc1 (after 2006).
DUALITY	A dummy variable indicating the board's structure, which equals one when a firm's chief executive officer (CEO) also serves as chairman of the board of directors, and zero otherwise.
FOUNDER	A dummy variable equal to one if the CEO is the founder of the company, and zero otherwise.
FAMILY_MEMBER	A dummy variable that equals one if the CEO is a family member of the original founders, and zero otherwise.
OUTSIDER	A dummy variable indicating successor origin, which equals one if the new CEO is an external candidate, and zero otherwise.
RND	Research and development expenditure over lagged revenue.
STKVOL	Annualized standard deviation of monthly stock return over the given year.
IND_SALES_GROWTH	The median three-year growth rate for aggregate sales for an industry defined by its two-digit SIC code.
LOW_DEBT_CAPACITY	A dummy variable equal to one if the firm has a long-term debt ratio (as measured by long-term debt divided by total assets) above the median industry long-term debt ratio and has a liquidity ratio (as measured by current assets divided by current liabilities) below the median industry liquidity ratio, and zero otherwise for firms matched by two-digit SIC code.
DIV_COVERAGE	Dividend coverage ratio, net income divided by common dividends.
DIV_CUT	A dummy variable that is equal to one if the firm decreases its annual dividend, and zero otherwise.
INTEREST_COVERAGE	Interest coverage ratio, operating earnings (EBITDA) divided by interest expense.
NUM_SEGMENTS	Number of business segments in which the firm operates.
HERF	Sale-based Herfindahl Index ranging from zero to one, calculated as the sum of the squares of each segment's sales as a proportion of total sales. A sale-based Herfindahl Index close to one indicates that the firm is concentrated with regard to its sales across different segments and hence having more concentrated operations.

Appendix B: Pre-Succession Firm Characteristics Mean Comparison Tests between the High-Gap Group and the Low-Gap Group

This table presents the difference in pre-succession firm characteristics between the high gap-succession group and low gap-succession group that are used in this paper for PSM matching spanning the period 1996-2016. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. HIGH_GAP is a dummy equal to one if the firm has a GAP_INDEX greater than the mean value of 1.82 and zero otherwise. PRE_PERFORMANCE_ST, is defined as ROA (return on total assets) one year prior to the succession event while PRE_PERFORMANCE is the three-year average pre-succession ROA. PRE_FIRM_AGE is the number of years since the firm was established one year prior to the succession event, PRE_SIZE is the firm size (natural log of total assets) one year prior to the succession event, PRE_LEV is the firm's book leverage (total debt) one year prior to the succession event, PRE_MTB is the firm's market-to-book ratio one year prior to the succession event, PRE_TANG is the firm's tangibility (calculated as fixed tangible assets divided by total assets) one year prior to the succession event. PRE_BOARDSIZE is the firm's number of directors one year prior to the succession event, while PRE_BOARD_IND is the proportion of independent directors on the board one year prior to the succession event. PRR_AGE denotes the age of the predecessor. PRE_OWNERSHIP is the percentage of outstanding shares owned by the predecessor and PRE_DUALITY is a dummy variable equalling one if the predecessor also serves as chairman of the board of directors, and zero otherwise.

Variable	Mean		Mean Difference	t-statistic	p>|t|
	High Gap	Low Gap			
PRE_PERFORMANCE_ST	0.164	0.169	-0.005	-0.757	0.450
PRE_PERFORMANCE	0.161	0.167	-0.006	-0.573	0.567
PRE_FIRM_AGE	3.915	4.160	-0.246	-3.697	0.000
PRE_SIZE	8.891	9.116	-0.226	-1.964	0.050
PRE_LEV	0.576	0.598	-0.022	-1.293	0.197
PRE_MTB	2.315	2.345	-0.030	-0.249	0.803
PRE_TANG	0.417	0.476	-0.059	-2.689	0.008
PRE_BOARDSIZE	10.602	10.791	-0.189	-0.910	0.364
PRE_BOARD_IND	0.730	0.746	-0.015	-1.032	0.303
PRE_AGE	60.691	59.900	0.791	1.598	0.111
PRE_OWNERSHIP	0.064	0.053	0.011	1.140	0.255
PRE_DUALITY	0.722	0.787	-0.066	-1.842	0.066
Observations	449	210			

40

Table 1 Summary Statistics

This table presents summary statistics of the variables used in this paper spanning the period 1996-2016. Columns 1 to 3 provide comparisons of descriptive statistics between succession group and non-succession group. Columns 4 to 6 report comparisons of descriptive statistics between forced succession and non-forced succession group. Columns 7 to 9 report comparisons of descriptive statistics between poor pre-performance and good pre-performance group. The dependent variable, PERFORMANCE, is defined as ROA (return on total assets) in the year following the succession event. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. Forced (Non-forced) Succession group is defined if the predecessor of the firm is forced out (not forced out) during the succession event. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). Poor (Good) Pre-Performance groups are defined if the firm's pre-succession firm performance is lower (higher) than its industry median in the given fiscal year in our sample, with industry defined at the two-digit SIC code level. Firm Characteristic control variables include: past firm performance (PRE_PERFORMANCE), the number of years since the firm was established (FIRM_AGE), leverage (LEV), firm size (SIZE), market-to-book ratio (MTB), capital expenditure ratio (CAPEX), free cash flow ratio (FCF) and fixed tangible assets (TANG). Corporate Governance control variables include: board size (BOARD_SIZE), and board independence (BOARD_IND). CEO characteristics control variables include: the percentage of outstanding shares owned by the CEO (OWNERSHIP), the proportion of total annual CEO compensation that comes from option grants and stocks (EQUITY_INTENSITY), CEO-chairman indicator (DUALITY), founder-CEO indicator (FOUNDER), family-member-CEO indicator (FAMILY_MEMBER), and successor origin (OUTSIDER). Definitions of control variables are provided in Appendix A. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	Succession (S) vs Non-Succession (NS) Group			Forced Succession (F) vs Non-forced Succession (NF) Group			Poor Pre-Performance (PP) vs Good Pre-Performance (GP) Group		
	S Mean	NS Mean	Difference	F Mean	NF Mean	Difference	PP Mean	GP Mean	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PERFORMANCE	0.164	0.165	-0.001	0.147	0.170	-0.023***	0.122	0.199	-0.076***
GAP_INDEX	1.817	0.000	1.817***	1.940	1.776	0.165	1.810	1.823	-0.013
PRE_PERFORMANCE	0.166	0.166	0.000	0.148	0.173	-0.025***	0.113	0.213	-0.100***
FIRM_AGE	4.020	3.840	0.180***	3.882	4.071	-0.189**	4.024	4.016	0.008
LEV	0.245	0.235	0.010	0.267	0.236	0.031**	0.261	0.231	0.030**
SIZE	9.032	8.742	0.290	9.293	8.943	0.350***	9.195	8.887	0.309***
MTB	1.953	2.061	-0.108*	1.854	1.991	-0.137	1.427	2.411	-0.984***
CAPEX	0.056	0.059	-0.003	0.049	0.058	-0.009***	0.045	0.065	-0.021***
FCF	0.039	0.037	0.002	0.036	0.040	-0.004	0.034	0.043	-0.009
TANG	0.437	0.414	0.023**	0.441	0.434	0.007	0.413	0.459	-0.045**
BOARDSIZE	10.67	10.36	0.311***	10.60	10.69	-0.093	10.65	10.69	-0.035
BOARD_IND	0.734	0.744	-0.010	0.770	0.721	0.049***	0.746	0.725	0.021
OWNERSHIP	0.023	0.080	-0.057***	0.023	0.023	0.000	0.021	0.025	-0.004
EQUITY_INTENSITY	0.566	0.494	0.072***	0.588	0.560	0.028	0.566	0.565	0.001
DUALITY	0.346	0.696	-0.350***	0.341	0.350	-0.009	0.404	0.295	0.109***
FOUNDER	0.029	0.142	-0.113***	0.039	0.025	0.014	0.029	0.029	0.001
FAMILY_MEMBER	0.023	0.056	-0.033***	0.039	0.017	0.022	0.029	0.017	0.012
OUTSIDER	0.188	0.168	0.020	0.296	0.149	0.147***	0.233	0.149	0.084***
Observations	659	6482		179	475		309	350	

Table 2 PSM Regression of Gap Index on Subsequent Firm Performance

Table 2 presents the results from PSM regression of CEO succession gaps on subsequent firm performance. The dependent variable, PERFORMANCE is the difference in subsequent performance between the treatment firm (succession firm) and the average subsequent performance of the matching group (non-succession matched peers), where subsequent performance is defined as ROA (return on total assets) in the year following the succession event. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). Firm Characteristic control variables include: past firm performance (PRE_PERFORMANCE), the number of years since the firm was established (FIRM_AGE), firm size (SIZE), leverage (LEV), market-to-book ratio (MTB), capital expenditure ratio (CAPEX), free cash flow ratio (FCF) and fixed tangible assets (TANG). Corporate Governance control variables include: board size (BOARD_SIZE), and board independence (BOARD_IND). CEO characteristics control variables include: the percentage of outstanding shares owned by the CEO (OWNERSHIP), the proportion of total annual CEO compensation that comes from option grants and stocks (EQUITY_INTENSITY), CEO-chairman indicator (DUALITY), founder-CEO indicator (FOUNDER), family-member-CEO indicator (FAMILY_MEMBER), and successor origin (OUTSIDER). Columns 1, 2 and 3 report the estimates of treatment effect on subsequent performance controlling for industry and year fixed effects, for industry, year and industry-year fixed effects and for firm and year fixed effects, respectively. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Subsequent Firm Performance

Variable	(1)	(2)	(3)
GAP_INDEX	0.000	0.004	-0.002
	(0.01)	(1.13)	(-0.54)
FORCED	-0.004	-0.011	0.006
	(-0.32)	(-0.83)	(0.43)
PRE_PERFORMANCE	-0.401***	-0.419***	-0.163***
	(-10.88)	(-11.98)	(-2.99)
FIRM_AGE	0.006*	0.006*	-0.102***
	(1.67)	(1.93)	(-2.72)
SIZE	0.004*	0.003	0.026**
	(1.84)	(1.58)	(2.27)
LEV	0.038**	0.038***	0.093**
	(2.32)	(2.65)	(2.50)
MTB	-0.014***	-0.015***	-0.010**
	(-4.98)	(-5.68)	(-2.22)
CAPEX	0.091	-0.043	0.493**
	(0.66)	(-0.32)	(2.48)
FCF	-0.078*	-0.141***	0.010
	(-1.74)	(-3.14)	(0.19)
TANG	-0.046***	-0.039***	0.060
	(-3.01)	(-2.79)	(1.31)
BOARDSIZE	-0.001	-0.001	0.001
	(-0.90)	(-0.80)	(0.50)
BOARD_IND	0.025	0.031	0.042
	(0.98)	(1.30)	(0.95)
OWNERSHIP	-0.025	-0.048	0.104*
	(-0.70)	(-1.56)	(1.71)
EQUITY_INTENSITY	0.038***	0.029***	0.038***
	(3.46)	(2.81)	(2.65)
DUALITY	-0.002	-0.003	-0.013
	(-0.42)	(-0.60)	(-1.45)
FOUNDER	-0.030*	-0.017	-0.024
	(-1.71)	(-1.11)	(-0.64)
FAMILY_MEMBER	0.011	0.015	0.023
	(0.75)	(1.16)	(0.55)
OUTSIDER	-0.008	-0.009*	-0.002
	(-1.44)	(-1.67)	(-0.15)
Constant	0.071	0.106	0.069
	(1.15)	(1.05)	(0.40)
Industry Fixed Effects	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes
Industry*Year Fixed Effects	No	Yes	No
Firm Fixed Effects	No	No	Yes
R-Squared	0.377	0.426	0.097
Observations	605	605	605

Table 3 PSM Regression of Gap Index on Subsequent Firm Performance – Sub-Sample: Forced vs. Non-Forced

Table 3 presents the sub-sample results from PSM regression of CEO succession gaps on subsequent firm performance for forced and non-forced succession firms. The dependent variable, PERFORMANCE is the difference in subsequent performance between the treatment firm (succession firm) and the average subsequent performance of the matching group (non-succession matched peers), where subsequent performance is defined as ROA (return on total assets) in the year following the succession event. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. Forced (Non-Forced) subsample is defined if the predecessor of the firm is forced out (not forced out) during the succession event. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). Firm Characteristic control variables include: past firm performance (PRE_PERFORMANCE), the number of years since the firm was established (FIRM_AGE), firm size (SIZE), leverage (LEV), market-to-book ratio (MTB), capital expenditure ratio (CAPEX), free cash flow ratio (FCF) and fixed tangible assets (TANG). Corporate Governance control variables include: board size (BOARD_SIZE), and board independence (BOARD_IND). CEO characteristics control variables include: the percentage of outstanding shares owned by the CEO (OWNERSHIP), the proportion of total annual CEO compensation that comes from option grants and stocks (EQUITY_INTENSITY), CEO-chairman indicator (DUALITY), founder-CEO indicator (FOUNDER), family-member-CEO indicator (FAMILY_MEMBER), and successor origin (OUTSIDER). Columns 1, 2 and 3 report the estimates of treatment effect on subsequent performance for forced succession firms controlling for industry and year fixed effects, for industry, year and industry-year fixed effects and for firm and year fixed effects, respectively. Columns 4, 5 and 6 report the estimates of treatment effect on subsequent performance for non-forced succession firms controlling for industry and year fixed effects, for industry, year and industry-year fixed effects and for firm and year fixed effects, respectively. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Subsequent Firm Performance

Variable	Forced			Non-Forced		
	(1)	(2)	(3)	(4)	(5)	(6)
GAP_INDEX	-0.010**	-0.010**	-0.011**	0.007*	0.013***	0.006
	(-2.36)	(-2.19)	(-2.33)	(1.85)	(3.10)	(1.36)
PRE_PERFORMANCE	-0.422***	-0.455***	-0.150***	-0.380***	-0.420***	-0.070
	(-12.01)	(-13.61)	(-2.93)	(-10.26)	(-12.14)	(-1.29)
FIRM_AGE	0.005	0.004	-0.107***	0.005	0.005	-0.080**
	(1.45)	(1.48)	(-3.02)	(1.30)	(1.54)	(-2.11)
SIZE	0.003	0.002	0.026**	0.005*	0.004*	0.032***
	(1.42)	(0.88)	(2.38)	(1.93)	(1.67)	(2.85)
LEV	0.024	0.025*	0.089**	0.040**	0.039***	0.079**
	(1.50)	(1.79)	(2.54)	(2.36)	(2.64)	(2.22)
MTB	-0.019***	-0.019***	-0.013***	-0.015***	-0.015***	-0.014***
	(-7.12)	(-7.72)	(-3.01)	(-5.25)	(-5.92)	(-3.13)
CAPEX	0.043	-0.096	0.476**	0.002	-0.140	0.299
	(0.32)	(-0.74)	(2.54)	(0.01)	(-1.06)	(1.54)
FCF	-0.109**	-0.138***	-0.008	-0.071	-0.147***	0.037
	(-2.53)	(-3.22)	(-0.16)	(-1.58)	(-3.31)	(0.74)
TANG	-0.037**	-0.027*	0.054	-0.048***	-0.040***	0.074
	(-2.49)	(-1.95)	(1.24)	(-3.05)	(-2.84)	(1.63)
BOARDSIZE	-0.002	-0.001	-0.000	-0.001	-0.001	0.000
	(-1.33)	(-1.02)	(-0.16)	(-1.03)	(-0.77)	(0.14)
BOARD_IND	0.033	0.036	0.039	0.021	0.027	0.026
	(1.31)	(1.57)	(0.90)	(0.78)	(1.16)	(0.60)
OWNERSHIP	-0.036	-0.049*	0.018	-0.016	-0.042	0.112*
	(-1.06)	(-1.66)	(0.30)	(-0.43)	(-1.38)	(1.80)
EQUITY_INTENSITY	0.037***	0.028***	0.036***	0.036***	0.027***	0.022
	(3.49)	(2.79)	(2.59)	(3.26)	(2.61)	(1.53)
DUALITY	-0.004	-0.005	-0.017*	-0.001	-0.001	-0.011
	(-0.81)	(-1.10)	(-1.82)	(-0.13)	(-0.23)	(-1.18)
FOUNDER	-0.022	-0.011	0.012	-0.028	-0.015	-0.016
	(-1.26)	(-0.73)	(0.32)	(-1.58)	(-0.95)	(-0.46)
FAMILY_MEMBER	0.021	0.023*	0.044	0.013	0.016	0.028
	(1.53)	(1.91)	(0.93)	(0.84)	(1.29)	(0.72)
OUTSIDER	-0.006	-0.007	0.004	-0.007	-0.007	-0.004
	(-1.12)	(-1.33)	(0.40)	(-1.19)	(-1.38)	(-0.37)
Constant	0.129**	0.110	0.133	0.086	0.119	-0.034
	(2.21)	(1.05)	(0.82)	(1.39)	(1.21)	(-0.20)
Industry Fixed Effects	Yes	Yes	No	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year Fixed Effects	No	Yes	No	No	Yes	No
Firm Fixed Effects	No	No	Yes	No	No	Yes
R-Squared	0.458	0.495	0.112	0.408	0.460	0.091
Observations	175	175	175	430	430	430

Table 4 PSM Regression of Gap Index on Subsequent Firm Performance – Sub-Sample: Poor Pre-Succession Performance vs. Good Pre-Succession Performance

Table 4 presents the sub-sample results from PSM regression of CEO succession gaps on subsequent firm performance for firms with poor past performance and firms with good pre-succession performance. The dependent variable, PERFORMANCE is the difference in subsequent performance between the treatment firm (succession firm) and the average subsequent performance of the matching group (non-succession matched peers), where subsequent performance is defined as ROA (return on total assets) in the year following the succession event. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). Poor (Good) Pre-Performance groups are defined if the firm's pre-succession firm performance is lower (higher) than its industry median in the given fiscal year in our sample, with industry defined at the two-digit SIC code level. Firm Characteristic control variables include: past firm performance (PRE_PERFORMANCE), the number of years since the firm was established (FIRM_AGE), firm size (SIZE), leverage (LEV), market-to-book ratio (MTB), capital expenditure ratio (CAPEX), free cash flow ratio (FCF) and fixed tangible assets (TANG). Corporate Governance control variables include: board size (BOARD_SIZE), and board independence (BOARD_IND). CEO characteristics control variables include: the percentage of outstanding shares owned by the CEO (OWNERSHIP), the proportion of total annual CEO compensation that comes from option grants and stocks (EQUITY_INTENSITY), CEO-chairman indicator (DUALITY), founder-CEO indicator (FOUNDER), family-member-CEO indicator (FAMILY_MEMBER), and successor origin (OUTSIDER). Columns 1, 2 and 3 report the estimates of treatment effect on subsequent performance for forced succession firms controlling for industry and year fixed effects, for industry, year and industry-year fixed effects and for firm and year fixed effects, respectively. Columns 4, 5 and 6 report the estimates of treatment effect on subsequent performance for non-forced succession firms controlling for industry and year fixed effects, for industry, year and industry-year fixed effects and for firm and year fixed effects, respectively. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Subsequent Firm Performance					
	Poor Pre-Performance			Good Pre-Performance		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gap_Index	-0.022***	-0.021***	-0.025***	0.014***	0.020***	0.013***
	(-3.79)	(-3.48)	(-4.04)	(3.20)	(4.53)	(2.70)
FORCED	0.002	-0.002	0.006	0.050***	0.042**	0.068***
	(0.10)	(-0.09)	(0.34)	(2.71)	(2.30)	(3.54)
PRE_PERFORMANCE	-0.407***	-0.449***	-0.135***	-0.403***	-0.445***	-0.077
	(-11.59)	(-13.63)	(-2.70)	(-11.02)	(-13.09)	(-1.41)
FIRM_AGE	0.004	0.003	-0.084**	0.005	0.005	-0.084**
	(1.02)	(0.90)	(-2.42)	(1.32)	(1.61)	(-2.24)
SIZE	0.004	0.002	0.025**	0.005**	0.004*	0.032***
	(1.45)	(0.76)	(2.41)	(2.02)	(1.83)	(2.89)
LEV	0.015	0.016	0.075**	0.039**	0.039***	0.078**
	(0.94)	(1.14)	(2.18)	(2.39)	(2.76)	(2.19)
MTB	-0.019***	-0.020***	-0.011***	-0.015***	-0.016***	-0.015***
	(-7.03)	(-7.85)	(-2.80)	(-5.52)	(-6.19)	(-3.40)
CAPEX	-0.040	-0.203	0.340*	0.008	-0.129	0.329*
	(-0.29)	(-1.57)	(1.85)	(0.06)	(-1.01)	(1.71)
FCF	-0.115***	-0.157***	-0.006	-0.069	-0.140***	0.040
	(-2.69)	(-3.73)	(-0.13)	(-1.57)	(-3.22)	(0.80)
TANG	-0.038**	-0.026*	0.049	-0.044***	-0.035***	0.072
	(-2.49)	(-1.89)	(1.15)	(-2.87)	(-2.58)	(1.61)
BOARDSIZE	-0.001	-0.000	0.000	-0.002	-0.002	-0.000
	(-0.80)	(-0.23)	(0.01)	(-1.32)	(-1.24)	(-0.05)
BOARD_IND	0.029	0.031	0.047	0.019	0.026	0.016
	(1.14)	(1.39)	(1.14)	(0.72)	(1.12)	(0.36)
OWNERSHIP	-0.017	-0.042	0.091	-0.022	-0.048	0.095
	(-0.51)	(-1.44)	(1.53)	(-0.64)	(-1.60)	(1.55)
EQUITY_INTENSITY	0.038***	0.027***	0.037***	0.032***	0.024**	0.012
	(3.63)	(2.73)	(2.73)	(2.88)	(2.32)	(0.79)
DUALITY	0.001	-0.000	-0.010	-0.004	-0.005	-0.014
	(0.11)	(-0.09)	(-1.12)	(-0.71)	(-0.97)	(-1.47)
FOUNDER	-0.022	-0.009	0.005	-0.027	-0.014	-0.017
	(-1.28)	(-0.61)	(0.12)	(-1.53)	(-0.95)	(-0.47)
FAMILY_MEMBER	0.015	0.019	0.020	0.015	0.020	0.007
	(1.09)	(1.56)	(0.51)	(1.05)	(1.64)	(0.15)
OUTSIDER	-0.004	-0.005	0.002	-0.008	-0.008	-0.006
	(-0.79)	(-0.91)	(0.21)	(-1.29)	(-1.57)	(-0.52)
Constant	0.131**	0.180*	0.041	0.099	0.067	0.003
	(2.25)	(1.91)	(0.26)	(1.64)	(0.63)	(0.02)
Industry Fixed Effects	Yes	Yes	No	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year Fixed Effects	No	Yes	No	No	Yes	No
Firm Fixed Effects	No	No	Yes	No	No	Yes
R-Squared	0.465	0.504	0.127	0.426	0.480	0.129
Observations	298	298	298	307	307	307

Table 5 PSM Regression of Gap Index on Subsequent Long-Term Firm Performance

Table 5 presents the results from PSM regression of CEO succession gaps on subsequent long-term firm performance using sub-samples. The dependent variable, PERFORMANCE is the difference in subsequent long-term performance between the treatment firm (succession firm) and the average subsequent performance of the matching group (non-succession matched peers), where subsequent long-term performance is defined as the three-year average subsequent ROA (return on total assets). Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). POOR_PRE_PERF takes the value of one if the firm's three years average pre-succession firm performance is lower than its industry median in the given fiscal year in our sample and zero otherwise, with industry defined at the two-digit SIC code level. Panel A reports estimates of gap index on long-term post-succession firm performance. Panel B reports sub-sample estimates of gap index on long-term post-succession firm performance for forced/non-forced succession firms while Panel C reports sub-sample estimates of gap index on long-term post-succession firm performance for poor pre-succession performance/good pre-succession performance firms. Columns 1, 2 and 3 report the estimates of treatment effect on subsequent performance controlling for industry and year fixed effects, for industry, year and industry-year fixed effects and for firm and year fixed effects, respectively. The models include all control variables from Table 2 (suppressed). Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Subsequent Long-Term Firm Performance

Variable	(1)	(2)	(3)
Panel A: PSM Regression of Gap Index on Subsequent Long-term Firm Performance			
GAP_INDEX	-0.000	0.000	-0.003
	(-0.11)	(0.01)	(-0.74)
FORCED	-0.009	-0.008	-0.010
	(-0.63)	(-0.55)	(-0.67)
PRE_PERFORMANCE	-0.233***	-0.233***	-0.019
	(-6.02)	(-6.11)	(-0.29)
Controls	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes
Industry*Year Fixed Effects	No	Yes	No
Firm Fixed Effects	No	No	Yes
R-Squared	0.424	0.475	0.112
Observations	439	439	439

Panel B: PSM Regression of Gap Index on Subsequent Long-term Firm Performance – Forced vs. Non-Forced	Forced			Non-Forced		
	(1)	(2)	(3)	(1)	(2)	(3)
GAP_INDEX	-0.019***	-0.018***	-0.024***	0.007*	0.008**	0.005
	(-3.65)	(-3.56)	(-4.44)	(1.88)	(2.15)	(1.37)
PRE_PERFORMANCE	-0.219***	-0.230***	0.039	-0.252***	-0.257***	0.078
	(-5.71)	(-6.10)	(0.64)	(-6.69)	(-6.88)	(1.22)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year Fixed Effects	No	Yes	No	No	Yes	No
Firm Fixed Effects	No	No	Yes	No	No	Yes
R-Squared	0.482	0.533	0.148	0.467	0.518	0.111
Observations	120	120	120	319	319	319

Panel C: PSM Regression of Gap Index on Subsequent Long-term Firm Performance – Poor Pre-Succession Performance vs. Good Pre-Succession Performance	Poor Pre-Succession Performance			Good Pre-Succession Performance		
	(1)	(2)	(3)	(1)	(2)	(3)
GAP_INDEX	-0.025***	-0.026***	-0.028***	0.018***	0.021***	0.017***
	(-4.27)	(-4.32)	(-4.81)	(4.42)	(4.88)	(3.99)
FORCED	-0.215***	-0.233***	0.082	-0.268***	-0.277***	0.045
	(-5.73)	(-6.36)	(1.44)	(-7.20)	(-7.59)	(0.71)
PRE_PERFORMANCE	-0.037*	-0.034	-0.040*	0.044***	0.039**	0.054***
	(-1.68)	(-1.54)	(-1.82)	(2.83)	(2.51)	(3.29)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry*Year Fixed Effects	No	Yes	No	No	Yes	No
Firm Fixed Effects	No	No	Yes	No	No	Yes
R-Squared	0.504	0.554	0.190	0.491	0.547	0.193
Observations	202	202	202	237	237	237

Table 6 PSM Regression of Gap Index on Subsequent Alternative Performance Measures

Table 6 presents the results from PSM regression of CEO succession gaps on subsequent firm performance. The dependent variable, PERFORMANCE is the difference in subsequent performance between the treatment firm (succession firm) and the average subsequent performance of the matching group (non-succession matched peers). Alternative performance measures include: (1) ROA redefined as net income scaled by total assets as opposed to EBITDA (earnings before interest, tax, depreciation and amortization) over total assets, and (2) return on equity (ROE), defined as net income divided by common equity. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). POOR_PRE_PERF takes the value of one if the firm's pre-succession firm performance is lower than its industry median in the given fiscal year in our sample and zero otherwise, with industry defined at the two-digit SIC code level. Panel A reports estimates of gap index on subsequent firm performance. Panel B reports sub-sample estimates of gap index on subsequent firm performance for forced/non-forced succession firms while Panel C reports sub-sample estimates of gap index on subsequent firm performance for poor pre-succession performance/good pre-succession performance firms. Columns 1 and 3 report the estimates of treatment effect on subsequent performance using a one-year post-succession window, while Columns 2 and 4 report the estimates of treatment effect on subsequent performance by adopting a three-year post-succession time frame. The models include all control variables from Table 2 (suppressed). All regressions include firm and year fixed effects. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	ROA (Net Income/ Total Assets)		ROE	
Panel A: PSM Regression of Gap Index on Subsequent Firm Performance	(1)	(2)	(3)	(4)
GAP_INDEX	-0.002	-0.002	0.005	0.008
	(-0.61)	(-0.59)	(0.24)	(0.46)
FORCED	-0.007	0.000	0.024	-0.019
	(-0.56)	(0.04)	(0.31)	(-0.28)
PRE_PERFORMANCE	0.027	0.244***	0.060	0.271***
	(0.69)	(4.33)	(1.40)	(4.08)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
R-Squared	0.069	0.144	0.040	0.094
Observations	605	439	605	439

Variable	ROA (Net Income/ Total Assets)				ROE			
Panel B: PSM Regression of Gap Index on Subsequent Firm Performance – Forced (F) vs. Non-Forced (NF)	F	NF	F	NF	F	NF	F	NF
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)
GAP_INDEX	-0.010**	0.001	-0.008*	-0.000	0.002	0.018	-0.047**	0.027
	(-2.16)	(0.25)	(-1.76)	(-0.03)	(0.06)	(0.74)	(-2.01)	(1.53)
PRE_PERFORMANCE	0.027	0.084*	0.316***	0.258***	0.069	0.050	0.280***	0.327***
	(0.70)	(1.90)	(6.75)	(4.62)	(1.61)	(1.06)	(4.84)	(4.97)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.084	0.075	0.232	0.148	0.041	0.040	0.147	0.111
Observations	175	430	120	319	175	430	120	319

Variable	ROA (Net Income/ Total Assets)				ROE			
Panel C: PSM Regression of Gap Index on Subsequent Firm Performance – Poor Pre-Succession Performance (PP) vs. Good Pre-Succession Performance (GP)	PP	GP	PP	GP	PP	GP	PP	GP
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)
GAP_INDEX	-0.028***	0.013***	-0.011**	0.004	-0.047	0.051*	-0.047*	0.0369*
	(-4.79)	(2.85)	(-2.49)	(1.03)	(-1.49)	(1.77)	(-1.73)	(1.82)
PRE_PERFORMANCE	0.014	0.078*	0.329***	0.241***	0.053	0.049	0.291***	0.306***
	(0.37)	(1.81)	(6.81)	(4.45)	(1.18)	(1.08)	(5.05)	(4.64)
FORCED	0.035*	-0.008	-0.015	0.005	0.037	-0.003	-0.066	0.032
	(1.92)	(-0.46)	(-0.81)	(0.39)	(0.30)	(-0.03)	(-0.58)	(0.44)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.088	0.106	0.219	0.174	0.040	0.047	0.156	0.110
Observations	298	307	202	237	298	307	202	237

Table 7 Two-Stage Least Squares Regression

Table 7 presents the results from two-stage least squares regression of CEO succession gaps on subsequent firm performance using sub-samples. The dependent variable, PERFORMANCE is the difference in subsequent performance between the treatment firm (succession firm) and the average subsequent performance of the matching group (non-succession matched peers), where subsequent performance is defined as ROA (return on total assets) in the year following the succession event. Panel A performs the one-year subsequent firm performance and panel B illustrates three-year average subsequent firm performance. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. Instrumented GAP_INDEX is the fitted value of GAP_INDEX from the first-stage regression. Potential candidates' average gap index (CANDIDATE_GAP) serves as our instrumental variable. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). POOR_PRE_PERF takes the value of one if the firm's pre-succession firm performance is lower than its industry median in the given fiscal year in our sample and zero otherwise, with industry defined at the two-digit SIC code level. The models include all control variables from Table 2 (suppressed). Definitions of control variables are provided in Appendix A. Regressions include year and firm fixed effects. T-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	Whole Sample		Forced		Non-Forced		Poor Pre-Performance		Good Pre-Performance	
	First Stage	Second Stage	First Stage	Second Stage	First Stage	Second Stage	First Stage	Second Stage	First Stage	Second Stage
Panel A: PSM Regression of Gap Index on One-Year Subsequent Firm Performance										
GAP_INDEX		-0.000		-0.012**		0.007		-0.032***		0.017***
		(-0.08)		(-2.24)		(1.48)		(-4.00)		(3.44)
CANDIDATE_GAP	0.854***		0.966***		0.869***		0.745***		0.907***	
	(52.83)		(62.40)		(64.09)		(35.75)		(44.48)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.839	0.098	0.835	0.112	0.759	0.092	0.806	0.127	0.880	0.128
Observations	605	605	175	175	430	430	298	298	307	307
Panel B: Treatment Effect on Three-Year Average Subsequent Firm Performance										
GAP_INDEX		-0.003		-0.014**		0.001		-0.044***		0.020***
		(-0.73)		(-2.44)		(0.24)		(-6.00)		(4.39)
CANDIDATE_GAP	0.852***		0.927***		0.866***		0.660***		0.969***	
	(44.46)		(56.66)		(49.36)		(32.11)		(61.96)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.835	0.120	0.869	0.153	0.818	0.119	0.834	0.185	0.886	0.203
Observations	439	439	120	120	319	319	202	202	237	237

Table 8 PSM Regression of Gap Index on Post-Succession Board Co-option

Table 8 presents the results from panel data regression of CEO succession gaps on post-succession board co-option. The dependent variable, CO_OPTED is the difference in proportion of board changes one-year after the CEO assumed office between each treatment firm (succession firm) and its matching group (non-succession matched peers). Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. HIGH_GAP is a dummy equal to one if the firm has a GAP_INDEX greater than the mean value of 1.82 and zero otherwise. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). POOR_PRE_PERF takes the value of one if the firm's pre-succession firm performance is lower than its industry median in the given fiscal year in our sample and zero otherwise, with industry defined at the two-digit SIC code level. OUTSIDER takes the value of one if the successor was employed by the firm for less than one year before he/she assumed office and zero otherwise. Control variables include: firm size (SIZE), leverage (LEV), number of business segments (NUM_SEGMENTS), firm age (FIRM_AGE), market-to-book ratio (MTB), research and development expense (RND), annualized standard deviation of monthly stock return over the year (STKVOL), firm profitability (ROA), free cash flow ratio (FCF), board size (BOARDSIZE), CEO share ownership (OWNERSHIP), CEO age (AGE), and CEO duality (DUALITY). Regressions include year and firm fixed effects. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Subsequent Board Co-option

	(1)	(2)
HIGH_GAP	0.079***	
	(2.70)	
GAP_INDEX		0.025*
		(1.81)
FORCED	0.054	0.062
	(1.38)	(1.39)
OUTSIDER	0.021	0.031
	(0.60)	(0.70)
POOR_PRE_PERF	-0.021	-0.020
	(-0.88)	(-0.76)
SIZE	-0.045	-0.076
	(-0.86)	(-1.31)
LEV	0.153	0.180
	(1.13)	(1.17)
NUM_SEGMENTS	0.000	0.000
	(0.02)	(0.10)
FIRM_AGE	-0.283	-0.326
	(-1.61)	(-1.60)
MTB	0.006	-0.002
	(0.38)	(-0.09)
RND	-0.039	-0.023
	(-0.25)	(-0.14)
STKVOL	-0.037	0.030
	(-0.14)	(0.11)
ROA	0.163	0.240
	(0.81)	(1.07)
FCF	-0.218	-0.310*
	(-1.24)	(-1.65)
BOARD_SIZE	0.016**	0.022***
	(2.42)	(3.07)
OWNERSHIP	0.297	0.240
	(1.20)	(0.84)
AGE	0.012***	0.016***
	(4.56)	(4.72)
DUALITY	0.043	0.042
	(1.47)	(1.27)
Constant	0.592	0.799
	(0.82)	(0.95)
Firm Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
R-Squared	0.116	0.134
Observations	620	547

Table 9 Logit Regression of High Gap on Subsequent Structural Changes

Table 9 presents the results from logit regression of CEO succession gaps on post-succession structural changes. Panel A reports the results of subsequent structural change and panel B represents the results of subsequent employee reduction. The dependent variables illustrate the structural change in panel A, STRUCTURE_CHANGE is a dummy variable taking the value of one if asset sale is announced and a firm's book value of total assets is reduced by more than 10% during the 2-year post-succession period. For the dependent variable that demonstrate the employee reduction in panel B, EMPLOYEE_REDUCTION is a dummy equal to one if a firm's number of employees is reduced by more than 10% during the 2-year post-succession period. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. HIGH_GAP, is a dummy equal to one if the firm has a GAP_INDEX greater than the mean value of 1.82 and zero otherwise. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). POOR_PRE_PERF takes the value of one if the firm's pre-succession firm performance is lower than its industry median in the given fiscal year in our sample and zero otherwise, with industry defined at the two-digit SIC code level. Control variables include: CEO origin (OUTSIDER), industry-adjusted debt capacity (LOW_DEBT_CAPACITY), interest coverage (INTEREST_COVERAGE), dividend coverage (DIV_COVERAGE), dividend cut indicator (DIV_CUT), return on assets (ROA), size (SIZE), leverage (LEV), market-to-book ratio (MTB), number of business segments (NUM_SEGMENTS), sale-based Herfindahl Index (HERF) and median industry sales growth rate within which the firm operates (IND_SALES_GROWTH). Regressions include year and firm fixed effects. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Dependent Variable – Subsequent Structural Change

Variable	(1)	(2)	(3)	(4)
HIGH_GAP	0.155	0.059	0.160	-0.307
	(0.74)	(0.27)	(0.77)	(-1.03)
FORCED	0.095	-1.207	0.073	0.042
	(0.25)	(-1.37)	(0.19)	(0.11)
FORCED*HIGH_GAP		1.733*		
		(1.76)		
POOR_PRE_PERF			0.183	0.062
			(0.99)	(0.32)
POOR_PRE_PERF*HIGH_GAP				0.894**
				(2.34)
Controls	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
R-Squared	0.189	0.191	0.190	0.193
Observations	2,316	2,316	2,316	2,316

Panel B: Dependent Variable – Subsequent Employee Reduction

Variable	(1)	(2)	(3)	(4)
HIGH_GAP	0.125	-0.025	0.146	-0.149
	(0.61)	(-0.12)	(0.70)	(-0.53)
FORCED	0.711**	-0.520	0.688*	0.672*
	(1.96)	(-0.81)	(1.89)	(1.84)
FORCED*HIGH_GAP		1.939**		
		(2.47)		
POOR_PRE_PERF			0.522***	0.440**
			(2.90)	(2.35)
POOR_PRE_PERF*HIGH_GAP				0.584
				(1.58)
Controls	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
R-Squared	0.125	0.129	0.130	0.131
Observations	2,063	2,063	2,063	2,063

Table 10 PSM Regression of High Gap on Subsequent Strategic Instability

Table 10 presents the PSM regression of CEO succession gaps on subsequent firm strategic instability. The dependent variable, SI is the difference in subsequent firm strategic instability between the treatment firm (succession firm) and the matching group (non-succession matched peers), where subsequent strategic instability is defined the variance in firm strategy a year following the succession event. Our state variable GAP_INDEX is constructed as follows. For every difference between the predecessor and the successor with regard to their gender/ age/ cultural background/ highest education level and eliteness of undergraduate school, one point is added to the index. HIGH_GAP, is a dummy equal to one if the firm has a GAP_INDEX greater than the mean value of 1.82 and zero otherwise. FORCED is a dummy variable equals to one if the predecessor is forced out and zero otherwise. The classification of succession events into forced/non-forced follows the method used by Parrino (1997). POOR_PRE_PERF takes the value of one if the firm's pre-succession firm performance is lower than its industry median in the given fiscal year in our sample and zero otherwise, with industry defined at the two-digit SIC code level. Control variables include: pre-succession firm strategic instability (PRE_SI), size (SIZE), firm age (FIRM_AGE), market-to-book ratio (MTB), free cash flow (FCF), return on assets (ROA), board size (BOARD_SIZE), board independence (BOARD_IND), CEO age (AGE), CEO share ownership (OWNERSHIP), CEO duality (DUALITY) and CEO origin (OUTSIDER). Regressions include year and firm fixed effects. Columns 1, 2 and 3 report the effect of High Gap, the interaction effect of High Gap and forced turnover, and the interaction effect of High Gap and Poor pre-succession firm performance on subsequent firm strategic instability, respectively. Definitions of control variables are provided in Appendix A. t-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Subsequent Strategic Instability

	(1)	(2)	(3)
HIGH_GAP	-0.039	-0.276	-0.312
	(-0.12)	(-0.79)	(-0.89)
FORCED	0.065	-0.875	-0.054
	(0.15)	(-1.36)	(-0.12)
FORCED*HIGH_GAP		1.690**	
		(1.97)	
POOR_PRE_PERF	0.011	0.014	-0.159
	(0.06)	(0.07)	(-0.75)
POOR_PRE_PERF*HIGH_GAP			1.158**
			(2.25)
PRE_SI	0.044	0.045	0.051
	(0.86)	(0.88)	(1.00)
SIZE	-1.656***	-1.644***	-1.654***
	(-4.11)	(-4.08)	(-4.11)
FIRM_AGE	3.990**	3.843**	4.031**
	(2.14)	(2.07)	(2.17)
MTB	-0.259	-0.275	-0.256
	(-1.52)	(-1.62)	(-1.51)
FCF	0.193	-0.011	-0.218
	(0.09)	(-0.00)	(-0.10)
ROA	0.669	0.446	0.524
	(0.30)	(0.20)	(0.24)
BOARD_SIZE	0.022	0.021	0.028
	(0.28)	(0.26)	(0.35)
BOARD_IND	-0.848	-0.738	-0.934
	(-0.49)	(-0.43)	(-0.55)
AGE	-0.029	-0.029	-0.025
	(-1.11)	(-1.13)	(-0.97)
OWNERSHIP	-0.295	0.206	-0.377
	(-0.11)	(0.08)	(-0.14)
DUALITY	0.230	0.181	0.212
	(0.71)	(0.56)	(0.66)
OUTSIDER	0.665	0.671	0.728
	(1.49)	(1.51)	(1.64)
Constant	2.188	2.547	1.568
	(0.29)	(0.34)	(0.21)
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
R-Squared	0.048	0.053	0.055
Observations	425	425	425