

Corporate Cultural Evolution: Empirical Investigation of Cross-Sectional and Time-Series Determinants of Corporate Culture

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Abstract

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JEL classifications: G34, M12, M14

Keywords: Corporate culture; CEO tenure; CEO career experience; Cultural strength

1. Introduction

A firm's chief executive officer (CEO) is the most prominent and powerful decision maker in the management team. Previous studies have widely studied the financial impacts of CEOs by examining CEOs' backgrounds and characteristics as well as agency issues in their decision processes. Few studies have examined the impact of CEOs on the firms' non-financial capital. This study fills the gap in the literature by studying how CEOs affect their firms' culture, a major form of non-financial capital developed over time by firms' management and employees. Corporate culture was considered as a side issue in economic and finance studies, but the situation has dramatically changed in recent years due to increasing evidence for the effects of culture on economic decisions and outcomes as well as consensus among economists about the definition of culture, a shift termed the "cultural revolution" by Zinagles (2015). This study rides on this revolution with benefits from available data on corporate culture.

From their interviews with CEOs, Graham et al (2022b) conclude that a firm's culture is primarily set by its current CEO. Although there is little doubt that a firm's CEO has a strong impact on the firm's culture, questions still exist on how a CEO shapes the firm's culture and when he/she reshapes the firm's culture, what affects his/her choice of cultural directions. Corporate culture has been largely unexplored due to unavailability of relevant data on a large scale. As researchers had to rely on questionnaires for corporate culture studies in the past, few studies in accounting and finance examined corporate culture until textual analysis became more developed to extract information from corporate documents and other textual sources. With advanced techniques for textual analysis, there have been booming corporate cultural studies in recent years.

Our study aims to shed light on corporate culture studies in accounting and finance by examining the impact of CEO on corporate culture. Though it has been long argued that CEOs play an important role in shaping corporate culture, there have been no empirical studies addressing how CEOs affect corporate culture. In particular, does a CEO rely on his/her career experience to shape the current firm's culture, and how does corporate culture evolve over the CEO's tenure in firm? The answer to the first part of the question allows the board of directors and investors to identify the right person for the CEO position, while the answer to the second part helps the board and investors to understand the right time for planning the CEO succession.

Cross-sectionally, we expect that a firm CEO's career experience affects its culture. Previous studies show that CEO characteristics affect corporate decisions and outcomes. Early studies suggest CEOs possess fixed innate characteristics (Bertrand and Schoar 2003) or styles (Fee, Hadlock and Pierce 2013) that drive corporate decisions. More recent studies show that work experiences such as financial experience (Custodio and Metzger 2014), invention experience (Islam and Zein 2020), job diversity (Hu and Liu 2015), military experience (Benmelech and Frydman 2015), and network (El-Khatib et al. 2015) affect corporate decisions and performance. Therefore, it is reasonable to expect that the CEO relies on his/her experience in previous positions to shape the firm's culture. While it could be argued that the reliance on experiences may be suboptimal in most cases, the tendency is consistent with human tendency to substitute rigorous thinking by intuitive thinking when facing large uncertainty (Kahneman 2011; references on anchoring). As ordinary people spend much time in the workplace to accumulate experience and knowledge, they are likely to carry their experience to a new position and influence others.

We also expect a predictable pattern of a firm's cultural strength over the CEO's tenure in firm, following previous studies on CEO tenure. However, it is *ex ante* unknown if the firm's cultural strength increases or declines over the CEO's tenure in firm. On one hand, as the market is uncertain about a new or young CEO's ability when he/she take the pivot position, the CEO may be eager to demonstrate their ability and mitigate their career concerns by playing strategies to such as overstating earnings (Ali and Zhang 2015) and hoarding bad news (Andreou, Louca and Petrou 2017). They also have incentives to engage in activities that provide long-term benefits such as activities that enhance their firms' social performance (Chen, Zhou and Zhu 2019). As building a firm's culture aims to ensure its long-term success, it is possible that the CEO invests more in the firm's cultural development during his/her initial time as the CEO. Over time, the incentives decline, and corporate culture depletes. On the other hand, a recent study by Brochet et al (2021) documents a hump-shaped CEO tenure-firm value relation. The general argument for the hump-shaped relation is that new CEOs initially gain their task knowledge but over time, they are losing task interests. While their long-term stay with the firm indicates their early success and brings them more power, they start engaging in routine tasks rather than exploratory tasks and not reaching out for diverse sources of information for their decisions. After some point of time, the CEO's continuing tenure brings more harms than benefits. As a firm's performance could influence its culture (Van den Steen 2010b), it is possible that the firm's cultural strength

increases with firm value at the beginning of the CEO's tenure in firm but declines after a certain point of time.

Researchers in accounting and finance commonly rely on two types of measures for corporate culture for their studies. The first type includes measurements developed by commercial organizations such as Great Place to Work Institute (GPWI). The second type includes measurements derived from textual analysis of documents or sources that may reflect corporate culture. For our analysis, we adopt Li et al.'s (2021) cultural strength measures that are derived from the question-and-answer (Q&A) sections of earnings call transcripts. We use this measure because it is suggested that "the construct of culture... should be clearly articulated, justified for the particular context in which it is used." (Gorton, Grennan and Zentefis 2022). As our study aims to address how CEOs affect corporate culture, the cultural strength measures developed by Li et al. (2021) should be more appropriate than others for the context of our study because the measures are derived based on the earnings call transcripts that reflect the top management's view, including the CEO's view, about the firm's development. Besides, comparing with other corporate documents that could be carefully polished, top managers' answers to pop-up questions in the Q&A section of a call are more likely to reflect their true views (Li et al. 2021).

To conduct our analysis, we collect firm-level proxies for cultural strength from Li et al. (2021) who measure firm-level strengths in five cultural values, namely integrity, teamwork, innovation, respect, and quality. Following Li et al. (2021), we sum up the five cultural value strengths to get the overall cultural strength. Therefore, our corporate cultural variables include five cultural value strengths and the overall cultural strength. To examine the impact of CEO's career experience on corporate culture, we identify CEO's work experience comes from BoardEx that provides job titles of US major firms' top executives. According to the job titles, we classify each CEO's work experience in the following nine areas, namely (1) academic, (2) accounting, finance, and risk management (AF&R), (3) entrepreneurship and innovation (E&I), (4) governance, (5) government and military (G&M), (6) legal, (7) marketing, (8) science and technology (S&T), and (9) sustainability. We also glance for CEO's international experience from job titles and job locations. Finally, we follow Custodio, Ferreira and Matos (2013) to measure a CEO's general ability. We also collect board/CEO characteristics from BoardEx, including CEO's tenure in firm.

Our sample consists of 32,535 US-listed firms in 2001-2018. Firm characteristics, board characteristics, CEO characteristics including work experience, and industry-fixed and time-fixed effects explain more than one third of variation of overall cultural strength. For individual cultural value strengths, our model has the strongest ability to explain the teamwork value strength with an R-squared equal to 33.8%, while it explains only 9.9% of the variation of the integrity value strength. We observe large variations in cultural impacts from CEO's different work experiences. In general, CEO's work experiences have stronger impacts on integrity and teamwork values than other cultural values. Some experiences are positively related to certain cultural value strengths, as follows:

- Academic, governance, and G&M work experiences are associated with stronger integrity and teamwork value strengths.
- AF&R, international, and S&T experiences are positively associated with the teamwork value strength.
- E&I experience is positively associated with stronger innovation and quality value strengths.
- Marketing experience is positively associated with the innovation value strength, and S&T experience is positively associated with the quality value strength.
- G&M experience is positively associated with the respect value strength.

Some experiences are negatively associated with certain cultural value strengths, as follows:

- Generalist CEOs are associated with low integrity and teamwork value strengths.
- Academic experience is negatively associated with the quality value strength.
- Marketing experience is negatively associated with the integrity value strength.
- S&T experience is negatively associated with the respect value strength.

Finally, only international and E&I experiences are positively associated with the overall cultural strength. In sum, our result illustrates the importance of studying individual cultural values because many factors may impact only one or two cultural values or may have offsetting impacts on different cultural values.

Another observation is that work experiences that have positive (negative) effects on integrity and teamwork value strengths generally have insignificant or negative (positive) effects on innovation and quality value strengths, and vice versa. As integrity and teamwork are internally oriented values while innovation and quality are externally oriented values, the

finding is consistent with the competing value framework (CVF) of organizational structure that has been widely adopted in management studies and industry practices (Hartnell, Ou and Kinicki 2011) since the seminal work of Quinn and Rohrbaugh (1983). The underlying assumption behind the CVF is that different culture values compete for limited firm resources. The outcome of the competition leads a firm to a certain cultural focus that in turn affects its effectiveness in a certain dimension such as employee attitudes, innovation, product/service quality, financial performance. Our result suggests the CEO selection is important not only for a firm's operating performance but also for its choice of cultural focus.

Board characteristics and other CEO characteristics also affect corporate cultural strength. The most striking result is that CEO's tenure in firm (including CEO time and non-CEO time) is negatively and significant associated with all cultural value strengths. Therefore, the longer the CEO has stayed in the firm, the weaker is the firm's culture. The negative impact of CEO on corporate cultural strength could be attributed to various reasons. For example, after staying in the firm for a long time, the CEO becomes part of the culture and ignores the need to renovate the culture. Alternatively, after years of successful operations, the CEO may immerse herself in the successful stories and lack motivation for the renovation. Nevertheless, the result sheds light on the long strand of literature on CEO tenure by showing that CEO tenure also affects corporate culture.¹

We further investigate the time-series pattern of corporate culture in two ways. First, we examine how corporate culture changes from year -3 to year +3 of a firm's CEO turnover. Relative to year -3, individual cultural value and overall cultural strengths increase significantly in year 0. After the turnover, integrity, teamwork, and quality value strengths immediately drop to the normal level in year +1, while innovation, respect and overall cultural value strengths drop gradually and become insignificant in year +3. Therefore, the result suggests that while new CEOs improve cultural strength, their influence on culture tends to be short-lived. To further explore the impact of CEO turnover on corporate culture, we divide the CEO turnovers into two groups according to the age of the former CEO before turnover. The idea is that if the former CEO leaves the firm at her retirement age, the turnover is likely to be a planned one and the firm should have sufficient time to identify the replacement. Then, the new CEO should have more time to prepare for his new role and set the firm's culture. However, if the former CEO leaves prematurely due to a forced turnover

¹ Refer to Darouichi et al. (2021) for a literature review on CEO tenure.

or an expected event such as a sudden death, then the firm may not have sufficient time to identify the replacement and the new CEO may not consider cultural change as a top issue. Our result indicates that the increase in cultural strength at turnover is more significant and more persistent when the former CEO leaves the company close to her retirement age (62 or above). Finally, we perform the same test for a sample of forced CEO turnovers identified by Peters and Wagner (2014), and Jenter and Kanaan (2015). We find that innovation and quality value strengths, and overall cultural strengths decline significantly before a forced turnover, and they come back to normal after the turnover. The result indicates that before a forced turnover, the firm is likely to experience a shaky state in management that leads to a cultural decline. After the old CEO is replaced, the new CEO pulls back the firm from the cultural turmoil.

Second, we examine how product market competition affects the above documented cultural decline during the CEO's tenure in the firm. Using various proxies for product market competition by Hoberg, Phillips and Prabhala (2014), and Hoberg and Phillips (2016), we show that the cultural decline is slower when a firm faces stronger threats from its product market rivals. The result indicates that external threats cause the CEO to be more aware of the firm's cultural development for dealing with potential challenges.

Our study contributes to the literature by relating CEO characteristics to corporate cultural development. In particular, the CEO's work experiences could shape a firm's culture, a new piece of evidence in the literature. While some work experiences enhance internally oriented values such as integrity and teamwork, other work experiences enhance externally oriented values such as innovation and quality. The result provides an additional consideration that firms should consider in CEO recruitment. Besides, there is a strong time-series pattern of corporate culture. Although management studies have long researched corporate culture development, they provide little empirical evidence on how corporate culture changes over the CEO's tenure. We shed light on studies of corporate culture by showing that corporate culture exhibits cyclical behavior, i.e. it is strengthened when a new CEO comes in place but depletes over the CEO's tenure in firm. Finally, results from our study indicate that researchers should control for the CEO's work experiences, the CEO's tenure in firm, and the CEO turnover in empirical analysis of corporate culture.

The rest of our paper is organized as follows. Section 2 reviews the literature. Section 3 describes data and sample for our study. Section 4 reports and discusses our empirical results. Section 5 concludes.

2. Literature Review

Traditional corporate finance theories consider the firm as a nexus of contracts to resolve agency problems in financial decisions (Gorton, Grennan and Zentefis 2022). Since Jensen and Meckling (1976), corporate finance studies have focused on resolving agency problems between stakeholders particularly agency problems between shareholders and managers. As a result, corporate decisions and performance are determined by the balance of agency problems, incentives, and managerial ability. Presumably, if we have two firms doing the same business with same assets, same incentive schemes, and same governance structure, we should achieve the same outcomes if we place two teams of people with same ability in the two firms. The traditional framework, of course, cannot explain large heterogeneities in corporate decision making and performance and firms' responses to unforeseen contingencies.

Recent studies suggest that corporate culture plays a significant role in corporate decisions. Culture is a mental construct and is a large collection of values, norms, conventions, shared beliefs, customs, traditions, symbols, rituals, knowledge, ideology, identities, and shared mental models (Gorton, Grennan and Zentefis 2022). Conceptually speaking, if we apply same inputs to two similar firms and get different outcomes, the difference is likely attributable to culture (Graham et al 2022a). The management literature more precisely suggests that culture is a control system that is based on shared assumptions, norms, and values to encourage appropriate behaviors and discourage inappropriate behaviors (Schein 1986; O'Reilly and Chatman 1996). Norms have specific "ought" or "must" quality and are difficult to violate without being sanctions. Values provide rationales for these normative requirements. A strong culture exists when norms and values are widely shared and strongly held throughout the organization (O'Reilly, 1989).

In the business world, corporate culture has an instrumental objective to promote corporate success via its effects on employees' behavior, information sharing and so on. Cremer (1993) defines culture as the part of the stock of knowledge that is shared by a substantial portion of the employees of the firm, but not to the general population. Corporate

culture is the portion of specific human capital that is shared by many employees of the firm. Like culture in other contexts, corporate culture is stable because building a corporate culture is costly, and corporate culture is so integrated to be changed on a bit-by-bit approach. Besides, the management will choose business and operating strategies that reinforce the culture.

Corporate culture is hard to measure unless it is pinned down into more concrete concepts. Harrison (1972) defines four types of culture: power, role, task/achievement, and person/support, according to employees' expected roles and development in organization. Cartwright and Cooper (1993) suggest those cultural types reflect different degrees of employee participation and autonomy. They conceptually predict merger success for 16 possible combinations of bidder and target by cultural type. Quinn and Rohrbaugh (1983) propose the Competing Values Framework (CVF) to consolidate vague cultural concepts into four main types of organizational cultures. Clan culture focuses on collaboration among employees, adhocracy culture focuses on flexibility, market culture focuses on competition in the product markets, and hierarchy culture focuses on control and stability within organization. Groysberg et al (2018) suggest there are eight distinct culture styles: caring, purpose, learning, enjoyment, results, authority, safety, and order. The eight styles affect how people interact (independent versus interdependent) and how they respond to changes (flexible versus stable). Nevertheless, those frameworks share a common point that different values are competing because most organizations are likely to focus on one or two cultural types while giving up or trading off others.

Previously, corporate culture was understudied in finance due to data limitation that prevents researchers from obtaining a large sample of firms for study. Studies largely relied on annual rankings developed by the Great Place to Work Institute (GPWI) to proxy for the culture of trust (Edmans 2011; Barger, Lehn and Smith 2015; Guiso, Sapienza and Zingales 2015). The GPWI partners with large companies worldwide to conduct an annual survey of the workplace of these companies. The survey focuses on trust in corporate culture (Barger, Lehn and Smith 2015). The GPWI then produces various annual rankings of the best companies to work for.

With the development of textual analysis techniques, there are increasing number of studies that capture firm-level culture by extracting textual information from documents or sources such as corporate 10-K files (Fiordelisi and Ricci 2014; Fiordelisi, Ricci and Lopes,

2018; Fiordelisi et al 2019; Barth and Mansouri 2021), analyst reports (Bellstam, Bhagat and Cookson 2021), corporate earnings call transcripts (Li et al. 2021), corporate websites (Guiso, Sapienza and Zingales 2015), and employee reviews from career communities such as Glassdoor (Pasch 2018; Ji, Rozenbaum and Welch; 2022) or career intelligence firms (Grennan 2022). In early years, studies mainly used various “bag-of-words” approaches to measure corporate culture, but recent studies such as Li et al. (2021) and Grennan (2022) have started using machine learning approaches to identifying keywords for the measurement of corporate cultural strength.

Our study adopts the cultural strength proxies by Li et al. (2021) who gauge firm-level strengths in cultural dimensions suggested by Guiso, Sapienza and Zingales (2005). Guiso, Sapienza and Zingales extract advertised values from corporate websites of S&P500 firms, and identify nine most common advertised values: integrity, teamwork, innovation, respect, quality, safety, community, communication, and hard work. They then compare the effect of advertised values by firms with the effect perceived values by employees, coming from the GPWI, on firm outcomes. Li et al. (2021) use a machine learning method to create a cultural dictionary for five cultural values: integrity, teamwork, innovation, respect, and quality, from question-and-answer (Q&A) sections in corporate earnings calls. They then measure a firm’s emphasis on each cultural dimension by counting the relative frequency of keywords related to the dimension.

The measurements of corporate culture developed in recent studies only tell us where the firm is but not where it comes from. Knowing the driving forces behind corporate culture is important for shareholders and the board of directors to find ways to move the firm’s culture to a certain direction. While different stakeholders in the firm may affect the firm’s culture, the chief executive officer is supposed to be the most influential driver. According to a recent survey and related interviews done by Graham et al. (2022a, b), corporate culture is primarily set by the CEO. However, it is largely unknown how the CEO affects corporate culture. Previous studies show that CEOs play a key role in determining major corporate financial policies. Early studies suggest CEOs possess fixed innate characteristics (Bertrand and Schoar 2003) or styles (Fee, Hadlock and Pierce 2013) that drive corporate decisions. Other studies focus on the impacts of CEO characteristics. In particulars, work experiences such as financial experience (Custodio and Metzger 2014), job diversity (Hu and Liu 2015), military experience (Benmelech and Frydman 2015), invention experience, and network (El-Khatib et al. 2015) are found to affect corporate decisions and performance. Our study aims

to shed light on the CEO literature by identifying sources of the CEO's impact on corporate culture.

3. Data and Sample

Data for firm-level strengths of different cultural dimensions come from Li et al. (2021). Li et al. use machine learning method (word2vec) to quantify texts of questions and answers (Q&A) in a large collection of corporate earnings call transcripts. They use the Q&A section in an earnings call as the corpus for information because the Q&A section is more spontaneous and therefore offers far less of an opportunity for managers to engage in window dressing (Lee 2016). Li et al. construct a cultural dictionary of words and phrases that are in close association with the five core corporate cultural values identified by Guiso, Sapienz and Zingales (2015), namely innovation, integrity, quality, respect and teamwork. The strength of each cultural dimension is then measured as the weighted-frequency count of those words and phrases in the earnings call transcripts. Following Li et al., we sum up the values of the five dimensional culture strengths into the overall cultural strength (Overall). We then merge the cultural strength data with CRSP/Compustat merged database by GVKEY.

Data for board/CEO characteristics and CEO work experience come from BoardEx that provides data for members in corporate boards, including the CEOs. From BoardEx, we get the working history of each CEO that includes the role, the employer with the sector, country of location, the starting date, and the ending date of each job. From the CEO's job history, we create variables that capture the CEO's experience in different areas as of a given fiscal year end. According to the job titles, we classify jobs into categories, namely (1) academic, (2) accounting, finance, and risk management (AF&R), (3) entrepreneurship and innovation (E&I), (4) governance, (5) government and military (G&M), (6) legal, (7) marketing, (8) science and technology (S&T), and (9) sustainability. We also glance from BoardEx for CEO's international experience, which accounts for employment experience outside the US and job titles that indicate international relationships. We then create an indicator for each work experience. Appendix 1 lists major keywords we use to identify work experience in each of the categories. We also follow the methodology by Custodio, Ferreira and Matos (2013) to calculate the general ability index (*GAI*) to capture the CEO's diversity in experience. Custodio, Ferreira and Matos (2013, 2019) find that generalist CEOs command a higher compensation and are more innovative than specialist CEOs.

We then merge the dataset for board characteristics and CEO characteristics with the dataset for cultural strength and firm characteristics. Following previous studies in corporate finance, we exclude firms in financial industries (SIC 6000-6999) and utility industries (SIC 4900-4999) from our sample. Given the data availability, our final sample consists of 31,679 firm-years in 2002-2018. Table 1 presents the distribution of the sample by year and the summary statistics of key variables.

[Insert Table 1]

4. Empirical results

4.1. CEO work experiences, board/CEO characteristics, and corporate culture

Our baseline model for corporate cultural strength is given below:

$$(1): Culture_t = \alpha_1 + \beta_{1,1} \times CEO\ Work_{t-1} + \beta_{1,2} \times Board/CEO\ Characteristics_{t-1} + \beta_{1,3} \times Firm\ Characteristics_{t-1} + \varepsilon_{1,t}$$

Culture is one of the overall cultural strength (*Overall*) and strengths of individual cultural dimension (i.e. *Integrity*, *Teamwork*, *Innovation*, *Respect*, and *Quality*). *CEO Work* is a vector of variables for the CEO work experiences, as described above. *Board/CEO Characteristics* is a set of variables for the CEO's other characteristics including log(board size), log(number of independent or non-executive directors, CEO duality, indicator for a female CEO, and log(CEO's tenure in firm). *Firm Characteristics* is a set of variables include Tobin's Q, log(total assets), asset tangibility, return-on-assets, research-and-development (R&D) expense, an indicator for non-zero R&D expense, recent 12-month stock return, and log(firm age). Appendix 2 provides the definitions of all variables. In all regressions, we include time-fixed effects and industry-fixed effects at 2-digit-SIC level. Reported standard errors are controlled for within-firm clustering.

Table 2 presents results from the baseline regressions. Columns 1-5 report results for strengths of individual cultural dimensions and Column 6 reports result for overall cultural strength. The fitness of regression varies across cultural dimensions, but all models except the model for integrity value have an R-squared over 0.2. Therefore, our empirical specification can capture significant variation in strengths of different culture dimensions.

Column 1 shows that the CEO's academic, governance, G&M (government and military), and legal experiences are positively associated with integrity culture. As

governance-, G&M-, and legal-related works largely follow rules and procedures, having such work experiences are likely to focus on accountability, duties, and ethics. While academic research focuses on new ideas and innovation, universities, especially public universities, are highly institutionalized. Besides, academicians are evaluated based on not only quality of their research outputs but also their academic integrity. Therefore, they tend to hold a strong view regarding compliance with rules and procedures. Meanwhile, the CEO's marketing experience is negatively associated with integrity, which is possible because marketing professionals focus on sales and promotion and could value less on integrity. Generalist CEOs also value less integrity than specialist CEOs, as suggested by the negative and significant coefficients of GAI. Therefore, while generalist CEOs enhance innovation (Custodio, Ferreira and Matos 2019) and can perform complex tasks (Custodio, Ferreira and Matos 2013), they may not be a promoter of integrity culture.

Column 2 shows that the CEO's academic, AF&R (accounting, finance and risk management), governance, G&M, and S&T (science and technology) experiences are positively associated with teamwork culture. CEOs with international experience also promote teamwork culture more than those without international experience. Teamwork requires collaboration and engagement. People with S&T background always work in a team while people with international exposure are generally good at working with people with different cultural backgrounds. Therefore, it is not surprising that CEOs with such experiences are associated with stronger teamwork culture. The finding that academic, governance, and G&M experiences are also positively associated with teamwork culture provides another perspective to understand teamwork. As the three work experiences are also positively associated with integrity culture, the finding suggests that promoting integrity also enhances teamwork. This is possible because adherence to principles such as accountability, transparency, and ethics can reduce uncertainties in cooperation and make team members' lives easier. Finally, generalist CEOs focus less on teamwork culture than specialist CEOs. Therefore, the general result from Columns 1&2 is that work experiences that promote integrity culture also enhance teamwork culture.

Column 3 shows that the CEO's E&I (entrepreneurship and innovation) and market experiences are positively associated with innovation culture. Meanwhile, experiences that are positively associated with integrity and teamwork cultures are not associated with innovation culture. The major purpose of innovation is to satisfy external stakeholders especially customers by taking risky investments, which may be in conflicts with the needs of

internal stakeholders who seek stability and job security. Therefore, when a CEO focuses on internally oriented cultural values such as integrity and teamwork, he/she may not be able to enhance externally oriented cultural values such as innovation. In contrast with Custodio, Ferrira and Matos (2019), we do not find a significant association between GAI and innovation, though a positive coefficient for GAI is observed.

Column 4 shows that the CEO's G&M experience is positively associated with respect culture while his/her S&T experience is negatively associated with respect culture, but both coefficients are only significant at the 10% level. Indeed, our following regression results also show that the CEO's work experiences do not explain much the cross-sectional variation of respect culture. When we come back to the word list on respect culture provided by Li et al. (2021), representative words for respect culture encompass a mixture of different concepts including talent, leadership, skills, competence, etc. Therefore, the identity of respect is vague compared with other cultural values.

Column 5 shows that the CEO's E&I, and S&T experiences are positively associated with quality culture while his/her academic experience is negatively associated with quality culture. Similar to innovation, quality is also an externally oriented cultural value. Therefore, CEOs with E&I experience are also more likely to promote quality culture in their management. Originally, we expected CEOs with market experience are also likely to promote quality culture because quality culture is customer-oriented, but the result fails to support our expectation. S&T jobs, while not customer-oriented, emphasize precision and scientific rigor, both of which enhance quality of products and services. Therefore, CEOs with S&T backgrounds also promote quality culture. On the other hand, except research in S&T areas, academic research is largely non-profit oriented. Therefore, academic CEOs tend to focus more on integrity and teamwork cultures and less on quality culture.

Column 6 shows that only the CEO's international experience and E&I experience are positively associated with the overall cultural strength while other work experiences do not have significant impact on the overall cultural strength. The finding highlights two issues in corporate cultural studies that are worth considering by researchers. First, many factors may have impact on one or two cultural dimensions only. If we study the overall cultural strength without examining the strengths of individual dimensions, we are likely to miss many important observations. Second, some factors may have opposite impacts on different cultural dimensions. Our observation is that factors that have positive association with

integrity and teamwork cultures tend to have insignificant or even negative association with innovation and quality cultures, and vice versa. The observation is also consistent with the competing-value framework (CVF) in management studies which suggests firms trade off different cultural values.

Board/CEO characteristics also have impacts on corporate culture. The most striking result is that the CEO's tenure in the firm is negatively associated with strengths of all cultural dimensions, with all coefficients significant at the 1% level. The finding suggests a predictable time-series pattern of corporate cultural strength; that is, a firm's cultural strength decreases throughout the CEO's tenure until a new, younger successor takes over the position. We provide further analysis of this result in section 4.3. Nevertheless, the result sheds light on previous corporate governance studies by showing that a longer CEO tenure is not only associated with stronger CEO power and weaker corporate governance, but also associated with weaker corporate culture.

Other firm characteristics also have significant impacts on corporate culture. In general, growth firms have a stronger culture than value firms. Larger firms, firms with more tangible assets, and more profitable firms are associated with weaker culture. Firms spending more on R&D also have stronger culture, primarily due to the association of R&D with teamwork and innovation cultures.

[Insert Table 2]

Although our regressions capture a significant portion of cross-sectional variation in cultural strength, it is possible that some unobservable variables that drive both work experience variables and cultural strength variables could bias our coefficient estimates. We use two methods to address the endogeneity issue in our baseline regressions. First, we follow previous studies to add lag-3 dependent variable to the right-hand-side of the regression as a control. Table 3 presents the regression results. Consistent with Li et al. (2021), we find a strong autocorrelation in different culture values. The coefficient of lagged dependent variable varies from 0.267 for integrity culture to 0.549 for innovation culture, with all the values significant at the 1% level. With a few exceptions, our results for the effects of work experience on corporate culture in Table 2 are preserved. Changed results include the following. CEO's academic experience becomes insignificantly (previously positively) associated with integrity culture. CEO's international experience becomes positively (previously insignificantly) associated with innovation culture, while CEO's E&I experience

becomes insignificantly (previously positively) associated with innovation culture. CEO's academic experience becomes negatively (previously insignificantly) associated with quality culture. CEO's G&M experience becomes positively (previously insignificantly) associated with the overall cultural strength.

[Insert Table 3]

4.2. Time-series patterns of corporate culture

The following analyses aim to provide insights to the time-series patterns of corporate culture. First, we examine the pattern of corporate cultural strength around the CEO turnover using the following models:

$$(3): Culture_t = \alpha_3 + \beta_{3,1} \times CEO\ Work_{t-1} + \beta_{3,2} \times Board/CEO\ Characteristics_{t-1} + \beta_{3,3} \times Firm\ Characteristics_{t-1} + \beta_{3,4} \times \sum_{t=-2}^{t=3} TOver_t + \varepsilon_{3,t}$$

There are two differences between Model (3) and the baseline Model (1). First, a set of indicators, *TOver*, is added to indicate the year of observation relative to the CEO turnover year, i.e. year 0. Second, we only include firm observations from $t = -3$ to $t = 3$ in our analysis. We also remove observations in overlapping event windows for clear inferences.

Table 4 reports the result. Except respect culture, the strengths of other cultural dimensions and the overall cultural strength do not change significantly but they sharply increase when the existing CEO is replaced. However, the increased cultural strengths revert quickly after the CEO turnover and come back to the pre-turnover levels by year 3. Therefore, after a CEO turnover, the new CEO tries to promote the firm's culture that is beyond the implications from his/her work experiences, but the effect is short-lived.

[Insert Table 4]

It is possible that the types of CEO turnover may affect the new CEO's effect to promote corporate culture. For example, if the transition is smooth and well-prepared, then the new CEO could have more time to develop his/her network in the firm, which can enhance the establishment of new culture. On the other hand, it can also be argued that a smooth and well-prepared could mean the extension of existing power in the firm, which could hinder any transformation effort by the new CEO. To test if a smooth and well-prepared transaction of power enhances the establishment of new culture, we classify the CEO turnovers into two groups according to the age of the departing CEO and re-run Model

(3). We expect a CEO turnover is likely to be smooth and well-prepared when the departing CEO is close to or after the retirement age, i.e. 65. Panels A and B of Table 5 report the results.

Panel A reports the result for the cases when the departing CEOs are at 62 years old or above in the year before the turnover. This type of turnover is expected to be smooth and well-prepared. There are sharp increases in strengths of all cultural values in the year of CEO turnover. Moreover, although the increased cultural strengths revert, innovation culture and the overall culture stay strong, and they sustain at a level significantly higher than the pre-turnover level. Panel B reports the result for the cases when the departing CEOs are younger than 62 years old in the year before the turnover. While all cultural values become stronger in the year of CEO turnover, they drop back to their pre-turnover levels immediately after the turnover. Therefore, the result indicates that a smooth and well-prepared transition of power enhances the establishment of innovation culture and promotes overall cultural strength, while other cultural values are largely unaffected. A CEO's pre-mature departure, however, may affect the transition power and divert the CEO's effort from enhancing the firm's culture.

We also examine if a new CEO enhances the firm's culture in a forced turnover. A forced turnover may happen for various reasons such as poor performance, conflicts between the CEOs with other stakeholders such as the corporate board, shareholders, and employees, and so on. When a new CEO comes, he/she could bring in fresh air to improve the firm's culture. We collect samples of forced CEO turnovers by Peters and Wagner (2014), and Jenter and Kanaan (2015) who identify forced CEO turnovers of firms covered by Execucomp in 1992-2018. We merge the forced turnover dataset with our sample.² Panel C of Table 5 report results from Model (3) regressions. Before the CEO turnover, innovation and quality cultures, and the overall culture deteriorate, and they go back to normal when the new CEO comes in. Integrity and respect cultures increase in the turnover year, but they drop back to the pre-turnover levels immediately. Therefore, conflicts between the CEO and other stakeholders weaken corporate culture, especially externally oriented cultural values. Then a new CEO comes in and restores the deteriorated cultural values. Beyond fixing the problems, the new CEO contributes little to further improve the culture values.

² Some mis-matchings are observed because the dataset indicates the year of observation according to the turnover announcement date that is different from the actual turnover date. We identify those cases to complete our sample of forced turnovers for regressions.

[Insert Table 5]

In sum, our results so far explain cross-sectional and time-series variations of corporate culture. On the cross-sectional side, common firm characteristics such as firm size and age, growth opportunities, profitability, R&D expense, and stock returns explain variation in cultural strength. More importantly, a firm's cultural focus is affected by the CEO's work experience. Some work experiences such as academic, AF&R, governance, and G&M experiences have a positive effect on internally oriented culture values such as integrity and teamwork, while other work experiences such as marketing and S&T experiences have a positive effect on externally oriented culture values such as innovation and quality. Therefore, when the CEO reshapes the firm's culture, they carry their work experiences in formulating their plans. On the time-series side, a firm's cultural strength displays a predictable pattern; that is, corporate cultural strength is declining over the CEO's tenure in firm. Our analysis of change in cultural strength around CEO turnover also indicates that corporate culture becomes stronger when a new CEO comes into office but declines over time. Therefore, while previous studies suggest positive effects of strong culture on firm performance, firms face a dilemma when promoting its cultural strength, i.e. they need new CEOs to refresh their culture but replacing CEOs frequently would disturb their operations and create instabilities.

4.3. Why does corporate culture weaken over the CEO's tenure in firm?

In previous tables, we find that corporate culture weakens over the CEO's tenure in firm. There are several potential reasons behind this finding. First, if a CEO manages to stay long in a firm, the firm should be relatively stable and successful. Therefore, the CEO may find less need to re-advocate or re-emphasize the firm's cultural values. Second, if a CEO stay long in a firm, the established culture should be well-known to public, including investors and analysts. Therefore, investors and analysts are less likely to raise questions that could be linked to corporate culture in earnings calls. Third, after the CEO stays long in the firm, he/she may lose his/her initial enthusiasm for engaging with people and becomes less sensitive to cultural issues.

Although we cannot distinguish between the above possibilities, they all predict that the CEO's numb with corporate culture will be intensified if the business environment is relatively stable so that the CEO feels less pressure in his/her work. To test this prediction,

we interact CEO's tenure in firm with one of the following proxies for product market competition and include the competition proxy and its interaction terms in our baseline Model (1). We adopt product market fluidity, industry concentration, and product similarity measures by Hoberg and Phillips (2014, 2016) as our proxies for product market competition. A firm is likely to face a more competitive environment if the firm's products overlap more with its rivals' products (i.e. higher fluidity and similarity) and it operates in a less concentrated industry. We choose the measures developed by Hoberg and Phillips (2014, 2016) because the measures are based on textual analysis annual reports that provide updated information about the firm's operating conditions and competitive environment.

Table 6 reports the results. For Panel A, we use product market fluidity as a proxy for product market competition. Column (6) indicates that firms in a more competitive environment, i.e. higher fluidity, have weaker overall culture. Meanwhile, the interaction term between the fluidity and CEO's tenure in firm is positive. Therefore, while the need for survival diverts the CEO's attention to build up the firm's culture, it also keeps the CEO alert in reinforcing the existing culture. The impact of product market competition on individual cultural values varies, as shown in Columns (1) – (5). For Panels B and C, we use industry Herfindhal index and product similarity index respectively as the proxy for product market competition. The results also indicate that firms in less concentrated industries with products closer to their rivals have weaker overall culture (Column 6).

The results in Table 6 suggest that product market competition has two effects on corporate culture over a CEO's tenure. When the CEO first takes over the position, product market competition weakens the firm's culture, because survival is more important than building up culture in a competitive environment. Over time, however, corporate culture becomes weaker. A competitive environment plays a positive role to maintain and reinforce the original culture.

[Insert Table 6]

5. Conclusions

This study examines the impacts of CEO on corporate culture from two perspectives. First, we test if a firm's CEO work experience, inside or outside the firm, has significant impact on the firm's culture. The answer is affirmative. After classifying CEO previous jobs

into categories, we find that different job categories are associated with strengths of different culture values. In particular, academic, governance, and G&M work experiences are associated with stronger integrity and teamwork value strengths. AF&R, international, and S&T experiences are positively associated with the teamwork value strength. E&I experience is positively associated with stronger innovation and quality value strengths. Marketing experience is positively associated with the innovation value strength, and S&T experience is positively associated with the quality value strength. G&M experience is positively associated with the respect value strength. The findings are consistent with our understanding of the skills and requirements of different job types.

Second, we trace the time-series pattern of corporate culture values over the CEO tenure. In general, a firm's culture values increase sharply when a new CEO joins the firm. Further analysis shows that the culture boost tends to be long-lasting if the former CEO retires at time close to the retirement age, i.e. when the turnover is planned. On the other hand, prior to a forced turnover, the firm's innovation and quality values decline significantly. After the CEO turnover, culture values are negatively associated with CEO tenure. However, the negative association is weaker in competitive industries than in concentrated industries. Overall, the finding suggests that after staying in the firm for a long time, the CEO may find less need to re-advocate or re-emphasize the firm's cultural values, or he/she may lose his/her initial enthusiasm for engaging with people and becomes less sensitive to cultural issues.

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Table 1 Summary statistics of key variables

Variable	N	Mean	Median	Min.	Max.	St. dev.
Integrity	32,497	0.538	0.449	0.000	2.228	0.403
Teamwork	32,497	0.890	0.684	0.000	3.956	0.723
Innovation	32,497	1.987	1.708	0.275	6.126	1.170
Respect	32,497	1.032	0.794	0.026	4.472	0.838
Quality	32,497	1.471	1.296	0.160	4.404	0.837
Overall	32,497	5.945	5.455	1.667	14.568	2.651
GAI	32,497	2.121	1.846	0.000	17.915	1.565
International	32,497	0.330	0.000	0.000	1.000	0.470
Academic	32,497	0.026	0.000	0.000	1.000	0.160
Accounting, Finance & Risk Mgmt.	32,497	0.207	0.000	0.000	1.000	0.405
Entrepreneurship & Innovation	32,497	0.005	0.000	0.000	1.000	0.069
Governance	32,497	0.607	1.000	0.000	1.000	0.489
Government & Military	32,497	0.029	0.000	0.000	1.000	0.167
Legal	32,497	0.036	0.000	0.000	1.000	0.186
Marketing	32,497	0.154	0.000	0.000	1.000	0.361
Science & Technology	32,497	0.053	0.000	0.000	1.000	0.225
Sustainability	32,497	0.059	0.000	0.000	1.000	0.236
Ln(Board size)	32,497	2.107	2.079	0.000	3.091	0.261
Ln(No. of indep. or non-exec. dir.)	32,497	1.965	1.946	0.000	2.944	0.303
Duality	32,497	0.571	1.000	0.000	1.000	0.495
Female	32,497	0.032	0.000	0.000	1.000	0.175
Ln(CEO tenure in firm)	32,497	2.271	2.342	0.000	4.067	0.858
Tobin's Q	32,497	2.102	1.620	0.367	10.571	1.512
Ln(Total assets)	32,497	6.721	6.665	1.601	11.449	1.879
Tangibility	32,497	0.243	0.159	0.000	0.914	0.230
ROA	32,497	0.085	0.121	-1.235	0.500	0.218
R&D expense	32,497	0.064	0.008	0.000	0.785	0.122
Dummy for R&D expense	32,497	0.554	1.000	0.000	1.000	0.497
Past 12-month stock return	32,497	0.165	0.083	-0.904	3.196	0.600
Ln(Firm age)	32,497	2.849	2.833	1.099	4.159	0.725

Table 2 CEO work experiences and corporate culture

	(1) Integrity	(2) Teamwork	(3) Innovation	(4) Respect	(5) Quality	(6) Overall
GAI	-0.008** (0.002)	-0.013** (0.004)	0.006 (0.009)	-0.002 (0.006)	0.007 (0.006)	-0.012 (0.018)
International	0.012 (0.008)	0.031** (0.013)	0.040 (0.025)	0.004 (0.017)	0.027 (0.019)	0.119** (0.054)
Academic	0.043 (0.023)	0.091** (0.042)	-0.009 (0.085)	-0.040 (0.041)	-0.114** (0.054)	-0.009 (0.166)
Accounting, Finance & Risk Management	0.011 (0.009)	0.023 (0.014)	-0.031 (0.027)	0.014 (0.020)	-0.000 (0.021)	0.015 (0.060)
Entrepreneurship & Innovation	-0.008 (0.049)	0.048 (0.079)	0.464*** (0.171)	0.131 (0.122)	0.212* (0.122)	0.810** (0.341)
Governance	0.027*** (0.008)	0.042*** (0.012)	-0.026 (0.024)	-0.003 (0.017)	-0.026 (0.018)	0.007 (0.052)
Government & Military	0.035 (0.019)	0.053 (0.027)	0.035 (0.066)	0.063* (0.034)	0.014 (0.044)	0.203 (0.132)
Legal	0.029 (0.020)	0.023 (0.028)	-0.024 (0.055)	0.033 (0.048)	-0.043 (0.043)	0.007 (0.123)
Marketing	-0.021** (0.009)	-0.000 (0.016)	0.089** (0.036)	-0.026 (0.020)	0.037 (0.024)	0.075 (0.068)
Science & Technology	0.010 (0.015)	0.088*** (0.029)	-0.022 (0.045)	-0.053* (0.029)	0.079** (0.037)	0.092 (0.103)
Sustainability	-0.012 (0.014)	0.025 (0.023)	0.067 (0.049)	-0.012 (0.033)	0.038 (0.035)	0.109 (0.092)
Ln(board size)	0.051** (0.023)	0.112*** (0.036)	0.150* (0.084)	0.016 (0.053)	-0.224*** (0.054)	0.123 (0.165)
Ln(No. of indep. or non-exec. directors)	-0.030 (0.019)	0.009 (0.029)	0.073 (0.071)	0.073* (0.040)	0.247*** (0.044)	0.370*** (0.136)
CEO duality	0.009 (0.007)	-0.026** (0.012)	0.010 (0.024)	0.035** (0.016)	-0.010 (0.017)	0.016 (0.051)
Female CEO	-0.027 (0.021)	0.002 (0.029)	0.100 (0.069)	-0.031 (0.039)	-0.025 (0.044)	0.042 (0.124)
Ln(CEO tenure in firm)	-0.032*** (0.005)	-0.034*** (0.007)	-0.093*** (0.015)	-0.043*** (0.010)	-0.022** (0.010)	-0.226*** (0.031)
Tobin's Q	0.019*** (0.003)	0.005 (0.005)	0.052*** (0.009)	0.058*** (0.007)	0.021*** (0.007)	0.156*** (0.021)
Ln(Total assets)	-0.013*** (0.003)	-0.037*** (0.005)	0.028*** (0.010)	-0.083*** (0.007)	-0.037*** (0.007)	-0.149*** (0.023)
Tangibility	-0.172*** (0.023)	-0.380*** (0.040)	-0.742*** (0.080)	-0.421*** (0.052)	-0.064 (0.065)	-1.778*** (0.179)

ROA	-0.237** (0.025)	-0.415*** (0.042)	-0.021 (0.069)	-0.239*** (0.046)	0.079* (0.046)	-0.879*** (0.139)
R&D expense	-0.042 (0.048)	1.359*** (0.103)	0.583*** (0.150)	-0.883*** (0.090)	-0.119 (0.100)	0.934*** (0.303)
Dummy for R&D expense	-0.036*** (0.011)	0.079*** (0.018)	0.311*** (0.044)	-0.059* (0.031)	0.200*** (0.029)	0.473*** (0.087)
Past 12-month stock returns	-0.021*** (0.004)	-0.030*** (0.007)	-0.056*** (0.011)	-0.039*** (0.008)	-0.016* (0.008)	-0.159*** (0.025)
Ln (Firm age)	0.035*** (0.006)	-0.039*** (0.010)	-0.039** (0.020)	0.020 (0.014)	-0.047*** (0.014)	-0.065 (0.043)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.098	.335	.287	.236	.254	.336
N	32,498	32,498	32,498	32,498	32,498	32,498

Table 3 CEO work experiences and corporate culture (controlled for lag-3 dependent variable)

	(1) Integrity	(2) Teamwork	(3) Innovation	(4) Respect	(5) Quality	(6) Overall
Lag-3 dep. variable.	0.267*** (0.011)	0.363*** (0.012)	0.549*** (0.013)	0.434*** (0.016)	0.510*** (0.011)	0.518*** (0.010)
GAI	-0.008** (0.002)	-0.007 (0.004)	0.001 (0.006)	-0.001 (0.004)	0.001 (0.004)	-0.012 (0.014)
International	0.010 (0.007)	0.032*** (0.011)	0.032* (0.018)	0.002 (0.013)	0.017 (0.013)	0.090** (0.039)
Academic	0.035 (0.023)	0.071* (0.039)	-0.036 (0.062)	-0.001 (0.040)	-0.073 (0.042)	-0.013 (0.129)
Accounting, Finance & Risk Management	0.007 (0.008)	0.020* (0.012)	-0.013 (0.020)	0.001 (0.015)	0.001 (0.015)	0.008 (0.045)
Entrepreneurship & Innovation	-0.013 (0.047)	0.054 (0.080)	0.171 (0.138)	0.115 (0.104)	0.206** (0.087)	0.523* (0.272)
Governance	0.026*** (0.007)	0.019* (0.010)	-0.024 (0.018)	-0.003 (0.014)	-0.020 (0.013)	-0.023 (0.040)
Government & Military	0.049** (0.020)	0.043* (0.024)	0.020 (0.040)	0.054* (0.029)	0.037 (0.032)	0.188** (0.094)
Legal	0.029 (0.019)	0.033 (0.022)	-0.045 (0.036)	0.028 (0.036)	-0.019 (0.032)	0.013 (0.090)
Marketing	-0.021** (0.009)	-0.006 (0.014)	0.045* (0.025)	-0.023 (0.016)	-0.003 (0.017)	-0.000 (0.050)
Science & Technology	0.012 (0.015)	0.054** (0.024)	-0.044 (0.034)	-0.051** (0.024)	0.047* (0.029)	-0.000 (0.079)
Sustainability	-0.014 (0.013)	0.023 (0.019)	0.033 (0.035)	-0.018 (0.025)	0.021 (0.024)	0.054 (0.069)
Ln (board size)	0.031 (0.026)	0.093** (0.036)	0.110 (0.071)	0.026 (0.047)	-0.165*** (0.047)	0.081 (0.143)
Ln (no. of indep. or non-exec. directors)	-0.019 (0.022)	-0.013 (0.031)	0.058 (0.062)	0.036 (0.040)	0.192*** (0.041)	0.239* (0.124)
CEO duality	0.007 (0.007)	-0.011 (0.010)	0.003 (0.018)	0.019 (0.013)	-0.005 (0.013)	0.014 (0.038)
Female CEO	-0.019 (0.019)	0.010 (0.027)	0.092* (0.054)	-0.036 (0.032)	0.040 (0.035)	0.112 (0.099)
Ln (CEO tenure in firm)	-0.031*** (0.004)	-0.023*** (0.007)	-0.064*** (0.011)	-0.025*** (0.008)	-0.015* (0.008)	-0.142*** (0.024)
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Adjusted R-sq	.161	.412	.473	.379	.431	.494
N	24,046	24,046	24,046	24,046	24,046	24,046

Table 4 Corporate culture around CEO turnover

	(1) Integrity	(2) Teamwork	(3) Innovation	(4) Respect	(5) Quality	(6) Overall
TOver (t-1)	0.008 (0.010)	0.006 (0.014)	-0.001 (0.020)	0.028* (0.017)	0.014 (0.016)	0.063 (0.046)
TOver (t-1)	0.016 (0.011)	0.010 (0.016)	-0.000 (0.023)	0.037** (0.019)	0.017 (0.018)	0.080 (0.052)
TOver (t)	0.054*** (0.011)	0.066*** (0.017)	0.154*** (0.026)	0.163*** (0.020)	0.076*** (0.020)	0.530*** (0.058)
TOver (t+1)	0.016 (0.012)	0.010 (0.018)	0.068** (0.031)	0.056** (0.022)	0.018 (0.023)	0.174*** (0.066)
TOver (t+2)	-0.002 (0.012)	0.038* (0.019)	0.077** (0.031)	0.006 (0.023)	0.024 (0.023)	0.139** (0.068)
TOver (t+3)	0.013 (0.013)	0.011 (0.020)	0.047 (0.033)	0.017 (0.024)	0.008 (0.024)	0.105 (0.071)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.100	.350	.294	.238	.252	.338
N	14,958	14,958	14,958	14,958	14,958	14,958

Table 5 Subsample analysis of corporate culture around CEO turnover

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
CEO age ≥ 62	Integrity	Teamwork	Innovation	Respect	Quality	Overall
TOver (t-2)	0.022 (0.015)	0.033 (0.022)	0.028 (0.031)	0.030 (0.025)	0.015 (0.024)	0.136* (0.071)
TOver (t-1)	0.032** (0.016)	0.004 (0.023)	-0.002 (0.033)	0.052* (0.028)	0.007 (0.027)	0.088 (0.078)
TOver (t)	0.041** (0.017)	0.053** (0.024)	0.189*** (0.038)	0.158*** (0.030)	0.094*** (0.029)	0.538*** (0.086)
TOver (t+1)	0.004 (0.020)	0.019 (0.028)	0.107** (0.051)	0.061* (0.035)	0.017 (0.037)	0.211* (0.109)
TOver (t+2)	-0.012 (0.021)	0.028 (0.030)	0.149** (0.052)	0.054 (0.036)	0.040 (0.039)	0.268** (0.116)
TOver (t+3)	-0.001 (0.021)	0.037 (0.032)	0.125** (0.056)	0.062 (0.039)	0.036 (0.041)	0.263** (0.124)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.107	.346	.300	.256	.249	.316
N	5,326	5,326	5,326	5,326	5,326	5,326

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
CEO age < 62	Integrity	Teamwork	Innovation	Respect	Quality	Overall
TOver (t-2)	-0.003 (0.013)	-0.016 (0.020)	-0.037 (0.028)	0.025 (0.024)	0.002 (0.024)	-0.020 (0.064)
TOver (t-1)	0.005 (0.015)	0.016 (0.022)	-0.015 (0.032)	0.028 (0.027)	0.011 (0.026)	0.052 (0.073)
TOver (t)	0.060*** (0.016)	0.074*** (0.024)	0.106*** (0.037)	0.170*** (0.028)	0.047* (0.029)	0.486*** (0.082)
TOver (t+1)	0.019 (0.017)	0.008 (0.026)	0.024 (0.043)	0.057* (0.033)	-0.008 (0.033)	0.111 (0.094)
TOver (t+2)	-0.001 (0.017)	0.047* (0.028)	0.044 (0.046)	0.001 (0.034)	0.008 (0.033)	0.091 (0.098)
TOver (t+3)	0.023 (0.019)	0.005 (0.029)	0.005 (0.048)	0.004 (0.035)	-0.014 (0.034)	0.038 (0.103)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.102	.349	.295	.234	.263	.346
N	8,717	8,717	8,717	8,717	8,717	8,717

Panel C	(1)	(2)	(3)	(4)	(5)	(6)
Forced turnovers	Integrity	Teamwork	Innovation	Respect	Quality	Overall
TOver (t-2)	-0.022 (0.027)	-0.042 (0.040)	-0.125* (0.065)	-0.079 (0.052)	-0.089* (0.047)	-0.370*** (0.135)
TOver (t-1)	-0.020 (0.029)	-0.036 (0.043)	-0.212*** (0.071)	-0.035 (0.056)	-0.096* (0.055)	-0.413*** (0.158)
TOver (t)	0.089*** (0.033)	0.020 (0.047)	0.011 (0.090)	0.126* (0.065)	-0.035 (0.063)	0.189 (0.189)
TOver (t+1)	0.012 (0.036)	-0.032 (0.054)	0.022 (0.103)	0.026 (0.076)	-0.063 (0.072)	-0.069 (0.218)
TOver (t+2)	-0.018 (0.037)	0.026 (0.059)	0.090 (0.106)	-0.035 (0.078)	-0.030 (0.075)	0.001 (0.229)
TOver (t+3)	-0.053 (0.037)	-0.013 (0.062)	0.002 (0.111)	-0.112 (0.075)	-0.071 (0.081)	-0.257 (0.238)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.151	.279	.408	.276	.328	.395
N	1,686	1,686	1,686	1,686	1,686	1,686

Table 6 Product market competition, CEO tenure, and corporate culture

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	Integrity	Teamwork	Innovation	Respect	Quality	Overall
Ln (CEO tenure in firm)	-0.045*** (0.008)	-0.044*** (0.013)	-0.185*** (0.027)	-0.054*** (0.018)	-0.074*** (0.018)	-0.405*** (0.056)
Product market fluidity	0.005* (0.003)	0.027*** (0.005)	-0.050*** (0.008)	-0.009 (0.005)	-0.028*** (0.005)	-0.057*** (0.017)
Ln (CEO tenure in firm)* Product market fluidity	0.002* (0.001)	0.002 (0.002)	0.014*** (0.003)	0.002 (0.002)	0.008*** (0.002)	0.028*** (0.007)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.104	.349	.286	.238	.250	.335
N	31,202	31,202	31,202	31,202	31,202	31,202

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
	Integrity	Teamwork	Innovation	Respect	Quality	Overall
Ln (CEO tenure in firm)	-0.027*** (0.006)	-0.029*** (0.010)	-0.057*** (0.020)	-0.047*** (0.013)	-0.009 (0.014)	-0.169*** (0.041)
Industry Herfindhal index	0.105*** (0.035)	-0.026 (0.054)	0.354*** (0.109)	0.053 (0.075)	0.059 (0.077)	0.564** (0.232)
Ln (CEO tenure in firm)* Industry Herfindhal index	-0.017 (0.014)	-0.022 (0.020)	-0.128*** (0.048)	0.017 (0.031)	-0.048 (0.031)	-0.203** (0.094)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.095	.328	.286	.240	.248	.336
N	31,202	31,202	31,202	31,202	31,202	31,202

Panel C	(1)	(2)	(3)	(4)	(5)	(6)
	Integrity	Teamwork	Innovation	Respect	Quality	Overall
Ln (CEO tenure in firm)	-0.038*** (0.005)	-0.057*** (0.008)	-0.111*** (0.016)	-0.046*** (0.011)	-0.027** (0.011)	-0.282*** (0.034)
Product similarity	0.000 (0.001)	-0.002 (0.002)	-0.026*** (0.003)	-0.006*** (0.002)	-0.016*** (0.002)	-0.052*** (0.006)
Ln (CEO tenure in firm)* Product similarity	0.002*** (0.001)	0.006*** (0.001)	0.004*** (0.001)	0.001 (0.001)	0.001 (0.001)	0.014*** (0.003)
CEO work experience	Yes	Yes	Yes	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-sq	.102	.343	.291	.238	.256	.338
N	31,432	31,432	31,432	31,432	31,432	31,432

Appendix 1 Job titles for work experiences

Work experiences	Job titles
International (International)	- Keywords: Country, Emerging Markets, Global, International, Worldwide - Work in a location outside the U.S.
Academic (General)	Keywords: Academic, Chancellor, Dean, Instructor, Lecturer, Preceptor, Professor, Rector, Reader, Scholar
Accounting (Throughput)	Accounting-related jobs such as accountant, auditor, financial controller, tax, etc.
Finance & Risk Mgmt. (Peripheral)	- Commercial bank-related jobs such as banker, corporate banking, loan officer, treasury, etc. - Corporate finance-related jobs such as CFO, financial controller, treasurer, etc. - Finance advisory-related jobs such as financial advisors, wealth management, etc. - Investment-related jobs such as equities, fixed-income, portfolio management, private equity, etc. - Investment banking-related jobs such as corporate finance, financial analysis, M&A, etc. - Risk management-related jobs such as actuary, credit officer, risk manager, etc.
Innovation (Nonthroughput)	Keywords: Innovation, Creative
Governance (General)	- Independent director, non-executive director, supervisory director - Other compliance related jobs such as company secretary, compliance officer, internal audit, etc.
Government & Military (General)	- Government work experiences such as diplomat, mayor, police, politician, etc. - Corporate officer who handles government relationship - Ranks/Titles in air forces, army, and navy.
Information Technology (Throughput)	Keywords: Cloud, Data, Information, IT
Legal (Peripheral)	- External legal experiences as arbitrator, barrister, judge, legislator, prosecutor, solicitor, etc. - Corporate legal experiences as legal advisor, legal counsel, regulatory affairs, etc.
Marketing (Nonthroughput)	Keywords: Advertising, Brand, Marketing, Sales
Manufacturing and Production (Throughput)	Keywords: Construction, Engineer, Logistic, Manufacture, Process, Production, Quality, Software, Technician
Product development (Nonthroughput)	Keywords: Product
Science & Technology (Nonthroughput)	- Keywords: Data, Database, Information, Invent, Research, Research and Development, Technology (Non-IT) - Scientist such as geologist, hydrologist, etc.
Customers & Services (Nonthroughput)	Keywords: Client, Customer, Service
Strategy and planning (Peripheral)	Keywords: Plan, Strategy
Sustainability	Keywords: Client, Community, Customer, Employee, Environment, Ethics, Health, Labor, Safety, Sustainability

Appendix 2 Definitions of key variables

Variable	Definition	Data source
Integrity	Integrity value strength	Li et al. (2021)
Teamwork	Teamwork value strength	Li et al. (2021)
Innovation	Innovation value strength	Li et al. (2021)
Respect	Respect value strength	Li et al. (2021)
Quality	Quality value strength	Li et al. (2021)
Overall	Sum of Integrity, Teamwork, Innovation, Respect and Quality	Li et al. (2021)
GAI	General ability index according to Custodio and Ferreira and Matos (2013)	BoardEx
International	An indicator that equals one if the CEO has international work experience	BoardEx
Academic	An indicator that equals one if the CEO has academic work experience	BoardEx
Accounting, Finance & Risk Mgmt.	An indicator that equals one if the CEO work experience in accounting, finance, or risk management	BoardEx
Entrepreneurship & Innovation	An indicator that equals one if the CEO has work experience in entrepreneurship and innovation	BoardEx
Governance	An indicator that equals one if the CEO has experience in corporate governance	BoardEx
Government & Military	An indicator that equals one if the CEO has work experience in government and armed forces	BoardEx
Legal	An indicator that equals one if the CEO has legal work experience	BoardEx
Marketing	An indicator that equals one if the CEO has marketing work experience	BoardEx
Science & Technology	An indicator that equals one if the CEO has work experience in science and technology	BoardEx
Sustainability	An indicator that equals one if the CEO has work experience in sustainability	BoardEx
Ln(Board size)	The natural logarithm of board size	BoardEx
Ln(No. of indep. or non-exec. dir.)	The natural logarithm of the number of independent or non-executive directors	BoardEx
Duality	An indicator that equals one if the same person take both the CEO and board chair positions	BoardEx
Female	An indicator that equals one for a female CEO	BoardEx
Ln(CEO tenure in firm)	The natural logarithm of one plus the CEO's tenure (in years) in firm as the CEO and other roles	BoardEx
Tobin's Q	The sum of market capitalization and total liabilities, divided by total assets	CRSP and Compustat
Ln(Total assets)	The natural logarithm of total assets	Compustat
Tangibility	Net property, plant, and equipment, divided by total assets	Compustat
ROA	Operating income before depreciation, divided by lagged total assets	Compustat
R&D expense	R&D expense divided by lagged total assets	Compustat
Dummy for R&D expense	An indicator that equals one for non-zero R&D expense	Compustat
Past 12-month stock return	12-month stock return before the fiscal year end	CRSP
Ln(Firm age)	The natural logarithm of one plus the firm age	Compustat