Powerful CEOs in uncertain times: survival of the fittest*

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Abstract

In contrast to the widespread concern about excessive CEO power, this paper examines whether powerful CEOs are more beneficial and desirable under uncertainty. I document that powerful CEOs have a lower dismissal rate in uncertain times. With better performance but no increased compensation, they are likely retained optimally for their effectiveness under uncertainty rather than by entrenched power. Two mechanisms potentially explain why powerful CEOs are more effective under uncertainty: they are more willing to share information with the board, and more capable of taking swift action. My findings support optimal dismissal theory, highlighting that powerful CEOs' effectiveness increases with uncertainty.

Keywords: Corporate governance, CEO power, Uncertainty, CEO turnover
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"Power tends to corrupt and absolute power corrupts absolutely." - Dalberg-Acton (1887).

"The term dictatorship comes from the Latin title dictator, which in the Roman Republic designated a temporary magistrate who was granted ***extraordinary powers*** *in order to deal with state* ***crises****."* - Britannica, The Editors of Encyclopaedia (2020).

1. Introduction

How much power should a CEO have? The conventional answer is probably not much, given the large literature on managerial entrenchment and numerous regulations designed to constrain CEO power. In addition, there is a growing call for separating the roles of board chair and CEO. However, history is replete with anecdotes of strong leadership—often with greater decisiveness and effectiveness—being critical for a community or an organization to survive crises. During the recent COVID-19 pandemic, many firms experienced power centralization: some long-tenured CEOs postponed their planned retirements, some firms experienced the comeback of their once-distanced influential leaders, and some other firms transformed from co-CEO to the sole CEO model.

Therefore, an important unanswered question is whether powerful CEOs are more desirable and more effective in uncertain times. There are two competing theories with different predictions. Entrenchment theory assumes that powerful CEOs can influence boards' decisions on their own turnover and compensation. Since replacing the incumbent CEO in uncertain times can be especially costly for firms, uncertainty makes it easier for powerful CEOs to exploit their entrenchment. Consequently, powerful CEOs' dismissal rate

should decrease with uncertainty, their compensation increase, and their firms' performance deteriorate due to suboptimal CEO selections. By contrast, optimal dismissal theory assumes that turnover decisions are optimally made by boards based on CEOs' and their potential substitutes' perceived match qualities. According to that theory, firms might optimally retain more powerful CEOs in uncertain times for their decisiveness and effectiveness. Furthermore, powerful CEOs should be associated with neither increased compensation nor worse performance in uncertain times.

To test those two rival theories, I examine three sequential questions: (1) Are powerful CEOs less likely to be dismissed in times of uncertainty? (2) If yes, is the lower dismissal probability caused by powerful CEOs' entrenchment or their desirability? (3) If the latter, through what mechanisms are powerful CEOs more effective during uncertain times?

Using a sample of 2,732 US public firms between 1999 and 2020, I document that powerful CEOs experience significantly fewer forced turnovers when uncertainty increases.[1] In addition, powerful CEOs have neither worse performance nor higher compensation during uncertain times. Furthermore, using the start of the COVID-19 pandemic as an exogenous shock to uncertainty, I find that powerful CEOs are associated with significantly higher stock returns than unpowerful ones in uncertain times. The evidence contradicts entrenchment theory but instead supports an optimal decision process where uncertainty increases firms' preferences for powerful CEOs. Finally, I find two potential mechanisms for powerful CEOs being more effective under uncertainty: they are more willing to share information with the board, and more capable of making swift responses to changing market conditions.

[1] I use the terms "dismissal" and "forced turnover" interchangeably.

I start my analyses by plotting the market-level yearly uncertainties from 1999 to 2020 and the corresponding dismissal rates of powerful CEOs and unpowerful CEOs, respectively. In most years, the dismissal rate of powerful CEOs is lower than that of unpowerful ones. More interestingly, the relation between powerful CEOs' dismissal rate and uncertainty and that of unpowerful CEOs' have opposite signs: powerful CEOs' dismissal rate decreases with uncertainty, while unpowerful ones' increases.

Then, I formally test how the CEO dismissal rate relates to CEO power (measured by *CEO duality* and alternatives) and uncertainty (measured by industry-year-level *Stock volatility* and *Delisting rate*). I run a firm-year-level panel data regression of CEO dismissal dummy on CEO power, uncertainty, their interaction term, and other controls. To address endogeneity problems due to omitted variables, I include both year and industry fixed effects to control for market-level time trends and time-invariant industry heterogeneities. The result shows that, on average, powerful CEOs have a lower probability of forced turnover. More interestingly, once the interaction term between CEO power and uncertainty is added into the regression, the coefficient of CEO power loses its significance while the coefficient of the interaction term is significantly negative. That means, compared with unpowerful CEOs, powerful CEOs become less likely to be dismissed when uncertainty increases. My finding is robust to alternative measures of CEO power and uncertainty.

Next, I employ three tests to distinguish between entrenchment theory and optimal dismissal theory. As aforementioned, if entrenchment theory is valid, then in uncertain times the retained powerful CEOs should have lower match qualities than unpowerful ones and thus worse performance. They should also obtain increased compensation by exploiting their entrenched power. By contrast, optimal dismissal theory predicts neither worse performance nor in-

creased compensation. To test both pairs of predictions, I use the sample between 1999 and 2020 and regress firm performance and CEO compensation, respectively, on CEO power, uncertainty, their interaction term, and other controls. Furthermore, since arranging a CEO turnover is complicated and time-consuming, the firm-CEO match is sticky to some extent. Therefore, if powerful CEOs are more effective in uncertain times, then they should outperform unpowerful CEOs at times of sudden uncertainty shocks before uncertainty-incurred optimal CEO replacements can take place. Therefore, for the third test, I exploit the Coronavirus Stock Market Crash between February 20th and March 20th in 2020 as an unexpected uncertainty shock, and compare stock returns associated with powerful CEOs with those with unpowerful ones during that one-month period.

My results consistently contradict the predictions of CEO entrenchment while supporting the notion of optimal dismissal decisions. In uncertain times, firms with powerful CEOs perform at least as well as firms with unpowerful CEOs. Specifically, Q ratio and sales growth are indistinguishable between those two groups of firms, while ROA is even higher among firms with powerful CEOs. Also inconsistent with the notion of entrenchment, although powerful CEOs do receive higher compensation on average compared with unpowerful ones, the gap does not widen with uncertainty. Furthermore, between February 20th and March 20th in 2020, when the stock market collapsed as the COVID-19 pandemic spurred extreme uncertainty and anxiety, powerful CEOs were associated with 2.8% higher stock returns in that one-month period than unpowerful peers. This result does not exist in a placebo test during the same period in the previous year, 2019, suggesting that powerful CEOs are particularly desirable in uncertain periods. In sum, the fewer dismissals of powerful CEOs during uncertain times are unlikely to be a result of managerial

entrenchment. Instead, the evidence is consistent with an efficient dismissal decision process where uncertainty increases firms' preferences for powerful CEOs.

Finally, I explore the mechanisms of why powerful CEOs are more desirable and more effective in uncertain times. The first potential mechanism is information sharing. As predicted in the model by Adams and Ferreira (2007), CEOs could be inhibited from revealing firm-specific information to boards if the monitoring is too tough, which in turn compromises the quality of advising. In times of uncertainty, when new information is generated at an accelerated rate, a friendly relationship between the board and the CEO becomes particularly beneficial. Powerful CEOs are less checked by boards and thus more willing to disclose information to boards, which might explain why they are more desirable in uncertain times.

To test this hypothesis, I divide my sample of firm-year observations into two subgroups based on information asymmetry, measured by an index combining the availability, homogeneity, and accuracy of analysts' quarterly earnings forecasts. I hypothesize that the uncertainty-associated reduction in powerful CEOs' dismissal risk is more evident among obscure firms, where boards rely more on CEOs for firm-specific information. I reexamine the relations between forced CEO turnover, uncertainty, and CEO power, but this time in each subgroup separately. The evidence confirms my hypothesis: among obscure firms, the dismissal risk during uncertain times is significantly lower for powerful CEOs, which is consistent with the baseline result on the entire sample. This result does not exist for transparent firms. Therefore, better information sharing seems to be one of the explanations for why powerful CEOs are more favored during uncertain periods.

The second potential mechanism I examine is the speed of taking action.

Unlike executives who run the firm on a daily basis, directors often have other obligations elsewhere. If a CEO is less powerful, then more decisions need approval from the board, which unavoidably leads to slower decision-making. If a board consists of busier directors, having a CEO with more decision-making power might be optimal in uncertain times. Therefore, I predict that the uncertainty-associated reduction in powerful CEOs' dismissal risk is more evident among firms with busier directors. I divide firms into two groups based on the average busyness of their directors, measured by the number of directorships they hold in listed firms. The result supports my prediction: among firms with busier directors, powerful CEOs are significantly less likely to be fired when uncertainty increases, while no such result is found among firms with less busy directors. Therefore, swift action-taking seems to be another potential explanation for why powerful CEOs are more favored during uncertain periods.

To my best knowledge, this paper is the first to ask whether powerful CEOs are more desirable and effective in uncertain times. It complements existing research on the relation between CEO power and firm performance (or its roughly opposite concept, CEO monitoring). According to the canonical agency theory (Fama and Jensen, 1983; Jensen, 1993), the misalignment between CEOs' interests and shareholder value determines that excessive CEO power (or insufficient CEO monitoring) undermines firm value. However, there is a well-known lack of empirical evidence to support this prediction (Bhagat and Black, 2001; Hermalin and Weisbach, 2003; Adams et al., 2005).[2] Recent

[2]Other related studies include: Villalonga and Amit (2006), Palia et al. (2008) Adams et al. (2009), and Fahlenbrach (2009) all find that firms with founder-CEOs, a subset of powerful CEOs, actually have better performance. Graham et al. (2020) find that the announcement of the sudden death of a powerful CEO (relatively long job tenure, dual board chair, or founder of the firm) is associated with higher abnormal market return, compared with that of a less powerful CEO. Bennedsen et al. (2020) document that firms'

studies find that the effectiveness of CEO monitoring varies with firm characteristics, like the cost of acquiring information (Duchin et al., 2010) and the relative importance of board advice and monitoring (Schmidt, 2015). Unlike those papers examining firms' *intrinsic characteristics*, I investigate firms' *external conditions* and provide evidence that powerful CEOs are more desirable and effective under uncertain market conditions.

This paper also adds new evidence to the debate between optimal dismissal theory and entrenchment theory. According to optimal dismissal theory, the board optimally makes CEO turnover decisions (Gibbons and Murphy, 1990; Bushman et al., 2010) in the best interests of shareholders. By contrast, a much larger literature argues that entrenched CEOs influence their own retentions (Weisbach, 1988; Shleifer and Vishny, 1989; Hermalin and Weisbach, 1998; Denis et al., 1997; Almazan and Suarez, 2003; Taylor, 2010; Fisman et al., 2014). I find that the lower dismissal rate of powerful CEOs in uncertain times is accompanied by neither worse performance nor increased compensation, which supports optimal dismissal theory. In addition, both lines of literature above assume that a CEO's effectiveness is constant. Contrarily, my results highlight that a CEO's effectiveness varies with market conditions, similar to the modeling assumptions in Jovanovic (1979) and Garrett and Pavan (2012).

Similar to CEO turnover, the literature is neither conclusive on whether CEO compensation is optimally determined (Gabaix and Landier, 2008; Peters and Wagner, 2014; Cheng et al., 2015) or influenced by entrenched CEOs (Bebchuk and Fried, 2004; Morse et al., 2011). My results are consistent with the former. Furthermore, this paper extends the literature on product market competition and corporate governance, which finds that powerful CEOs

accounting performance declines after relatively long-tenured CEOs are hospitalized, while the hospitalizations of relatively new CEOs have insignificant effects.

are more effective when the product market is more competitive (Giroud and Mueller, 2010, 2011; Yang and Zhao, 2014; Li et al., 2019). I complement this literature by turning the focus from product market competition to a more general facet of the business environment, i.e., external uncertainty.

2. Data, variables, and sample construction

I obtain data on US public firms from various sources and build a sample in their intersection. I start with Execucomp, which contains CEOs' compensation and characteristics, and then merge it with board information from Boardex, firm characteristics from Compustat, forced CEO turnovers from Gentry et al. (2021), stock market return and delisting events from CRSP, and analyst forecasts from IBES. The details of the variables and the sample are described below.

2.1. Forced CEO turnover

With rare exceptions (like CEO sudden deaths), CEO turnovers can be roughly categorized as either forced (i.e. dismissal) or voluntary. Forced CEO turnovers mostly occur when firms think their incumbent CEOs are less qualified than potential successors, while voluntary turnovers are mainly due to CEOs' personal choices, like outside opportunities or retirement. Consistent with the vast literature on CEO turnover, I focus on the first type, forced turnovers, which are initiated by firms.

As well-documented in the literature, it is challenging for researchers to distinguish dismissals from voluntary turnovers. It is because firms have no obligation to disclose the reasons for CEO turnovers (Weisbach, 1988; Kaplan and Minton, 2012; Jenter and Lewellen, 2021). Even when firms voluntarily disclose, they sometimes disguise forced CEO turnovers as voluntary re-

tirements. Researchers design various algorithms to identify forced turnovers based on CEO age, press coverage and whether the CEO remains on the board after the turnover (Parrino, 1997; Bushman et al., 2010; Peters and Wagner, 2014; Jenter and Kanaan, 2015). Unavoidably, this identifying process involves researchers' subjective assessment, and hence the sets of forced turnovers in different studies do not fully overlap (Gentry et al., 2021).

Gentry et al. provide an open-source dataset of CEO departures in S&P 1500 firms from 1987 through 2020. They code each CEO departure for one of eight voluntary and involuntary reasons. Furthermore, they provide web references (SEC filings and/or press releases) on which each coding is based. This level of transparency makes their dataset easily verifiable and helps minimize subjective bias.

I identify forced CEO turnovers based on the dataset from Gentry et al.. There are 1490 forced CEO turnovers (i.e. ceo_dismissal=1) in their dataset from 1999 to 2020. After merging with other datasets and deleting observations with missing values in the baseline regression model, my final sample contains 900 forced CEO turnovers.

2.2. Proxies for uncertainty

Milliken (1987) defines the uncertainty of the business environment as individuals' inability to forecast the direction of environmental changes, the impacts on organizations, and their optimal responses. Guided by this definition and related literature, I adopt two measures of uncertainty in this paper: *Stock volatility* and *Delisting rate*. Since my purpose is to capture exogenous uncertainty rather than the riskiness of endogenously-chosen firm policies, both measures are on the industry-year level. Firms with the identical first two digits of SIC codes are regarded as in the same industry.

These two measures are correlated but emphasize different aspects of external uncertainty. The first measure, *Stock volatility*, is defined as the industry equal-weighted average standard deviation of individual firms' monthly returns in one year, similar to Peters and Wagner (2014). *Stock volatility* signals the uncertainty over the values of firms in an industry. The second measure, *Delisting rate*, is the fraction of firms in an industry that are delisted within a year (Gillan et al., 2009). CRSP Stock Events - Delisting Information records delisting events of public US firms for various reasons. In this paper, I calculate *delisting rate* as the fraction of firms that are delisted because of mergers (first digit of delisting code=2), liquidations (first digit of delisting code=4), or dropped (first digit of delisting code=5). Industry-years with more of those events are generally considered more uncertain.

To visualize the fluctuations of those two uncertainty measures over the sample period, I pick ten representative industries with relatively large numbers of observations and plot their uncertainty measures from 1999 to 2020, as shown in Figure 1.

2.3. CEO power

Although all CEOs have legitimate authority as the highest-ranking executive in their companies, their power varies with many factors. In the literature, CEO power is often measured by CEOs' additional titles, status, or board composition. For example, Grinstein and Hribar (2004) measure CEO power by CEO-chair duality, membership of the nominating committee, and the ratio of insider directors; Adams et al. (2005) measure CEO power by founder status, being the only insider on the board, and concentration of titles; Custódio and Metzger (2013) use CEO duality; Song and Wan (2019) use duality, founder status and concentration of titles.

In addition, CEO power is also affected by the relationship between the CEO and other top corporate leaders, like the fraction of executives and directors who have been appointed during the current CEO' tenure (Morse et al., 2011; Khanna et al., 2015). The rationale here is, as shown in the literature (Coles et al., 2014), that the CEO has substantial influence in shaping the board composition, and therefore directors and executives appointed during a CEO's tenure might feel beholden to the CEO.

Furthermore, the literature shows that CEO power strengthens over a CEO's tenure. Hermalin and Weisbach (1998) build a framework where retained CEOs bargain for less independent boards; consistent with the prediction of this model, Boone et al. (2007) find a negative relation between board independence and CEO tenure.

Therefore, I adopt multiple measures for CEO power. In the baseline regression, I use *CEO duality*, which equals one if the CEO is also the board chair and zero otherwise. For robustness purposes, CEO power is alternatively proxied by *CEO's concentration of titles*, the length of *CEO tenure*, whether the CEO became a director earlier than (if there exists) the independent chair (*Longer directorship*), and if the CEO is a *Founder CEO*. The intuitions are: additional titles like chairperson and president give the CEO a bigger say among other directors or executives, respectively; long-tenured CEOs and founder CEOs possess a bigger influence via their achievements, expertise, and long-term relationship with company constituents; a more senior independent chairperson provides a check on the CEO's power. The detailed definition of those measures can be found in Table A1.

2.4. Sample and summary statistics

The sources and construction of other variables not discussed above are listed in Table A1. Since Boardex collects board characteristics on a yearly basis at the end of each fiscal year, I merge variables from Boardex to Execucomp with special caution for turnover years in order to make sure departing CEOs are matched with the right board characteristics. Specially, if a CEO leaves before the annual shareholder meeting (AGM), the values of director-related variables are taken from the previous fiscal year rather than the current one. It is because directors are appointed during AGMs, which are usually in the middle of fiscal years. Therefore, for pre-AGM CEO turnovers, the board composition at the time of turnover remains the same as at the end of the previous fiscal year. In addition, for variables that might change with the CEO turnover, like *CEO duality*, their values in turnover years are taken from the previous fiscal year rather than the current one in order to avoid capturing the characteristics of the incoming CEO rather than the departing CEO.

Conditioning on none of the variables in the baseline regression missing, my final sample contains 32,033 firm-years between 1999 and 2020, with 900 forced CEO turnovers. The sample size shrinks for some other analyses in this paper due to partially missing values of certain variables.

Table 1 reports the descriptive statistics. The incidence of forced turnover is 2.8% among all firm-years. Among 53.8% of firm-years, the CEO is also the board chair. Both measures of uncertainty are within $[0, 0.5]$, and their standard deviations are 0.050 and 0.037, respectively. All variables are winsorized at the 1^{st} and 99^{th} percentiles to minimize the impact of outliers.

3. Empirical Results

3.1. Baseline results

In this section, I examine the relations between CEO forced turnover, uncertainty, and CEO power. I first visualize the relations between yearly market-level uncertainty and forced CEO turnover rates and then conduct formal statistical analyses.

Figure 2 shows the relation between market-average uncertainty and the fraction of dismissed CEOs in each year from 1999 to 2020 among dual CEOs (Subfigures (a) and (c)) and non-dual CEOs (Subfigures (b) and (d)), respectively. Two alternative measures are used for uncertainty: *Market average stock volatility* (Subfigures (a) and (b)) and *Market average delisting rate* (Subfigures (c) and (d)). Comparing Subfigures (a) and (c) with Subfigures (b) and (d) indicates that forced turnovers are in general rarer among dual CEOs than among non-dual ones. Specifically, the yearly fraction of dismissed dual CEOs ranges from 0% (in 1999) to 3.51% (in 2017), while that number for non-dual CEOs ranges from 2.28% (in 2017) to 6.25% (in 1999). More interestingly, the relation between forced turnover percentage and uncertainty is exactly the opposite for those two groups of CEOs. As uncertainty increases (moving towards the right-hand side along the horizontal axis), the forced turnover percentage decreases among dual CEOs but increases among non-dual ones. In other words, the dismissal risk for dual (non-dual) CEOs is negatively (positively) associated with uncertainty.

To formally test whether uncertainty affects the forced turnover probabilities of powerful CEOs and unpowerful CEOs differently, I estimate the

following firm-year panel regression:

$$\begin{aligned} Forced\ turnover_{it} = \beta_0 + \beta_1 Uncertainty_{It} + \beta_2 CEO\ power_{it} \\ + \beta_3 CEO\ power_{it} \times Uncertainty_{It} + B_4 X_{it} \\ + B_5 X_{it} \times Uncertainty_{It} + d_I + d_t + \varepsilon_{it} \end{aligned} \tag{1}$$

where $Forced\ Turnover_{it}$ is a dummy indicating whether firm i experiences a forced CEO turnover in year t, $Uncertainty_{It}$ is the average uncertainty of firm i's industry I in year t, $CEO\ power_{it}$ measures the power of the CEO of firm i in year t, X_{it} is a vector of CEO and firm characteristics, d_I is a dummy for firm i's industry I, d_t is a dummy for year t, and ϵ_{it} is the error term adjusted for heteroskedasticity and industry-level clustering. Both $CEO\ power_{it}$ and X_{it} are interacted with $Uncertainty_{It}$, in order to examine how the relations between forced CEO turnover and CEO/firm characteristics are moderated by uncertainty. The industry fixed effects and year fixed effects absorb time-invariant industry heterogeneities and common time trends, respectively. Therefore, the estimation builds on the cross-firm and over-time variations of variables within the same industry. In an alternative specification, I control for industry-year fixed effects d_{It}, rather than industry fixed effects d_I and year fixed effects d_t. In that case, the estimation builds on the cross-firm variations of variables within the same industry and year, and thus $Uncertainty_{It}$ is excluded from the controls.

The interpretation of the estimands is as follows: the impact of uncertainty on forced turnovers ($\beta_1 + \beta_3 CEO\ power_{it}$) consists of two parts: β_1 is the common effect of uncertainty on all CEOs, while $\beta_3 CEO\ power_{it}$ gauges the differential effect of uncertainty that is in proportion to CEO power. If β_3 is non-zero, then it implies that the impact of uncertainty on dismissal

probability varies with the level of CEO power. Similarly, the impact of CEO power on forced turnovers ($\beta_2 + \beta_3 Uncertainty_{It}$) also has two components: β_2 is the common effect of CEO power regardless of the uncertainty level, while $\beta_3 Uncertainty_{It}$ varies with uncertainty. If β_3 is non-zero, then it also implies that the impact of CEO power on dismissal probability is moderated by uncertainty.

Uncertainty is measured by two alternative proxies: *Stock volatility* and *Delisting rate*. Both measures emphasize different aspects of external uncertainty: *Stock volatility* measures the uncertainty manifested in the equity market, while *Delisting rate* gauges the prevalence of extreme cases where firms are delisted from stock exchanges. Both measures are averaged across all firms in the same industry and year and thus exogenous to individual firms' policies and characteristics.

CEO Power is measured by five alternative proxies: *CEO duality*, *CEO's concentration of titles*, *CEO tenure*, *Longer directorship*, and *Founder CEO*. The detailed definition of those measures can be found in Table A1. Table 2 reports the regression results measuring CEO power with *CEO duality*. In the interest of space, the results using the other four measures are reported in Table A2.

In Columns (1) and (5) of Table 2, I regress CEO forced turnover on uncertainty and CEO power without their interaction term, in order to evaluate how forced CEO turnover is associated with uncertainty and CEO power, respectively. The correlation between forced CEO turnover and uncertainty is significantly positive when uncertainty is measured by *Stock volatility*, which indicates that the dismissal risk increases with stock value uncertainty. This result is consistent with Peters and Wagner (2014). When uncertainty is measured by *Delisting rate*, the correlation between forced CEO turnover and un-

certainty becomes insignificant. Forced CEO turnover is negatively associated with CEO power, implying that the more powerful a CEO is, the less likely she is to be fired.

On the basis of Columns (1) and (5), Columns (2) and (6) add the interaction term between CEO power and uncertainty to the control list. For both measures of uncertainty, the coefficient of CEO power becomes insignificant and positive after adding in the interaction term, while the estimate of the interaction term itself is significantly negative. Therefore, the dismissal probabilities gap between powerful and unpowerful CEOs in Columns (1) and (5) is entirely correlated with uncertainty. Columns (3) and (7) add in more controls and estimate the specification in Equation (1). Columns (4) and (8) estimate the same specification except for controlling for alternative fixed effects (industry-year fixed effects rather than industry fixed effects and year fixed effects). Both specifications confirm the first main finding in this paper, i.e., the more uncertain the environment is, the less likely a powerful CEO is to be fired relative to unpowerful CEOs. The dismissal probability of powerful CEOs decreases with uncertainty, which is not the case for unpowerful ones. The results also show that, among other explanatory variables, *CEO power* is the only one whose relation with forced CEO turnover is consistently moderated by both measures of uncertainty. Those results of statistical tests confirm the graphical patterns in Figure 2.

The results are also economically significant: when uncertainty increases by one standard deviation, dual CEOs become 0.47% or 0.57% less likely to be forced out, depending on whether uncertainty is measured by *Stock volatility* or *Delisting rate*. These magnitudes are substantial, given that the average ratio of forced turnover is merely 2.31% among dual CEOs. For robustness purposes, I run the same regressions with alternative measures of CEO power.

The results are reported in Table A2. For all of the four alternative measures of CEO power, the estimates of the interaction term between CEO power and uncertainty are negative, which confirms my first main finding: compared with unpowerful ones, powerful CEOs become less likely to be fired as uncertainty increases.

To more directly examine the relation between turnover risk and CEO power under various uncertainty levels, I run separate regressions in stable times and uncertain times, respectively. Specifically, I split my sample of firm-years into two halves based on whether the industry-level uncertainty is below or above the median of that industry across all sample years. Then I regress the dummy variable *Forced turnover* on CEO power and other control variables.

Table 3 shows the results. During relatively stable periods, as shown in Panel A, being a dual CEO is associated with either similar or slightly lower dismissal risk, depending on the specification. At maximum, a dual CEO is 0.06% (uncertainty measured by *Stock volatility*) or 0.03% (uncertainty measured by *Delisting rate*) less likely to be fired than a non-dual CEO. In contrast, in relatively uncertain times, the difference in dismissal risk between dual CEOs and non-dual CEOs is much more significant and substantial, as shown in Panel B. Being a dual CEO is associated with 0.23% (uncertainty measured by *Stock volatility*) or 0.15% (uncertainty measured by *Delisting rate*) less probability to be fired in relatively uncertain times. In addition, I test whether CEOs' power affects their turnover-performance sensitivities by adding *Abnormal return* $\times$ *CEO power* to the controls in Columns (4) and (8). Panel B implies that dual CEOs are associated with lower turnover-performance sensitivities in uncertain times, but no such result exists in stable times, as shown in Panel A.

I also do the same analyses using four alternative measures of CEO power

and find generally similar results, as shown in Table OA1. The only exception is *Founder CEO*s, who are significantly less likely to be fired either in uncertain times or stable times. The reason might be that *Founder CEO*s are so powerful that they are rarely fired regardless of the external uncertainty. Table 3 and Table OA1 confirm my first main finding from the perspective of cross-CEO-group comparison: during uncertain times, powerful CEOs are significantly less likely to be fired compared with unpowerful CEOs, while this difference is much smaller and less significant during stable times.

3.2. Optimal dismissal decision or CEO entrenchment?

The second question approached in this paper is whether the fact that powerful CEOs are less likely to be fired during times of uncertainty is efficient. The fact could be possibly explained by either firms' changing preferences on CEO power or CEOs' entrenchment, depending on which CEO turnover theory is employed. Optimal dismissal theory assumes that firms make retention or dismissal decisions efficiently (Gibbons and Murphy, 1990; Bushman et al., 2010). According to that theory, firms assess the suitability of both their incumbent CEOs and potential replacements. Firms retain the incumbent CEOs if and only if they are assessed as better than their potential replacements. Applying this theory to the context of uncertainty, if firms' preferences for powerful CEOs increase with uncertainty, then the dismissal probabilities of powerful CEOs optimally decrease with uncertainty. As opposed to optimal dismissal theory, entrenchment theory assumes that incumbent CEOs are capable of taking various measures to reduce their possibilities of being fired (Shleifer and Vishny, 1989; Hermalin and Weisbach, 1998; Denis et al., 1997; Almazan and Suarez, 2003; Bebchuk and Fried, 2004; Taylor, 2010; Fisman et al., 2014). Following the idea of entrenchment theory, powerful CEOs may take advan-

tage of uncertain periods to exploit their entrenchment, given that replacing them in uncertain times could be extraordinarily costly for firms. This notion of entrenchment provides an alternative explanation for why powerful CEOs are less likely to be dismissed when uncertainty is high. To distinguish those two potential explanations, I examine firm performance, CEO compensation, and stock return during the 2020 Coronavirus Stock Market Crash.

3.2.1. Firm performance

If powerful CEOs are less likely to be fired in uncertain times because of entrenchment, then their average ability should be lower than that of unpowerful CEOs. Therefore, in times of uncertainty, firms led by powerful CEOs should perform worse than those led by unpowerful CEOs. On the contrary, if the turnover decisions are efficiently made, firms led by powerful CEOs should not perform worse in uncertain times. I estimate the following firm-year panel regression:

$$\begin{aligned} Firm\ performance_{it} = \beta_0 + \beta_1 Uncertainty_{It} + \beta_2 CEO\ power_{it} \\ + \beta_3 CEO\ power_{it} \times Uncertainty_{It} + B_4 X_{it} \\ + B_5 X_{it} \times Uncertainty_{It} + d_i + d_t + \varepsilon_{it} \end{aligned} \tag{2}$$

where $Firm\ performance_{it}$ is measured by either Q, ROA, or *Sales growth* of firm i in year t, $CEO\ power_{it}$ is measured by *CEO duality* of firm i in year t, d_i is a dummy for firm i. Other control variables are defined in the identical way as in Equation (1). In alternative specifications, I control for either d_{ij} (a dummy for the pair of firm i and CEO j) and d_t or d_{It} (industry-year fixed effects), as a substitute for d_i and d_t in Equation (2). For cross-CEO-group comparisons, $\beta_2 + \beta_3 Uncertainty_{It}$ measures the performance gap between firms run by powerful CEOs versus those by unpowerful ones when the

uncertainty level is $Uncertainty_{It}$. β_3 measures how the relation between firm performance and CEO power is moderated by uncertainty. Eentrenchment theory predicts that β_3 is negative. By contrast, if optimal dismissal theory is valid, β_3 should be nonnegative.

The results are reported in Table 4. The estimated β_3 is either insignificant or significantly positive, no matter the performance is measured by either Q (Panel A), *ROA* (Panel B), or *Sales growth* (Panel C). That means powerful CEOs' relative performances compared with unpowerful ones do not worsen with uncertainty, which is predicted by optimal dismissal theory.

Therefore, the evidence on firm performance is consistent with optimal dismissal theory as opposed to CEO entrenchment theory.

3.2.2. CEO compensation

Another test I employ to distinguish between optimal dismissal theory and CEO entrenchment theory is on CEO compensation. Studies find that entrenched CEOs receive higher compensation relative to unpowerful peers (Bebchuk and Fried, 2004; Masulis et al., 2009; Morse et al., 2011). CEO entrenchment theory interprets this compensation premium as (partly) due to CEO entrenchment and predicts that, if powerful CEOs exploit their entrenchment in uncertain times, they are likely to enjoy an even higher payment during uncertain periods relative to unpowerful CEOs' compensation.

I regress both the total and the components of CEO yearly compensation on *Uncertainty*, *CEO power* and other controls. The sum and the components of CEO compensation are both in log terms, not only because those variables are skewed but also to be consistent with a model where CEO pay scales linearly with firm size (Edmans et al., 2012). Following Guthrie et al. (2012), I exclude two firms with outlier CEO compensations, Apple and Fossil, from

my sample. Uncertainty is measured by either *Stock volatility* (Panel A) or *Delisting rate* (Panel B). CEO power is measured by *CEO duality*. The firm fixed effects and year fixed effects are controlled for in Columns (1) - (3); the year-industry fixed effects are controlled for in Column (4); the firm-CEO fixed effects and year fixed effects are controlled for in Columns (5) - (8). The coefficient of *CEO power* $\times$ *Uncertainty* indicates how powerful CEOs' higher compensation changes with uncertainty. If the positive wage gap between powerful and unpowerful CEOs widens with uncertainty, then the coefficient of *CEO power* $\times$ *Uncertainty* should be positive.

The results are reported in Table 5. In Column (1), the total compensation is regressed on *Uncertainty* and *CEO power*. The result in Column (1) shows that on average powerful CEOs do receive higher compensation than unpowerful ones, which is consistent with the literature. However, this result itself is insufficient to attest to CEO entrenchment because the higher compensation may be simply a reward for dual CEOs who undertake additional workloads as chairmen. In Columns (2) - (5), the estimated coefficients of *CEO power* $\times$ *Uncertainty* are negative, indicating that the compensation gap between powerful and unpowerful CEOs does not enlarge in times of uncertainty; if anything, the compensation gap decreases with uncertainty. In Columns (6) - (8), I inspect the salary, bonus, and equity-based compensation separately and find that neither of those compensation components witnesses a widened gap between powerful and unpowerful CEOs in times of uncertainty.

Although powerful CEOs are not exceptionally higher paid in uncertain years, they might alternatively secure larger compensation afterward when the firm's operation returns to normal. I examine this possibility by regressing future CEO compensation (in the next year or the year after next) on current uncertainty and other explanatory variables. The results are reported in Ap-

pendix A3, showing that powerful CEOs are not exceptionally higher paid in the years subsequent to uncertain periods either.

In conclusion, the evidence on CEO compensation is also consistent with optimal dismissal theory as opposed to CEO entrenchment theory.

3.2.3. Stock return during the 2020 Coronavirus Stock Market Crash

The results in previous sections confirm the predictions of optimal dismissal theory for the *equilibrium state*: powerful CEOs are more advantageous in uncertain times, firms accordingly raise the evaluation of powerful CEOs, and consequently, they become less likely to be fired when uncertainty increases. In equilibrium, powerful CEOs and unpowerful ones have similar performances because they are assessed and retained based on the same criteria.

However, since finding a suitable new CEO is generally an arduous and time-consuming process, the firm-CEO match is sticky to some extent, and there is often a lag between a board's plan to replace the CEO and the actual occurrence. Therefore, optimal dismissal theory also predicts the *out-of-equilibrium state*: when a sudden uncertainty shock hits, the value of incumbent powerful CEOs increases compared with that of unpowerful ones. Before that change in market conditions materializes in the CEO retention decisions, powerful CEOs should have better performances than unpowerful ones.

I test this prediction by examining the stock market performances at the beginning of the COVID-19 pandemic, an unforeseen and hugely influential uncertainty shock. Between February 20th and March 20th in 2020, the stock market collapsed as the COVID-19 pandemic spurred lots of uncertainty and anxiety. In addition, firms are unlikely to adjust their management team in reaction to the pandemic outbreak during such a short period. Therefore, the beginning of the pandemic provides an ideal setting to test the out-of-

equilibrium prediction.

I compare the stock returns during this period of firms with a powerful CEO versus those with an unpowerful one. If optimal dismissal theory is valid, which implies that powerful CEOs are more advantageous and favored during uncertain times, then powerful CEOs should be associated with higher stock returns than unpowerful ones at the onset of the pandemic. Otherwise, if the CEO entrenchment theory is valid, then the stock returns during this period should be either uncorrelated with CEO power or negatively correlated due to the concern over entrenchment.

Table 6 shows the results. In Panel A, the dependent variable *Return pandemic*, the accumulated return between February 20th and March 20th in 2020, is regressed on *CEO power* and other control variables. *CEO power* is measured by five alternative proxies: *CEO duality*, *CEO's concentration of titles*, *CEO tenure*, *Longer directorship*, and *Founder CEO*. A tiny fraction (13 out of 1546) of firms that experienced a CEO turnover during the one-month period are excluded from the regression sample. Consistent with the prediction of optimal dismissal theory, the correlation between *Return pandemic* and *CEO power* is positive for all the five measures and is significant for four measures except *Longer directorship*. Quantitatively, firms with a dual CEO have 2.8% higher stock returns on average in the one-month period than the other firms.

To alleviate the concern that the observed correlation between higher stock returns and CEO power is not unique to uncertain periods, I repeat the analyses above on the same period (i.e. from February 20th to March 20th) in the previous year, 2019. The results of this placebo test are presented in Panel B, showing no differences in the returns between powerful CEOs and unpowerful ones.

In summary, based on the evidence on firm performance and CEO com-

pensation from 1999 to 2020 and stock return during the 2020 Coronavirus Stock Market Crash, powerful CEOs' lowered forced turnover probabilities during uncertain times should result from optimal dismissal decisions rather than CEO entrenchment. In other words, firms reveal increased preferences for powerful CEOs in times of uncertainty.

3.3. Mechanisms

In the previous section, I show that powerful CEOs are more beneficial and favored by firms in uncertain times. This section examines two mechanisms that potentially explain this increased preference for powerful CEOs in times of uncertainty.

3.3.1. Information sharing

The first potential mechanism I examine is information sharing. During uncertain times, the business environment and firms' internal conditions change fast, with old information becoming obsolete and new information being generated quickly. Therefore, up-to-date information becomes even more crucial for directors to advise and monitor CEOs.

Boards meet periodically to monitor and advice the executives. Independent directors, who are not involved in daily operations, rely on executive directors for firm-specific information. Therefore, during uncertain times, information sharing between the CEO and the board becomes especially important. Adams and Ferreira (2007) model that a CEO faces a trade-off in sharing information, which helps the CEO receive better advice from the board but at the same time possibly causes stricter monitoring. Adams and Ferreira thus argue that a friendly board could be optimal. Following the logic of their theory, friendly boards and powerful CEOs become more beneficial in uncertain times, when efficient information sharing is especially crucial. Therefore, bet-

ter information sharing might make powerful CEOs more popular in times of uncertainty.

I examine this potential mechanism by dividing the sample of firm-year observations into two parts based on their relative information asymmetry compared with their peer firms in the same industry and year. I measure information asymmetry following Duchin et al. (2010). For each firm-year observation, I calculate the number of following analysts, the standard deviation of analysts' quarterly earnings forecasts scaled by book value, and the average bias between analysts' forecasts and actual earnings scaled by book value. Then I convert those three numbers into percentiles (*reversed* percentile for the number of analysts) within the same industry and year. Next, I take the average of those three (reversed) percentiles as the information asymmetry index. The half of the firm-year observations with above-median asymmetry indices constitute the obscure group. The other half of the firm-year observations constitute the transparent group. Since obscure firms face a more severe information asymmetry in times of uncertainty, I hypothesize that the decrease in powerful CEOs' turnover rate is more evident among obscure firms than in transparent firms.

I estimate Equation (1) on each of the two groups, respectively. The results are reported in Table 7. Consistent with my hypothesis, Panel A shows that powerful CEOs of obscure firms become less likely to be fired when uncertainty increases, which is consistent with the baseline results on the entire sample. In contrast, Panel B shows that such a result is not found among transparent firms. The results are robust to whether uncertainty is measured by *Stock volatility* or *Delisting rate*.

3.3.2. Reaction speed

The second possible mechanism I examine is reaction speed. Some firm decisions, especially the major ones, need to be consulted with the board and approved. Unlike executives who run the firm on a daily basis, directors often have other commitments elsewhere. That means more board power and less CEO power unavoidably cause delays in firms' decision-making. In times of uncertainty, the business environment is fast-changing and delayed actions might incur costly consequences.

As busier directors are less likely to respond to requests promptly, having a CEO with more decision-making power might be optimal in uncertain times if the board consists of busier directors. Therefore, I hypothesize that firms with busier directors have especially higher preferences for powerful CEOs in times of uncertainty.

I divide firms into two groups based on the average busyness of their directors, which is measured by the number of directorships they hold in publicly listed firms. A firm is assigned to the busier group if its directors' average number of directorships is above the median among other firms in the same industry and year; otherwise, it is assigned to the less busy group. I reestimate Equation (1) on each of those two groups and report the results in Table 8. The evidence supports my hypothesis: among firms with busier directors, powerful CEOs are significantly less likely to be fired when uncertainty increases, which is consistent with the baseline result on the entire sample; such a result is not found among firms with less busy directors. The evidence is robust to whether uncertainty is measured by *Stock volatility* or *Delisting rate*.

Besides the two mechanisms discussed above, inspired by the risk-shifting literature, I test one more potential mechanism that powerful CEOs are increasingly preferred in times of uncertainty because they transfer wealth from

creditors to shareholders by choosing riskier firm policies. For this mechanism to be valid, powerful CEOs need to be associated with subsequent higher default rates and/or lower survival rates. As shown in Appendix A4, when uncertainty is higher, firms with powerful CEOs are neither less likely to survive nor more likely to default in the subsequent two years. Besides, in untabulated results, I examine risk-related firm policies like leverage and find no significant distinctions between powerful and unpowerful CEOs in times of uncertainty. Therefore, the riskiness of firm policies is unlikely to be a mechanism for my baseline results.

In conclusion, two mechanisms potentially explain why powerful CEOs are more beneficial and increasingly preferred in times of uncertainty: they are more willing to share information with the board, and more capable of making swift responses to changing market conditions.

4. Conclusion

This paper examines whether powerful CEOs are more beneficial in uncertain times. Documenting less powerful CEOs dismissed in uncertain times, I find that the evidence supports optimal dismissal theory, which implies powerful CEOs are more desirable in turbulent times. Two potential mechanisms explain why powerful CEOs are more effective during uncertain times: they are more willing to share information with the board, and more capable of taking quick action.

By showing powerful CEOs benefit firms' performance under uncertainty, this paper complements the existing literature on the consequences of CEO power, which predominantly focuses on the costs of managerial entrenchment. This paper also compares two rival theories for CEO turnover and provides supporting evidence for optimal dismissal theory. In addition, this paper has

important policy implications. Much of the existing and proposed regulations focus on limiting CEOs' power.[3] This paper serves as a caution that having a powerful CEO is sometimes a firm's optimal choice, and thus externally imposed constraints on CEO power might create rather than fix distortions. Alternative to restricting CEO power, it might be advisable for policymakers to assess other tools for protecting shareholder value, like regulating long-term incentive plans to align the CEOs' and shareholders' interests.

Furthermore, my results suggest that business environment interacts with corporate governance, which has been under-discussed in the literature. Future research on corporate governance might benefit from exploring other factors of business environment than uncertainty that also influence the effectiveness of CEO power. In addition, this paper provides an explanation for why CEO duality exists in many firms, while simultaneously bringing up further questions: what are the causes and consequences of the declining prevalence of CEO duality over the past decades? Is that trend efficient? More research needs to be done to answer those questions.

[3]Following the Sarbanes-Oxley Act of 2002, the NYSE and NASDAQ updated their listing rules, which require a majority of independent directors on the corporate board and fully independent nominating, compensation, and audit committees (Guo and Masulis, 2015). The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act) contains provisions that require firms to allow stockholders to nominate directors, make more comprehensive proxy disclosures, and hold shareholder advisory votes on certain corporate governance issues like executive compensation ("Say on Pay"). In 2009 SEC adopted amendments to Regulation S-K, which require companies to disclose why they have chosen to combine or separate the CEO and chairperson roles. There is increasing pressure from investors and experts to split the roles of CEO and board chair. Although SEC has not adopted such a rule, it did force Elon Musk to step aside as chairperson of the Tesla board for three years as part of their settlement in 2018.

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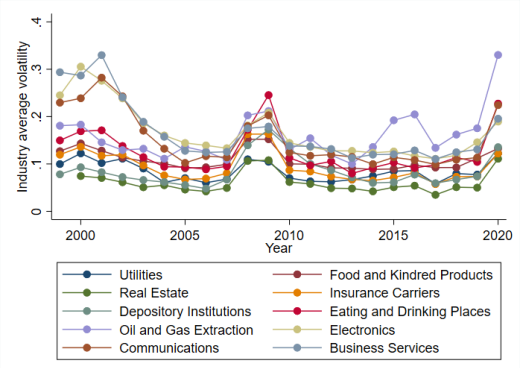
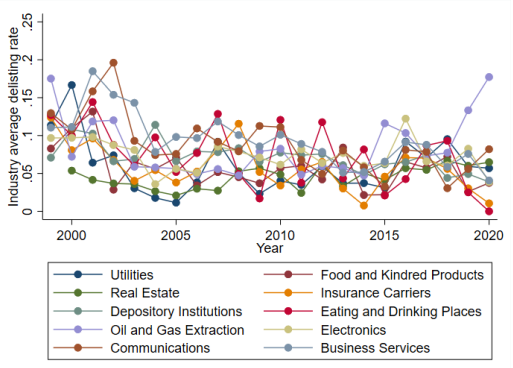
Figure 1
Industry uncertainty over the years

This figure illustrates the trends in industry uncertainty between 1999 and 2020. I pick ten representative industries with relatively large numbers of observations. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Subfigures (a) and (c), and *Delisting rate* in Subfigures (b) and (d). In Subfigures (a) and (b), the vertical axis is the original value of *Stock volatility* and *Delisting rate*, respectively. In Subfigures (c) and (d), the vertical axis is the demeaned-and-detrended value of *Stock volatility* and *Delisting rate*, respectively. Specifically, I subtract the industry average of uncertainty measures from the original value to obtain demeaned value; then, I subtract the year average of demeaned value from the demeaned value to obtain the demeaned-and-detrended value. The demeaning process corresponds to controlling for industry fixed effects in regressions, while detrending corresponds to controlling for year fixed effects.

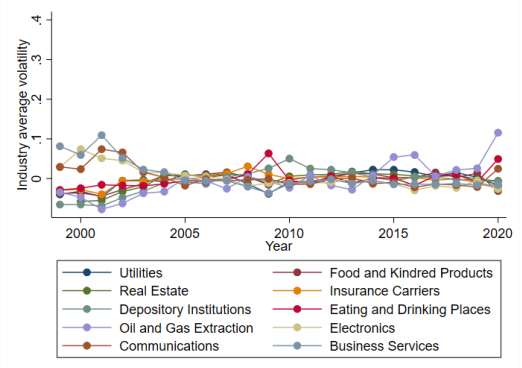
(a) Stock volatility



(b) Delisting rate



(c) Stock volatility, demeaned-and-detrended



(d) Delisting rate, demeaned-and-detrended

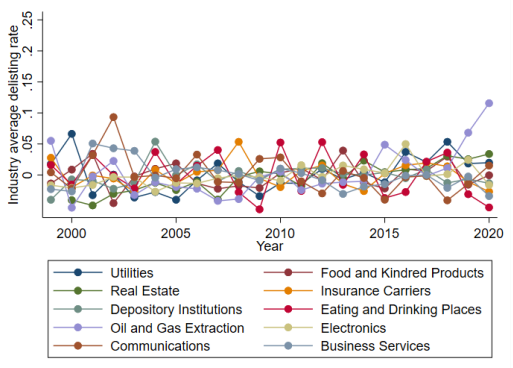
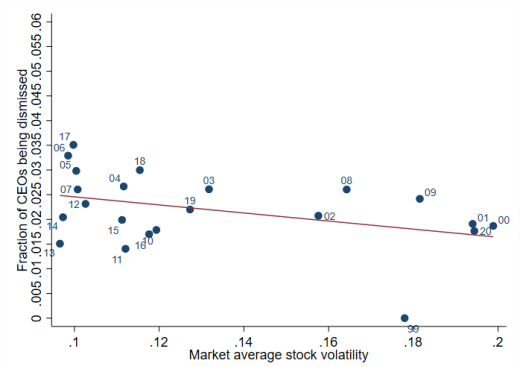


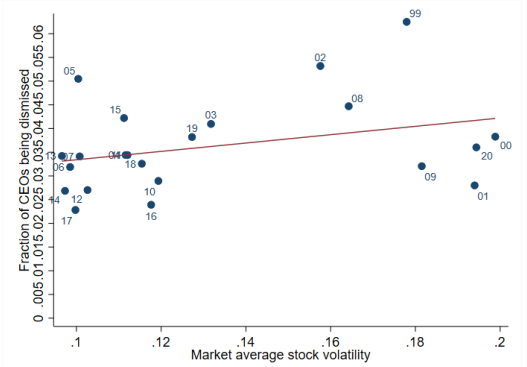
Figure 2
Market uncertainty and CEO forced turnover

This figure illustrates the relations between market-level uncertainty and the fractions of powerful CEOs and unpowerful CEOs being dismissed in each year, repectively. I split the entire sample into two subgroups based on whether the CEO is also the board chair, and then for each subgroup plot the relation between uncertainty and dismissal rate. In all subfigures, each dot represents a year between 1999 and 2020 (the last two digits of the corresponding year are tagged next to each dot). The vertical coordinate of each dot is the fraction of dual CEOs (Subfigures (a) and (c)) or non-dual CEOs (Subfigures (b) and (d)) being dismissed in the corresponding year. The horizontal coordinate of each dot is the market-level uncertainty in the corresponding year, proxied by one of two alternative measures: *Market average stock volatility* (Subfigures (a) and (b)) and *Market average delisting rate* (Subfigures (c) and (d)). Both measures of uncertainty are averaged across all firms in each specific year.

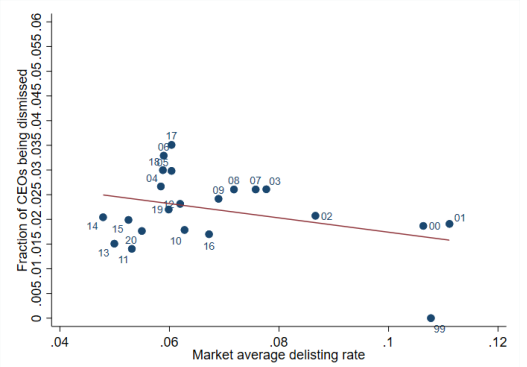
(a) Dual CEOs; uncertainty = *Market average stock volatility*



(b) Non-dual CEOs; uncertainty = *Market average stock volatility*



(c) Dual CEOs; uncertainty = *Market average delisting rate*



(d) Non-dual CEOs; uncertainty = *Market average delisting rate*

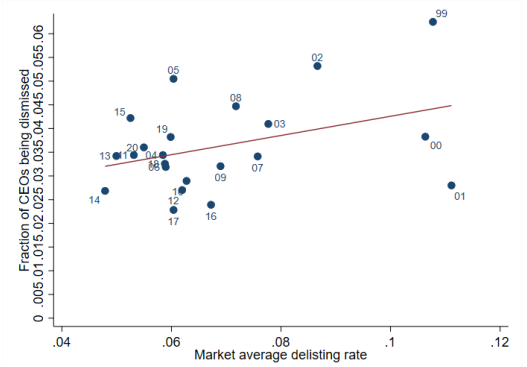


Table 1
Descriptive statistics

This table reports the descriptive statistics of variables. The sample consists of 30,129 firm-years from 1999 to 2020. The description and sources of these variables can be found in Table A1.

	N	Mean	Median	SD	Min	Max
Forced Turnover of CEO						
Forced turnover	32033	0.028	0.000	0.165	0.000	1.000
Environmental Uncertainty						
Stock volatility	32033	0.129	0.123	0.050	0.035	0.334
Delisting rate	32033	0.066	0.063	0.037	0.000	0.405
Market average stock volatility	32033	0.127	0.112	0.033	0.097	0.199
Market average delisting rate	32033	0.065	0.060	0.015	0.048	0.111
CEO Characteristics						
CEO duality	32033	0.538	1.000	0.499	0.000	1.000
CEO's concentration of titles	32033	2.424	2.000	0.522	1.000	3.000
CEO tenure	32033	8.445	6.247	7.150	0.584	39.025
Longer directorship	32029	0.641	1.000	0.480	0.000	1.000
Founder CEO	32033	0.044	0.000	0.205	0.000	1.000
CEO age $\geq$ 60	32033	0.333	0.000	0.471	0.000	1.000
CEO is female	32033	0.031	0.000	0.172	0.000	1.000
Ln(compensation)	31932	8.151	8.225	1.039	4.405	11.348
Ln(salary)	31946	6.450	6.620	1.250	-6.908	7.824
Ln(bonus)	10611	6.147	6.319	1.521	-3.442	9.402
Ln(equity-based)	6069	7.470	7.544	1.354	-1.609	11.052
Firm Performance and Characteristics						
Q	32028	1.934	1.490	1.349	0.588	37.772
ROA	30594	0.118	0.115	0.100	-0.521	0.471
Sales growth	32011	0.090	0.063	0.235	-0.697	2.790

Continued on next page

Table 1 continued

Surviving the next two years	32033	0.948	1.000	0.222	0.000	1.000
Defaulting in the next two years	14809	0.002	0.000	0.042	0.000	1.000
Abnormal return	32033	0.049	-0.002	0.430	-0.902	6.620
Independent board	32033	0.779	0.818	0.136	0.000	1.000
Firm Size	32033	7.388	7.296	1.605	2.926	11.999
Board size	32033	9.454	9.000	2.403	5.000	25.000
Female director	32033	0.741	1.000	0.438	0.000	1.000
CEO successor	32033	0.196	0.000	0.397	0.000	1.000
Information asymmetry	31133	50.150	49.333	19.506	7.333	96.667
# Directorships	32033	1.877	1.800	0.607	1.000	4.727

Table 2
Regression of forced CEO turnover

This table presents the regression estimation of the impacts of uncertainty, CEO characteristics, and firm characteristics on forced CEO turnovers. The dependent variable *Forced turnover* is a dummy, equal to 1 if a CEO is dismissed in that year and 0 otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. In Columns (2) - (4) and (6) - (8), CEO power and other CEO and firm characteristics are interacted with uncertainty, in order to show how their impacts on forced CEO turnover are moderated by uncertainty. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (3) and (5) - (7), while the year-industry fixed effects are controlled for in Columns (4) and (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	*Forced turnover*							
Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Uncertainty	0.078**	0.127***	0.060		0.044	0.121***	0.105	
	(0.04)	(0.05)	(0.14)		(0.03)	(0.05)	(0.18)	
CEO power	-0.006**	0.005	0.005	-0.000	-0.006**	0.003	0.001	-0.002
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CEO power × Uncertainty		-0.081**	-0.104***	-0.095***		-0.134***	-0.141***	-0.156***
		(0.04)	(0.04)	(0.03)		(0.04)	(0.04)	(0.05)
Abnormal return			-0.058***	-0.070***			-0.040***	-0.045***
			(0.01)	(0.01)			(0.01)	(0.01)
Abnormal return × Uncertainty			0.122**	0.161***			0.018	0.020
			(0.05)	(0.06)			(0.07)	(0.09)
Independent board			-0.018	0.028			-0.021	0.006

Continued on next page

Table 2 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(0.03)	(0.03)			(0.02)	(0.02)
Independent board × Uncertainty			0.063	-0.166			0.154	-0.032
			(0.14)	(0.16)			(0.19)	(0.22)
Firm Size			0.004	0.003			0.002	0.000
			(0.00)	(0.00)			(0.00)	(0.00)
Firm Size × Uncertainty			-0.015	-0.013			-0.003	0.017
			(0.02)	(0.02)			(0.02)	(0.02)
CEO age ≥ 60			0.002	0.000			-0.002	-0.006
			(0.00)	(0.00)			(0.00)	(0.00)
CEO age ≥ 60 × Uncertainty			0.026	0.013			0.104**	0.130**
			(0.03)	(0.03)			(0.05)	(0.06)
CEO is female			0.005	0.009			-0.002	0.006
			(0.02)	(0.01)			(0.02)	(0.02)
CEO is female × Uncertainty			-0.073	-0.033			-0.027	-0.017
			(0.12)	(0.12)			(0.25)	(0.26)
Board size			-0.003**	-0.002			-0.001	0.001
			(0.00)	(0.00)			(0.00)	(0.00)
Board size × Uncertainty			0.010	0.006			-0.008	-0.030*
			(0.01)	(0.01)			(0.02)	(0.02)
Female director			-0.001	-0.001			0.003	0.004
			(0.01)	(0.01)			(0.01)	(0.01)

Continued on next page

Table 2 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female director × Uncertainty			0.011	0.013			-0.031	-0.039
			(0.05)	(0.05)			(0.06)	(0.07)
CEO successor			0.002	0.004			0.010*	0.005
			(0.01)	(0.01)			(0.01)	(0.01)
CEO successor × Uncertainty			0.037	0.018			-0.032	0.015
			(0.05)	(0.05)			(0.06)	(0.06)
Observations	32033	32033	32033	32033	32033	32033	32033	32033
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes

Table 3
Separate regressions of forced CEO turnover during stable times and uncertain times

This table presents the regression estimation of the impacts of uncertainty, CEO characteristics, and firm characteristics on forced CEO turnovers in more stable times and more uncertain times, respectively. The sample of firm-years is split into two halves based on whether the industry-level uncertainty, measured by either *Stock volatility* or *Delisting rate*, is lower or higher than the median uncertainty of that industry across all sample years. The dependent variable *Forced turnover* is a dummy, equal to 1 if a CEO is dismissed in that year and 0 otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. In Columns (4) and (8), CEO power is interacted with *Abnormal return*, in order to show how CEO power affects their turnover-performance sensitivity. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (2) and (5) - (6), while the year-industry fixed effects are controlled for in Columns (3) - (4) and (7) - (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	*Forced turnover*							
Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Relatively stable times								
Uncertainty	0.215	0.145			0.057	0.050		
	(0.16)	(0.18)			(0.09)	(0.08)		
CEO power	-0.002	-0.004	-0.006*	-0.006*	-0.004	-0.005*	-0.006**	-0.006**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.051***	-0.056***	-0.060***		-0.039***	-0.041***	-0.045***
		(0.01)	(0.01)	(0.01)		(0.00)	(0.00)	(0.01)
Independent board		0.003	0.012	0.012		0.007	0.010	0.011
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)

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Table 3 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm Size		0.002	0.001	0.001		0.000	-0.000	-0.000
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
CEO age $\geq$ 60		0.003	0.002	0.002		0.001	0.001	0.000
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
CEO is female		-0.001	0.002	0.002		-0.003	0.000	0.001
		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Board size		-0.002***	-0.002***	-0.002***		-0.001*	-0.001	-0.001
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Female director		0.001	0.002	0.002		0.002	0.001	0.001
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
CEO successor		0.005	0.006	0.006		0.007	0.006	0.006
		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Abnormal return $\times$ CEO power				0.009				0.008
				(0.01)				(0.01)
Observations	16216	16216	16216	16216	17043	17043	17043	17043
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel B: Relatively uncertain times								
Uncertainty	0.139***	0.126***			-0.024	-0.017		
	(0.04)	(0.04)			(0.06)	(0.06)		

Continued on next page

Table 3 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CEO power	-0.010***	-0.013***	-0.015***	-0.016***	-0.010***	-0.014***	-0.016***	-0.017***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.032***	-0.035***	-0.042***		-0.040***	-0.043***	-0.052***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.01)
Independent board		-0.013	-0.010	-0.011		-0.012	-0.008	-0.009
		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Firm Size		0.001	0.001	0.002		0.003**	0.003**	0.003**
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
CEO age $\geq$ 60		0.007**	0.005	0.005		0.009***	0.007**	0.007**
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
CEO is female		-0.004	0.000	0.000		-0.004	0.001	0.001
		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Board size		-0.001	-0.001	-0.001		-0.002*	-0.002*	-0.002*
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Female director		0.001	-0.000	-0.000		0.001	0.000	0.000
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
CEO successor		0.008**	0.006*	0.006*		0.006*	0.006*	0.006*
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Abnormal return $\times$ CEO power				0.014**				0.016***
				(0.01)				(0.01)
Observations	15817	15817	15817	15817	14990	14990	14990	14990

Continued on next page

Table 3 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes

Table 4
Regression of firm performance

This table presents the regression estimation of the impacts of CEO power and uncertainty on firm performance. The dependent variable is Q in Panel A, *ROA* in Panel B, and *Sales growth* in Panel C. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (5), and *Delisting rate* in Columns (6) - (10). All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. In Columns (2) - (5) and (7) - (10), CEO power and other controls are interacted with uncertainty, in order to show how their impacts on firm performance are moderated by uncertainty. The untabulated control variables in Panels B - C are the same as in Panel A. The year fixed effects are controlled for throughout all specifications except for Columns (4) and (9). The firm fixed effects are controlled for in Columns (1) - (3) and (6) - (8), while the firm-CEO fixed effects are controlled for in Columns (5) and (10). The year-industry fixed effects are controlled for in Columns (4) and (9). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Uncertainty =	*Stock volatility*					*Delisting rate*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Dependent variable = Q										
Uncertainty	2.170**	1.930*	3.641**		1.277	-0.900**	-0.921	-0.539		-1.641
	(0.92)	(1.12)	(1.46)		(1.39)	(0.37)	(0.58)	(2.00)		(2.03)
CEO power	0.063**	0.010	-0.037	0.056	-0.080	0.064**	0.062	0.066	0.067	0.008
	(0.03)	(0.07)	(0.06)	(0.06)	(0.07)	(0.03)	(0.05)	(0.04)	(0.04)	(0.06)
CEO power × Uncertainty		0.412	0.767	0.021	0.699*		0.036	0.027	-0.113	0.040
		(0.55)	(0.49)	(0.44)	(0.38)		(0.58)	(0.56)	(0.51)	(0.47)
Abnormal return			0.487***	0.622***	0.502***			0.561***	0.654***	0.509***
			(0.15)	(0.14)	(0.15)			(0.14)	(0.14)	(0.15)
Abnormal return × Uncertainty			1.346	0.587	0.996			1.923	0.835	2.060
			(1.20)	(1.05)	(1.26)			(2.36)	(2.05)	(2.57)
Independent board			0.188	-1.008***	0.185			-0.246	-0.429**	-0.105

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Table 4 continued

Uncertainty =	*Stock volatility*					*Delisting rate*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			(0.29)	(0.23)	(0.18)			(0.19)	(0.18)	(0.16)
Independent board × Uncertainty			-1.495	6.428***	-1.081			2.413	4.941**	1.589
			(1.77)	(1.70)	(1.43)			(2.08)	(2.35)	(2.24)
Firm Size			-0.022	-0.081**	-0.001			-0.039	-0.061**	-0.007
			(0.06)	(0.04)	(0.05)			(0.04)	(0.03)	(0.03)
Firm Size × Uncertainty			-0.063	0.046	0.070			0.011	-0.196	0.176
			(0.26)	(0.16)	(0.27)			(0.17)	(0.14)	(0.14)
CEO age ≥ 60			0.093*	0.042	0.127**			0.048	0.044	0.046
			(0.05)	(0.04)	(0.06)			(0.03)	(0.03)	(0.03)
CEO age ≥ 60 × Uncertainty			-0.587	-0.178	-0.780*			-0.515	-0.394	-0.249
			(0.45)	(0.37)	(0.46)			(0.38)	(0.36)	(0.29)
CEO is female			-0.032	-0.059				0.019	0.114	
			(0.19)	(0.17)				(0.11)	(0.10)	
CEO is female × Uncertainty			0.973	1.274				1.163	-0.199	
			(1.60)	(1.34)				(1.12)	(1.10)	
Board size			-0.011	0.005	-0.020			-0.008	-0.015	-0.009
			(0.02)	(0.02)	(0.02)			(0.01)	(0.01)	(0.01)
Board size × Uncertainty			-0.141	-0.228*	-0.036			-0.328*	-0.147	-0.243*
			(0.19)	(0.14)	(0.18)			(0.18)	(0.15)	(0.14)
Female director			-0.075	-0.102	-0.045			-0.053	-0.043	-0.025
			(0.07)	(0.06)	(0.07)			(0.05)	(0.05)	(0.05)

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Table 4 continued

Uncertainty =	*Stock volatility*					*Delisting rate*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Female director × Uncertainty			0.393	0.786	0.373			0.531	0.661	0.477
			(0.70)	(0.61)	(0.66)			(0.52)	(0.50)	(0.57)
CEO successor			-0.147*	-0.093	-0.118**			-0.034	-0.044	-0.035
			(0.08)	(0.06)	(0.05)			(0.03)	(0.03)	(0.04)
CEO successor × Uncertainty			1.346**	0.838	0.845**			1.096***	0.996***	0.548
			(0.62)	(0.57)	(0.40)			(0.34)	(0.30)	(0.48)
Observations	28569	28569	28569	28569	28569	28569	28569	28569	28569	28569
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Firm FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
FirmCEO FE	No	No	No	No	Yes	No	No	No	No	Yes
YearIndustry FE	No	No	No	Yes	No	No	No	No	Yes	No
Panel B: Dependent variable = *ROA*										
Uncertainty	-0.318**	-0.392***	-0.408***		-0.453***	-0.078	-0.128	-0.114		-0.133
	(0.13)	(0.14)	(0.14)		(0.13)	(0.06)	(0.09)	(0.18)		(0.14)
CEO power	0.006**	-0.011**	-0.016***	-0.006**	-0.010**	0.006*	0.000	-0.004	-0.002	0.001
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CEO power × Uncertainty		0.126***	0.124***	0.052**	0.099***		0.087	0.066	0.038	0.044
		(0.05)	(0.04)	(0.02)	(0.03)		(0.06)	(0.04)	(0.04)	(0.03)
Observations	27231	27231	27231	27231	27231	27231	27231	27231	27231	27231
Controls	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Firm FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No

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Table 4 continued

Uncertainty =	*Stock volatility*					*Delisting rate*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FirmCEO FE	No	No	No	No	Yes	No	No	No	No	Yes
YearIndustry FE	No	No	No	Yes	No	No	No	No	Yes	No
Panel C: Dependent variable = *Sales growth*										
Uncertainty	-0.661*	-0.681*	-0.461		-0.976*	-0.278	-0.281	-0.733		-1.104
	(0.34)	(0.38)	(0.75)		(0.57)	(0.19)	(0.21)	(0.66)		(0.69)
CEO power	0.011***	0.007	-0.001	0.021*	0.016	0.011***	0.011	0.013*	0.009	0.022**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		0.034	0.056	-0.118	0.009		0.005	-0.093	-0.050	-0.045
		(0.11)	(0.10)	(0.08)	(0.11)		(0.10)	(0.09)	(0.11)	(0.09)
Observations	28551	28551	28551	28551	28551	28551	28551	28551	28551	28551
Controls	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Firm FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
FirmCEO FE	No	No	No	No	Yes	No	No	No	No	Yes
YearIndustry FE	No	No	No	Yes	No	No	No	No	Yes	No

Table 5
Regression of CEO compensation

This table presents the regression estimation of the impacts of CEO power and uncertainty on CEO compensation. In Columns (1) - (5), the dependent variable is the natural logarithm of CEO total compensation. In Columns (6) - (8), the dependent variable is the natural logarithm of one of the components of CEO compensation: *Salary*, *Bonus*, or *Equity-based* component. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Panel A, and *Delisting rate* in Panel B. All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. In Columns (2) - (8), CEO power and other controls are interacted with uncertainty, in order to show how their impacts on CEO compensation are moderated by uncertainty. The year fixed effects are controlled for throughout all specifications except for Column (4). The firm fixed effects are controlled for in Columns (1) - (3), while the firm-CEO fixed effects are controlled for in Columns (5) - (8). The year-industry fixed effects are controlled for in Column (4). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	Ln(*Compensation*)					Ln(*Salary*)	Ln(*Bonus*)	Ln(*Equity-based*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Uncertainty = *Stock volatility*								
Uncertainty	-0.370	-0.118	0.778		1.333	0.682	3.119	3.858
	(0.51)	(0.58)	(1.01)		(1.03)	(1.87)	(2.01)	(2.38)
CEO power	0.095***	0.148***	0.118***	0.138***	0.084*	0.040	0.245	0.231
	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.17)	(0.14)
CEO power × Uncertainty		-0.406	-0.453*	-0.651**	-0.319	0.243	-0.734	-0.851
		(0.25)	(0.23)	(0.26)	(0.29)	(0.28)	(0.69)	(0.78)
Abnormal return			0.187***	0.207***	0.180***	-0.004	0.319***	0.028
			(0.03)	(0.04)	(0.04)	(0.03)	(0.08)	(0.09)
Abnormal return × Uncertainty			-0.389*	-0.494**	-0.427	0.117	-0.830**	-0.150
			(0.20)	(0.23)	(0.30)	(0.14)	(0.38)	(0.46)

Continued on next page

Table 5 continued

Dependent variable =	Ln(*Compensation*)					Ln(*Salary*)	Ln(*Bonus*)	Ln(*Equity-based*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent board			0.337***	0.219	0.360**	0.308	0.051	0.468
			(0.12)	(0.17)	(0.15)	(0.23)	(0.37)	(0.34)
Independent board × Uncertainty			-0.125	1.581	-1.020	-1.371	-0.843	-1.029
			(0.77)	(1.08)	(0.80)	(1.76)	(1.72)	(1.71)
Firm Size			0.375***	0.434***	0.361***	0.141***	0.446***	0.583***
			(0.04)	(0.02)	(0.04)	(0.03)	(0.07)	(0.09)
Firm Size × Uncertainty			0.030	-0.174	0.051	-0.126	-0.177	-0.156
			(0.14)	(0.12)	(0.14)	(0.12)	(0.20)	(0.30)
CEO age ≥ 60			0.046	0.031	0.057*	0.066	-0.082	-0.111
			(0.04)	(0.04)	(0.03)	(0.06)	(0.07)	(0.10)
CEO age ≥ 60 × Uncertainty			-0.521**	-0.431	-0.483**	-0.252	0.284	0.122
			(0.26)	(0.28)	(0.23)	(0.33)	(0.48)	(0.68)
CEO is female			0.133	0.116				
			(0.09)	(0.08)				
CEO is female × Uncertainty			-1.035*	-0.961*				
			(0.53)	(0.50)				
Board size			0.008	-0.007	-0.002	-0.009	-0.015	-0.047*
			(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Board size × Uncertainty			0.003	0.098	-0.006	0.131**	-0.079	0.288**
			(0.09)	(0.08)	(0.08)	(0.06)	(0.14)	(0.14)
Female director			0.090***	0.057*	0.102***	0.063	-0.063	0.185

Continued on next page

Table 5 continued

Dependent variable =	Ln(*Compensation*)					Ln(*Salary*)	Ln(*Bonus*)	Ln(*Equity-based*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(0.03)	(0.03)	(0.03)	(0.08)	(0.13)	(0.16)
Female director × Uncertainty			-0.381*	-0.129	-0.600***	-0.198	-0.059	-1.170
			(0.20)	(0.24)	(0.16)	(0.49)	(0.80)	(1.02)
CEO successor			-0.074*	-0.047	-0.037	-0.008	-0.155	-0.087
			(0.04)	(0.04)	(0.04)	(0.03)	(0.09)	(0.11)
CEO successor × Uncertainty			0.526*	0.346	0.286	0.305	0.602	0.682
			(0.30)	(0.30)	(0.23)	(0.39)	(0.46)	(0.51)
Observations	25432	25432	25432	25432	25432	25439	8698	4979
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	No	No	No	No	No
FirmCEO FE	No	No	No	No	Yes	Yes	Yes	Yes
YearIndustry FE	No	No	No	Yes	No	No	No	No
Panel B: Uncertainty = *Delisting rate*								
Uncertainty	0.083	0.076	-1.831*		-0.676	1.842	-1.802	-2.689
	(0.18)	(0.23)	(0.96)		(1.13)	(1.88)	(1.88)	(3.24)
CEO power	0.095***	0.094***	0.089***	0.081***	0.065**	0.066**	0.188*	0.143
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.10)	(0.09)
CEO power × Uncertainty		0.011	-0.431*	-0.397*	-0.302	0.098	-0.546	-0.573
		(0.25)	(0.22)	(0.22)	(0.22)	(0.25)	(0.63)	(0.74)
Abnormal return			0.117***	0.128***	0.101***	0.004	0.237***	0.024
			(0.02)	(0.02)	(0.02)	(0.03)	(0.06)	(0.07)
Abnormal return × Uncertainty			0.109	0.002	0.147	0.129	-0.667	-0.188

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Table 5 continued

Dependent variable =	Ln(*Compensation*)					Ln(*Salary*)	Ln(*Bonus*)	Ln(*Equity-based*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(0.22)	(0.25)	(0.23)	(0.33)	(0.58)	(0.67)
Independent board			0.334***	0.506***	0.224**	0.202	-0.230	0.268
			(0.10)	(0.11)	(0.10)	(0.13)	(0.24)	(0.21)
Independent board × Uncertainty			-0.160	-0.751	-0.160	-1.318	1.892	-0.121
			(0.91)	(1.18)	(0.96)	(1.63)	(1.75)	(2.20)
Firm Size			0.366***	0.402***	0.359***	0.130***	0.435***	0.532***
			(0.03)	(0.02)	(0.04)	(0.02)	(0.08)	(0.09)
Firm Size × Uncertainty			0.172	0.140	0.112	-0.068	-0.206	0.379
			(0.13)	(0.14)	(0.11)	(0.11)	(0.35)	(0.32)
CEO age ≥ 60			-0.023	-0.025	-0.022	0.026	-0.051	-0.033
			(0.02)	(0.02)	(0.02)	(0.04)	(0.05)	(0.07)
CEO age ≥ 60 × Uncertainty			0.043	0.032	0.342*	0.149	0.099	-0.499
			(0.23)	(0.27)	(0.20)	(0.33)	(0.59)	(0.74)
CEO is female			0.047	0.042				
			(0.06)	(0.06)				
CEO is female × Uncertainty			-0.677	-0.672				
			(0.64)	(0.58)				
Board size			-0.001	-0.006	-0.002	0.012	-0.040**	-0.014
			(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Board size × Uncertainty			0.120	0.155	-0.009	-0.064	0.181	0.050
			(0.07)	(0.10)	(0.06)	(0.06)	(0.17)	(0.17)

Continued on next page

Table 5 continued

Dependent variable =	Ln(*Compensation*)					Ln(*Salary*)	Ln(*Bonus*)	Ln(*Equity-based*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female director			0.042*	0.046*	0.017	0.029	-0.038	0.118
			(0.02)	(0.02)	(0.02)	(0.04)	(0.10)	(0.08)
Female director × Uncertainty			-0.079	-0.129	0.102	0.137	-0.435	-1.197
			(0.25)	(0.34)	(0.25)	(0.32)	(0.62)	(0.91)
CEO successor			0.001	-0.006	-0.005	0.015	-0.167***	-0.055
			(0.02)	(0.02)	(0.02)	(0.03)	(0.06)	(0.08)
CEO successor × Uncertainty			-0.052	0.060	0.078	0.281	1.259**	0.812
			(0.24)	(0.30)	(0.26)	(0.40)	(0.55)	(0.72)
Observations	25432	25432	25432	25432	25432	25439	8698	4979
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	No	No	No	No	No
FirmCEO FE	No	No	No	No	Yes	Yes	Yes	Yes
YearIndustry FE	No	No	No	Yes	No	No	No	No

Table 6
Regression of the returns during the 2020 Coronavirus Stock Market Crash

This table presents the regression estimation of the impacts of CEO power on the stock returns during the 2020 Coronavirus Stock Market Crash. In panel A, the dependent variable is *Return pandemic*, the accumulated return between February 20th and March 20th in 2020, during which period the stock market in the U.S. collapsed sharply due to fear of uncertainty. CEO power is measured by five alternative proxies: *Dual CEO*, *CEO's concentration of titles*, *CEO tenure*, *Longer directorship*, and *Founder CEO*. All explanatory variables are on the firm level. Panel B shows the results of a placebo test, which replicates the regressions in Panel A on the same period but in the previous year (i.e. between Febrary 20th and March 20th in 2019). Standard errors are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

CEO power =	*Dual CEO*		*Concentration of titles*		*CEO tenure*		*Longer directorship*		*Founder CEO*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Dependent variable = *Return pandemic*										
CEO power	0.030***	0.028***	0.027***	0.027***	0.001*	0.001**	0.007	0.005	0.045**	0.052***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.02)	(0.02)
Independent board		-0.062		-0.074		-0.045		-0.055		-0.041
		(0.05)		(0.05)		(0.05)		(0.05)		(0.05)
Firm Size		0.009**		0.009**		0.010***		0.010***		0.010***
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
CEO age $\geq$ 60		-0.006		-0.005		-0.010		-0.000		-0.002
		(0.01)		(0.01)		(0.01)		(0.01)		(0.01)
CEO is female		0.007		0.003		0.001		0.003		0.003
		(0.02)		(0.02)		(0.02)		(0.02)		(0.02)
Board size		0.001		0.001		0.001		0.000		0.001
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Female director		-0.014		-0.035		-0.008		-0.039		-0.011
		(0.03)		(0.04)		(0.03)		(0.04)		(0.03)

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Table 6 continued

CEO power =	*Dual CEO*		*Concentration of titles*		*CEO tenure*		*Longer directorship*		*Founder CEO*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CEO successor		0.012		0.013		0.008		0.013		0.011
		(0.02)		(0.02)		(0.02)		(0.02)		(0.02)
Constant	-0.411***	-0.417***	-0.459***	-0.440***	-0.407***	-0.446***	-0.403***	-0.401***	-0.401***	-0.441***
	(0.01)	(0.05)	(0.02)	(0.05)	(0.01)	(0.05)	(0.01)	(0.05)	(0.00)	(0.05)
Observations	1427	1424	1449	1447	1468	1465	1400	1398	1478	1475
Panel B: Dependent variable = *Return placebo*										
CEO power	-0.007	-0.006	-0.004	-0.005	-0.000	-0.000	0.002	0.004	0.011	0.011
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Independent board		0.014		0.016		0.008		0.010		0.009
		(0.02)		(0.03)		(0.02)		(0.03)		(0.02)
Firm Size		0.001		0.001		0.001		0.001		0.001
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
CEO age $\geq$ 60		-0.007		-0.006		-0.006		-0.009*		-0.007
		(0.00)		(0.00)		(0.01)		(0.00)		(0.00)
CEO is female		0.004		0.001		0.002		0.005		0.002
		(0.01)		(0.01)		(0.01)		(0.01)		(0.01)
Board size		-0.001		-0.001		-0.001		-0.001		-0.001
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Female director		-0.009		-0.017		-0.017		-0.008		-0.014
		(0.01)		(0.01)		(0.01)		(0.01)		(0.01)
CEO successor		-0.023***		-0.024***		-0.023***		-0.023***		-0.023***

Continued on next page

Table 6 continued

CEO power =	*Dual CEO*		*Concentration of titles*		*CEO tenure*		*Longer directorship*		*Founder CEO*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		(0.01)		(0.01)		(0.01)		(0.01)		(0.01)
Constant	-0.015***	-0.016	-0.008	0.003	-0.015***	-0.002	-0.019***	-0.015	-0.019***	-0.007
	(0.00)	(0.02)	(0.01)	(0.02)	(0.00)	(0.02)	(0.00)	(0.02)	(0.00)	(0.02)
Observations	1539	1537	1562	1561	1585	1583	1512	1511	1591	1589

Table 7
Forced CEO turnover in obscure versus transparent firms

This table presents the regression estimation of the impacts of CEO power and uncertainty on forced CEO turnovers among obscure firms and transparent firms, respectively. Firms are split into two groups based on their relative information asymmetry compared with their peer firms in the same industry and year. The half of firms that have fewer analysts following and less homogeneous or accurate analysts' quarterly earnings forecasts constitute the obscure group (Panel A). The other half of firms constitute the transparent group (Panel B). The dependent variable *Forced turnover* is a dummy, equal to 1 if a CEO is dismissed in that year and 0 otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. The untabulated control variables in Columns (3) - (4) and (7) - (8) are the same as in Table 2. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (3) and (5) - (7), while the year-industry fixed effects are controlled for in Columns (4) and (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	*Forced turnover*							
Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Obscure firms								
Uncertainty	0.255***	0.302***	-0.058		0.114*	0.211***	0.063	
	(0.06)	(0.07)	(0.29)		(0.06)	(0.08)	(0.37)	
CEO power	-0.008**	0.003	0.004	0.004	-0.008**	0.004	0.003	0.002
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		-0.083	-0.120**	-0.140**		-0.184***	-0.216***	-0.241***
		(0.05)	(0.06)	(0.06)		(0.07)	(0.07)	(0.09)
Observations	15105	15105	15105	15105	15105	15105	15105	15105
Controls	No	No	Yes	Yes	No	No	Yes	Yes

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Table 7 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes
Panel B: Transparent firms								
Uncertainty	-0.060	-0.038	0.124		-0.016	-0.002	0.094	
	(0.06)	(0.07)	(0.19)		(0.03)	(0.06)	(0.25)	
CEO power	-0.005	-0.000	-0.001	-0.006	-0.005	-0.003	-0.005	-0.006
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		-0.035	-0.046	-0.026		-0.023	-0.024	-0.045
		(0.05)	(0.05)	(0.05)		(0.06)	(0.06)	(0.08)
Observations	16028	16028	16028	16028	16028	16028	16028	16028
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes

Table 8
Forced CEO turnover in firms with a busier versus less busy board

This table presents the regression estimation of the impacts of CEO power and uncertainty on forced CEO turnovers among firms with a busier board and those with a less busy board, respectively. Firms are split into two groups based on the average number of directorships in listed firms held by each of their directors, compared with those of their peer firms in the same industry and year. The half of firms that have more directorships per director constitute the busier group (Panel A). The other half of firms constitute the less busy group (Panel B). The dependent variable *Forced turnover* is a dummy, equal to 1 if a CEO is dismissed in that year and 0 otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. The untabulated control variables in Columns (3) - (4) and (7) - (8) are the same as in Table 2. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (3) and (5) - (7), while the year-industry fixed effects are controlled for in Columns (4) and (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	*Forced turnover*							
Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Firms with a busier board								
Uncertainty	0.126**	0.208***	0.045		0.067	0.196***	0.087	
	(0.06)	(0.06)	(0.24)		(0.04)	(0.07)	(0.30)	
CEO power	-0.003	0.015**	0.014*	0.013	-0.003	0.012**	0.009	0.013*
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		-0.134***	-0.141**	-0.154**		-0.218***	-0.209**	-0.305***
		(0.05)	(0.06)	(0.06)		(0.08)	(0.09)	(0.11)
Observations	15697	15697	15697	15697	15697	15697	15697	15697

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Table 8 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes
Panel B: Firms with a less busy board								
Uncertainty	0.001	0.007	0.045		0.021	0.051	0.178	
	(0.05)	(0.07)	(0.18)		(0.04)	(0.06)	(0.20)	
CEO power	-0.005*	-0.004	-0.001	-0.002	-0.005*	-0.002	-0.003	-0.003
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		-0.012	-0.053	-0.068		-0.053	-0.073	-0.116
		(0.07)	(0.07)	(0.08)		(0.07)	(0.07)	(0.09)
Observations	16336	16336	16336	16336	16336	16336	16336	16336
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes

A Appendix

A.1 Examples of power rearrangement during the pandemic

Anecdotal evidence tends to show that a larger number of firms were managed by a powerful CEO during the extraordinarily uncertain period at the beginning of the COVID-19 pandemic. Some firms extended the tenures of their experienced CEOs: IAG postponed the planned retirement of its CEO Willie Walsh on June 30 in 2020, because "As we respond to COVID-19, ..., management stability across the Group should be a priority" (Garcia, 2020); in July 2020 Greenbrier announced that its CEO Bill Furman postponed his retirement for two years because "the current COVID-19 crisis and accompanying environment of economic uncertainty requires an experienced industry and management team to lead Greenbrier through extraordinary times" (Rattner, 2020).

At the same time, some firms witness the comeback of their once-distanced powerful CEOs: Amazon's founder and then-CEO Jeff Bezos, who had distanced himself from day-to-day management since years ago, took back charge of its daily operation soon after the pandemic started spreading across US in March 2020 (Weise, 2020); Bob Iger, who passed the baton of CEO of Disney to Bob Chapek in February 2021 and became executive chairman himself, effectively returned to running the company merely a few weeks later, explaining that "a crisis of this magnitude, and its impact on Disney, would necessarily result in my actively helping Bob [Chapek] and the company contend with it, particularly since I ran the company for 15 years!" (Smith, 2020).

For some other firms, this crisis leads to further concentration of power: SAP SE transformed from co-CEO to sole CEO model amid the coronavirus pandemic "to ensure strong, unambiguous steering in times of an unprecedented crisis" (Armental, 2020).

Table A1
Definition of Variables

Variable	Description	Sources
Forced Turnover of CEO		
Forced turnover	A dummy variable with value "1" indicating a firm's CEO is dismissed in that year and value "0" otherwise.	Gentry et al. (2021)
Environmental Uncertainty		
Stock volatility	Industry equally-weighted average of individual stocks' yearly volatilities, computed from their monthly returns. Firms with the same two-digit SIC code are viewed as in the same industry. (same below)	CRSP-monthly
Delisting rate	The fraction of delisted firms in each industry and year, due to either merger (the first digit of the delisting code=2), liquidation (the first digit of the delisting code=4), or delisting by NYSE, NYSE MKT, NASDAQ or Arca (the first digit of the delisting code=5).	CRSP-Delisting
Market average stock volatility	The equally-weighted average of the yearly volatilities of individual stocks of the entire sample firms, computed from their monthly returns.	CRSP-monthly
Market average delisting rate	The fraction of delisted firms each year among the entire sample firms, due to either merger (the first digit of the delisting code=2), liquidation (the first digit of the delisting code=4), or delisting by NYSE, NYSE MKT, NASDAQ or Arca (the first digit of the delisting code=5).	CRSP-Delisting
CEO Characteristics		
CEO duality	A dummy variable with value "1" indicating in that year a firm's CEO is also its board chair and value "0" indicating that there exists a separate board chair.	BoardEx
CEO's concentration of titles	The number of titles (CEO, president, COO and board chair) a CEO have in that year. If no president or COO title exists, add one to the actual number of titles.	BoardEx
CEO tenure	The number of years since the CEO started their tenure	Execucomp
Longer directorship	A dummy variable with value "1" indicating in that year a firm's CEO has sitting on its board for longer or equal time than its separate board chair and "0" otherwise. If the CEO is also the chair, assign value "1" to this variable.	BoardEx
Founder CEO	A dummy variable with value "1" indicating in that year a firm's CEO has a founder status in that firm and value "0" otherwise.	Execucomp
CEO age ≥ 60	A dummy equal to one if the age of CEO is larger or equal to 60 and zero otherwise.	Execucomp
CEO is female	A dummy equal to one if the CEO is female and zero otherwise.	Execucomp
Ln(compensation)	The natural log of total compensation in thousands of US$ for the CEO in that year	Execucomp

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Table A1 continued

Variable	Description	
Ln(salary)	The natural log of salary in thousands of US$ for the CEO in that year	Execucomp
Ln(bonus)	The natural log of bonus in thousands of US$ for the CEO in that year	Execucomp
Ln(equity-based)	The natural log of equity-based part of compensation in thousands of US$ for the CEO in that year	Execucomp
Firm Performance and Characteristics		
Q	Market capitalisation (at - ceq + prcc_f*csho) / book value (at)	Compustat-Fundamentals
ROA	Operating income before depreciation (oibdp) / book value (at)	Compustat-Fundamentals
Sales growth	The growth rate of yearly sales, $(Sales_t - Sales_{t-1})/Sales_{t-1}$	Compustat-Fundamentals
Surviving the next two years	A dummy equal to one if a firm is not delisted in the next two years, and equal to zero otherwise.	CRSP-Delisting
Defaulting in the next two years	A dummy equal to one if a firm defaults (splticrm="D") in the next two years, while equal to zero otherwise.	Compustat-Ratings
Abnormal return	The difference between the return of a firm's stock and the value-weighted market average return in one year. For fiscal years when a CEO turnover happened, this variable is calculated on the 12 months before the turnover. Otherwise, this variable is calculated on the entire fiscal year.	CRSP-Monthly
Independent board	A dummy equal to one if more than half of the directors are independent, and equal to zero otherwise.	Boardex
Firm Size	The natural log of sales.	Compustat-Fundamentals
Board size	The number of directors.	Boardex
Female director	A dummy equal to one if there is at least one female director, and zero otherwise.	Boardex
CEO successor	A dummy equal to one if a firm has a COO or president who ranks among the top five executives in terms of compensation, and equal to zero otherwise, following Kini and Williams (2012).	Execucomp
Information asymmetry	The average of a firm's three percentile rankings according to the number of following analysts, the dispersion of earnings forecasts across analysts and the forecast error of the mean analyst earnings forecast.	IBES
#Directorships	The number of directorships in listed firms a director has in a specific year.	Boardex

Table A2
Regression of forced CEO turnover with alternative measures of CEO power

This table presents the regression estimation of the impacts of uncertainty and CEO power on forced CEO turnovers. The dependent variable *Forced turnover* is a dummy, equal to 1 if a CEO is dismissed in that year and 0 otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power is measured in four alternative ways: *CEO's concentration of titles* in Panel A, *CEO tenure* in Panel B, *Longer directorship* in Panel C, and *Founder CEO* in Panel D. In Columns (2) - (4) and (6) - (8), CEO power and other CEO and firm characteristics are interacted with uncertainty, in order to show how their impacts on forced CEO turnover are moderated by uncertainty. The untabulated control variables in Columns (3) - (4) and (7) - (8) are the same as in Table 2. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (3) and (5) - (7), while the year-industry fixed effects are controlled for in Columns (4) and (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	*Forced turnover*							
Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: CEO power = *CEO's concentration of titles*								
Uncertainty	0.079**	0.217**	0.173		0.044	0.302***	0.291	
	(0.04)	(0.09)	(0.16)		(0.03)	(0.11)	(0.19)	
CEO power	-0.006**	0.002	0.002	-0.002	-0.006**	0.002	0.001	-0.003
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CEO power × Uncertainty		-0.057	-0.062*	-0.053*		-0.106***	-0.108***	-0.098**
		(0.03)	(0.04)	(0.03)		(0.04)	(0.04)	(0.05)
Observations	32033	32033	32033	32033	32033	32033	32033	32033
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No

Continued on next page

Table A2 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
YearIndustry FE	No	No	No	Yes	No	No	No	Yes
Panel B: CEO power = *CEO tenure*								
Uncertainty	0.078**	0.150***	0.148		0.044	0.065	0.159	
	(0.04)	(0.05)	(0.16)		(0.03)	(0.05)	(0.18)	
CEO power	-0.000	0.001***	0.001**	0.000	-0.000	0.000	-0.000	-0.001*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CEO power × Uncertainty		-0.009***	-0.010***	-0.010***		-0.003	-0.006*	-0.008**
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Observations	32033	32033	32033	32033	32033	32033	32033	32033
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes
Panel C: CEO power = *Longer directorship*								
Uncertainty	0.073*	0.113**	0.074		0.045	0.121**	0.132	
	(0.04)	(0.05)	(0.14)		(0.03)	(0.05)	(0.18)	
CEO power	-0.003	0.004	0.004	-0.000	-0.003	0.004	0.003	-0.001
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
CEO power × Uncertainty		-0.061	-0.073*	-0.074*		-0.116**	-0.122**	-0.130**
		(0.04)	(0.04)	(0.04)		(0.05)	(0.05)	(0.06)
Observations	32029	32029	32029	32029	32029	32029	32029	32029

Continued on next page

Table A2 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes
Panel D: CEO power = *Founder CEO*								
Uncertainty	0.074*	0.076**	0.029		0.044	0.041	0.073	
	(0.04)	(0.04)	(0.15)		(0.03)	(0.03)	(0.18)	
CEO power	-0.013***	-0.002	-0.004	-0.002	-0.013***	-0.018*	-0.014	-0.011
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		-0.080	-0.079	-0.121		0.082	-0.010	-0.095
		(0.07)	(0.07)	(0.09)		(0.14)	(0.14)	(0.15)
Observations	32033	32033	32033	32033	32033	32033	32033	32033
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes

Table A3
Regression of the CEO's future compensation

This table presents the regression estimation of the impacts of CEO power and uncertainty on the CEO's future compensation. The dependent variable is the natural logarithm of total CEO compensation either in the next year (Columns (1) - (4)) or in the year after next year (Columns (5) - (8)). Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Panel A, and *Delisting rate* in Panel B. All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. In Columns (2) - (4) and (6) - (8), CEO power and other controls are interacted with uncertainty, in order to show how their impacts on CEO's future compensation are moderated by uncertainty. Only the key regressors are tabulated here, while the complete list of controls is identical as in Table 5. The year fixed effects are controlled for throughout all specifications except for Columns (3) and (7). The firm fixed effects are controlled for in Columns (1) - (2) and (5) - (6), while the firm-CEO fixed effects are controlled for in Columns (4) and (8). The industry-year fixed effects are controlled for in Column (3) and (7). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	Ln(*Compensation* in one year)				Ln(*Compensation* in two years)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Uncertainty = *Stock volatility*								
Uncertainty	-0.651	-0.837		0.547	-0.698	-1.425		-0.211
	(0.55)	(1.65)		(1.20)	(0.45)	(1.33)		(1.08)
CEO power	0.084***	0.086*	0.094**	0.045	0.056*	0.072*	0.091**	0.065
	(0.03)	(0.04)	(0.05)	(0.06)	(0.03)	(0.04)	(0.04)	(0.06)
CEO power × Uncertainty		-0.208	-0.345	-0.161		-0.219	-0.421**	-0.210
		(0.26)	(0.27)	(0.32)		(0.18)	(0.16)	(0.27)
Observations	22593	22593	22593	22593	18961	18961	18961	18716
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	Yes	Yes	Yes	No	Yes

Continued on next page

Table A3 continued

Dependent variable =	Ln(*Compensation* in one year)				Ln(*Compensation* in two years)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm FE	Yes	Yes	No	No	Yes	Yes	No	No
FirmCEO FE	No	No	No	Yes	No	No	No	Yes
YearIndustry FE	No	No	Yes	No	No	No	Yes	No
Panel B: Uncertainty = *Delisting rate*								
Uncertainty	0.085	-3.383**		-0.912	0.270	-2.383*		0.703
	(0.19)	(1.41)		(0.99)	(0.18)	(1.29)		(0.99)
CEO power	0.084***	0.068**	0.061**	0.027	0.056*	0.033	0.036	0.029
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
CEO power × Uncertainty		-0.116	-0.178	-0.015		0.161	0.010	0.122
		(0.24)	(0.25)	(0.24)		(0.24)	(0.27)	(0.24)
Observations	22593	22593	22593	22593	18961	18961	18961	18716
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Firm FE	Yes	Yes	No	No	Yes	Yes	No	No
FirmCEO FE	No	No	No	Yes	No	No	No	Yes
YearIndustry FE	No	No	Yes	No	No	No	Yes	No

Table A4
Regression of survivals and defaults

This table presents the regression estimation of the impacts of CEO power and uncertainty on firms' survivals and defaults. The dependent variable in Panel A is *Survives the next two years*, a dummy equal to one if a firm survives through the next two years and zero otherwise. In Panel B, the dependent variable is *Defaults in the next two years*, a dummy equal to one if a firm defaults in the next two years and zero otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power is measured by *Dual CEO*, an indicator equal to one if the CEO is also the board chair and zero otherwise. In Columns (2) - (4) and (6) - (8), CEO power and other CEO and firm characteristics are interacted with uncertainty, in order to show how their impacts on survivals and defaults are moderated by uncertainty. The untabulated control variables in Panel B are the same as in Panel A. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (3) and (5) - (7), while the year-industry fixed effects are controlled for in Columns (4) and (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Dependent variable = *Surviving the next two years*								
Uncertainty	0.069	0.069	0.771***		0.024	-0.033	0.795***	
	(0.07)	(0.07)	(0.25)		(0.04)	(0.06)	(0.23)	
CEO power	0.001	0.001	-0.004	0.002	0.001	-0.005	-0.011*	-0.010*
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
CEO power × Uncertainty		-0.000	0.026	-0.023		0.100	0.178**	0.153
		(0.08)	(0.09)	(0.10)		(0.09)	(0.09)	(0.09)
Abnormal return			0.047***	0.052***			0.021***	0.027***
			(0.01)	(0.01)			(0.01)	(0.01)
Abnormal return × Uncertainty			-0.179***	-0.204***			-0.053	-0.094

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Table A4 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(0.05)	(0.06)			(0.08)	(0.10)
Independent board			0.045	0.004			0.060	0.030
			(0.07)	(0.10)			(0.04)	(0.05)
Independent board × Uncertainty			0.037	0.293			-0.137	0.207
			(0.30)	(0.51)			(0.26)	(0.37)
Firm Size			0.022***	0.020**			0.016***	0.014***
			(0.01)	(0.01)			(0.00)	(0.00)
Firm Size × Uncertainty			-0.083**	-0.073			-0.069***	-0.064**
			(0.04)	(0.05)			(0.02)	(0.03)
CEO age ≥ 60			0.002	-0.007			0.005	0.004
			(0.01)	(0.01)			(0.01)	(0.01)
CEO age ≥ 60 × Uncertainty			-0.073	0.006			-0.189**	-0.171***
			(0.07)	(0.07)			(0.07)	(0.06)
CEO is female			-0.018	-0.022			-0.037	-0.034
			(0.03)	(0.03)			(0.02)	(0.02)
CEO is female × Uncertainty			0.007	0.022			0.327	0.236
			(0.20)	(0.20)			(0.32)	(0.30)
Board size			0.000	0.001			-0.000	0.000
			(0.00)	(0.00)			(0.00)	(0.00)
Board size × Uncertainty			-0.004	-0.007			-0.000	0.000
			(0.02)	(0.02)			(0.02)	(0.02)

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Table A4 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female director			0.005	0.006			0.008	0.009
			(0.01)	(0.01)			(0.01)	(0.01)
Female director × Uncertainty			-0.093	-0.075			-0.218***	-0.183*
			(0.07)	(0.08)			(0.08)	(0.09)
CEO successor			-0.015	-0.014			0.003	0.003
			(0.01)	(0.02)			(0.01)	(0.01)
CEO successor × Uncertainty			0.103	0.072			-0.061	-0.087
			(0.08)	(0.09)			(0.08)	(0.09)
Observations	28572	28572	28572	28572	28572	28572	28572	28572
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes
Panel B: Dependent variable = *Defaulting in the next two years*								
Uncertainty	0.015	0.034	0.021		0.001	0.019	-0.082	
	(0.03)	(0.03)	(0.06)		(0.02)	(0.02)	(0.20)	
CEO power	0.000	0.004	0.004	0.002	0.000	0.002	0.002	0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CEO power × Uncertainty		-0.029	-0.024	-0.014		-0.027	-0.016	-0.007
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.03)
Observations	13153	13153	13153	13153	13153	13153	13153	13153
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No

Continued on next page

Table A4 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
YearIndustry FE	No	No	No	Yes	No	No	No	Yes

OA Online Appendix

Table OA1
Separate regressions of forced CEO turnover during stable times and uncertain times, with alternative measures of CEO power

This table presents the regression estimation of the impacts of uncertainty and CEO power on forced CEO turnovers in more stable times and more uncertain times, respectively. The sample of firm-years is split into two halves based on whether the industry-level uncertainty, measured by either *Stock volatility* or *Delisting rate*, is lower or higher than the median uncertainty of that industry across all years. The dependent variable *Forced turnover* is a dummy, equal to 1 if a CEO is dismissed in that year and 0 otherwise. Uncertainty is measured by two alternative proxies on the industry-year level: *Stock volatility* in Columns (1) - (4), and *Delisting rate* in Columns (5) - (8). All variables except uncertainty measures are on the firm-year level. CEO power measures the concentration of the CEO's power in four alternative ways: *CEO's concentration of titles* in Panels A and B, *CEO tenure* in Panels C and D, *Longer directorship* in Panels E and F, and *Founder CEO* in Panels G and H. In Columns (4) and (8), CEO power is interacted with *Abnormal return*, in order to show how CEO power affects their turnover-performance sensitivity. The untabulated control variables in Columns (2) - (4) and (6) - (8) are the same as in Table 3. The year fixed effects and industry fixed effects are controlled for in Columns (1) - (2) and (5) - (6), while the year-industry fixed effects are controlled for in Columns (3) - (4) and (7) - (8). Standard errors, adjusted for clustering at the industry level, are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table A1.

Dependent variable =	*Forced turnover*							
Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Relatively stable times, CEO power = *CEO's concentration of titles*								
Uncertainty	0.216	0.147			0.057	0.050		
	(0.16)	(0.18)			(0.09)	(0.08)		
CEO power	-0.003	-0.004	-0.005*	-0.005*	-0.003	-0.005	-0.006**	-0.006*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.051***	-0.056***	-0.074***		-0.039***	-0.041***	-0.041**
		(0.01)	(0.01)	(0.03)		(0.00)	(0.01)	(0.02)
Abnormal return × CEO power				0.007				0.000

Continued on next page

Table OA1 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				(0.01)				(0.01)
Observations	16216	16216	16216	16216	17043	17043	17043	17043
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel B: Relatively uncertain times, CEO power = *CEO's concentration of titles*								
Uncertainty	0.141***	0.127***			-0.023	-0.017		
	(0.04)	(0.04)			(0.06)	(0.06)		
CEO power	-0.008***	-0.009***	-0.011***	-0.011***	-0.007**	-0.009***	-0.010***	-0.011***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.032***	-0.035***	-0.048***		-0.040***	-0.043***	-0.069***
		(0.00)	(0.00)	(0.01)		(0.00)	(0.00)	(0.02)
Abnormal return × CEO power				0.005				0.011
				(0.01)				(0.01)
Observations	15817	15817	15817	15817	14990	14990	14990	14990
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel C: Relatively stable times, CEO power = *CEO tenure*								
Uncertainty	0.217	0.146			0.056	0.050		

Continued on next page

Table OA1 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.16)	(0.18)			(0.09)	(0.08)		
CEO power	0.000	-0.000	-0.001*	-0.001**	-0.000	-0.000	-0.001**	-0.001**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.052***	-0.057***	-0.079***		-0.039***	-0.041***	-0.055***
		(0.01)	(0.01)	(0.01)		(0.00)	(0.01)	(0.01)
Abnormal return × CEO power				0.003***				0.002***
				(0.00)				(0.00)
Observations	16216	16216	16216	16216	17043	17043	17043	17043
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel D: Relatively uncertain times, CEO power = *CEO tenure*								
Uncertainty	0.138***	0.123***			-0.024	-0.020		
	(0.04)	(0.04)			(0.06)	(0.06)		
CEO power	-0.000***	-0.001***	-0.001***	-0.001***	-0.000**	-0.001***	-0.001***	-0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.032***	-0.035***	-0.042***		-0.040***	-0.044***	-0.053***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.01)
Abnormal return × CEO power				0.001***				0.001***
				(0.00)				(0.00)
Observations	15817	15817	15817	15817	14990	14990	14990	14990

Continued on next page

Table OA1 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel E: Relatively stable times, CEO power = *Longer directorship*								
Uncertainty	0.215	0.146			0.057	0.050		
	(0.16)	(0.18)			(0.09)	(0.08)		
CEO power	0.000	-0.001	-0.003	-0.003	-0.002	-0.003	-0.004	-0.004
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.051***	-0.056***	-0.064***		-0.039***	-0.041***	-0.050***
		(0.01)	(0.01)	(0.01)		(0.00)	(0.01)	(0.01)
Abnormal return × CEO power				0.013*				0.015**
				(0.01)				(0.01)
Observations	16216	16216	16216	16216	17043	17043	17043	17043
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel F: Relatively uncertain times, CEO power = *Longer directorship*								
Uncertainty	0.131***	0.117**			-0.023	-0.017		
	(0.05)	(0.05)			(0.06)	(0.06)		
CEO power	-0.008**	-0.010***	-0.012***	-0.013***	-0.007**	-0.010***	-0.012***	-0.013***

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Table OA1 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Abnormal return		-0.032***	-0.034***	-0.045***		-0.039***	-0.043***	-0.053***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.01)
Abnormal return × CEO power				0.016***				0.015**
				(0.01)				(0.01)
Observations	15813	15813	15813	15813	14986	14986	14986	14986
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel G: Relatively stable times, CEO power = *Founder CEO*								
Uncertainty	0.209	0.138			0.056	0.049		
	(0.16)	(0.18)			(0.09)	(0.08)		
CEO power	-0.016**	-0.016**	-0.019**	-0.022***	-0.015***	-0.014***	-0.015***	-0.018***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
Abnormal return		-0.051***	-0.056***	-0.060***		-0.039***	-0.041***	-0.043***
		(0.01)	(0.01)	(0.01)		(0.00)	(0.01)	(0.01)
Abnormal return × CEO power				0.042***				0.028**
				(0.01)				(0.01)
Observations	16216	16216	16216	16216	17043	17043	17043	17043
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No

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Table OA1 continued

Uncertainty =	*Stock volatility*				*Delisting rate*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes
Panel H: Relatively uncertain times, CEO power = *Founder CEO*								
Uncertainty	0.138***	0.124***			-0.022	-0.016		
	(0.04)	(0.05)			(0.06)	(0.06)		
CEO power	-0.009**	-0.011**	-0.013**	-0.014***	-0.014*	-0.016**	-0.018**	-0.019**
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Abnormal return		-0.032***	-0.034***	-0.035***		-0.039***	-0.043***	-0.044***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Abnormal return × CEO power				0.016*				0.019
				(0.01)				(0.02)
Observations	15817	15817	15817	15817	14990	14990	14990	14990
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No	Yes	Yes	No	No
YearIndustry FE	No	No	Yes	Yes	No	No	Yes	Yes