CEOs and the Product Market: When are Powerful CEOs Beneficial?

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Abstract

We find that in dynamic and competitive product markets, CEO power is beneficial in enhancing firm value. In these product markets investors react favorably to the announcements of granting more power to the CEOs, and firms with powerful CEOs tend to invest and advertise more, and introduce more new products. Firms with powerful CEOs also hold fewer board meetings. The results are not driven by CEO ability, experience or incentive ownership, and are robust to addressing the endogeneity of CEO power. These findings imply that product markets play an important role in affecting the benefits and costs of CEO power.

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1. Introduction

It is without doubt that CEOs exert a large influence over firms. CEOs have substantial "soft" influence along with explicit legal authority within the firm to direct corporate behavior. However, recent evidence suggests powerful CEOs may be bad news for shareholders. Bebchuk and Fried (2004), Faulkender and Yang (2010), Bebchuck, Cremers and Peyer (2011), and Morse, Nanda, and Seru (2011) show that powerful CEOs reduce managerial compensation efficiency. In addition, Bebchuck, Cremers and Peyer (2011) and Landier, Sauvagnat, Sraer, and Thesmar (2013) show that firms with powerful CEOs are associated with lower profitability and firm value. Furthermore, Khanna, Kim, and Lu (2015) show that CEO power arising from appointment decisions can increase the likelihood of corporate fraud and also reduce the detection of fraud.[2]

With all these negative effects of CEO power, why do firms still grant power to CEOs? In an ideal world, the board would grant an optimal level of power to the CEO, weighing various costs and benefits specific to the firm characteristics and the business conditions in which it operates as Hermalin and Weisbach (1998) model. Thus, despite the costs of CEO power documented in previous studies, it is important to understand if there are potential benefits of having a powerful CEO and under what conditions CEO power becomes more beneficial to firms. Indeed, concentration of power in the CEO office may help overcome bureaucratic constraints and expedite decision-making processes, resulting in more timely and efficient reactions to internal and external problems or proactive responses to anticipated changes in market conditions. Such

[2] Additionally, Grinstein and Hribar (2003) find that CEOs with more power also tend to engage in larger deals relative to the size of their own firms, and the market responds more negatively to their acquisition announcements.

benefits are consistent with the evidence in Adams, Almeida, and Ferreira (2005) who find that powerful CEOs are associated with the best and the worst performing firms. Therefore, CEO power may be associated with both beneficial and deleterious effects (Sah and Stiglitz, 1986, 1991).

In this paper, we explore how the potential benefits and costs of CEO power vary depending on product market conditions. We hypothesize that CEO power can become more beneficial for a firm operating in a more dynamic and competitive product market. The reasons are twofold. First, a firm's success is more dependent on how quickly managerial decisions can be made and implemented in these markets. Granting the CEO sufficient power to efficiently lead the management team may be important for staying abreast, or getting ahead, of the changes and threats in product markets. In contrast, when a firm operates in a stable product market with highly predictable cash flows and less competition, such benefit of CEO power through managerial autonomy may not be as important, while the potential abuse of CEO power may become a major concern. Second, the cost of CEO power is likely to be reduced since product market competition can play a role in mitigating agency problems and disciplining CEOs (e.g., Giroud and Mueller, 2010, 2011; Kim and Lu, 2011).

We examine how CEO power interacts with product market dynamics and competition to influence firm value through proactive decisions not just because of its potential to mitigate and discipline CEOs. We consider three key variables to measure the degree of product market dynamics and competition. The first one, product market fluidity from Hoberg, Phillips, and Prabhala (2014), measures competitive threats from product innovation and development. By analyzing the texts of product descriptions from corporate 10-K filings, fluidity captures to what

degree the changes in rival firms' product offerings are similar to a given firm. The second one, vertical demand shock, is a measure of the changes to demand that a firm faces in its external product market. We use the changes in product shipments for downstream industries, as implied by the BEA input-output matrix, to capture exogenous demand shocks for the firm. The third one measures the competition a firm faces in the product market. We use a reversed text-based Herfindahl index (Hoberg and Phillips, 2015), where rival firms are identified dynamically each year by assessing the degree of similarity in product descriptions in 10-K filings. To have a more complete picture, we convert the above measures into three indicator variables based on the sample medians, and then sum these indicator variables to construct a composite index of a firm's external product market conditions.

Our measures of CEO power have both explicit and "soft" components that capture the CEO's ability to influence and direct corporate policies. We use as indicators for explicit influence whether the CEO chairs the board, or is a founder. We also capture "soft" influence by the CEO's internal connections to executives and directors in the firm. Following previous studies (e.g., Morse, Nanda, and Seru, 2011; Khanna, Kim, and Lu, 2015), we use the fraction of top four non-CEO executives and directors appointed during the current CEO's tenure. The overall CEO power index is the sum of the above two indicators for explicit power plus two additional indicators of "soft" power with each being one if the fraction of top four non-CEO executives or directors appointed during the current CEO's tenure is greater than 50 percent, respectively.

Our results show that the impact of CEO power on firm value depends on product market conditions. We show such conditional effect of CEO power exists both using an event study based

on the announcement returns when the current CEO is appointed to the dual role of the chair of the board and using panel estimates of the effect of CEO power on firm value. Specifically, we examine abnormal returns of 254 appointment announcements during 1996-2010 that contain information only on expanding the power of the current CEO while keeping constant other firm and executive level factors. The results show that granting more power to the CEO increases shareholder wealth only when a firm operates in a dynamic and competitive product market. The economic impact is striking: the average announcement-day abnormal return estimated using an equal-weighted market index is 0.79% for firms in product markets where fluidity, demand shock and competition are all above the sample median and -0.09% for firms in product markets where fluidity, demand shock and competition are all below the sample median.

Our results also show that the impact of CEO power through both his/her explicit positions and "soft" influence over other executives and directors on firm value measured by Tobin's q depends on product market conditions. The interaction terms between CEO power variables and our key measures of product market conditions are significantly positive, both within-firm after controlling for firm fixed effects and cross-firm and industry after using CEO-firm pair between regressions or controlling for industry fixed effects. The economic magnitude is also large: when we consider the most dynamic and competitive product market, moving from the lowest to the highest CEO explicit power, the predicted Tobin's q increases 30.29%. Additionally, among the three factors of product market environment, fluidity which measures industry dynamics and competitive threats from product innovation has the most prominent influence on the effects of giving the CEO more power. Furthermore, we examine a firm's industry life cycle, and find CEO

power more beneficial in industries with a higher level of long-term growth.

We further document potential channels through which CEO power can add value. We find that firms with powerful CEOs are able to invest and advertise more and introduce more new products in more dynamic and competitive product markets. In addition, CEO power is significantly negatively related to the number of board meetings, suggesting CEOs with strong influence are capable of making corporate decisions with less interference from the board.

We consider the possibility that powerful CEOs could be more capable individuals or individuals with relevant experience or incentives through his/her ownership. These CEOs, regardless of their power, may be able to better react to the challenges from product markets, resulting in higher firm values in these markets. We measure CEO capability by whether the CEO obtains a bachelor's degree from an Ivy League university or a MBA degree from the top ten program ranked by US News & World Report (2010), as well as the last year industry-adjusted operating performance of the firm where the CEO worked prior to joining the company (i.e., CEO past performance). We measure CEO experience using CEO age and the number of years working in the same industry prior to joining the company. Our results remain after controlling for a comprehensive list of variables for CEO capability, industry experience and equity ownership, suggesting these CEO characteristics, while important, do not explain our findings.

Finally, we also consider different sources of CEO "soft" power. We find that CEO "soft" power arising from appointment decisions on both other top executives and directors can be beneficial in more dynamic and competitive product markets. In particular, having the CFO, CTO and a greater fraction of directors on the audit committee appointed during the CEO tenure can

enhance firm value in product markets with high fluidity and competition, consistent with the idea that the CEO's connections to these corporate leaders help mitigate communication costs and circumvent decision-making process constraints.

We recognize that CEO power may be endogenous due to reverse causality and omitted variables. We show that our results are robust to the Dynamic Panel GMM estimation, which accounts for the dynamic relation between CEO power and firm performance and the endogeneity issues of control variables (Wintoki, Linck, and Netter, 2012). Our results are also robust to instrumenting CEO power with sudden exogenous executive and director deaths (i.e., deaths unrelated to pressures from firm performance) during the current CEO's tenure. To increase the likelihood that our instrument satisfies the exclusion restriction, we exclude deaths that happen in the concurrent year when constructing the instrumental variables. These exclusions ensure that the information asymmetry and searching costs regarding the new candidate have been resolved and these deaths, thus, would cause no long-lasting impact on firm value except through the increase in CEO power. Besides the endogeneity issues, our results are also robust to alternative performance measures and alternative specifications controlling for other governance factors, and the alternative sample to address survivorship bias prevalent in dynamic product markets.

We contribute to the literature studying CEOs by helping understand the two-sided nature of CEO power. Unlike previous studies (e.g., Bebchuck and Fried, 2004; Morse, Nanda, and Seru, 2011; Bebchuck, Cremers, and Peyer, 2011), we document when and how CEO power could have a "bright" side. We show that product market is an important factor influencing the tradeoffs of CEO power, thus adding to Adams, Almeida, and Ferreira (2005) who find that powerful CEOs

are associated with the best and the worst performing firms.

The paper proceeds as follows. Section 2 describes the data and summary statistics. Section 3 examines the announcement effect of a CEO's dual appointment as the chairman of the board. Section 4 presents our analysis of the impact of CEO power and product market conditions on firm value. Section 5 examines the channels through which CEO power can add value. Section 6 presents a detailed analysis of different sources of CEO "soft" power. Section 7 addresses endogeneity issues and runs a battery of robustness checks. Section 8 concludes.

2. Data and descriptive statistics

2.1 The sample

Our initial sample consists of S&P1500 firms and firms that were once part of the index in ExecuComp over the time period of 1996 to 2010. The sample begins in 1996 given ExecuComp coverage is quite limited prior to 1996. We match several databases to construct the key variables used in our study. We construct CEO power and CEO characteristics variables using ExecuComp, Riskmetrics, and BoardEx. Our product market environment variables are from the Hoberg-Phillips Data Library [3] and Bureau of Economic Analysis (BEA) website. Financial and accounting data are from Compustat. Stock return data are from CRSP. We read news articles in the Factiva and Capital IQ database to construct variables on the announcement returns of a CEO's dual appointment as the chairman of the board and executive and director deaths. Detailed descriptions of our main variables are provided in Appendix 1.

[3] The Hoberg-Phillips industry data web page is at: http://cwis.usc.edu/projects/industrydata/.

2.2 The product market environment

We use three primary measures to capture a firm's external product market conditions. First, we use a text-based measure of product market fluidity from Hoberg, Phillips, and Prabhala (2014). It measures the change in a firm's product space due to moves made by competitors. This measure is constructed using words in a firm's product description section in its 10-K and how they are similar to the change in rival firms' product words from rival firms' 10-Ks. Specifically, fluidity is the "cosine" similarity between a firm's own word usage vector and the aggregate rival firms' word change vector. Fluidity thus focuses on product space dynamics and changes in products of rival firms and how these changes relate to a firm's current product offerings. Apple Inc. is a company that illustrates the benefits of the text-based method. After Apple introduced the iPad, words including "tablet" appear in its 10-K. As rivals followed and introduced tablet computers themselves, the usage of "tablet" by rival firms would increase, resulting in a higher fluidity score for Apple.

Second, we use a measure of the changes to demand that a firm faces in its external product market. Specifically, we use the change in product shipments for a firm's downstream industries from the BEA website.[4] We identify the downstream industries using the BEA input-output matrix. These downstream changes in industry shipments are thus used to capture demand shocks for the upstream industry that are exogenous to the firm.

Third, we use a text-based measure of product market concentration following Hoberg and

[4] The BEA industry shipments data are available from their website at: https://www.bea.gov/industry/gdpbyind_data.htm

Phillips (2015). These data are also available on the Hoberg-Phillips industry data website. We use the Herfindahl index for a firm's market that is constructed using the Hoberg and Phillips 10-K text-based network industries (TNIC). In their method, each firm has its own set of distinct competitors based on word similarity scores of each firm's product description with each other firm's product description.[5] Given 10-Ks are updated annually, the product market fluidity and text-based concentration measure are able to capture changes in each year of a firm's competitors and thus the threat and competition the firm faces in the product market.

We construct three indicator variables, *H_Fluid, H_Vdshock, and L_TNIC_HHI,* each equal to one if fluidity, vertical demand shock, or the reversed text-based Herfindahl index is above the sample median. The composite index of a firm's external product market conditions, *Prod_Index*, is thus defined as the sum of the above indicators.[6] By definition, the index takes on the value of zero to three, with higher values corresponding to a more dynamics and competitive product market environment. We also examine industry life cycle which reflects long-term product market conditions. We measure the industry life cycle as the growth of product shipments based on two-digit NAICS industries during the period of 1999 to 2010,[7] or the number of IPOs in each industry over the full sample period.

[5] As a robustness check, we also measure product market concentration using the three-digit SIC code.

[6] As a robustness check, we also construct the index using the principle component analysis approach.

[7] Since BEA started to report product shipment data based on NAICS rather than SIC industries in 1998 and computing the growth rate of product shipments requires the value in the previous period, our time series of the long-term industry growth variable *(LTIndustryGrowth*) are only available after 1999. Due to the same reason, our data on vertical demand shock (*Vdshock*) and product environment index (*Prov_Index*) start after 1999.

2.3 CEO power variables

CEO power is defined as the capacity to exert one's own will on corporate decisions. This influence is likely to be strengthened by the CEO's official positions in the firm or his/her internal connections to other corporate leaders. Thus, we measure CEO power from both perspectives. The first measure, *CEO_Hard_Power*, follows previous studies (Adams, Almeida, and Ferreira, 2005; Morse, Nanda, and Seru, 2011; Fracassi and Tate, 2012) and captures the explicit sources of CEO power that arise from a CEO's official positions. It is defined as the logged value of one plus the sum of two components: whether the CEO chairs the board (*CEO_Chair*) or is a founder (*CEO_Founder*). Following Bebchuk, Cremers, and Peyer (2011), *CEO_Founder* is an indicator equal to one if a CEO was the CEO five years prior to the IPO date reported by CRSP or five years prior to the first date when the firm appears in CRSP, and zero otherwise.

The second variable, *CEO_Soft_Power*, measures the CEO's internal connections to other top executives and directors through appointment decisions. It is defined as the average of the fraction of top four non-CEO executives (*FTA*) and directors (*FDA*) appointed during the current CEO's tenure. Connectedness built through appointment decisions increases what social psychologists refer to as social influence. It relies on norms of reciprocity, liking, and social consensus to shape group decision-making processes (Cialdini, 1984) and, hence, facilitates the acquiescence or coordination required to engage in corporate decisions. CEOs are heavily involved in recruiting, nominating, and appointing top executives and also in deciding their compensation and relative positions. Thus, top executives are more likely to share similar beliefs and visions with, and may be beholden to, the CEO who hired or promoted them (Landier, Sauvagnat, Sraer,

and Thesmar, 2013). CEOs also tend to be involved in appointing board members either directly or indirectly through consultation with the nominating committee (Shivdasani and Yermack, 1999); thus, directors appointed during a CEO's tenure may similarly be beholden to the CEO (Morse, Nanda, and Seru, 2011; Coles, Daniel, and Naveen, 2014).[8]

The overall CEO power index, *CEO_All_Power*, is defined as the logged value of one plus the sum of *CEO_Chair, CEO_Founder*, *H_FTA*, and *H_FDA*, where *H_FTA* (*H_FDA*) is equal to one if *FTA* (*FDA*) is greater than 0.5 (0.5) (sample median), and zero otherwise. *CEO_All_Power* can capture the CEO's overall influence in the firm through both his/her explicit positions and soft influence.

A CEO's equity ownership can be another important source of CEO power, since CEOs with more equity ownership tend to have greater voting power in the firm. However, we do not include this factor in our CEO power measures since it also reflects incentives received by the CEO. Instead, we include CEO ownership in all regressions throughout the paper as a separate independent variable.

2.4 Summary Statistics

Table 1 presents the sample distribution by year and the product market environment index. After dropping the observations with missing values for all CEO power variables *or* product

[8] We do not consider connections built through prior network ties because such connections may have less impact on a CEO's internal power than those through appointment decisions. When an individual is appointed to a top executive position or recommended to the board by a CEO, he or she may feel a greater sense of loyalty to the CEO. Such a loyalty factor is likely to be weaker when the connection is through prior network ties. One may even argue sharing similar education or work experiences can breed a sense of competition that may not fit as comfortably with loyalty (Khanna, Kim, and Lu, 2015).

market variables, our sample covers *26,709* firm-year observations. Column (2) reports the number of observations in each year. Columns (3)–(6) report the number of observations with *Prod_Index* equal to zero, one, two, or three in each year, respectively.[9] One can see from the table that the number of firms at the extremes (i.e. the groups with the highest and lowest product market index) is lower than the other groups, with most firms occupying stable industries.

Insert Table 1 here

Table 2 reports summary statistics for the variables used in the main body of the paper. The median of *Prod_Index* is one, suggesting that for the median firm in the sample, at least one of the three product market environment measures has a value larger than the sample median. The median of *CEO_Hard_Power* is 0.693, suggesting that the median value of the sum of *CEO_Founder* and *CEO_Chair* is one. Thus, the median CEO in our sample is either the founder or chairs the board. The median of both measures of CEO "soft" power (i.e., *FTA* and *FDA*) is 0.5, suggesting that 50% of non-CEO executives and board of directors are appointed during the CEO tenure.

Insert Table 2 here

3. Announcement effects of the CEO's dual appointment as the chairman

Before we estimate any regressions, we conduct the event study analyses to examine how CEO power matters under different product market conditions. We estimate the abnormal returns on the announcement date of appointing the current CEO to the dual role of chairman of the board. We focus on these announcements, because they contain information only on expanding the power

[9] The sample with *Prod_Index* equal to 3 in 2009 has only eight observations. This low number is a result of negative demand shocks from the financial crisis in 2008–2009.

scope of the CEO while keeping other CEO and firm characteristics (e.g., CEO capability and past experience) constant.

We obtain around 1,800 potential appointments during the sample period by searching for changes in the CEO title in the ExecuComp dataset.[10] To extract the announcement dates, we read relevant news articles and company public announcements from the Factiva and Capital IQ database. We further make sure that these announcements contain information *only* on expanding the power of the current CEO. For example, we exclude announcements that also contain information on appointing other executives or directors, corporate earnings, or mergers and acquisitions. We further exclude cases in which an earnings report is released during the same month. Our final sample is composed of 254 appointment announcements with non-missing product market environment information. The announcement-day abnormal returns are estimated using the market model with the equal- or value- weighted market index (Brown and Warner, 1985). The estimation window covers (-256, -6) trading days relative to the announcement date.

Insert Table 3 here

The results from Table 3 show that the announcement-day abnormal return is significantly positively related to changes in product market conditions. Panel A reports the mean abnormal returns for subsamples with different levels of product market index. First, the mean abnormal returns monotonically increase with the product market index regardless of whether the abnormal returns are estimated based on the equal- or value-weighed stock market index. In addition, the

[10] There are data errors regarding the description of executive titles in the ExecuComp database. We verify such information by reading related news articles and public announcements in Factiva and Capital IQ.

differences in announcement returns between the high and low product market environment sample are striking. The event-day abnormal return estimated using the equal-weighted (value-weighted) market index is 0.79% (0.51%) for firms with the highest product market environment index and -0.09% (-0.16%) for firms with the lowest product market environment index.

We further control for firm size, firm age, firm performance prior to the announcement date measured by Tobin's *q*, CEO ownership, and industry and year fixed effects in regression analyses in Panel B. Our results are robust to these controls. Taken together, the event study results suggest that granting the CEO more power through dual appointments as the chairman of the board can generate value for shareholders *only* when a firm operates in a dynamic and competitive product market.

4. CEO power, product market conditions and firm value

Our main hypothesis is that a firm benefits more from a powerful CEO when it operates in a more dynamic and competitive product market. In this section, we consider this hypothesis by interacting CEO power with product market characteristics (i.e., short-term product market environment and longer-term industry life cycle) to affect firm value.

4. 1 Product market environment analysis

We begin with estimating the interaction effect of CEO power with the composite product market environment index on Tobin's *q*, given no single variable can capture all different aspects of a firm's product market. Because the fiduciary responsibility of the management is to promote shareholder value, our key dependent variable is Tobin's *q*, defined as the market value of common

equity plus the book value of total liabilities divided by the book value of total assets winsorized by top 0.5 percentile. Table 4 presents the results. We estimate the OLS regressions with firm and year fixed effect to control for time-invariant firm and year factors in Columns (1)–(3). To address the concern on within-firm auto-correlation, we cluster the standard errors at the firm level in these columns. We also estimate CEO-firm pair between regressions in Columns (4)–(6), in which we obtain one observation for each CEO-firm pair by averaging main variables across the times-series to examine the cross-sectional effects of CEO power.

Insert Table 4 here

Inspection of Table 4 shows that the interaction between CEO power and the product market environment index has a positive association with value for both within-firm and cross-sectional specifications. The results are robust for all three measures of CEO power. The economic size of this product market interaction effect is significant. In nontabulated analysis, we compute predicted Tobin's *q* for different product market environments.

Using the coefficients from Column (1) we find that the predicted Tobin's *q* increases 30.92% as we move from the least dynamic and competitive product market environment, *(Prod_Index = 0)*, to the most dynamic and competitive product market environment, *(Prod_Index = 3)*, with CEO explicit power at the highest level (*CEO_Hard_Power = 1.0986*) and all other variables at their sample medians. Analogously, when we consider the most dynamic and competitive product market (*Prod_Index* = 3), moving from the lowest CEO explicit power (*CEO_Hard_Power =0*) to the highest CEO explicit power (*CEO_Hard_Power = 1.0986*), the predicted Tobin's *q* increases 30.29%.

Similarly, using the coefficients from Column (2) we find that the predicted Tobin's *q* increases 14.53% when we move from the least dynamic and competitive product market environment, (*Prod_Index* = 0), to the most dynamic and competitive product market environment, (*Prod_Index* = 3), for CEO "soft" power with a value of one and all other variables at their sample medians. Analogously, when we consider the most dynamic and competitive product market (*Prod_Index* = 3), moving from the lowest CEO "soft" power (*CEO_Soft_Power = 0*) to the highest CEO "soft" power (*CEO_Soft_Power = 1*), the predicted Tobin's *q* increases 13.22%.

We then examine different components of the product market index, using firm fixed effects regressions in Columns (1)–(3) in Table 4. We present the results in Table 5. We measure the product market environment using fluidity (*Fluid*) in Columns (1)–(3), vertical demand shock (*Vdshock*) in Columns (4)–(6), and competition (*R_HHI*) in Columns (7)–(9).

Insert Table 5 here

Inspection of the results presented in Table 5 shows that Tobin's *q* is significantly positively related to the interaction of CEO power and each individual product market variable. Among the three product market environment factors, Tobin's *q* is consistently significantly positively related to the interaction of CEO power and fluidity at the 5% level. The coefficients of all other interactions between CEO power variables and demand shocks and product market competition are also positive but their significance level is lower. Overall, these results suggest that CEO power is especially useful for responding to industry dynamics and competitive threats from product development.

4.2 Are the results driven by CEO ability, experience or ownership?

We consider an alternative hypothesis that our results may be driven by other CEO characteristics including CEO capability, experience or incentive ownership. Powerful CEOs could be very capable people or people with relevant work experience or high incentive ownership. CEOs with these characteristics, despite their internal influence, may be able to better react to the fast changes and competition from product markets. Thus, the higher value of firms managed by powerful CEOs in more dynamic and competitive product markets could be driven by a CEO's capability, experience, or incentive ownership instead.

We re-estimate the main results by controlling for these CEOs characteristics and their interactions with product market conditions. We measure a CEO's capability using education and past performance. Following previous studies (e.g., Chevalier and Ellison, 1999), we construct two proxies for CEO education: an indicator of whether a CEO obtains a bachelor's degree from an Ivy League university, and an indicator of whether a CEO obtains a MBA degree from the top ten programs ranked by US News & World Report (2010). To capture a CEO's past performance, we combine the BoardEx and ExecuComp dataset to obtain a comprehensive employment history of the CEO, and then link the employer information to the Compustat dataset to compute the firm's performance measure. Specifically, we use the last year industry-adjusted EBITDA/total assets of the firm where the CEO worked as a top executive prior to joining the given firm.[11] We measure

[11] A CEO's past performance data may be missing because the CEO worked for a private company or was a lower-level employee before joining the given firm. We thus replace missing values with the sample median to retain the empirical power of our test.

a CEO's experience by the CEO's age and the number of years working in the same industry as a top executive prior to joining the company. For the construction of CEO past performance and industry experience, industries are defined based on the two-digit NAICS.

Insert Table 6 here

Table 6 presents the results. The positive interaction effects of CEO power and the product market environment still hold.[12] Among the CEO characteristics, we find that the coefficients of the interactions of product market index with CEO age are negative, suggesting younger CEOs are better at reacting to product market dynamics and competition. The coefficient of CEO past performance is significantly positive, suggesting that CEOs with better past performance can indeed help enhance firm value.

4. 3 Industry life cycle analysis

Our product market environment index and its three components are all measured year by year. Thus, they only capture a firm's short-term product market environment. A firm's long-term product market environment, which critically depends on its industry life cycle, may also affect the tradeoff between the benefits and costs of CEO power. We now examine how CEO power and a firm's industry life cycle jointly affect firm value.

The first industry life cycle measure, *LTIndustryGrowth,* is based on the long-run growth of

[12] Our main results are also robust to controlling for the following alternative CEO characteristics: (1) whether a CEO obtains a master's degree, (2) whether a CEO obtains a PhD degree, (3) the number of years of working experience in the same industry as a *CEO* prior to joining the company, (4) the number of Wall Street Journal news articles that cite the CEO with a positive tone during the three years prior to joining the company as a measure for CEO past performance, (5) the *average* industry-adjusted EBITDA/total assets of the firm where the CEO worked as a top executive prior to joining the given firm

industry product shipments at the two-digit NAICS level during the period 1999–2010. Product shipment data taken from BEA are expressed in 2011 dollars using industry price deflators. We calculate the change in product shipments in real dollars. The second industry life cycle measure, *Num_IPO*, focuses on competition and growth faced by the firm. We compute the number of IPOs into each industry over the full sample period. This variable thus captures whether the industry is in a growth period. The number of IPOs should be related to industry demand shocks and also changing industry fluidity as fluidity captures changes to industry products and Hoberg, Phillips, and Prabhala (2014) show that fluidity is related to the product texts of IPO firms. Since *Num_IPO* is an integral variable, we use the logged value of one plus *Num_IPO* in the regressions. Since both industry life cycle variables are time-invariant, the CEO-firm pair between regressions are estimated in this section.

Insert Table 7 here

The results in Table 7 show that the interaction between CEO power and industry life cycle has a positive relation to Tobin's *q* for both measures. This result supports the previous findings that having powerful CEOs in dynamic product markets has value as CEO power gives the CEO greater ability to respond to product market challenges and growth.

5. How does CEO power matter?

Given that CEO power is more beneficial in product markets with more fluidity, demand shocks and competition, what are the potential channels though which powerful CEOs can create value in these markets? In this section, we explore how CEO power in dynamic and competitive

product markets affect real corporate decisions.

5.1 CEO power, product market environment and corporate actions

We first focus on corporate investment decisions and marketing expenditures since potential reactions to the rapid changes and threat of competition from product markets frequently involve investment both in tangible assets such as plants and assembly lines through capital expenditures, and in intangible assets through advertising. Responding to positive industry demand shocks may also involve higher investment. We measure corporate investment by capital expenditures divided by total assets. Marketing expense is measured by advertising expenditures divided by total assets.

Insert Tables 8

Estimation results are reported in Table 8. Table 8 shows that capital expenditures and marketing expenses are significantly higher for firms with more powerful CEOs in more dynamic and competitive product markets. We also examine subsequent new product introductions as an outcome variable as introducing more new products can differentiate a firm in its markets from its rivals, and hence increase its value. We follow Hoberg and Phillips (2010) and use the logarithmic growth in the number of words used in the product description section of a firm's 10-K in subsequent years to capture future new product introductions, *Product_Growth*. Given it takes time to introduce new products, we construct the variables over one, two and three years, respectively.

Insert Tables 9 here

Table 9 shows that firms with more powerful CEOs have higher new product growth over two and three years in more fluid and competitive product markets, while the base effect is that

new product growth is lower in these markets overall given the increased competition. These findings suggest that powerful CEO help firms to introduce more new products in the face of more competitive product markets.

Our findings suggest that CEO power is beneficial in boosting investment, spurring increased marketing activities, and introduction of more new products in response to industry fluidity, demand shocks and product market competition. In addition, CEOs' connections with other corporate leaders via appointment decisions may be more effective than explicit power sources in initiating and implementing above corporate decisions.

5.2 CEO power and board influence

One interpretation of the above finding is that firms without powerful CEOs are subject to frictions that cause them to slow down the decision-making process. Thus, CEO power can enhance efficiency by reducing these constraints. In this section, we examine the impact of CEO power on the number of board meetings. Too many board meetings may slow down the decision-making process, since coordinating the schedules among directors is costly and conflicts of opinions among directors may also delay the process. Information on the number of board meetings is available in ExecuComp only through 2005 with missing observations in 2006, as S&P stopped collecting the data in 2007. We hand-collect the number of board meetings data after 2005 from proxy statements.

Insert Table 10 here

The results reported in Table 10 show that all three measures of CEO power are significantly

negatively related to the number of board meetings at the 1% level, suggesting that CEOs with stronger influence are capable of making corporate decisions with less interference from the board.

6. Detailed analyses of CEO "soft" power

The above results have demonstrated the importance of CEO "soft" power in response to the challenges from the product market. To compare the role of different sources of CEO "soft" power, we break down our CEO "soft" power variable and examine how different sources interact with product market conditions to affect firm value.

We first examine a CEO's influence in the executive suite by analyzing which types of executives appointed during the CEO's tenure are most helpful for the firm in responding to product market dynamics and competition. We consider the appointment decisions regarding the Chief Operating Officer (COO), Chief Financial Officer (CFO), and Chief Technology Officer (CTO). Although CTOs are not as common as CFOs or COOs in our sample,[13] we examine them because CTOs play a unique role in technological advancement, which can be crucial for rising to the challenges from product markets.

We identify the COOs, CFOs, and CTOs from the ExecuComp database according to the descriptions of executive annual titles. We create three dummy variables (*FTA_COO*, *FTA_CFO*, and *FTA_CTO*) that indicate whether the COO, CFO or CTO of the firm in a given year is appointed during the current CEO's tenure, respectively. In all regressions, we also control for three other dummy variables (*Miss_COO, Miss_CFO, Miss_CTO*) and their interaction terms with

[13] These three types of executives together account for 19.2% of all executive-year observations in ExecuComp. Among them, COOs, CFOs and CTOs account for 6.41%, 12.52%, and 0.49%, respectively.

the product market environment, to account for the fact that some companies either do not have a COO, CFO or CTO, or have missing information on these executives in ExecuComp.

Insert Table 11a here

The results reported in Table 11a show that the percentage of top executives appointed during the CEO tenure is significantly positively related to firm value in the product market with high fluidity, demand shock and competition. Among different types of executives, a CEO's connection to the CFO and CTO via appointment decisions helps a firm react more efficiently to competitive threats from product development and product market competition. A CEO's connection to the COO also helps a firm react more efficiently to product market competition. However, CEO's connections to all these three types of top executives do not necessarily help a firm adjust to demand shocks from downstream industries.

Next, we analyze how CEOs exert influence on selecting directors serving on a variety of board committees. Since corporate boards perform the dual role of monitoring and advising the management, we examine director appointments on three categories of board committees: the audit committee, compensation committee, and advisory committees. We collect information on the audit and compensation committees from Riskmetrics. We define advisory committees as a set of committees that may assist the CEO in making crucial investment and other corporate strategy decisions, such as finance, investment, and budgeting committees, the corporate strategy, M&A, and business committees, and the science and technology development committees. We collect information on the battery of advisory committees from BoardEx. We create three measures (*FDA_Audit, FDA_Compensation,* and *FDA_Advice*) by computing the fraction of non-CEO

directors appointed during the current CEO's tenure in the audit, compensation, and advisory committees, respectively.

Insert Table 11b here

The results reported in Table 11b show that the percentage of directors appointed during the CEO tenure is significantly positively related to firm value in the product market with high fluidity, demand shock and competition. Specifically, the interaction effect between CEO power in the audit and compensation committees and product market competition is positive and significant. The interaction effect between CEO power in the audit committee and product market fluidity is also positive and significant. Our finding is consistent with the idea that a CEO's connections to these corporate leaders help circumvent potential decision-making frictions when the CEO initiates corporate actions in response to dynamic product markets.

In contrast, CEO power in the audit, compensation, and advisory committees is not very helpful for reacting to industry demand shocks. CEOs' connections to advisory committees do not show any significant interactive effects with product market environment variables, suggesting that CEOs' influence over advisory committees is less important than their influence over monitoring committees for enhancing the efficiency of reacting to product dynamics and competition.

7. Robustness tests

In this section, we address the endogeneity issue by estimating the dynamic panel GMM model and the two-stage instrumental variable regression. We also present various other robustness

test results.

7.1 Accounting for the endogeneity of CEO power

We recognize that CEO power is endogenous for multiple reasons. First, our CEO power variables may be reversely affected by firm performance as boards may give successful CEOs more power (Hermalin and Weisbach, 1998). Second, there may exist omitted time-varying variables that affect both firm performance and CEO power.

We re-estimate the regression in Column (3) of Table 4 using the dynamic panel GMM estimator because the relation between firm value and CEO power may be dynamic, and Wintoki, Linck, and Netter (2012) demonstrate how the dynamic panel GMM estimator can be used to account for endogeneity, especially in the setting of examining the performance implication of corporate governance issues. Following Wintoki, Linck, and Netter (2012), we assume that among all independent variables, only firm age and year dummies are exogenous. We use variables lagged two and three periods as the instruments for all the endogenous variables.

Insert Table 12 here

The results in Table 12 show that the stand-alone variable of CEO power has a significantly negative impact on firm value and its interaction term with product market index has a positive impact on firm value. These results suggest that our main finding is robust after addressing the reverse causality relation between CEO power and firm value. The p-value for J-statistics is greater than 0.1 for the Hansen test of over-identification, suggesting that we cannot reject the hypothesis that our instruments are valid. The p-value for J-statistics is also greater than 0.1 for the Diff-in-

Hansen test of exogeneity, implying that we cannot reject the hypothesis that the additional subset of instruments used in the system GMM estimates is indeed exogenous.

The dynamic panel GMM estimator has some limitations, including a potential problem in using a set of "internal" instruments contained within the panel itself (Wintoki, Linck, and Netter, 2012; Roberts and Whited, 2013). Thus, we also estimate two-stage regressions with IVs. Following Khanna, Kim, and Lu (2015), our main IVs are the number of top four non-CEO executives and directors who left their positions due to sudden deaths.

In order to satisfy the exclusion restrictions for the IVs, we first exclude suicides or executive and director deaths that are related to pressures from firm performance by searching media articles from Factiva on the cause of their deaths. Second, to mitigate potential short-term effects of executive and director deaths on firm value, we exclude executive and director deaths that happen in the concurrent year.[14] By doing so, we ensure that the information asymmetry and searching costs concerning the new candidate have already been resolved (Nguyen and Nielsen, 2010). These sudden executive and director deaths during the past years of CEO tenure, therefore, lead to an increase in CEO power, but are unlikely to cause a long-lasting impact on firm value except through the channel of CEO power. To give additional suggestive evidence, we directly test the relation between our IVs and Tobin's q in the subsequent year in our sample and find insignificant

[14] Nguyen and Nielsen (2010) find an average four-day (-1,+2 day) accumulated abnormal return of 0.85% surrounding the unexpected death of an independent director. They attribute this effect to the information asymmetry and searching costs regarding the new candidate. We note that different than Nguyen and Nielsen (2010), our hypothesis is based on the long-term impact of sudden director deaths on firm value. In the long term the impact of sudden deaths of directors or executives can be mitigated due to position replacement.

coefficient estimates.

CEO ownership is also considered as a potential endogenous variable. Because firm fixed effects control only for time-invariant characteristics, we are concerned with endogeneity issues due to time-variant omitted variables and reverse causality from firm value to CEO ownership (Kole, 1996; Cho, 1998; Himmelberg, Hubbard, and Palia, 1999). Following Kim and Lu (2011), we use the sum of maximum marginal state and federal marginal personal income tax rates as the instrumental variable. Personal income taxes may affect a CEO's ownership by influencing the composition of personal portfolios and the timing of stock transactions and option exercises, but they are unlikely to directly affect firm value. CEOs located in a high income tax state may prefer tax-exempt securities to stocks than CEOs in a low income tax state, leading to lower share ownership, all else being equal.[15]

We use the maximum marginal state and federal personal income tax rates because most firms covered by ExecuComp are relatively large and their CEOs' marginal income tax rates are likely to be subject to the maximum rate.[16] For state personal income tax rates, we assume a CEO is taxed by the state of his/her company's headquarters location. Inclusion of state personal income tax rates makes the IV especially useful, because state tax rates vary across states with changes

[15] See Miller (1977) and Kim (1982) for an illustration of the important role personal taxes play in investors' choice between tax-exempt and taxable securities.

[16] We use the rates applicable to married couples filing joint returns. The Tax Foundation's web site (http://www.taxfoundation.org/publications/show/151.html) provides federal marginal individual income tax rates. The web site http://www.taxfoundation.org/taxdata/show/228.html provides maximum marginal state income tax rates for 2000–2010. For 1999, we rely on the Book of the States available online at www.csg.org/policy/publications/bookofthestates.aspx.

occurring at different time. Since *CEO_OWN* and CEO_OWN^2 are both endogenous, we use *Tax* and Tax^2 as instrumental variables. We also use CEO tenure as another instrumental variable for CEO ownership following Palia (2001). Gibbons and Murphy (1992) and Edmans, Gabaix, Sadzik, and Sannikov (2012) show theoretically that equity ownership should rise with tenure, and Gibbons and Murphy (1992) provide supporting evidence for these theories. However, it is not clear CEO tenure will be directly related to Tobin's *q*.

Insert Table 13 here

We report the IV regression results in Table 13. In the first-stage regressions reported in Columns (1)-(4), we regress each of the four endogenous variables on the instrumental variables and the controls with firm and year fixed effects and obtain the predicted values, respectively. The F-statistics of joint significance of the instrumental variables are all above or close to 10, suggesting the validness of our IVs. In the second stage, we re-estimate the benchmark regression in Table 4 with the predicted variables of all endogenous variables, and find robust results.

7.2 Other robustness tests

We also conduct a battery of robustness checks using alternative measures of the key variables, alternative specifications and alternative samples. We discuss these robustness checks below with the estimated results reported in the Appendix 2. We estimate all regressions with firm and year fixed effects except the regression in Column (2) of Table A.2.4 and using unreported same control variables as in model (3) of Table 4.

Alternative measures of the product market environment. To address the concern that

product market fluidity, industry demand shocks and competition may be correlated or may not equally affect the product market environment, we construct an alternative index based on the principal component analysis. Next, besides the text-based concentration measure, we also compute the conventional product market concentration by using the 3-digit SIC code, which typically focuses on a firm's main business sector to define competitors and does not change overtime. Third, we use the absolute value of demand shocks to capture the effects of negative shocks, as firms need to cut assembly lines and close unprofitable plants to efficiently react to these shocks, and CEO power may also be beneficial under these circumstances. Finally, Hoberg and Phillips (2015) show that product market similarity is also a very important perspective to describe product market conditions. We thus incorporate similarity as an additional component in the product market environment index. Our results are robust to using the above measures of product market conditions.

Alternative measures of the CEO power. To address the concern that each component of our CEO power variable may be correlated or may not equally affect the CEO's overall influence in the firm, we construct an alternative CEO power index based on the principal component analysis. Next, since all components of our CEO power measure are correlated with CEO tenure,[17] to partial out CEO tenure effects, we regress the overall CEO power index on CEO tenure and use the residuals as the measure of CEO power. Our results are robust to these alternative measures of CEO power variables.

[17]Additionally, Graham, Harvey and Puri (2015) show that CEOs with longer tenure tend to hold more power and delegate less financial decisions to others.

Alternative performance measures. We explore three alternative firm performance measures other than Tobin's *q*: return on assets (*ROA*), buy-and-hold stock returns during the fiscal year, and firm growth, measured as the three-year annual growth rate of sales in percentage. All results are robust, with the interaction effects between CEO power and product market changes stronger for the growth-related performance measure than the accounting performance measure (*ROA*).

Alternative specifications. First, we consider the possibility that our results may be driven by other internal governance factors, since firms with better governance may do a better job in reacting to challenges from external product market conditions. Our results hold after controlling for two widely-used governance factors and their interactions with the product market index: the percentage of independent directors on the board and the reversed entrenchment index which equals six minus the entrenchment index. Second, instead of firm fixed effects, we re-estimate the main results by controlling for industry fixed effects. All of our previous results are robust to these alternative specifications.

Survivorship and alternative samples. An additional alternative explanation for our results is that competitive product markets play an effective role in disciplining underperforming firms by forcing them either out of business or being acquired by other companies. Thus, firms with powerful CEOs tend to have higher values in competitive industries, not because powerful CEOs are beneficial per se, but because underperforming ones are more likely to drop out of the sample. To address the concern of survivorship bias, we re-estimate the benchmark regression by using a balanced sample that includes only firms that exist throughout the entire sample period, and obtain

similar results. Finally, we estimate the main regression using the subsample with the high and low product market environment index, respectively. Our results show that CEO power adds value *only* in the sample of firms with a high product market environment index.

8. Conclusions

We examine how the external product market influences the trade-off between the costs and benefits of CEO power. We ask why firms have powerful CEOs given well-documented negative outcomes associated with CEO power. We explicitly consider that giving CEOs more power may create value for the firm when it needs to respond quickly to dynamic and competitive product markets. We find that the announcement of granting more power to the CEO by appointing him/her also as the chairman of the board is associated with significantly higher abnormal returns when a firm operates in a more dynamic and competitive product market. Such a firm is also associated with a higher Tobin's *q* when it grants CEO more power. We show that the benefits of CEO power in dynamic and competitive markets are not explained by the CEO's capability, experience or incentive ownership.

We further investigate why powerful CEOs may add value, and show that investment, advertising, and new product introductions increase with CEO power in more dynamic and competitive product markets. We also find that CEO power is negatively related to the number of board meetings, suggesting that powerful CEOs are capable of making corporate decisions with less interference from the board. To address the endogeneity of CEO power, we estimate dynamic panel GMM regressions and instrument CEO power with non-CEO executive and director sudden

deaths excluding the concurrent year and find robust results.

We show that the positive effects of CEO power are not limited to explicit sources of CEO power such as whether the CEO chairs the board or is a founder, but also extend to "soft" sources arising from the CEO's connections to key officers and board members on the audit and compensation committees through appointment decisions. Overall, our findings imply that the product market environment plays an important role in influencing the optimal amount of power that should be delegated to the CEO.

References

Adams, R. B., H. Almeida, and D. Ferreira. 2005. Powerful CEOs and their impact on corporate performance. *Review of Financial Studies* 18: 1403–32.

Bebchuk, L. A., and J. M. Fried. 2004. *Pay without Performance: The Unfulfilled Promise of Executive Compensation* (Harvard University Press, Cambridge, MA).

Bebchuk, L. A., M. Cremers, and U. Peyer. 2011. The CEO pay slice. *Journal of Financial Economics* 102: 199–221.

Brown, S. J., and J. B. Warner. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics* 14: 3–31.

Chevalier, J., and G. Ellison. 1999. Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance. *Journal of Finance* 54: 875–99.

Cho, M.. 1998. Ownership structure, investment, and the corporate value: an empirical analysis. *Journal of Financial Economics* 47: 103–21.

Cialdini, R. B., 1984. Principles of automatic influence, in J. Jacoby & S. Craig, eds.: *Personal Influence: Theory, research, and practice* (Lexington, MA: Heath).

Coles, J. L., N. D. Daniel, and L. Naveen. 2014. Co-opted boards. *Review of Financial Studies* 27: 1751–96.

Edmans,A., X.Gabaix, T. Sadzik, and Y. Sannikov. 2012. Dynamic CEO compensation. *Journal of Finance* 67: 1603–45.

Faulkender, Michael, and Jun Yang. 2010. Inside the black box: The role and composition of compensation peer groups. *Journal of Financial Economics* 96: 257–270.

Fracassi, C., and G. Tate. 2012. External networking and internal firm governance. *Journal of Finance* 67: 153–194.

Gibbons, R., Murphy, K.J., 1992. Optimal incentive contracts in the presence of career concerns: theory and evidence. *Journal of Political Economy* 100, 468–505.

Giroud, X., and H. M. Mueller. 2010. Does corporate governance matter in competitive industries? *Journal of Financial Economics* 95: 312–31.

Giroud, X., and H. M. Mueller. 2011. Corporate governance, product market competition, and equity prices. *Journal of Finance* 66: 563–600.

Graham, John R., Campbell R. Harvey, and Manju Puri. 2015. Capital allocation and delegation of decision-making authority. *Journal of Financial Economics* 115: 449–470.

Grinstein, Yaniv and Paul Hribar. 2003. CEO compensation and incentives: Evidence from M&A bonuses. *Journal of Financial Economics* 73: 119–143.

Guadalupe, M., and J. Wulf. 2010. The flattening firm and product market competition: The effect of trade liberalization. *American Economic Journal: Applied Economics* 2: 105–27.

Hermalin, B. E., and M. S. Weisbach. 1998. Endogenously chosen boards of directors and their monitoring of the CEO. *American Economic Review* 88: 96–118.

Himmelberg, C. P., R. G. Hubbard, and D. Palia. 1999. Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics* 53: 353–84.

Hoberg, G., and G. Phillips. 2010. Product market synergies in mergers and acquisitions: A text based analysis. *Review of Financial Studies* 23: 3773–811.

———. 2015. Text-Based network industries and endogenous product differentiation. Forthcoming *Journal of Political Economy*.

Hoberg, G., G. Phillips, and N. Prabhala. 2014. Product market threats, payouts, and financial flexibility. *Journal of Finance* 69: 293–324.

Khanna, V., E. Han Kim, and Y. Lu. 2015. CEO connectedness and corporate frauds. *Journal of Finance* 70: 1203–52.

Kim, E. H.. 1982. Miller's equilibrium, shareholder leverage clienteles, and optimal capital structure. *Journal of Finance* 37: 301–19.

Kim, E. H., and Y. Lu. 2011. CEO ownership, external governance, and risk-taking. *Journal of Financial Economics* 102: 272–92.

Kole, S.. 1996. Managerial ownership and firm performance: incentives or rewards? In M. Hirschey, M.W. Marr, Eds.: *Advances in Financial Economics* (JAI Press Inc., Greenwich, CT).

Landier, A., J. Sauvagnat, D. Sraer, and D. Thesmar. 2013. Bottom-up corporate governance. *Review*

of Finance 17: 161–201.

Miller, M. H.. 1977. Debt and taxes. *Journal of Finance* 32: 261–75.

Morse, A., V. Nanda, and A. Seru. 2011. Are incentive contracts rigged by powerful CEOs? *Journal of Finance* 66: 1779–821.

Nguyen, Bang Dang, and Kasper Meisner Nielsen. 2010. The value of independent directors: Evidence from sudden deaths. *Journal of Financial Economics* 98: 550–18.

Palia, D., 2001. The endogeneity of managerial compensation in firm valuation: a solution. *Review of Financial Studies* 14: 735–64.

Roberts, M.R. and T. M. Whited. 2013. Endogeneity in empirical corporate finance. *Handbook of the Economics of Finance* 493–572.

Sah, R. K., and J. E. Stiglitz. 1986. The architecture of economic systems: Hierarchies and polyarchies. *American Economic Review* 76: 716–27.

———. 1991. The quality of managers in centralized versus decentralized organizations. *The Quarterly Journal of Economics* 106: 289–95.

Shivdasani, A., and D., Yermack. 1999. CEO involvement in the selection of new board members: An empirical analysis. *Journal of Finance* 54: 1829–53.

Wintoki, M.B., J.S. Linck, and J. M. Netter. 2012. Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics* 105: 581–606.

Table 1: Sample description

This table describes the sample. Column (2) reports the number of observations by year. Columns (3)–(6) report the number of observations when product market environment index (*Prod_Index*) equals 0, 1, 2, and 3, respectively. *Prod_Index* is defined as the sum of *H_Fluid*, *H_Vdshock*, and *L_TNIC_HHI*. *H_Fluid*, *H_Vdshock*, and *L_TNIC_HHI* are indicator variables equal to one if fluidity (*Fluid*), vertical demand shock (*Vdshock*), or the reversed text-based Herfindahl index (*R_HHI*) is above the sample median, respectively, and zero otherwise. The full sample covers the period 1996 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. Since *Prod_Index* is available only after 1999, Columns (3)–(6) report the subsamples covering the period 1999 through 2010.

Year	Full	Prod_Index=0	Prod_Index=1	Prod_Index=2	Prod_Index=3
(1)	(2)	(3)	(4)	(5)	(6)
1996	1,640				
1997	1,665				
1998	1,720				
1999	1,798	203	441	433	306
2000	1,779	103	436	484	343
2001	1,659	391	478	373	50
2002	1,663	385	419	393	98
2003	1,732	331	389	390	107
2004	1,741	187	609	390	146
2005	1,742	71	560	463	216
2006	1,853	180	517	490	173
2007	2,033	226	605	370	231
2008	1,956	484	525	278	106
2009	1,893	472	571	338	8
2010	1,835	133	499	433	272
Total	26,709	3,166	6,049	4,835	2,056

Table 2: Summary statistics

This table reports summary statistics for key variables. Columns (1)–(5) report the sample mean, median, standard deviation, and minimum and maximum values for each variable, respectively. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide definitions of all variables in Appendix 1.

	Mean	Median	S.D.	Min	Max
	(1)	(2)	(3)	(4)	(5)
Product Market Environment Variables					
Prod_Index	1.359	1.000	0.937	0.000	3.000
Fluid	6.929	6.283	3.685	0.000	35.236
TNIC_HHI	0.144	0.082	0.171	0.007	1.000
Vdshock	0.031	0.041	0.104	-0.442	0.726
LTIndustryGrowth	0.357	0.271	0.675	-0.239	2.263
Num_IPO	161.031	95.000	172.415	0.000	1119.000
CEO Power Variables					
CEO_Hard_Power	0.512	0.693	0.399	0.000	1.099
CEO_Soft_Power	0.510	0.500	0.336	0.000	1.000
CEO_All_Power	0.934	1.099	0.524	0.000	1.609
CEO_Chair	0.577	1.000	0.494	0.000	1.000
CEO_Founder	0.223	0.000	0.416	0.000	1.000
FTA	0.532	0.500	0.397	0.000	1.000
FDA	0.507	0.500	0.355	0.000	1.000
FTA_COO	0.209	0.000	0.406	0.000	1.000
FTA_CFO	0.444	0.000	0.497	0.000	1.000
FTA_CTO	0.018	0.000	0.132	0.000	1.000
FDA_Audit	0.373	0.333	0.295	0.000	0.875
FDA_Compensation	0.338	0.333	0.300	0.000	0.917
FDA_Advice	0.642	1.000	0.423	0.000	1.000
Other Variables					
Tobin's *q*	1.947	1.472	1.426	0.373	10.863
Product_Growth_1Y	-0.007	0.012	0.408	-5.169	5.031
Product_Growth_2Y	-0.017	0.019	0.512	-5.373	4.499
Product_Growth_3Y	-0.004	0.029	0.561	-5.373	4.585
Capx/TA	0.053	0.037	0.057	0.000	1.205
AD/TA	0.034	0.013	0.065	0.000	2.097
Num_of_Board_Meeting	7.787	7.000	3.780	0.000	67.000
Ivybachlr	0.085	0.000	0.279	0.000	1.000
MBATop10	0.167	0.000	0.373	0.000	1.000
IndExp	10.033	8.000	9.343	0.000	54.000
CEOAge	55.371	55.000	7.516	28.000	94.000
CEO_Past_Perform	0.026	0.026	0.086	-0.310	0.400
LNS	7.062	7.041	1.524	-3.411	10.386
FirmAge	23.130	17.000	18.350	1.000	86.000
PPE/TA	0.533	0.442	0.399	0.000	5.876
CEO_OWN	0.025	0.003	0.062	0.000	0.811
%_Ind_Dir	0.691	0.714	0.168	0.000	1.000
Ln(BoardSize)	2.216	2.197	0.284	1.099	3.664
Exe_Death	0.018	0.000	0.161	0.000	2.000
Dir_Death	0.061	0.000	0.263	0.000	4.000
Tax	0.424	.425	0.039	0.350	0.661
CEO_Tenure	8.006	6.000	7.146	1.000	60.000

Table 3: Announcement effects of the CEO's dual appointment as the chairman

This table reports the results on the announcement returns when the incumbent CEO was also appointed the chairman of the board. Panel A reports the mean abnormal return (*AR*) on the announcement date for subsamples with different levels of product market environment index. Columns (1) and (2) report the abnormal return estimated using the market model with equal- and value-weighted market index, respectively, for an estimation period of (-256, -6) trading days following Brown and Warner (1985). P-values of the *t*-tests whether the mean is significantly different from zero are reported in parentheses. Panel B reports the regression estimation results on the impact of product market environment on appointment announcement returns. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. All regressions control for year fixed effects, and industry fixed effects based on the two-digit SIC code. Robust standard errors are reported in parentheses**.** Mean values and coefficient estimates marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

Panel A: Descriptive Statistics

	AR (equal-weighted market index)	**AR (value-weighted market index)**
	(1)	**(2)**
Prod_Index=0	-0.094%	-0.158%
	(0.6969)	(0.5250)
Prod_Index=1	-0.078%	-0.034%
	(0.8101)	(0.9150)
Prod_Index=2	0.720%**	0.395%**
	(0.0356)	(0.0437)
Prod_Index=3	0.786%*	0.510%*
	(0.0663)	(0.0789)

Panel B: Regression Analyses

	AR (equal-weighted market index)		**AR (value-weighted market index)**	
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
Prod_Index	0.612**	0.676**	0.593**	0.642*
	(0.287)	(0.340)	(0.289)	(0.340)
Ln(FirmAge)		0.032		0.002
		(0.307)		(0.306)
LNS		-0.252		-0.235
		(0.192)		(0.183)
CEO_OWN		-5.032		-8.553
		(20.709)		(21.161)
CEO_OWN^2		19.907		39.665
		(74.837)		(76.367)
Tobin's q_{t-1}		0.041		0.025
		(0.202)		(0.188)
Constant	2.773	4.384	2.874	4.603
	(3.041)	(3.356)	(2.914)	(3.232)
Year FE & Industry FE	Y	Y	Y	Y
Observations	254	229	254	229
Adjusted R-squared	0.062	0.059	0.074	0.080

Table 4: The product market environment index, CEO power and firm value

This table reports the results for the interaction of the product market environment index (*Prod_Index*) and CEO power on Tobin's *q*. *Prod_Index* is defined as the sum of *H_Fluid, H_Vdshock*, and *L_TNIC_HHI*. *H_Fluid*, *H_Vdshock*, and *L_TNIC_HHI* are indicator variables equal to one if fluidity (*Fluid*), vertical demand shock (*Vdshock*), or the reversed text-based Herfindahl index (*R_HHI)* is above the sample median, respectively, and zero otherwise. *CEO_Hard_Power* is the logged value of one plus the sum of *CEO_Founder* and *CEO_Chair*. *CEO_Soft_Power* is the sum of the fraction of top four non-CEO executives (*FTA*) and non-CEO directors (*FDA*) appointed during the current CEO's tenure. *CEO_All_Power* is defined as the logged value of one plus the sum of *CEO_Founder*, *CEO_Chair*, *H_FTA,* and *H_FDA*, where *H_FTA (H_FDA)* equals one if *FTA (FDA)* is greater than 0.5 (0.5), and zero otherwise. Regressions in Columns (1)–(3) include firm and year fixed effects. Regressions in Columns (4)–(6) are the CEO-firm pair level between estimations, in which we obtain one observation for each CEO-firm pair by averaging main variables across the times-series. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. Robust standard errors (robust standard errors clustered at the firm level) are reported in parentheses in Columns (4)–(6) (Columns (1)–(3)). *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's *q*					
	OLS			**CEO-Firm Pair Level Between Regressions**		
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Prod_Index	-0.036	-0.020	-0.036	0.137***	0.099*	0.066
	(0.029)	(0.033)	(0.033)	(0.043)	(0.051)	(0.055)
CEO_Hard_Power	-0.105			-0.012		
	(0.066)			(0.125)		
CEO_Hard_Power*Prod_Index	0.225***			0.287***		
	(0.044)			(0.073)		
CEO_Soft_Power		-0.080			-0.232	
		(0.071)			(0.145)	
CEO_Soft_Power*Prod_Index		0.103**			0.256***	
		(0.051)			(0.085)	
CEO_All_Power			-0.043			-0.069
			(0.041)			(0.090)
CEO_All_Power*Prod_Index			0.075**			0.185***
			(0.029)			(0.054)
Ln(FirmAge)	-0.956***	-0.655***	-0.644***	-0.135***	-0.130***	-0.116***
	(0.142)	(0.172)	(0.172)	(0.030)	(0.034)	(0.034)
LNS	-0.306***	-0.253***	-0.253***	-0.157***	-0.052***	-0.057***
	(0.059)	(0.075)	(0.074)	(0.017)	(0.019)	(0.019)
CEO_OWN	0.053	1.642	1.445	-0.783	-0.039	-0.679
	(0.830)	(1.175)	(1.172)	(1.084)	(1.212)	(1.212)
CEO_OWN^2	-1.130	-4.740*	-4.471*	2.825	2.758	3.938
	(1.684)	(2.666)	(2.638)	(3.089)	(3.553)	(3.547)
Constant	7.050***	5.796***	5.765***	3.297***	2.896***	2.819***
	(0.617)	(0.751)	(0.749)	(0.230)	(0.261)	(0.259)
Firm FE & Year FE	Y	Y	Y	N	N	N
Observations	14,300	10,379	10,374	14,300	10,379	10,374
Adjusted R-squared	0.589	0.623	0.624	0.106	0.056	0.061
Number of CEO-Firm Pairs				3,320	2,738	2,735

Table 5: Different components of product market environment index

This table reports the impact of different components of product market environment index and CEO power on Tobin's q. Product market environment is measured by fluidity (*Fluid*) in Columns (1)–(3), vertical demand shock (*Vdshock*) in Columns (4)–(6), and a reversed text-based Herfindahl index (*R_ HHI*) in Columns (7)–(9). The sample covers the period 1996 through 2010 in Columns (1)–(3) and (7)–(9); and 1999 through 2010 in Columns (4)–(6). We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects and other controls (*Ln(FirmAge), LNS, CEO_OWN,* and CEO_OWN^2). Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's q								
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
CEO_Hard_Power*Fluid	0.038***								
	(0.011)								
CEO_Soft_Power*Fluid		0.023**							
		(0.011)							
CEO_All_Power*Fluid			0.014**						
			(0.007)						
CEO_Hard_Power*Vdshock				0.648***					
				(0.227)					
CEO_Soft_Power*Vdshock					0.518*				
					(0.269)				
CEO_All_Power*Vdshock						0.390**			
						(0.176)			
CEO_Hard_Power*R_HHI							0.269*		
							(0.158)		
CEO_Soft_Power*R_HHI								0.355*	
								(0.181)	
CEO_All_Power*R_HHI									0.149*
									(0.089)
Fluid	-0.018**	-0.016**	-0.018**						
	(0.007)	(0.008)	(0.008)						
Vdshock				0.589***	0.364**	0.267			
				(0.142)	(0.178)	(0.195)			
R_HHI							-0.131	-0.309**	-0.266***
							(0.101)	(0.122)	(0.096)
CEO_Hard_Power	-0.094			0.182***			-0.070		
	(0.074)			(0.054)			(0.136)		
CEO_Soft_Power		-0.106			0.044			-0.260	
		(0.075)			(0.058)			(0.158)	
CEO_All_Power			-0.043			0.043			-0.078
			(0.044)			(0.032)			(0.076)
Other Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE & Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	21,049	14,385	14,380	14,805	10,729	10,724	22,334	14,433	14,428
Adjusted R-squared	0.611	0.645	0.645	0.593	0.631	0.632	0.605	0.643	0.643

Table 6 Controlling for CEO characteristics

This table reports regression results on Tobin's q after controlling for CEO characteristics and the interaction terms between CEO characteristics and product market environment index. CEO characteristics include an indicator for whether a CEO obtains a bachelor's degree from an Ivy League university (*Ivybachlr*), an indicator for whether a CEO obtains a MBA degree from the top ten programs ranked by US News & World Report (2010) *(MBATop10*), both the last year industry-adjusted performance of the firm where the CEO worked as a top executive (*CEO_Past_Perform*) and the total number of years working in the same industry as a top executive (*Indexp_Exe*) prior to joining the given firm, CEO age (*CEOAge*), and CEO ownership (*CEO_OWN*). The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's q		
VARIABLES	**(1)**	**(2)**	**(3)**
Prod_Index	0.783***	0.455**	0.476**
	(0.164)	(0.190)	(0.191)
CEO_Hard_Power	-0.127		
	(0.080)		
CEO_Hard_Power*Prod_Index	0.265***		
	(0.053)		
CEO_Soft_Power		-0.039	
		(0.097)	
CEO_Soft_Power*Prod_Index		0.130**	
		(0.064)	
CEO_All_Power			-0.037
			(0.053)
CEO_All_Power*Prod_Index			0.095**
			(0.037)
Ivybachlr	-0.102	-0.069	-0.070
	(0.126)	(0.140)	(0.140)
Ivybachlr*Prod_Index	-0.050	-0.093	-0.091
	(0.084)	(0.096)	(0.095)
MBATop10	-0.060	-0.133	-0.131
	(0.086)	(0.089)	(0.089)
MBATop10*Prod_Index	0.046	0.053	0.048
	(0.057)	(0.058)	(0.059)
Indexp_Exe	0.003	0.003	0.003
	(0.003)	(0.004)	(0.004)
Indexp_Exe*Prod_Index	-0.004*	-0.002	-0.002
	(0.002)	(0.002)	(0.002)
CEOAge	0.011**	0.007	0.008
	(0.005)	(0.005)	(0.005)
CEOAge*Prod_Index	-0.015***	-0.008**	-0.009**
	(0.003)	(0.004)	(0.004)
CEO_Past_Perform	1.456**	1.984***	1.985***
	(0.632)	(0.665)	(0.668)
CEO_Past_Perform*Prod_Index	-0.437	-0.770**	-0.778**
	(0.305)	(0.362)	(0.360)
CEO_OWN	-0.128	-0.431	-0.467
	(0.994)	(1.511)	(1.511)
CEO_OWN^2	-2.151	-2.708	-2.714
	(2.096)	(3.098)	(3.084)
CEO_OWN*Prod_Index	0.394	0.792	0.766
	(0.322)	(0.489)	(0.482)
Ln(FirmAge)	-0.832***	-0.604***	-0.595***
	(0.149)	(0.193)	(0.193)
LNS	-0.301***	-0.264***	-0.262***
	(0.062)	(0.085)	(0.084)
Constant	6.030***	5.295***	5.242***
	(0.650)	(0.906)	(0.903)
Firm FE & Year FE	Y	Y	Y
Observations	11,748	8,812	8,807
Adjusted R-squared	0.600	0.624	0.624

Table 7: Industry life cycle, CEO power and firm value

This table reports the effect of the interaction between industry life cycle and CEO power on Tobin's q. Industry life cycle (*Ind_Life_Cycle*) is measured by long-term industry growth (*LTIndustryGrowth*) in Columns (1) to (3), and logged value of one plus the number of IPOs (*Ln(Num_IPO+1)*) in Columns (4) to (6). *LTIndustryGrowth* is the long-run growth of industry product shipments deflated by industry price deflators using BEA data during the period of 1999 to 2010. *Num_IPO* is the number of IPOs in each industry over the full sample period. Industries are defined based on the two-digit NAICS. CEO power is measured by *CEO_Hard_Power* in Columns (1) and (4), *CEO_Soft_Power* in Columns (2) and (5), and *CEO_All_Power* in Columns (3) and (6). The sample covers the period 1999 through 2010 in Columns (1)–(3) and the period 1996 through 2010 in Columns (4)–(6). The sample consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. All regressions are CEO-firm pair level between regressions, in which we obtain one observation for each CEO-firm pair by averaging each variable across the times-series. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's q					
	LTIndustryGrowth			**Ln(Num_IPO+1)**		
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Ind_Life_Cycle	0.074*	0.088	0.064	0.066***	0.011	0.005
	(0.041)	(0.058)	(0.063)	(0.021)	(0.029)	(0.032)
CEO_Hard_Power	0.021			-0.290*		
	(0.105)			(0.166)		
CEO_Hard_Power*Ind_Life_Cycle	0.272***			0.125***		
	(0.070)			(0.035)		
CEO_Soft_Power		-0.001			-1.188***	
		(0.142)			(0.237)	
CEO_Soft_Power*Ind_Life_Cycle		0.275***			0.273***	
		(0.100)			(0.050)	
CEO_All_Power			0.056			-0.613***
			(0.093)			(0.152)
CEO_All_Power*Ind_Life_Cycle			0.189***			0.160***
			(0.064)			(0.032)
Ln(FirmAge)	-0.059*	-0.129***	-0.127***	-0.154***	-0.169***	-0.156***
	(0.036)	(0.047)	(0.047)	(0.020)	(0.027)	(0.027)
LNS	-0.097***	0.007	0.004	-0.146***	-0.035**	-0.039**
	(0.022)	(0.027)	(0.027)	(0.012)	(0.015)	(0.015)
CEO_OWN	-0.207	-1.609	-2.293	1.804**	1.278	0.797
	(1.554)	(2.164)	(2.172)	(0.762)	(1.035)	(1.035)
CEO_OWN^2	7.786*	12.224*	13.597**	-1.784	1.734	2.671
	(4.247)	(6.394)	(6.396)	(2.197)	(3.106)	(3.105)
Constant	2.619***	2.654***	1.885***	2.438***	2.798***	2.269***
	(0.412)	(0.390)	(0.417)	(0.212)	(0.256)	(0.250)
Observations	8,716	5,454	5,452	26,358	14,684	14,679
Number of CEO-Firm Pairs	1,550	1,193	1,192	5,331	3,718	3,715
Adjusted R-squared	0.098	0.080	0.084	0.121	0.067	0.067

Table 8: The product market environment, CEO power and corporate actions

This table reports the results of the influence of CEO power on corporate actions. The dependent variable is capital expenditures divided by total assets times 100 (Capx/TA) in Columns (1)–(3), and advertising expenditures expenses divided by total assets times 100 (AD/TA) in Columns (4)–(6). The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Capx/TA			AD/TA		
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Prod_Index	0.078	0.008	-0.027	-0.119	-0.203**	-0.233***
	(0.088)	(0.094)	(0.085)	(0.176)	(0.087)	(0.073)
CEO_Hard_Power	-0.086			-0.358		
	(0.187)			(0.328)		
CEO_Hard_Power *Prod_Index	0.244**			0.174		
	(0.113)			(0.226)		
CEO_Soft_Power		-0.001			-0.651**	
		(0.218)			(0.312)	
CEO_Soft_Power *Prod_Index		0.351**			0.315**	
		(0.145)			(0.130)	
CEO_All_Power			-0.047			-0.419***
			(0.107)			(0.136)
CEO_All_Power *Prod_Index			0.234***			0.205***
			(0.074)			(0.064)
Ln(FirmAge)	-1.506***	-2.019***	-2.004***	0.311	0.275	0.282
	(0.308)	(0.448)	(0.290)	(0.533)	(0.426)	(0.272)
PPE/TA	2.289***	2.289***	2.285***	2.351**	2.627***	2.628***
	(0.589)	(0.746)	(0.543)	(0.953)	(0.594)	(0.373)
LNS	0.589***	0.820***	0.827***	-0.605	0.047	0.050
	(0.169)	(0.243)	(0.173)	(0.750)	(0.270)	(0.163)
CEO_OWN	2.602**	3.122*	2.942**	0.044	0.530	0.609
	(1.245)	(1.755)	(1.223)	(1.034)	(1.343)	(0.932)
Constant	2.812*	2.584	2.539*	5.930	1.006	1.016
	(1.599)	(2.052)	(1.475)	(4.868)	(2.446)	(1.290)
Firm FE & Year FE	Y	Y	Y	Y	Y	Y
Observations	14,552	10,305	10,300	5,968	4,151	4,148
Adjusted R-squared	0.683	0.720	0.720	0.817	0.928	0.928

Table 9: The product market environment, CEO power and new product introductions

This table reports the results of the influence of CEO power on new product introductions. The dependent variable is new product introductions for the year t to t+1 in Columns (1)–(3), for years t to t+2 in Columns (4)–(6), and for years t to t+3 in Columns (7)–(9). We define new product introduction as the logarithmic growth in the number of words used in the product description section of a firm's 10-K. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Product_Growth$_{t,t+1}$			**Product_Growth$_{t,t+2}$**			**Product_Growth$_{t,t+3}$**		
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Prod_Index	-0.063***	-0.061***	-0.055***	-0.085***	-0.084***	-0.077***	-0.096***	-0.096***	-0.092***
	(0.009)	(0.012)	(0.012)	(0.015)	(0.018)	(0.016)	(0.017)	(0.022)	(0.017)
CEO_Hard_Power	-0.005			-0.036			-0.016		
	(0.021)			(0.035)			(0.040)		
CEO_Hard_Power									
*Prod_Index	0.017			0.034*			0.040*		
	(0.012)			(0.019)			(0.022)		
CEO_Soft_Power		-0.025			-0.050			-0.029	
		(0.026)			(0.042)			(0.052)	
CEO_Soft_Power									
*Prod_Index		0.026			0.062***			0.066**	
		(0.016)			(0.024)			(0.028)	
CEO_All_Power			-0.005			-0.018			-0.010
			(0.017)			(0.022)			(0.024)
CEO_All_Power									
*Prod_Index			0.008			0.026**			0.032**
			(0.010)			(0.012)			(0.014)
Ln(FirmAge)	0.017	-0.006	-0.006	0.029	0.018	0.018	0.055	0.045	0.047
	(0.020)	(0.035)	(0.037)	(0.042)	(0.073)	(0.058)	(0.055)	(0.094)	(0.067)
PPE/TA	0.003	0.008	0.008	-0.011	0.017	0.018	-0.066	0.007	0.009
	(0.034)	(0.045)	(0.046)	(0.061)	(0.077)	(0.064)	(0.093)	(0.110)	(0.078)
LNS	-0.004	0.004	0.004	0.001	0.005	0.006	-0.017	-0.030	-0.029
	(0.012)	(0.016)	(0.016)	(0.020)	(0.027)	(0.021)	(0.030)	(0.042)	(0.028)
CEO_OWN	-0.067	-0.079	-0.085	0.008	-0.134	-0.147	-0.136	-0.390	-0.413
	(0.095)	(0.137)	(0.152)	(0.199)	(0.232)	(0.222)	(0.229)	(0.246)	(0.255)
Constant	0.075	0.094	0.086	0.104	0.067	0.050	0.253	0.321	0.297
	(0.102)	(0.155)	(0.170)	(0.163)	(0.247)	(0.202)	(0.246)	(0.369)	(0.249)
Firm FE & Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	12,919	9,162	9,162	11,155	7,909	7,909	9,537	6,840	6,840
Adjusted R-squared	0.007	0.003	0.003	0.135	0.122	0.121	0.217	0.234	0.234

Table 10: CEO power and the number of board meetings

This table reports the results of the influence of CEO power on the number of board meetings. The dependent variable, *Ln(Num_of_Board_Meeting)*, is the logged value of one plus the number of board meetings. The key independent variable is *CEO_Hard_Power* in Column (1), *CEO_Soft_Power* in Column (2), and *CEO_All_Power* in column (3). The sample covers the period 1996 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Ln(Num_of_Board_Meeting)		
VARIABLES	**(1)**	**(2)**	**(3)**
CEO_Hard_Power	-0.051***		
	(0.013)		
CEO_Soft_Power		-0.050***	
		(0.015)	
CEO_All_Power			-0.029***
			(0.009)
Ln(FirmAge)	0.061**	0.049	0.049
	(0.026)	(0.033)	(0.033)
PPE/TA	0.007	0.002	0.002
	(0.033)	(0.038)	(0.038)
LNS	0.009	0.004	0.004
	(0.012)	(0.015)	(0.015)
CEO_OWN	-0.229**	-0.093	-0.076
	(0.107)	(0.105)	(0.107)
%_Ind_Dir	0.105***	0.096**	0.097**
	(0.035)	(0.041)	(0.041)
Ln(BoardSize)	-0.028	-0.037	-0.041
	(0.029)	(0.032)	(0.032)
Constant	1.862***	1.971***	1.975***
	(0.125)	(0.150)	(0.150)
Firm FE & Year FE	Y	Y	Y
Observations	14,895	11,881	11,881
Adjusted R-squared	0.487	0.484	0.484

Table 11a: CEO power in the executive suite

This table analyzes the effect of CEO power in the executive suite interacting with product market environment on Tobin's *q*. In Panel A, B, and C, product market environment is measured by fluidity (*Fluid*), vertical demand shock (*Vdshock*), and a reversed text-based Herfindahl index (*R_ HHI*), respectively. CEO power in the executive suite is measured by *FTA*, *FTA_COO*, *FTA_CFO*, and *FTA_CTO* in Columns (1)–(4), respectively. *FTA* is the faction of top four non-CEO executives appointed during the current CEO's tenure. *FTA_COO (FTA_CFO, FTA_CTO)* is an indicator variable equal to one if the COO (CFO, CTO) is appointed during the current CEO tenure. Regressions in Column (2) (Column (3), Column (4)) control for *Miss_COO (Miss_CFO, Miss_CTO)* and its interaction term with product market environment. *Miss_COO (Miss_CFO, Miss_CTO)* equals one if the company does not have a COO (CFO, CTO), or has missing information on the COO (CFO, CTO) in ExecuComp, and zero otherwise. Other control variables are the same as in Table 4 and therefore not reported. The sample covers the period 1996 through 2010 in Panel A and C, and 1999 through 2010 in Panel B. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's *q*			
VARIABLES	**FTA**	**FTA_COO**	**FTA_CFO**	**FTA_CTO**
	(1)	**(2)**	**(3)**	**(4)**
Panel A: Interacting with Fluidity				
FTA_Exe	-0.086	0.017	-0.062	-0.559*
	(0.063)	(0.064)	(0.048)	(0.308)
FTA_Exe*Fluid	0.020**	-0.006	0.018**	0.087*
	(0.009)	(0.009)	(0.007)	(0.046)
Fluid	-0.009	0.005	-0.013**	-0.036
	(0.008)	(0.008)	(0.007)	(0.029)
Firm FE & Year FE	Y	Y	Y	Y
Observations	19,294	19,294	19,294	19,294
Adjusted R-squared	0.613	0.613	0.613	0.613
Panel B: Interacting with Vdshock				
FTA_Exe	0.041	-0.002	0.060*	-0.017
	(0.045)	(0.050)	(0.035)	(0.185)
FTA_Exe*Vdshock	0.546**	0.353	0.247	-1.355
	(0.223)	(0.227)	(0.165)	(1.016)
Vdshock	0.466***	0.594***	0.760***	3.651***
	(0.174)	(0.180)	(0.142)	(0.673)
Firm FE & Year FE	Y	Y	Y	Y
Observations	13,641	13,641	13,641	13,641
Adjusted R-squared	0.597	0.597	0.597	0.598
Panel C: Interacting with R_ HHI				
FTA_Exe	-0.193	-0.251**	-0.134	-0.764
	(0.117)	(0.112)	(0.095)	(0.480)
FTA_Exe*R_HHI	0.291**	0.285**	0.218*	1.045*
	(0.140)	(0.130)	(0.115)	(0.620)
R_HHI	-0.204	-0.183*	-0.165*	-0.623
	(0.133)	(0.105)	(0.099)	(0.430)
Firm FE & Year FE	Y	Y	Y	Y
Observations	20,414	20,414	20,414	20,414
Adjusted R-squared	0.608	0.608	0.608	0.608

Table 11b: CEO power in the board room

This table analyzes the effect of CEO power in the board room interacting with the product market environment on Tobin's *q*. In Panel A, B, and C, product market environment is measured by fluidity (*Fluid*), vertical demand shock (*Vdshock*), and a reversed text-based Herfindahl index (*R_ HHI*), respectively. CEO power in the board room is measured by *FDA, FDA_Audit, FDA_Compensation, and FDA_Advice* in Columns (1)–(4), respectively. *FDA_Audit (FDA_Compensation, FDA_Advice)* is the fraction of directors appointed during the current CEO's tenure in the audit committee (compensation committee, advisory committees), excluding the CEO from both the numerator and denominator if the CEO is on the board. Other control variables are the same as in Table 4 and therefore not reported. The sample covers the period 1996 through 2010 in Panel A and C, and 1999 through 2010 in Panel B. We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's *q*			
VARIABLES	**FDA**	**FDA_Audit**	**FDA_Compensation**	**FDA_Advice**
	(1)	**(2)**	**(3)**	**(4)**
Panel A: Interacting with Fluidity				
FDA_Committee	-0.084*	-0.116**	-0.175**	-0.033
	(0.051)	(0.054)	(0.086)	(0.074)
FDA_Committee*Fluid	0.017**	0.019**	0.025	0.011
	(0.007)	(0.008)	(0.017)	(0.012)
Fluid	-0.011**	-0.010**	-0.010*	-0.022*
	(0.005)	(0.004)	(0.006)	(0.011)
Firm FE & Year FE	Y	Y	Y	Y
Observations	15,141	15,141	15,141	5,281
Adjusted R-squared	0.646	0.646	0.512	0.643
Panel B: Interacting with Vdshock				
FDA_Committee	0.037	0.032	-0.031	0.065
	(0.057)	(0.058)	(0.062)	(0.061)
FDA_Committee*Vdshock	0.486**	0.173	0.215	-0.106
	(0.246)	(0.295)	(0.272)	(0.334)
Vdshock	0.382**	0.573***	0.562***	0.663**
	(0.162)	(0.168)	(0.159)	(0.333)
Firm FE & Year FE	Y	Y	Y	Y
Observations	11,339	11,339	11,339	3,621
Adjusted R-squared	0.632	0.632	0.632	0.655
Panel C: Interacting with R_ HHI				
FDA_Committee	-0.353**	-0.318*	-0.472***	0.203
	(0.162)	(0.174)	(0.181)	(0.191)
FDA_Committee*R_HHI	0.433**	0.359*	0.498**	-0.210
	(0.182)	(0.199)	(0.206)	(0.212)
R_HHI	-0.354***	-0.275**	-0.309***	-0.022
	(0.119)	(0.111)	(0.109)	(0.130)
Firm FE & Year FE	Y	Y	Y	Y
Observations	15,191	15,191	15,191	5,321
Adjusted R-squared	0.644	0.644	0.644	0.670

Table 12: GMM regression results

This table reports the results of dynamic panel GMM estimations based on model (3) of Table 4. The endogenous variables include all independent variables excluding firm age and year dummies. Exogenous variables include firm age and year dummies. Instruments are from t-2 and t-3. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first-differenced residuals, under the null of no serial correlation. The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations are exogenous. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Tobin's *q*
VARIABLES	**(1)**
Prod_Index	-0.146
	(0.125)
CEO_All_Power	-0.271**
	(0.132)
CEO_All_Power*Prod_Index	0.247**
	(0.105)
Ln(FirmAge)	-0.117
	(0.126)
LNS	0.118
	(0.139)
CEO_OWN	-0.936
	(2.662)
CEO_OWN^2	-2.978
	(4.962)
Tobin's q_{t-1}	0.605***
	(0.057)
Tobin's q_{t-2}	0.001
	(0.019)
Tobin's q_{t-3}	0.016
	(0.016)
Constant	0.454
	(0.504)
Firm FE & Year FE	Y
Observations	9,931
Number of gvkey	1,584
AR(1)test (p-value)	0.000
AR(2)test (p-value)	0.288
Hansen test of over-identification (p-value)	0.733
Diff-in-Hansen tests of exogeneity (p-value)	0.538

Table 13: IV regression results

This table reports instrumental variable regression results based on model (3) of Table 4. The endogenous variables are *CEO_All_Power*, *CEO_All_Power*Prod_Index*, *CEO_OWN*, and *CEO_OWN*^{2}. The instrumental variables are *Exe_Death*, *Dir_Death*, *Tax*, *Tax*^{2}, and *Ln(CEO_Tenure+1)*. *Exe_Death (Dir_Death)* is the number of top four non-CEO executives (all non-CEO directors) who left their positions due to sudden deaths during the current CEO's tenure up to the previous year (i.e., year t-1). Deaths related to pressures from firm performance or suicides are excluded. *Tax* is the sum of maximum marginal federal and state personal income tax rates. The first stage instrumental regression results are reported in Columns (1)–(4) and the second stage regression results are reported in Column (5). The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. We provide the definitions of all variables in Appendix 1. All regressions include firm and year fixed effects. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	1st Stage				2nd Stage
	CEO_All_Power	CEO_All_Power *Prod_Index	CEO_OWN	CEO_OWN^2	Tobin's *q*
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Prod_Index	-0.004	0.914***	0.002***	0.001***	-5.079*
	(0.005)	(0.013)	(0.001)	(0.000)	(2.932)
CEO_All_Power_Hat					-7.036*
					(4.075)
CEO_All_Power*Prod_Index_Hat					5.787*
					(3.279)
Ln(FirmAge)	-0.358***	-0.580***	-0.011***	-0.002*	-0.239
	(0.024)	(0.052)	(0.003)	(0.001)	(0.275)
LNS	-0.005	-0.045*	-0.003***	-0.001	-0.182**
	(0.010)	(0.023)	(0.001)	(0.000)	(0.084)
CEO_OWN_Hat					16.138
					(14.518)
CEO_OWN^2_Hat					-288.683***
					(107.912)
Exe_Death	-0.008	-0.012	-0.002	-0.001	
	(0.022)	(0.065)	(0.002)	(0.001)	
Dir_Death	0.096***	0.083**	-0.003*	-0.001*	
	(0.018)	(0.035)	(0.002)	(0.001)	
Tax	-0.732	-1.021	0.128	0.035	
	(1.770)	(3.913)	(0.234)	(0.099)	
Tax^2	0.913	0.784	-0.074	-0.046	
	(1.731)	(3.698)	(0.216)	(0.084)	
Ln(CEO_Tenure+1)	0.626***	0.832***	0.012***	0.002***	
	(0.006)	(0.016)	(0.001)	(0.000)	
Constant	0.976**	0.797	0.008	0.002	10.339***
	(0.455)	(1.026)	(0.060)	(0.026)	(2.581)
Firm FE & Year FE	Y	Y	Y	Y	Y
Observations	10,354	10,354	10,354	10,354	10,354
Adjusted R-squared	0.773	0.811	0.737	0.646	0.623
F-statistics (IVs)	788.72	217.03	44.75	7.92	

Appendix 1: Variable definitions

A.1.1 Product market environment variables

Variable	*Definition*
Prod_Index	The sum of *H_Fluid*, *H_Vdshock*, and *L_TNIC_HHI*. *H_Fluid, H_Vdshock*, and *L_TNIC_HHI* are indicator variables equal to one if fluidity (*Fluid*), vertical demand shock (*Vdshock*), or the reversed text-based Herfindahl index (*R_HHI*) is above the sample median, respectively, and zero otherwise.
Fluid	10-K text based product market fluidity measure developed in Hoberg, Phillips and Prabhala (2014). It assesses the degree of competitive threat and product market changes surrounding a firm.
Vdshock	Annual percentage change in product shipments for downstream industries. The changes in product shipments are from the BEA website. Downstream industries are identified using the BEA input-output matrix based on the NAICS two-digit industries.
TNIC_HHI	The squared sum of the market share of the four biggest firms in sales among competitor firms. Competitor firms are identified using the 10-K based product market similarity measure in Hoberg and Phillips (2015). The similarity measure assesses the degree of similarity in product market descriptions in the 10-K filings for all firm pairs in Compustat database.
R_ HHI	Reversed *TNIC_HHI*.
LTIndustryGrowth	Long-run growth of industry product shipments at the two-digit NAICS level during the period 1999 to 2010. Data on product shipments are obtained from BEA website and are deflated by industry price deflators.
Num_IPO	Number of IPOs into each two-digit NAICS industry during the full sample period. Firm-level IPO data are from Securities Data Company (SDC) Thompson Platinum database.

A.1.2 CEO power variables

Variable	*Definition*
CEO_Hard_Power	The logged value of one plus the sum of *CEO_Founder* and *CEO_Chair*.
CEO_Chair	An indicator variable equal to one if a CEO also chairs the board, and zero otherwise.
CEO_Founder	An indicator variable equal to one if a CEO was the CEO five years prior to the IPO date reported by CRSP or the first date when the firm appears in CRSP, and zero otherwise.
CEO_Soft_Power	CEO_Soft_Power is the average of *FTA* and *FDA*.
FTA	Fraction of top four non-CEO executives appointed during the current CEO's tenure.
FDA	Fraction of directors appointed during the current CEO's tenure, excluding the CEO from both the numerator and denominator if the CEO is on the board.
CEO_All_Power	The logged value of one plus the sum of *CEO_Founder*, *CEO_Chair, H_FTA, and H_FDA*. *H_FTA (H_FDA)* is equal to one if *FTA (FDA)* is greater than 0.5 (0.5), and zero otherwise.
FTA_COO(CFO,CTO)	An indicator variable equal to one if the COO (CFO, CTO) of the firm is appointed during the current CEO's tenure, and zero otherwise.
FDA_Audit	Fraction of directors appointed during the current CEO's tenure in the audit committee, excluding the CEO from both the numerator and denominator if the CEO is on the board.
FDA_Compensation	Fraction of directors appointed during the current CEO's tenure in the compensation committee, excluding the CEO from both the numerator and denominator if the CEO is on the board.
FDA_Advice	Fraction of directors appointed during the current CEO's tenure in the advisory committees, excluding the CEO from both the numerator and denominator if the CEO is on the board. Advisory committees are a set of committees that assist the CEO in making crucial investment and corporate strategy decisions, including (1) finance, investment and budgeting committees; (2) corporate strategy, M&A, and business committees; (3) science and technology development committees; (4) executive committees. Advisory

	committees do not include auditing, corporate governance, nomination, or compensation committees.

A.1.3 Other variables

Variable	*Definition*
Tobin's *q*	The market value of common equity plus the book value of total liabilities divided by the book value of total assets.
Ln(FirmAge)	The logged value of one plus the number of years from the firm's IPO as reported in CRSP or the number of years since its first appearance in CRSP.
LNS	The logged value of sales.
CEO_OWN	Percentage of outstanding common shares held by a CEO.
CEO_OWN^2	The square of *CEO_OWN*.
Ivybachlr	An indicator variable equal to one if a CEO obtains a bachelor's degree from an Ivy League university, and zero otherwise.
MBATop10	An indicator variable equal to one if a CEO obtains a MBA degree from the top ten programs ranked by US News & World Report (2010), and zero otherwise.
CEO_Past_Perform	The last year industry-adjusted performance (EBITDA/total assets) of the firm where the CEO worked as a top executive prior to joining the given firm. Industries are defined based on NAICS two-digit industries. Missing values are replaced with the sample median.
IndExp	The number of years working in the same industry as a top executive prior to joining the given firm. Industries are defined based on NAICS two-digit industries.
CEOAge	CEO age.
Capx/TA	Capital expenditures divided by the value of total assets.
AD/TA	Advertising expenses divided by the value of total assets
Product_Growth	Logarithmic growth in the number of words used in the product description section of a firm's 10-K following Hoberg and Phillips (2010).
PPE/TA	Property, plant, and equipment divided by total assets.
Num_of_Board_Meeting	The number of board meetings during the fiscal year. Data after 2005 are hand-collected from proxy filings.
%_Ind_Dir	Percentage of independent directors on the board.
Ln(BoardSize)	The logged value of one plus the total number of directors on the board.
Miss_COO (CFO,CTO)	An indicator variable equal to one if the company does not have a COO (CFO, CTO), or has missing information on the COO (CFO, CTO) in ExecuComp, and zero otherwise.
Exe_Death	The number of top four non-CEO executives who left their positions due to sudden deaths during the current CEO's tenure up to the previous year (i.e., year t-1). Deaths related to pressures from firm performance or suicides are excluded.
Dir_Death	The number of non-CEO directors who left their positions due to sudden deaths during the current CEO's tenure up to the previous year (i.e., year t-1). Deaths related to pressures from firm performance or suicides are excluded.
Tax	The sum of maximum marginal federal and state personal income tax rates.
Tax^2	The square of *Tax*.
CEO_Tenure	The number of years since the CEO was appointed.

Appendix 2: Robustness results

Table A.2.1: Alternative measures of product market environment

This table reports the estimation results of model (3) of Table 4 using alternative measures of product market environment. Product market environment (*Prod_VAR*) is measured by product market environment index constructed based on principle component analysis in Column (1), the reversed Herfindahl index based on three-digit SIC code using Compustat data in Column (2), the absolute value of vertical demand shock in Column (3), and the sum of *H_Fluid*, *H_Vdshock*, *L_HHI*, and *H_Sim* in Column (4). *H_Sim* is an indicator variable equal to one if the average similarity score across firm pairs is above the sample median, and zero otherwise. The sample covers the period 1999 through 2010 in Columns (1), (3) and (4); and the period 1996 through 2010 in Column (2). The sample consists of S&P 1500 firms plus those that were once part of the index. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Tobin's *q*			
	PCA Prod_Index	Compustat HHI	Abs_Vdshock	Add Similarity
VARIABLES	(1)	(2)	(3)	(4)
Prod_VAR	-0.093***	-0.634**	-0.032	-0.042
	(0.034)	(0.302)	(0.257)	(0.028)
CEO_All_Power	0.057*	-0.185*	0.014	-0.047
	(0.033)	(0.109)	(0.037)	(0.041)
CEO_All_Power*Prod_VAR	0.069**	0.279**	0.537**	0.060***
	(0.029)	(0.130)	(0.264)	(0.023)
Firm FE & Year FE	Y	Y	Y	Y
Observations	10,456	14,641	10,724	10,374
Adjusted R-squared	0.623	0.646	0.631	0.623

Table A.2.2: Alternative measures of CEO power

This table reports the estimation results of model (3) of Table 4 using alternative measures of CEO power. *CEO_All_Power_VAR* is measured by the overall CEO power index constructed based on principle component analysis in Column (1), and the overall CEO power index constructed based on the residuals of the regression of *CEO_All_Power* on *CEO_tenure* in Column (2). The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Tobin's *q*	
	PCA CEO_ALL_Power	CEO_ALL_Power Controlling for CEO Tenure
VARIABLES	(1)	(2)
Prod_Index	0.034	0.034
	(0.021)	(0.022)
CEO_All_Power_VAR	-0.031*	-0.069
	(0.018)	(0.054)
CEO_All_Power_VAR*Prod_Index	0.039***	0.099**
	(0.013)	(0.040)
Firm FE & Year FE	Y	Y
Observations	10,374	10,374
Adjusted R-squared	0.624	0.624

Table A.2.3: Alternative firm performance measures

This table reports the estimation results of model (3) of Table 4 using alternative firm performance measures. The dependent variable is ROA in Column (1), buy-and-hold stock returns in Column (2), and three-year sales growth rate in Column (3). The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	ROA	Buy-Hold Return	Sales_Gr
VARIABLES	**(1)**	**(2)**	**(3)**
Prod_Index	-0.001	0.009	-1.599**
	(0.002)	(0.030)	(0.635)
CEO_All_Power	-0.004	-0.073*	-1.421**
	(0.003)	(0.039)	(0.719)
CEO_All_Power*Prod_Index	0.003*	0.073**	2.088***
	(0.002)	(0.031)	(0.554)
Firm FE & Year FE	Y	Y	Y
Observations	10,220	10,322	10,392
Adjusted R-squared	0.451	0.214	0.545

Table A.2.4: Alternative Specifications

This table reports the estimation results of model (3) of Table 4 using alternative specifications. Column (1) reports the results controlling for corporate governance factors, including the percentage of independent directors on the board (*%_Ind_Dir*) and reversed entrenchment index (*Rev_Eindex*). Column (2) reports the results controlling for industry fixed effects. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. Regression in Column (1) includes firm and year fixed effects, while regression in Column (2) includes industry and year fixed effects. Robust standard errors (clustered at the firm level) are reported in parentheses in Column (2) (Column (1)). Coefficients marked with *, **, and *** are significant at 10%, 5%, 1% level, respectively.

	Tobin's *q*	
VARIABLES	**(1)**	**(2)**
Prod_Index	0.141	0.132***
	(0.110)	(0.039)
CEO_All_Power	-0.029	-0.076
	(0.044)	(0.059)
CEO_All_Power*Prod_Index	0.060*	0.076**
	(0.031)	(0.034)
%_Ind_Dir	0.358*	
	(0.198)	
%_Ind_Dir*Prod_Index	-0.386***	
	(0.130)	
Rev_Eindex	-0.072	
	(0.072)	
Rev_Eindex*Prod_Index	0.069*	
	(0.041)	
Year FE	Y	Y
Firm FE	Y	N
Observations	8,810	10,374
Adjusted R-squared	0.638	0.098

Table A.2.5: Alternative Samples

This table reports the estimation results of model (3) of Table 4 using alternative samples. In Column (1) the sample is balanced panel data. Columns (2) and (3) report the results estimated with the high and low Prod_Index subsamples, respectively. The high (low) Prod_Index sample is composed of observations with product market environment index above (equal to or below) one. The sample covers the period 1999 through 2010 and consists of S&P 1500 firms plus those that were once part of the index. All regressions include firm and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Tobin's q		
	Balanced Panel Data	**High Prod_Env**	**Low Prod_Env**
VARIABLES	**(1)**	**(2)**	**(3)**
Prod_Index	-0.035	0.194***	0.007
	(0.037)	(0.066)	(0.019)
CEO_All_Power	-0.037	0.097*	-0.003
	(0.046)	(0.054)	(0.023)
CEO_All_Power*Prod_Index	0.071**		
	(0.034)		
Firm FE & Year FE	Y	Y	Y
Observations	7,607	4,247	6,127
Adjusted R-squared	0.615	0.560	0.708