Powerful CEOs and their Impact on Corporate Performance*

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Abstract

We argue in this paper that executives can only impact firm outcomes if they have influence over crucial decisions. Based on this idea we develop and test a hypothesis about how CEOs' power to influence decisions will affect firm performance: since managers' opinions may differ, firms whose CEOs have more decision-making power should experience more variability in firm performance. Thus performance depends on the interaction between executive characteristics and organizational variables. By focusing on this interaction we are able to use firm-level characteristics to test predictions that are related to unobservable managerial characteristics. Using such firm-level characteristics of the Executive Office we develop a proxy for the CEO's power to influence decisions and provide evidence consistent with our hypothesis. Firm performance (measured by Tobin's Q, stock returns and ROA) is significantly more variable for firms with greater values of our proxy for CEO influence power. The results are robust across various tests designed to detect differences in variability.

1 Introduction

> ...the VP said of the decision process: "The decision was a Don Rogers edict - not a vote". The CEO agreed: "I made the decision myself, despite the objections of everyone. I said 'the hell with it, let's go with the PC interface."'
>
> (quoted by Eisenhardt and Bourgeois, 1988)

In some firms the CEO makes all the major decisions. In other firms decisions are more clearly the product of consensus among the top executives. In this paper we examine whether the power of the CEO to influence decisions affects performance.

More power to influence decisions in the hands of the CEO is not necessarily bad. For example, if the CEO in the quote above had the right intuition about the PC interface, then the fact that he had the power to implement his choice against the objections of the other executives was in the best interests of the firm. On the other hand, the CEO could have been wrong. As this simple example illustrates, power in the hands of the CEO may have an ambiguous effect on average performance. However, with more decision-making power the CEO will not need to rely as much on the opinions of other executives. Therefore, firms whose CEOs have more power to impact decisions may have more variable performances because the CEO is making decisions by himself rather than with a group.

We develop a simple hypothesis about how the CEO's ability to influence decisions will affect firm performance. In an organization in which only the CEO makes the most relevant decisions, the risk arising from judgement errors is not well diversified. That is, the likelihood of either very good or very bad decisions is higher in an organization in which the CEO's power to influence decisions is greater than in an organization in which many executives are involved in decision-making, because the CEO will have to compromise with them when they disagree with him. Thus, our main prediction is that as the degree of CEO influence increases variability in firm performance increases because decisions with extreme consequences are more likely to be taken.[1]

[1] In section 2 we construct our hypothesis using the theoretical framework in Sah and Stiglitz (1986, 1988). Sah (1991) and Sah and Stiglitz (1991) develop very similar arguments to the one we discuss here, although in a different context.

Frictions in decision-making by top management have been the focus of a large number of papers in the corporate finance literature. Most of this work is based on agency theory, which emphasizes the possibility that the incentives of top managers and shareholders are not perfectly aligned, creating the potential for value-decreasing distortions in the corporate decision process (see for example the survey of corporate governance by Shleifer and Vishny, 1997). However, the hypothesized relationship between the ability to influence decisions and variability in performance we study here does not depend on the existence of an agency problem. Real world decisions will also be constrained by the decision-making ability of top managers. Even when they have the right incentives, managers may make good or bad decisions due to human fallibility (Sah, 1991; Sah and Stiglitz, 1991; Bhidé, 2001) or because they are overconfident (Heaton, 1998; Goel and Thakor, 2000) or have different "visions" (Rotemberg and Saloner, 2000; Van den Steen, 2001; Hart and Holmstrom, 2002). We focus primarily on these latter ideas to develop our empirical tests, although we also examine to what degree the evidence we present is consistent with agency problems.

In order to test our hypothesis we develop a measure of the CEO's power to influence decisions which we call the *index of influence power*. Our index uses the number of job titles of the CEO, the CEO succession process, the overlap of the Executive Office with the Board and the retention of the CEO title by a firm's founder to proxy for the number of people participating in decision-making. For example, we argue that if the Chairman of the Board is not the CEO, the CEO has less influence power because the Chairman will also participate in decision-making. Similarly, if the current CEO is an original founder of the firm, he is more likely to have the power to make decisions on his own.

Because our hypothesis concerns differences in variability, we apply three different heteroscedasticity tests to our data. The Goldfeld-Quandt test consists of comparing the variance of the performance variable (or the part of it not explained by an appropriate empirical model) between groups of firms whose CEOs have high or low influence power. The Glejser test uses regressions which allow us to control for variables (other than influence power) which could also explain the variability of performance. Both these tests use either a cross-section or a panel of firms. We also use a third test which allows us to isolate the effect of influence power on the within-firm, over-time variability of performance.

We apply these tests to a sample of 336 firms from the 1998 Fortune 500 over the time period 1992-1999. Data are from Execucomp, CRSP, Compustat, Moody's Industrial Manuals, International Directories of Business Histories, Hoover's Company Profile Database, the U.S. News source and archived Forbes and Fortune stories on Lexis-Nexis, proxy statements, annual reports and the internet. Our final sample consists of 2,633 firm-years of data and 34,158 monthly stock returns for 336 firms during the 1992-1999 time period. Using three different measures of performance, Tobin's Q, ROA and stock returns, we find that performance is more variable in firms with greater values of our influence power index.

The empirical evidence that CEO influence power is positively correlated with the variability of performance is consistent with the hypothesis we examine. However, one might argue that this correlation could be explained by alternative arguments. For example, Amihud and Lev (1981), Agrawal and Mandelker (1987) and Saunders, Strock and Travlos (1990) have argued that if managerial interests are not well aligned with those of shareholders, then managers might engage in self-interested risk-reduction activities such as conglomerate acquisitions. The authors thus predict a positive relationship between managerial ownership and risk (which they measure using variability in accounting measures of performance or stock returns). If managerial ownership is positively correlated with CEO influence power, then our result could be explained by this agency argument. However, even though the correlation between ownership and performance variability is positive in our data, the relationship between the influence power index and performance variability is positive even after we control for CEO ownership. Similarly, one might argue that the influence power index is simply capturing other variables which could affect performance variability such as diversification, firm size, or firm age. Although these variables affect variability in performance in the expected ways in our data, we show that our index has an independent effect even after controlling for these other determinants of variability. Furthermore, the effect of influence power on the variability of performance is also economically significant, compared to the effect of these other variables. For example, one less title for the CEO has an effect on performance variability which is equivalent to an increase of 20 years of firm age or to 3 additional segments.

Our empirical investigation is motivated by the idea that the more latitude in decision-making a CEO has, the greater the impact of his own views on corporate performance. The evidence we present is consistent with this view. However, CEO influence power may be endogenously determined. In particular, variance in performance may lead to changes in CEO influence power. For example, an increase in uncertainty may increase the scope for moral hazard (e.g. Demsetz, 1983; Demsetz and Lehn, 1985). Therefore, agency theory would predict that when uncertainty increases, principals would try to put more constraints on agents' behavior.[2] If reducing a CEO's influence power is a way to prevent his misbehavior, then increases in the variability of performance should result in a decrease in the CEO's influence power. For example, if the scope for agency problems increases it might be desirable to separate the positions of Chairman of the Board and CEO (e.g. Core, Holthausen and Larcker, 1999). Similarly, it might be desirable to have a CEO position occupied by someone other than a founder of the firm. Separating these positions decreases our measure of CEO influence power. Thus, the positive correlation between our proxy for CEO influence power and variability cannot be driven by this agency argument. In fact, if this argument is true it would be more difficult for us to find a positive correlation between performance variability and influence power.[3]

The other possibility is that both the worst and also the best past performers tend to give more power to the CEO. The worst performers may need to implement quick changes in decisions and direction, while the best performing firms may give more power to the CEO because good performance signals high decision-making ability of the CEO. This theory could explain our finding, since the best and the worst performers tend to be in the sample of volatile firms. However, the direction of the causality is from past performance to CEO power, and not the other way around.

We explore the explicit temporal dimension of this argument to assess its relevance in our data. We find that past extreme performances, if anything, reduce the likelihood of future increases in influence power. This finding casts doubt on theories that try to explain the positive correlation between influence power and performance variability by postulating causation from variability to influence power. On the other hand, the results are consistent with the idea that CEOs become

[2] For example, Demsetz and Lehn (1985) use this insight to explain their finding of a positive correlation between inside ownership and volatility of performance.

[3] There is also a substantial management literature which predicts a similar negative relationship between the uncertainty of the firm's environment and concentration of decision-making power in the hands of the CEO (see the survey by Finkelstein and Hambrick, 1996).

more constrained as uncertainty increases. We also find that past increases in influence power increase the likelihood of future extreme performances, which is consistent with the hypothesis that influence power affects performance variability.

To try to isolate the effect of influence power on performance variability from other sources of variation, we use instrumental variables methods. We use founders' current age, whether founders are alive or dead during our sample period and the number of founders as instruments for influence power. The results suggest the existence of an independent effect of influence power on performance variability, one that remains even after we control for the possible endogeneity of CEO influence power. The IV estimates of the effect of influence power on performance variability are always greater than the OLS estimates, which also suggests that performance variability may have a *negative* effect on CEO influence power, consistent with the agency story we describe above. We conclude that the positive correlation between CEO influence power and performance variability is not only robust, but is also consistent with causation running from influence power to performance.

Our paper adds to a large literature which tries to assess the impact of managers on firm outcomes. In the management literature there is some controversy over whether top executives matter. A classic reference on the view that managers do not matter is Lieberson and O'Connor (1972). In contrast, Hambrick and Mason (1984) argue that they do matter, and are supported by numerous large-sample studies evaluating the importance of executives for outcomes, e.g. Weiner and Mahoney (1981) (see Finkelstein and Hambrick, 1996, for an extensive list of references). In economics and finance many papers analyze related questions. Hermalin and Weisbach (1988) and Agrawal and Knoeber (2001) find evidence consistent with firms optimally choosing directors for their characteristics. Denis and Denis (1995), Weisbach (1995), Parrino (1997), Huson, Malatesta and Parrino (2001) and Clayton, Rosenberg and Hartzell (2000) all show evidence that CEO turnover is related to firm outcomes. Malmendier and Tate (2001) and Bertrand and Schoar (2001) provide evidence that top executives' characteristics are related to firm outcomes.

Our point in this paper is that executives can only impact firm outcomes if they have influence over crucial decisions. By focusing on influence we highlight the idea that performance depends on the interaction between executive characteristics and organizational variables. Our focus on this interaction allows us to use firm-level characteristics to test predictions that are related to unobservable managerial characteristics. The main characteristics we are concerned with in this paper are the CEO's opinions, which are not easily observable. Therefore, we use our influence power index, which is a firm-level variable, to assess the impact of CEOs' opinions on performance.[4] In addition, it is difficult to predict how executive characteristics should affect outcomes. Our approach allows us to identify a precise testable implication: if CEOs opinions differ, concentration of decision-making power in the hands of the CEO should lead to more variability in firm performance.

We develop our theoretical hypothesis in section 2. In section 3, we describe our measure of CEO influence power. In section 4 we describe our sample in detail. We test our empirical hypothesis in section 5. After establishing our result, we discuss possible implications in section 6.

2 Influence Power and Performance: Theoretical Arguments

Our hypothesis is that firms in which the CEO has less power to influence decisions will have less extreme performances. With less power, CEOs will implement fewer projects, either good or bad, because the CEO will have to compromise with other members of the top management team when they disagree with him. We illustrate this argument with a simple model based on Sah and Stiglitz (1986, 1988).

Sah and Stiglitz (1986, 1988) compare outcomes under different structures of group-decision-making when individuals' judgements entail errors. We re-interpret their set-up in terms of CEO influence power.

The CEO and other top managers face the decision of whether or not to implement a given project. With probability π the project has a positive NPV of G and with probability $1-\pi$ the project has a negative NPV of $-B$. For simplicity, we compare two cases: either the CEO decides alone or he has to share the responsibility over the decision with one other person. In the latter case, the CEO has less influence power than when he makes the decision alone.

Each manager has his own opinion about whether the project is good or bad. More specifically, let p_G be the probability that a manager thinks the project is good (i.e., of positive NPV) given

[4] This approach is similar to the one adopted by many researchers who are concerned with the effects of managers' private benefits on their incentives to improve firm performance. Because managers' preferences are difficult to measure, they have used firm-level variables like ownership to test the effects of preference misalignments on performance.

that project is G. Even when the project is G, there is a possibility that a manager thinks that the project is B. Therefore, $p_G \leq 1$. Similarly, p_B is the probability that a manager thinks the project is good given that project is B. Even when the project is B, there is a possibility that a manager thinks that the project is G. Therefore, $p_B \geq 0$. The crucial assumption in the model is that managers might end up having different opinions; i.e., the probability that a given manager thinks that the project is good is independent of what other managers think. For simplicity, we also assume that p_G and p_B are the same for all managers. In short, opinions are random variables that are independently and identically distributed across managers.

When the CEO makes all the decisions himself (i.e., when he has more influence power), the probability that he accepts the project (regardless of whether the project is good (G) or bad (B)) is $\pi p_G + (1-\pi)\, p_B$. On the other hand, if the CEO shares decision power with some other executive, they both have to believe that the project is good in order to implement it. Therefore, the probability that they accept the project is $\pi p_G^2 + (1-\pi)\, p_B^2$.

Our main result follows immediately:

Proposition 1 *The probability of extreme performances (i.e., an outcome of either G or $-B$) increases with the CEO's influence power.*

The intuition for this result is as follows. When the CEO's influence on decisions increases, more projects of either type will be accepted because the number of managers who need to agree with the CEO for a project to be accepted decreases. Therefore, more positive NPV projects are accepted, but more negative NPV projects are accepted as well.

The effect of CEOs' influence power on expected performance is ambiguous. Expected performance depends on the relative costs of rejecting good projects versus accepting bad ones.

Sah and Stiglitz (1986, 1988) justify their assumption that managers have different opinions about whether the project is good using the ideas that communication is costly, or that people differ in their abilities to process information. Another justification for this lack of agreement could be that people have different priors. For our purposes, it makes little difference which of these explanations apply.[5] As long as people disagree, the results derived above hold.

[5] For a discussion on whether the assumption of non-common priors is compatible with standard economic theory see Morris (1995).

A set of recent papers also emphasizes differences in opinions. The common theme underlying these papers is that the CEO's judgement is biased. This bias has been called overconfidence, optimism or vision (Heaton, 1998; Rotemberg and Saloner, 2000; Goel and Thakor, 2000; Van den Steen, 2001; Hart and Holmstrom, 2002). It is easy to reinterpret the model above to allow for a CEO with a strong vision (or an overconfident CEO). Suppose now that when the CEO is confronted with a project of type l, $l \in \{G, B\}$, the probability that the CEO believes the project is good is p_l^{CEO}. For the other manager, this probability is still p_l. In this set up, a meaningful way to characterize an overconfident CEO is to assume that $p_l^{CEO} > p_l$ for all l. This means that an overconfident CEO is more likely to think that the project is good than the other manager. In this case, the probability of extreme performances (i.e., an outcome of either G or $-B$) also increases with the CEO's degree of overconfidence.[6] By adding an overconfident CEO to the model, we also obtain the implication that the degree of overconfidence magnifies the effect of influence power on the variability of performance.[7] However, since the sign of the relationship between CEO influence power and extreme performances does not depend on the specific value of p_l^{CEO}, our hypothesis does not depend on whether the CEO is overconfident or not.

3 Measuring CEO Influence Power

Our main hypothesis is that firms in which the CEO has greater power to influence decisions will have more variable performance. In order to perform our empirical tests, we need to measure how much decision-making power is concentrated in the hands of the CEO. We do this by trying to identify whether other individuals at the top of the managerial hierarchy (the "Executive Office") are participating in decision-making with the CEO. The higher the number of relevant decision-makers, the less powerful the CEO is likely to be.

For example, if the CEO is not the Chairman of the Board, we expect him to have less influence over decisions, since the Chairman often has an important role in strategic decision-making. The

[6] This result is analogous to the one Van den Steen (2001) derives, that firms with visionary CEOs have more extreme performances.

[7] This is because the effect of overconfidence on the probability of acceptance is bigger in the case in which the CEO decides alone than in the case in which there is joint decision-making.

Chairman is frequently an ex-CEO, who retains the title of Chairman during a probationary 'training' period for the new CEO. During this period the old CEO passes on relevant information to the new CEO. Brickley, Coles and Jarrell (1997) also point out that giving an ex-CEO the Chairman title eases his transition from active duty to retirement.[8] This suggests that upon becoming Chairman, the former CEO still participates in decision-making.[9]

The CEO succession process of a firm also influences the degree of joint decision-making in the firm to the extent that the successor of the CEO is involved in CEO decision-making *prior* to becoming CEO. The two most familiar types of CEO succession processes (e.g. Vancil 1987, Brickley, Coles and Jarrell 1997, Naveen 2000) are *horse races,* in which the firm conducts a tournament among eligible candidates for the position of CEO, and *passing the baton,* in which the firm chooses a designated successor for the CEO.[10] In the latter case, a new CEO often also has the title of President. Once he plans his succession, he hands the title of president to the heir apparent. If the CEO has an heir apparent then there is a gain to grooming him by involving him in CEO level decision-making.[11] Thus, if the CEO does not also hold the President title, we expect him to have less power to influence decisions.

On the other hand, it is plausible that the candidates for the CEO position will participate

[8] The management literature also argues that a CEO who is also the Chairman of the board has more discretion than a CEO who does not hold both posts. For example, Finkelstein and D'Aveni (1994) argue that consolidation of the CEO and the Chairman positions establishes a "unity of command" at the top of the firm. See Finkelstein and Hambrick (1996) for a survey of the relevant management literature.

[9] An example of how an ex-CEO who retains the title of chairman can still have substantial influence over the firm's management is documented in Lehn and Treml (2000). The founder of JLG industries, John L. Grove, was replaced in 1991 by L. David Black as the CEO of the company, but retained his position as Chairman. The board determined in 1992 that Grove should withdraw from day-to-day activities and concentrate on board activities, but he continued to have disagreements with the management team and openly expressed his concerns about the state of affairs in the firm. The leadership conflict culminated with the removal of Grove as chairman in 1993. Even when the Chairman is not an ex-CEO, he may have an important role in decision-making. For example, the Financial Times (November 29th, 2001) reports that the CEO of Ford was obliged to meet regularly with the non-executive Chairman in order to discuss strategy.

[10] These are probably also the most common types of succession plans. Naveen (2000) finds in a sample of 691 successions of the firms in the 1991 Forbes compensation survey during 1987-1997 that the CEO was the former President 58% of the time. Canella and Lubatkin (1993) find that over two thirds of the CEOs in their sample were President of their firm at the time of their appointment.

[11] The recent cases of restructuring of the top management teams in Coca-Cola (Financial Times, March 5th, 2001), Microsoft (Financial Times, February 15th, 2001 and April 5th, 2002) and Motorola (Business Week, Oct. 3, 2001) highlight the importance of the president for corporate strategy. In all cases it was clear that the promotion or demotion of a new president was a major event for the corporation.

less in CEO decision-making in a horse race than when the CEO passes the baton. If the firm conducts a tournament for the CEO, then it may be difficult to involve all candidates fairly in CEO decision-making. In addition, involving the candidates in CEO decision-making may have drawbacks since the losers of the tournament generally leave the firm.[12] Thus, we consider CEOs in firms which are passing the baton to be less influential than in firms which conduct horse races for the CEO position.

We also expect the overlap of the Executive Office with the board and the frequent retention of the CEO title by one of the company's founders to affect CEOs' influence in decision-making. Since the board is legally responsible for the management of the corporation, we expect that if an inside[13] manager (other than the CEO) sits on the board, he is more likely to participate in top decision-making.[14] Thus, we consider CEOs in firms with more than one inside manager on the board to have less influence power.[15] Moreover, we consider CEOs who are also founders of their firms to have more influence power.

The CEO succession process, the overlap of the Executive Office with the Board and the retention of the CEO title by a firm's founder are all interconnected. The heir apparent to the CEO is usually also appointed to the board.[16] When the CEO is also one of the founders, the firm is less

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[12] The case of General Electric illustrates both points (Hill, 2000). First, Jack Welch does not describe his own competition for the CEO position of GE as a very participatory experience: "I had to come to work for three years, and sit with seven other candidates in a dining room and stare at each other." Second, the two candidates who lost the horse race for Jack Welch's position in 2001 were expected to leave the firm. Even while the tournament was being conducted Jack Welch was depicted as the primary decision-maker in the media.

[13] As opposed to managers who are "outsiders", i.e. they do not work for the firm.

[14] For example, Finkelstein (1988) asked 444 top managers to rate their influence and the influence of the other managers on strategic decisions within their (102) firms. The average rating for board members was higher than the rating for non-members, even when CEOs were excluded from the analysis. The differences were statistically significant, consistent with the notion that there is a gap between the power of inside board members and other executives.

[15] One might argue that insiders just rubberstamp CEO decisions, and thus that this measure does not capture an increase in the number of decision-makers. We do not believe this to be true. In the business literature, there are also many examples of firms in which the President voices his opinion on strategy, often contradicting the CEO's opinion. See for example the Wall Street Journal on October 26th 2000, for a story involving AT&T's President John Zeglis and CEO C. Michael Armstrong's cable strategy. In any case, the presence of rubberstamping will make it harder for us to find our results.

[16] The number of candidates in a horse race may be too large to accommodate on the board. For example, the number of people competing in the horse race for the position of CEO of General Electric in 1980 was 7 (Hill, 2000).

likely to have a formal CEO succession process. Furthermore, in order to be able to apply some of our heteroscedasticity tests, we need to rank observations according to one single measure of CEO influence power. Therefore, we construct a measure which summarizes these aspects of the Executive Office into a single measure of CEO influence power which we call the *influence power index* (or IP index for short).

We define our influence power index IP as the sum of 5 indicator variables i_{chair}, $i_{president}$, $i_{nocoopres}$, i_{noiob}, and $i_{founder}$. i_{chair} is equal to 1 if the CEO is also the chairman, $i_{president}$ is equal to 1 if the CEO is also the president, $i_{nocoopres}$ is equal to 1 if the firm has no president and no COO, i_{noiob} is equal to 1 if there is no other insider on the board other than the CEO and $i_{founder}$ is equal to 1 if the CEO is a founder of the company.[17]

The variable $i_{nocoopres}$ is a proxy for the type of succession process in the firm.[18] If a firm's succession process typically consists of a horse race, then the candidates for the CEO position are more likely to be of equal rank and thus have titles such as Vice President or Executive Vice President (Naveen, 2000) or, as in the case of Jack Welch's succession (Hill, 2000), the candidates may have titles associated with different divisions. In this case the firm will be less likely to have a President or COO, thus the absence of a President or COO is a sign that the CEO may have more influence power.

Our index essentially consists of three different components that we also analyze separately later. The first component is related to the CEO succession process, and is the sum of the variables $i_{chair}, i_{president}$ and $i_{nocoopres}$.[19] The second and third components are the "no insider on the board" dummy and the founder dummy. These components give additional information about CEO power that is not directly related to the CEO succession process.

[17] We do not use a separate indicator variable to designate whether the CEO is also the COO, although in principle the succession process may occur through the COO instead of through the President, because the CEO is never the COO in our sample.

[18] This is similar to the argument in Naveen (2000) who classifies firms which have a President or COO distinct from the CEO as those with succession plans.

[19] This is similar to the BOSS variable used by Morck, Shleifer and Vishny (1989).

4 Data Description

Our sample consists of data on publicly traded firms in the 1998 Fortune 500 during 1992-1999. We restrict our sample to exclude financial firms and utilities because, as Saunders, Strock and Travlos (1990) point out, the presence of a regulator may affect decision-making in regulated firms (in their paper specifically: risk-taking in banks). We further restrict our sample to the set of firms for which data is available on Execucomp (2000). From Standard and Poor's Execucomp (2000) we obtain information on all executives mentioned in the firms' executive compensation table as well as financial information. We obtain monthly stock returns for the sample firms as well as value-weighted market returns from CRSP. We gather the remaining financial information from Compustat and the date of the firm's incorporation from Moody's Industrial Manuals (1999), proxy statements and annual reports for fiscal 1998. Our final sample consists of 2,633 firm-years of data and 34,158 monthly stock returns for 336 firms during the 1992-1999 time period.

The data we gather on executives from Execucomp (2000) consists of 16,022 executive-years of data for our 336 sample firms during the 1992-1999 time period. This data contains information on whether the named executive sits on the board and the title of each executive. If the named executive is the CEO, we also obtain the year in which he became CEO and his ownership in the firm.[20] We use the data on executives to construct a data set of firm-years containing CEO ownership, CEO tenure as CEO and the first 4 indicator variables necessary to construct our IP index, $i_{noiob}, i_{nocoopres}, i_{president}, i_{chair}$. We define i_{noiob} in a given year to be equal to 1 if no executive mentioned in the firm's executive compensation table except the CEO sits on the board in that year. Similarly we define $i_{nocoopres}$ to be equal to 1 in a given year if the firm has neither a President nor a COO amongst the executives mentioned in the compensation table for that year. According to Regulation S-K of the Securities Act of 1933, the executives described in a firm's compensation table must include the 4 highest paid executives in the firm other than the CEO.

[20] In Execucomp the data item containing the proportional ownership of the CEO is often missing if ownership is less than 5%. We therefore calculate it as the ratio of the number of shares owned by the CEO to total shares outstanding after adjusting the number of shares owned by the CEO for stock splits. While Execucomp (2000) adjusts the total shares outstanding for stock splits it may not adjust CEO ownership (as can be seen in the case of CEO Bill Gates of Microsoft whose mean ownership according to Execucomp 2000 is 5.5% during 1992-1999, but whose actual mean ownership is 23.6%), however it does include an adjustment factor (Access item: AJEX) that can be used to adjust ownership.

While it is feasible that other insiders sit on the board or that the President (COO) is not amongst the top 4 executives in terms of salary, we consider it unlikely. We use the title of the CEO in a given year to set $i_{president}$ (i_{chair}) equal to 1 if the CEO is also the President (Chairman) in that year.

Since ExecuComp (2000) does not contain information on whether the CEO is also a founder, we define $i_{founder}$ in a given year to be 0 if the firm was incorporated at least 64 years prior to the current year or if the current CEO joined the company at least 4 years after the date of the firm's incorporation.[21] For the remaining firm-years we checked whether the current CEO was one of the firm's founders in a variety of sources consisting of proxy statements, annual reports and the internet.[22] We set $i_{founder}$ in a given year equal to 1 if any source explicitly named the current CEO as a founder or the main executive at the time the company began (including when it was spun-off).

We use three performance measures for our sample firms, Tobin's Q (Q), return on assets (ROA), and stock returns. Our measure of Tobin's Q is the ratio of the firm's market value to its book value. The firm's market value is calculated as the book value of assets minus the book value of equity plus the market value of equity. We define ROA as the ratio of net income before extraordinary items and discontinued operations to its book value of assets. Stock returns are monthly stock returns including dividends from CRSP.

In Table 1 we present summary statistics concerning select financial variables, CEO characteristics and our measure of CEO power, the IP index. In most firm-years another insider other than the CEO sits on the board (71%). In 23% of the firm-years there is no President nor COO. CEOs are more likely to accumulate the title of Chair (86%) than the title of President (27%). In 9% of firm-years the CEO is also one of the founders. Panel A of Table 2 shows that our compilation of this information into the IP index is distributed between 0 and 4, with most values between 1

[21] The longest period of time a CEO has been working for his firm in our sample is 59 years. We use 64 years as a cutoff to account for missing data on CEO firm tenure. Since most firms are founded several years prior to the date of incorporation this procedure ensures that we check more CEOs than are likely to be founders.

[22] When we could find the name of the firm's original founders this procedure was straightforward. However, very few proxies, annual reports or company websites disclosed the names of the original founders. We were most successful doing a search with the name of the executive and the word founder using the Google search engine.

and 3, resulting in a mean of 1.77 for the entire sample. Panel B shows the correlations between the three main components of our index. The correlations are relatively low, indicating that the components capture different aspects of CEO influence power.

5 Empirical Tests

In this section we test whether our index of CEO influence power (IP index) is positively related to the variability of performance measures. In order to do this we apply several heteroscedasticity tests to our data, using three different measures of performance (Q, stock returns and ROA).

Our hypothesis has implications both for the variability of performance across firms, because firms in which more power is concentrated in the CEO's hands should have more extreme performances, and for within-firm variability of performance, because a firm in which the CEO has more influence over decisions should have higher variability in performance over time. Thus we perform our tests using a panel of firms, in which both effects should be present, but we also try to isolate the between-firm and the within-firm effects. We do the former by replicating the same tests we perform for the panel using the averages of all variables from 1992 to 1999. We do the latter (in section 5.2.3) by regressing the standard deviation of the performance measures over 1992-1999 on the influence power index and controls.

In what follows, we are primarily concerned with providing evidence of a correlation between CEO influence power and the variability of performance measures. We postpone the discussion of possible endogeneity problems and causality issues to section 5.3.

5.1 Influence Power and Performance Levels

Our heteroscedasticity tests require us to specify a model for Tobin's Q, ROA and stock returns. For Tobin's Q, we estimate a similar model as in Morck, Shleifer and Vishny (1988), Yermack (1996), and Himmelberg, Hubbard and Palia (1999). The main difference is that we include the IP index among the explanatory variables because influence power may affect average performance, even though we have no prior for the direction of this relationship (see section 2).

We regress Q on IP, CEO ownership and its square, current and one-year lagged return on assets, the log of assets (a proxy for firm size), capital expenditures over sales (a proxy for firm growth), firm age (measured by the number of years since the date of incorporation), the number of 2-digit SIC segments (a proxy for diversification) and year dummies (in our panel regressions):

$$
\begin{aligned}
Q &= b_0 + b_1 IP \text{ index} + b_2 \text{CEO ownership} + b_3 (\text{CEO ownership})^2 + b_5 ROA + b_6 ROA_{-1} \\
&\quad + b_7 \ln(\text{assets}) + b_8 \frac{\text{Capex}}{\text{Sales}} + b_9 \text{Firm age} + b_{10} \text{number of segments} + u
\end{aligned}
$$

Table 3 (columns I and II) shows the output of two different regressions. Column I shows the results of a panel regression in which every firm-year is counted as one observation. Column II shows the results of a cross-sectional regression with the variables averaged over the 1992-99 period. The coefficients on all variables are broadly consistent with the ones estimated in the previous literature. The coefficients on the IP index are positive in both regressions but not significantly different from zero at conventional significance levels.

We estimate a similar model for ROA, except that we exclude ROA as an explanatory variable:

$$
\begin{aligned}
ROA &= b_0 + b_1 IP \text{ index} + b_2 \text{CEO ownership} + b_3 (\text{CEO ownership})^2 + b_4 \ln(\text{assets}) \\
&\quad + b_5 \frac{\text{Capex}}{\text{Sales}} + b_6 \text{Firm age} + b_7 \text{number of segments} + u
\end{aligned}
$$

Table 3 (columns III and IV) displays the results. IP has a significantly negative effect on ROA in both regressions.

Our conclusion from Table 3 is that CEO influence power has an ambiguous effect on performance. The effect on Q is positive but not significant. The effect on ROA is negative and significant, suggesting that our measure of influence power may have some detrimental effects on performance. This suggests that the influence power index might be capturing some agency effects. However, when we decompose the index into its three component parts (the *succession* variable, the *founder* dummy and the no-insider-on-board dummy) and use them as regressors, we find that what is driving the negative effect of IP on ROA is the variable that indicates that there is no insider on the board other than the CEO.[23] However, based on agency considerations, we would expect this variable to have a *positive* effect on ROA, because it indicates that there are few insiders (and therefore possibly more outsiders) on the board. In sum, the effects of IP on average

[23] Results available upon request.

performance are not robust across specifications and are not consistent with agency interpretations of influence power.

We refrain from using a multi-factor model for stock returns that would include IP. We use a simple market model instead, with the market return (value-weighted market return from CRSP) as the single factor. We use monthly stock returns to estimate our betas and residuals for the period 1992-1999.

5.2 Influence Power and Performance Variability

Our finding that influence power has an ambiguous effect on performance is not surprising. The theories we refer to above do not predict a monotonic relationship between CEO influence power and *average* performance. On the other hand, as we argued in section 2, an increase in the importance of the CEO in decision-making should lead to extreme performances. Figure 1 presents some descriptive evidence which is consistent with this hypothesis. We plot the Tobin's Q residuals from the cross-sectional regressions for the firms with the highest 20% and the lowest 20% values of the influence power index. The cross-sectional variability of performance is clearly higher in the sample in which influence power is high. We now turn to formal tests of our hypothesis using some standard heteroscedasticity tests.

5.2.1 Goldfeld-Quandt Heteroscedasticity Tests

In this section, we apply the Goldfeld-Quandt (1965) heteroscedasticity test to our data.[24] This requires us to divide our sample into two groups of firms: one in which there is a high concentration of power in CEOs' hands (high IP) and one in which there is low concentration of power in CEOs' hands (low IP). We then apply our empirical models for Q, ROA and stock returns to each sub-sample separately. The tests are based on the residuals of these "first stage" regressions. We focus first on the models that we have specified in the previous section, but we also perform the tests using the raw variables. The reason for this is to check that the results are not too dependent on our specification of the models for the performance variables. In the latter case, the Goldfeld-Quandt test collapses into a standard test of comparing variances between two different samples.

[24] For more details on this test see Greene (1993).

Since the median of the IP index is 2, we define the low-IP sub-sample in our panel sample as the one containing observations with IP indices of 0 and 1 and the high-IP sub-sample as the one with IP indices ranging from 2 to 4. In our cross-sectional sample, IP indices are averages over 8 years and thus not necessarily integer valued. In that case, we use the median IP value of 1.75 as the cut-off point.[25]

Using the residuals from the two separate regressions for each performance measure, we compute the sum of the squares of the residuals (RSS) for each group. Under the assumption of normality of these residuals, the ratio of the RSS of the first group to the RSS of the second group should follow an $F-$distribution with $n_1 - k$ and $n_2 - k$ degrees of freedom of the numerator and the denominator, respectively, where n_i is the number of observations in group i, $i = 1, 2$, and k is the number of regressors. Therefore, to test the null hypothesis of homoscedasticity against the alternative that firms with more concentration of power in CEOs' hands have greater variance in their performance measures than ones in which CEOs have limited discretion, we create an $F-$statistic by dividing $(RSS/n_1 - k)$ for the first group by the $(RSS/n_2 - k)$ of the second group and compare it with critical values from F-tables with the appropriate degrees of freedom. An $F-$statistic greater than 1 is evidence against the null and in favor of the hypothesis of greater variance when CEOs are more powerful.

The results (reported in Table 4, panels A, B and C) are consistent with this hypothesis. In both the cross-section and the panel samples, and for all the three performance measures, the $F-$statistics are greater than one and almost always highly significant, with virtually zero p-values. The only exception occurs in column I in panel B, where the F-statistic, although greater than one, is not significant at conventional confidence levels.

The results appear to be robust not only across different measures of firm performance, but also across different specifications (raw variables vs. residuals from regressions; cross-section vs. panel samples). The difference in variances also appears to be economically significant. For example, if we look at panel A, the implied ratio of variances goes from 1.42 to 2.90.[26] This implies that the

[25] In this case, we omit a range of intermediate values (all observations for which the IP index lies on an open interval of length 0.5 centered on our cutoff point of 1.75), as is standard in Goldfeld-Quandt tests.

[26] One estimate for the variance is just the residual sum of squares divided by the degrees of freedom.

standard deviation of Tobin's Q is higher in the sample of firms with more powerful CEOs by a factor varying from 20% to 70%.

5.2.2 Tests Based on Regressions

One of the weaknesses of the tests in the previous subsection is that observations can only be ranked by one variable at a time. Therefore, we cannot test whether CEO influence power affects performance variability after controlling for other variables that might also affect the variance of performance.

For example, Amihud and Lev (1981) explain differences in the variability of performance by appealing to an agency argument. They argue that firms with disperse ownership (firms with more severe agency problems) engage in more conglomerate acquisitions in order to reduce risk, even when this is not optimal for shareholders. If the CEO has higher ownership, he will have less incentives to reduce risk (see also Agrawal and Mandelker, 1987, and Saunders, Strock and Travlos, 1990). This could induce a positive correlation between managerial ownership and variability in performance. To ensure that our measure of influence power is not capturing this agency effect, we need to be able to control for CEO ownership.

Another possibility is that our index simply reflects the degree of diversification. Firms with more segments may need more people making decisions, and thus appear to have more dispersion in decision-making power. Such firms may also have less variability because of the direct effects of diversification. Thus, diversification could generate a spurious positive correlation between influence power and variability.

In order to control for these and other possible determinants of performance variability, we apply Glejser's heteroscedasticity test to our sample.[27] To conduct the Glejser test, we regress the absolute value of the residuals $\widehat{u}_i$ from our empirical models for each of the three performance measures on the CEOs' influence power index IP_i and on a vector of controls $\mathbf{z}_i$ which we hypothesize should be associated with the variability in firm performance:

$$|\widehat{u}_i| = \alpha + \beta IP_i + \boldsymbol{\theta}\mathbf{z}_i + e_i \tag{1}$$

[27] For further details about this test, see Goldfeld and Quandt (1972), Amemyia (1985) and Godfrey (1988).

An F-test of the hypothesis that all slopes equal zero is a test of the null hypothesis of homoscedasticity against the alternative that the variance of firm performance is a function of $(IP_i, \mathbf{z}_i)$. To test whether influence power alone positively affects the variance of firm performance, we use a t-test for the null that the coefficient $\beta \leq 0$ against the alternative $\beta > 0$. High t-statistics are evidence that influence power is positively related to the variance of firm performance.

Our benchmark vector of controls $\mathbf{z}$ includes CEO ownership (to control for the agency argument described in Amihud and Lev, 1981) and its square, the degree of diversification (the number of different two-digit SIC segment codes), firm size (natural log of assets), firm age (number of years since date of incorporation), leverage (book value of long term debt divided by book assets), CEO tenure (the number of years since the CEO was appointed CEO) and its square, capital expenditures over sales and two-digit-SIC industry dummies:

$$\begin{aligned} |\widehat{u}| &= a_0 + a_1 IP \text{ index} + a_2 \text{CEO ownership} + a_3 (\text{CEO ownership})^2 + a_4 \text{CEO tenure} \\ &\quad + a_5 (\text{CEO tenure})^2 + a_6 \text{leverage} + a_7 \ln(\text{assets}) + a_8 \text{Firm age} \\ &\quad + a_9 \text{number of segments} + a_{10} \text{capex/sales} + \text{industry dummies} + e \end{aligned} \tag{2}$$

We expect bigger and older firms to exhibit less variability in performance. We include leverage because of the evidence that leverage is negatively correlated with variability (see Harris and Raviv, 1991). We include the tenure variables to control for life-cycle learning or signalling effects (see May, 1995 and Prendergast and Stole, 1996), and the industry dummies to control for the fact that some industries might be inherently more volatile than others. We also include any additional variables that we used in the first-stage regression to construct the residuals, because variables which affect average performance could also affect the variance of performance.

In Table 5 we report the results of regression (2) for the three performance measures and for each type of sample, the panel and the cross-section. The panel regressions include year dummies. We do not use firm fixed-effects in our panel specification, because our influence index does not vary much over time for a given firm (the change in the index for the same firm from one year to the next one is zero approximately 80% of the time).[28] In addition, we expect differences in

[28] In the context of the ownership literature, Himmelberg, Hubbard and Palia (1999) argue for the use of firm

variability to be more systematically related to industry, which we control for. We always use heteroscedasticity-corrected standard errors when calculating our t-statistics, since the residuals of these regressions are heteroscedastic by construction.[29]

The null of homoscedasticity is always easily rejected against the alternative that the variance of firm performance is a function of $(IP_i, \mathbf{z}_i)$, as evidenced by the large F-statistics (the corresponding p-values, which we do not report, are virtually zero). More importantly, in all six cases reported in Table 5 the coefficient on IP is positive, indicating that more influence power is associated with greater variance in firm performance.

Columns I and II display the results for Q. IP enters positively and is significant at 10% and 5% in the panel and cross-sectional samples, respectively. Columns III and IV display the results for ROA. Although IP enters positively, as expected, it is not significant at any conventional levels.

To perform the Glejser test using stock returns we use the residual returns from the market model with the market return (value-weighted market return from CRSP) as the single factor.[30] We use monthly stock returns to estimate our betas and residuals for the period 1992-1999. As in the tests with Q and ROA, we use both a cross-sectional and a panel sample of residuals. To perform the panel tests we construct the residuals for each firm-month as the difference between the stock return for the firm in that month, and the market return multiplied by the firm's beta. Thus, the firm's residual return is the component of performance which cannot be explained by the market model (abnormal performance). Our hypothesis is that the variability in abnormal performance increases with influence power. Since we use monthly data for stock returns and annual data for the controls, we adjust the t-statistics for non-independence within firm-year. To perform the cross-sectional tests we calculate the residual as the difference between the firm's average stock return in the time period, and the average market return multiplied by the firm's beta.

fixed effects in regressions which relate ownership to firm performance. However, Zhou (2001) points out that if the explanatory variable changes slowly over time (as do ownership and influence power), firm fixed-effect regressions may fail to detect relationships in the data even when they exist.

[29] The residuals (e_i) of these regression have the following three features: (1) they have non-zero expected value, (2) they are autocorrelated and (3) they are heteroscedastic. Amemiya (1977) shows that, asymptotically, the first two problems vanish (see also Amemiya, 1985). To correct for heteroscedasticity, Greene (1993) suggests using the asymptotically corrected covariance matrix of White.

[30] We also used total stock returns instead of the residuals and the results were similar.

Columns V and VI display the results for stock returns. IP enters positively and is significant at 1% and 5% in the panel and cross-sectional samples, respectively.

In general, the results of these tests corroborate our previous findings that IP is positively related to the variance of firm performance, both cross-sectionally and in the panel sample. In addition, the tests performed in this section allow us to control for other possible determinants of variance in firm performance. For example, even after controlling for CEO ownership, CEO influence power is still related to the variability in firm performance. This implies that the influence power index is not simply capturing the particular agency problem emphasized in Amihud and Lev (1981), Agrawal and Mandelker (1987), and Saunders, Strock and Travlos (1990). Similarly, the correlation between the IP index and performance variability does not seem to be driven by diversification and other firm characteristics such as age and size.

The economic significance of the coefficient on influence power also appears to be large, as compared to the coefficients on these other variables. Consider, for example, the results for stock returns. In column V, the coefficient on the influence power index indicates that one less title for the CEO is equivalent to an increase of 20 years of firm age or to 3 additional segments. Given that firm age and diversification are plausible determinants of volatility, it is striking that our measure of CEO influence over decisions seems to have effects that are as large as the ones resulting from large changes in firm age and in the number of business segments.[31]

Finally, an additional benefit of using a regression-based heteroscedasticity test is that we can estimate the individual impact of each component of our influence power index on the variance of performance. This was not possible in the Goldfeld-Quandt approach, because it requires the observations to be ranked according to one single measure. One of the main reasons why we decided to construct an influence power index was that we wanted to apply the Goldfeld-Quandt test, which is a very powerful and widely used heteroscedasticity test. The regression-based approach of this section has a less general alternative hypothesis than the Goldfeld-Quandt test, but it allows the pattern of heteroscedasticity to depend on multiple variables.

In Table 6 we replicate the previous tests using the three individual components of influence

[31] The large economic significance of IP is robust across performance measures, as one can see in columns I to VI in Table 5.

power (the *founder* indicator, the *succession* variable and the no-insider-on-the-board indicator (*noins*)) instead of the IP index. First, we note that the three variables are always jointly significant at 5%, except in the cross-sectional test using ROA, as evidenced by the F-tests reported in that table. Columns I and II display the results for Q. All three variables consistently enter positively in the regressions explaining the variance of Q, but only *founder* is significant. Columns III and IV display the results for ROA. As before, the results are less compelling for the ROA variable. The only significant variable is again *founder,* but only in the panel sample. *Succession* enters positively in both cases, while *noins* enters negatively in columns III and IV, but they are never significantly different from zero. Columns V and VI display the results for stock returns. *Founder* enters positively and significantly in both cases. *Noins* is significantly positive in column V and still positive but not significant in column VI. *Succession* is not significant in either case.

We conclude that, at least for the tests in this section, the retention of the CEO title by one of the founders is the most significant variable affecting the variability of performance, followed by the absence of insiders other than the CEO on the board. The succession variable alone does not play a significant role.

5.2.3 Influence Power and Variability Over Time

In this section, we estimate the effect of influence power on within-firm variability of performance. We compute the sample standard deviation of Q, ROA and stock returns for each firm using their yearly values from 1992 to 1999. We also use the standard deviation of the firm-specific stock returns (the residuals from the market model) as a dependent variable, as in Saunders, Strock and Travlos (1990). Then, we regress the standard deviations on the possible determinants of variability.[32] We use the same set of controls as in equation 2. The data for the regressors are averages over the whole period (1992-1999).

Table 7 shows the results. In the regression for Q (column I), IP enters positively, but is not significantly different from zero at conventional levels. The coefficient on the influence power index in the regressions for ROA and stock returns, however, are positive and significant at 1%. This is consistent with the idea that stock returns and ROA are more volatile over time than Q, and that

[32] For an example of this approach in a somewhat different context, see Rodrik (2000).

this volatility is positively affected by a CEO's control over key decisions. The other coefficients also have the expected signs. Larger, older and more diversified firms tend to have lower variability in performance. Furthermore, higher CEO ownership is positively correlated with variability.

Table 7 allows us to easily evaluate the economic significance of the effect of influence power on within-firm variability in performance. For example, one additional title for the CEO (an increase of one in our index, which is a little more than a one-standard-deviation-change according to Table 1) increases the standard deviation of residual stock returns by approximately 0.006. This has an effect equivalent to 30 fewer years of firm age.[33]

In Table 8 we investigate the individual effects of each of the three components of our influence power index. The *founder* variable is the only one of the three that significantly affects within-firm variability in Tobin's Q. In the ROA regression, however, all three variables enter positively and significantly. In both regressions for stock returns, all three variables enter positively, but again only *founder* seems to be consistently significant.

We conclude that the retention of the CEO title by the one of the founders seems again to be the most significant variable affecting the within-firm variability of performance, but the results of this subsection suggest a much more balanced role of *founder*, *noins* and *succession* in explaining within-firm over-time variability in performance.

5.3 Endogeneity and Causality Issues

There appears to be a robust positive correlation between the degree to which a CEO is influential in his firm's key decisions, as measured by our influence power index, and the variability in measures of firm performance. Our empirical investigation was motivated by the idea that the more latitude in decision-making a CEO has, the greater the impact of his own views on corporate performance. The evidence we have presented is consistent with this view. However, it could also be consistent with alternative stories that emphasize the reverse causation: more variability in performance may lead to increases in CEO influence power.

[33] Similar results hold when we use ROA instead, or Tobin's Q (even though the effect on the latter is not statistically significant). For example, the coefficient on our index is consistently at least as large as the coefficient on the number of segments.

It is possible that causation runs in both ways. However, our goal in this paper is to emphasize one specific direction: more influence power leading to more variability in performance. In this section, we address the potential endogeneity problem in two different but complementary ways. First, we try to assess how much past variability in performance helps predict future changes in influence power in subsection 5.3.1. We also estimate how much changes in past influence power help predict future variability in performance. Prediction does not imply causality, but in many cases (and under additional assumptions) causality implies prediction. Therefore, failure to detect predictive power of a variable x with respect to y can be interpreted as a weakness of the causal link from x to y. Second, even if we accept that there might be a causal link from x to y, it could still be possible to empirically isolate the effect of y on x. In subsection 5.3.2, we use instrumental variables methods to try to isolate the effects of influence power on performance variability from other sources of variation.

Even though it may not be possible to establish causation with certainty, we believe that the evidence presented in this section is consistent with a causation relation from influence power to performance variability.

5.3.1 Does Performance Predict Influence Power?

Most reverse causality stories that have been suggested to us are very similar and can be summarized as follows. On the one hand, if firms have performed extremely well in the past, it might be easier for CEOs to force changes that increase their influence power. This assumes that CEOs value independence and enjoy being influential. Also, it assumes either that governance mechanisms become weak when firms perform well or that extremely good performances are signals of high CEO talent, justifying increases in CEO influence power. On the other hand, following poor performance, firms may want to purposefully concentrate decision-making power in the hands of a few managers in order to make fast and radical decisions. This argument could explain our finding, since the best and the worst performers tend to be in the sample of volatile firms.

We explore the explicit temporal dimension of these stories to assess their empirical relevance. We focus on stock returns in this section, for a very simple reason: past returns are poor predictors of current returns. Therefore, we can be reasonably confident that we are isolating the effects of past performance on current changes in influence power from the contemporaneous correlation between these two variables.

We create a dummy variable called *extreme* that equals 1 for either very high or very low values of stock returns and is zero otherwise. More specifically, we define high performance as a value for the stock return that ranks among the highest 15% returns for all observations in our sample. Similarly, low performance occurs when the value for the stock return ranks among the lowest 15%. Our dummy variable equals zero for all other intermediate values (70% of the sample).

We want to check whether past extreme performance predicts changes in our influence power index. If either very high or very low performances lead to more concentration of power in the CEO's hands, lagged *extreme* should be positively correlated with current changes in the IP index.

Since changes in the IP variable are count data, we run a Poisson regression of changes in the IP index on the first and second lags of *extreme* and the same controls we have used in the previous tests.[34] Column I in Table 9 displays the results. The coefficient on the variable $extreme_{-1}$ is not significant. $Extreme_{-2}$ enters significantly but negatively, which suggests that, if anything, past extreme performances, either good or bad, tend to *reduce* CEO influence power over decisions.

We also do the reverse experiment: Do changes in influence power help predict either very high or very low performances? We run a Probit regression to estimate how past changes in influence power affect the probability of having extremely good or bad performances. Notice that we focus on *changes* and not *levels* of IP. The levels of IP within firms are highly autocorrelated and we already know from previous tests that current IP levels are correlated with current performance variability. Therefore, this test is substantially different from the ones in the previous sections, because we are controlling for a firm-specific effect on influence power.

Column II in table 9 displays the results for this Probit. Both first and second lags of changes in influence power enter the regression positively and significantly at 5%. Past positive changes in influence power appear to increase the probability of either very good or very bad performances.

The conclusions from these tests are clear. Past increases in influence power increase the likelihood of future extreme performances, which is consistent with the hypothesis that influence

[34] The Poisson regression assumes that the dependent variable is a nonnegative integer. Since changes in IP may sometimes be negative integers, we actually use $\Delta IP + 4$ as our dependent variable.

power affects performance variability. Past extreme performances, if anything, reduce the likelihood of future increases in influence power. This finding casts doubt on theories that try to explain the positive correlation between influence power and performance variability by postulating causation from variability to influence power.

5.3.2 Instrumental Variables

In this section we use instrumental variables methods to try to isolate the effects of influence power on performance variability from other sources of variation. Because instrumental variable techniques are most directly applicable to them, we focus here on the cross-sectional regressions of performance variability on measures of CEO influence power in section 5.2.3. Since the influence power index is a combination of different components, it is difficult to find good instruments for it. An arguably good instrument for one component may not seem to be a good instrument for a different one. Therefore, we focused on finding instruments for the (empirically) most important component of the IP index, the *founder* variable. In the appendix we discuss in detail how we construct our instruments. Here we focus first on discussing the validity of three different variables that we use as instruments: *founder age*, *dead founders* and *number of founders* and then on describing the results of our IV regressions.

Founder Age The first variable we use as an instrument is the *current* age of the founder (if there are multiple founders, we use the average age among them). Older founders are more likely to be close to retirement and therefore less likely to still work as the CEO of their firms. Therefore, this variable should meet the first criterion for a valid instrument, that it is correlated with the *founder* variable (a dummy variable that equals 1 if the current CEO is one of the founders).

However, to be a good instrument founder age must also be uncorrelated with performance volatility except through explanatory variables contained in the second stage regression. We find it unlikely that current founder age is caused by performance volatility. Its main determinants are the age of the founder at the firm's birth and the current age of the firm. However, expected future variability may have an effect on a founder's age at the time of the firm's birth, as long as age is correlated with preferences towards risk. We find it unlikely that the type of residual variability we are dealing with in this paper could be easily forecasted before the firm is founded. Future founders may know that some industries are riskier than others which may affect their perceptions of the risks involved in founding a new firm. However, this type of predictable industry-specific risk should be captured by our industry dummies.

In addition, founder age is unlikely to have a direct effect on performance variability. It is true that young founders are usually found in young firms, which are more likely to have volatile performances. However, this is an effect of the age of the firm and not of the age of the founder which we control for by including firm age in all of our tests. The quality of our instrument could also be affected if founder age is correlated with risk preferences. However, we find it unlikely that differences in risk aversion between young and old CEOs can explain most of their differences in defining their corporate strategies. Managers that have more of their human capital tied to the firm may be more conservative, but this effect is better captured by their tenure in the firm, which we control for in addition to its square, than by their age. Finally, most CEOs in our sample are over 50 years old. Purely behavioral differences in risk attitudes between people of 50 or 60 years of age are not likely to be large.

Dead Founders The second variable we use as an instrument is a dummy variable that takes the value of 1 if the founder died before the start of our sample period and zero otherwise (if there are multiple founders, we take the average of this variable among all founders). The motivation for this instrument is the same as for the age of the founder: dead founders cannot be CEOs. The main reason why we use this variable instead of using founder age is because it is less likely to be correlated with founder risk preferences than founder age. Living founders can be young or old, therefore this variable should not be correlated with risk aversion. The death of a founder should be a fairly exogenous event which will affect the likelihood that the current CEO is one of the founders but does not have a plausible direct effect on performance volatility, except when the founder happens to be the CEO.

Number of Founders Finally, we also use a third variable as an instrument, which is the number of founders of each firm. We believe that this variable also satisfies the conditions necessary for a valid instrument. First, the probability that the current CEO is one of the founders is mechanically increasing in the number of founders, although since one founder often plays a more dominant role than the others we expect this correlation to be weaker than in the case of the other two instruments.[35] Second, it should be fairly exogenous in our set-up. In particular, the number of founders is unlikely to have any direct effect on the variability of firm performance years after the founding event.

Results of IV Regressions Using one instrument at a time, we attempt to control for endogeneity in the regressions in section 5.2.3, except that we use the founder variable as our sole measure of CEO influence power. The dependent variables are the sample standard deviations of Q, ROA, stock returns and residual stock returns for each firm using their yearly values from 1992 to 1999. The data for the regressors are averages over the whole period (1992-1999).

Table 10 shows the outcomes of the first-stage regressions. The dependent variable is *founder* in all three columns. In Column I, the first regressor is the founder age as of 1994.[36] In Column II, the first regressor is an indicator function that takes the value of 1 when the founder is dead as of 1992.[37] In Column III, the first regressor is the number of founders for each firm.

From Table 10 we see that the proposed instruments appear to be reasonably strongly correlated with *founder*. Furthermore, the correlations are all significant at greater than the 5% level and have the expected signs.

In Table 11 we show the outcomes of the second-stage regressions using the three different

[35] The case of Arrow Electronics illustrates how the number of founders may influence whether or not the current CEO is a founder (see Hoovers 2002, Fortune, January 12, 1981, p. 19 and The New York Times, December 6, 1980, p. 26). In 1968 three friends led a group of investors in acquiring a then obscure company called Arrow Electronics Corporation. After merging it with another company, they used it to found what is now one of the largest distributors of electronic components in the country. One of the partners, Duke Glenn, Jr., was the Chairman and CEO. The other two were Executive Vice-Presidents. In 1980 a hotel fire killed 13 members of Arrow's senior management including the founder/CEO and another founder. The remaining founder, John Waddell, was immediately named acting CEO and remained CEO with only brief interruptions until 1986. Although Waddell's primary responsibilities were in corporate administration and communications before the fire, the crisis led the board to choose him as acting CEO because he was one of the original founders.

[36] When there are multiple founders, the value used is the average age among them. When founders are dead as of 1994, we arbitrarily assign the age of 95 years to them. See the appendix for more details.

[37] If there are multiple founders, we take the average of this variable among all founders. Thus this measures the proportion of a firm's founders who died prior to 1992.

instruments. Table 11 consists of four panels, one for each dependent variable. Each panel has four columns. In all panels, Column I displays the OLS results for comparison with the IV estimates. Column II uses *founder age*, Column III uses *dead founder* and Column IV uses *number of founders* as instruments.

Even after instrumenting the *founder* variable, the coefficients on *founder* are positive in all regressions. Furthermore, the coefficients on *founder* enter significantly in all regressions that use the first two instruments. In the regressions using the number of founders as an instrument, the relevant coefficient enters significantly only in panel A. Perhaps more importantly, in *all* IV regressions the estimated effect of *founder* on performance variability is substantially larger than the one obtained through OLS. This suggests that reverse causation may be biasing us against finding a positive correlation between influence power and performance variability in simple OLS regressions.

5.3.3 Conclusions

The tests presented in this section all suggest a similar conclusion. Using two distinct approaches to deal with endogeneity problems, we find that the evidence does not support stories emphasizing a causal *positive* relationship running from performance variability to influence power. In fact, the evidence suggests the existence of a negative causal link from performance variability to influence power. This should bias us against finding the positive correlation predicted by the theory in section 2.

The results from the instrumental variables regressions suggest that an independent effect of influence power on performance variability remains even after we control for the possible endogeneity of CEO influence power. We conclude that the positive correlation between CEO influence power and performance variability is not only robust, but is also consistent with causation running from influence power to performance.

6 Final Remarks

In this paper we develop and test the theoretical hypothesis that firm performance will be more variable as decision-making power becomes more concentrated in the hands of the CEO. We use characteristics of the Executive Office to develop a proxy for CEO influence power. We test our hypothesis using this proxy and find that the evidence is consistent with our hypothesis. The results are consistent across performance measures and across various tests designed to detect differences in variance. The results hold both across firms and within firms.[38]

It is important to stress that our interpretation of these results does not depend on the existence of an agency problem. Even if managers are benevolent, corporate decisions may be good or bad because managers have different opinions.

In general, it is difficult to predict how executive characteristics should affect outcomes. Our point is that executives can only impact firm outcomes if they have influence over crucial decisions. By focusing on influence we highlight the idea that performance depends on the interaction between executive characteristics and organizational variables. Our focus on this interaction allows us to use firm-level characteristics to test predictions that are related to unobservable managerial characteristics.

A natural question that arises is whether the concentration of power in the hands of the CEO is good. The governance literature argues that is it not and advocates the separation of the CEO and Chairman of the Board positions.[39] Our results highlight that firms with powerful CEOs can be those with the worst as well as the best performances. Thus any policy recommendations should not be based on the consideration of isolated cases of extreme performances, although they may be particularly compelling.[40]

As Campbell, Lettau, Malkiel and Xu (2001) point out, there is very little empirical research on volatility at the firm level. They discuss several reasons why this could be important, such as the fact that arbitrageurs face risks related to idiosyncratic volatility, and the lack of diversification in many investors' portfolios. Our paper suggests that managerial characteristics and the structure

[38] Sah (1991) conjectured that the structure of decision-making will affect performance in similar ways in any type of organization, be it a corporation or the political system of a given country. In particular, he develops a conjecture that autocratic countries should have more volatile economic growth than democratic ones. Almeida and Ferreira (2001) provide empirical evidence which is consistent with Sah's conjecture.

[39] The governance literature is more concerned with entrenchment than decision-making, although the two concepts may sometimes be difficult to disentangle.

[40] This implication is similar to Van den Steen's (2001) suggestion that vision may look better than it is, because many successful firms will have had visionary CEOs.

of decision-making may be important for understanding differences in volatility at the firm level.

7 Appendix-Construction of Founder Instruments

In this section we discuss the construction of the instruments for the dummy variable *founder* indicating whether or not the CEO is also one of the company's founders. As we discussed in section 5.3.2, we use three instruments for this dummy. The first is the average age of the company's founders in 1994. The second is the proportion of a company's founders who are dead prior to the time our data starts (1992). The third is the number of founders of the company.

We collected the data necessary to construct the instruments from a variety of sources using Lexis-Nexis as well as the International Directory of Company Histories (various volumes) and company histories on company websites when available. In order to determine who the founders of the firms in our sample are, we first had to establish what the founding event of the firm in its form in which it appears in 1998 was (since our firms are taken from the 1998 Fortune 500 list). We consider the following four types of events to be founding events: a simple business start-up (e.g. a shop opening), a merger of equals, a spin-off of a division that was not previously a separate company that had been acquired and a major change in ownership, e.g. an LBO, MBO or other acquisition, that leads to a major change in the development of the company. In the case of a merger of equals, we consider the founders of the new company to be the founders of both firms that are merging. In the case of a spin-off we consider the founders to be the founders of the original company, as well as the CEO at the time of the spin-off if he appears important to the development of the company. If a company was acquired and spun-off again, we consider the founders to be the founders of the company pre spin-off. We also generally consider any person to be a founder of the company who is identified as such in any of our data sources. In some cases our sources also identify important investors in the company or the first CEO who was hired by a founder as founders.

Our procedure was to use the company descriptions in the International Directory of Company Histories and the histories of the companies in Hoover's Company Profile Database, as well as information on the founders of the 1992 Fortune 200 firms in the National Commission on Entrepreneurship's (2001) study on entrepreneurs as a starting point for identifying the founding event, and if possible, the names of the founders. This procedure worked better for firms that were founded recently than for older firms that had undergone several mergers or restructurings. Generally older firms tended to have company histories on their websites that we could use to identify what the firm considers to be its main founding event. Once we identified the founding events, we searched archived stories from the sources Forbes, Fortune and U.S. News on Lexis-Nexis for further information on the founders of the company, the ages of the founders, the dates of the documents containing the founders' ages and information on whether or not the founders died prior to 1992 and the year the founders died. We consider a founder to be alive after 1992 when we could either verify that he was alive after 1992 or we could not find an obituary for the founder and the founder is mentioned in news articles as playing an important role in the company after 1975. If we are unable to find the name of a founder, we consider him to be alive if most of the other founders are alive. Otherwise, we consider a founder to be dead. When we were unable to find the necessary information on Lexis-Nexis, we searched for the founders using Forbes' Peopletracker and the internet.

Our final dataset consists of 608 observations on founders for the 336 firms in our sample. Since one founder often played a more dominant role in the company than the others, it was generally easier to identify the number of founders than it was to identify each of their names and their ages, thus our data on the number of founders is more complete than the founder age data. Likewise we were able to judge whether or not the founder died prior to 1992 even when we did not have age data for the founder. To generate the average age of the founders in 1994 we treat all founders who died prior to 1994 as being 95 years old and then average the age of all founders for whom we have age data for each firm. By assigning dead founders the age of 95 we code the fact that it is impossible for dead founders to be the CEO in 1994 because older founders are also less likely to be the CEO. We chose the age of dead founders to be 95 because the age of the oldest living founder in 1994 in our data is 94 years. The other instruments are a straightforward per-firm average of the dummy indicating whether the founder died prior to 1992 and the per-firm sum of all founders.

To reduce data collection costs, we did not collect data on founders for a random sample of 63 firms that had been incorporated more than 64 years prior to 1992 out of the 336 firms in our sample. For these firms we assume that there was only one founder and that the founder died prior to 1992. Since it is highly likely that the founders of these firms all died prior to 1992 and the probability that any of the founders are the CEO in 1994 is very low, we do not expect this shortcut to affect our results. Similarly, when the parties involved in a merger of equals themselves were the product of mergers of equals, we consider the firm to have two founders who died prior to 1992. Since these firms were all older firms and the influence of the original founders of each component firm is likely to be very small after several restructurings, this coding is consistent with the fact that it is highly unlikely that any of the founders is the CEO in 1994.

Of the 273 firms for which we collected detailed founder data, most were founded by simple business start-ups. Approximately 21 firms were founded through mergers of equals and 13 were founded as the result of a spin-off. The average number of founders in our sample is 1.8 with a standard deviation of 1.1 and a maximum of 8 founders. 50% of the firms were founded prior to 1961. This is reflected in the fact that the average proportion of founders who died prior to 1992 is 68.4% with a standard deviation of 44.3%. After adjusting the age for the dead founders, the average age of the founders in 1994 is 84.2 years with a standard deviation of 18 years.

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Table 1: Summary of select financial variables, CEO characteristics and the influence power index

Sample consists of monthly stock returns and 2,633 firm-years of data for 336 publicly traded, non-regulated firms from the 1998 Fortune 500 that were available on Execucomp (2000) during the years 1992-1999. Data on titles is constructed from 16,022 executive-years of data for these 336 firms during the years 1992-1999. Most financial data, all title data and CEO tenure is from Execucomp (2000). Monthly stock return data (variable name = RET) and market returns (variable name = VWRETD) are from CRSP. Remaining financial data and segment data is from Compustat. Firm age is collected from Moody's Manuals (1999), proxy statements and 10-Ks for fiscal 1998. Founder data is collected from a variety of sources consisting of proxy statements, annual reports and the internet. Observations vary because of missing data. Our proxy for Tobin's Q is = (book value of assets-book value of equity+market value of equity)/book value of assets. ROA = net income before extraordinary items and discontinued operations/book value of assets. Leverage=long-term debt/assets. Firm age = #years since first date of incorporation. # of segments is equal to the number of different 2-digit SIC code industries the firm operates in. CEO tenure is the number of years since the CEO was appointed CEO. CEO ownership is defined as the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding. We define our influence power index *IP* to be the sum of 5 indicator variables i_{chair}, $i_{president}$, $i_{nocoopres}$, i_{noiob}, $i_{founder}$. i_{chair} is equal to 1 if the CEO is also the chairman, $i_{president}$ is equal to 1 if the CEO is also the president, $i_{nocoopres}$ is equal to 1 if the firm has no president and no COO, i_{noiob} is equal to 1 if there is no other insider on the board other than the CEO and $i_{founder}$ is equal to 1 if the CEO is a founder of the company.

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Financial variables and CEO characteristics					
Tobin's Q	2595	2.01	1.38	0.81	19.15
Return on assets (ROA)	2633	5.42	5.80	-48.19	48.15
Stock returns	30689	0.02	0.10	-0.82	2.93
Value-weighted market returns	30742	0.02	0.04	-0.16	0.08
Leverage	2598	0.21	0.13	0.00	1.04
Assets in billions	2633	11.08	26.23	0.02	405.20
Capital expenditures/Sales	2556	0.07	0.06	0.00	1.28
# of segments	2543	2.74	1.70	1.00	13.00
Firm age	2622	55.43	34.53	0.00	147.00
CEO tenure as CEO	2257	7.37	7.22	0.00	47.00
CEO ownership	2304	0.02	0.05	0.00	0.46
CEO = Chair dummy	2349	0.86	0.35	0.00	1.00
CEO = President dummy	2349	0.27	0.44	0.00	1.00
Firm-years in which firm has a President	2571	0.75	0.43	0.00	1.00
Firm-years in which firm has a COO	2571	0.36	0.48	0.00	1.00
Firm-years in which no insiders other than the CEO sit on the board	2571	0.29	0.45	0.00	1.00
CEO=Founder dummy	2412	0.09	0.29	0.00	1.00
Influence power measure					
Influence power index (*IP* index)	2349	1.77	0.79	0.00	4.00

Table 2: Frequency distribution of influence power (*IP*) index and correlation of index components

Table 2, panel A shows frequency distribution of the *IP* index. Sample consists of 2,633 firm-years of data for 336 publicly traded, non-regulated firms from the 1998 Fortune 500 that were available on Execucomp (2000) during the years 1992-1999. Data on titles is constructed from 16,022 executive-years of data for these 336 firms during the years 1992-1999. All title data is from Execucomp (2000). Founder data is collected from a variety of sources consisting of proxy statements, annual reports and the internet. Observations vary because of missing data. We define our influence power index *IP* as the sum of 5 indicator variables i_{chair}, $i_{president}$, $i_{nocoopres}$, i_{noiob}, $i_{founder}$. i_{chair} is equal to 1 if the CEO is also the chairman, $i_{president}$ is equal to 1 if the CEO is also the president, $i_{nocoopres}$ is equal to 1 if the firm has no president and no COO, i_{noiob} is equal to 1 if there is no other insider on the board other than the CEO and $i_{founder}$ is equal to 1 if the CEO is a founder of the company. In panel B we report the correlations among the different components of the *IP index*, namely *succession* (the sum of CEO=Chair, CEO=President and a dummy which is equal to 1 if the firm has no President nor a COO among the five executives reported in Execucomp), *founder* (a dummy which is equal to 1 if the CEO is one of the founders of the company) and *Noins* (a dummy which is equal to 1 if there is no executive on the board other than the CEO).

PANEL A-Frequency distribution of influence power (*IP*) index

Value of *IP* index	Frequency in the Sample	Percentage of Sample	Cumulative Percentage of Sample
0	28	1.19	1.19
1	973	41.42	42.61
2	879	37.42	80.03
3	453	19.28	99.32
4	16	0.68	100.00
Total	2349	100.00	

PANEL B-Correlation matrix of index components

	Succession	*Noins*	*Founder*
Succession	1.00	.	.
Noins	0.20	1.00	.
Founder	-0.08	-0.01	1.00

Table 3: Regression of Tobin's Q and *ROA* on the influence power (*IP*) index and control variables

Table 3 shows OLS regressions of Tobin's Q and *ROA* levels on *IP* index plus controls. Sample consists of 2,633 firm-years of data for 336 publicly traded, non-regulated firms from the 1998 Fortune 500 that were available on Execucomp (2000) during the years 1992-1999. Most financial data is from Execucomp (2000). Remaining financial data is from Compustat. Firm age is collected from Moody's Manuals (1999), proxy statements and 10-Ks for fiscal 1998. Our proxy for Tobin's Q = (book value of assets-book value of equity + market value of equity)/book value of assets. Table 1 describes the construction of *IP* index. Control variables: CEO ownership is defined as the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding. *ROA* =net income before extraordinary items and discontinued operations/book value of assets. Firm age=#years since first date of incorporation. # of segments=# of 2-digit SIC code segments the firm operates in. Regressions vary by dependent variable and sample type. Columns I and II show the Tobin's Q regressions. Column I uses the full panel of observations and includes year dummies. Column II shows a cross-sectional regression estimated on the mean of each variable over the period 1992-1999 for each firm. Columns III and IV shows the *ROA* regressions. Column III uses the full panel of observations and includes year dummies. Column IV shows a cross-sectional regression estimated on the mean of each variable over the period 1992-1999 for each firm. Robust t-statistics shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: Tobin's Q		Dependent Variable: *ROA*	
	I	II	III	IV
IP index	0.036	0.097	-0.389**	-0.732**
	(0.94)	(1.47)	(-2.48)	(-1.98)
CEO ownership	4.874**	6.478**	9.954	-0.741
	(2.58)	(2.08)	(1.38)	(-0.05)
CEO ownership squared	-13.134**	-22.062***	26.845	87.992**
	(-2.37)	(-2.68)	(1.05)	(2.40)
ROA	0.093***	0.213***	.	.
	(7.16)	(10.69)	.	.
Lagged *ROA*	0.083***	.	.	.
	(6.91)	.	.	.
Ln(assets)	0.129***	0.051	0.093	0.376
	(4.44)	(1.11)	(0.070)	(1.54)
Capex/Sales	-0.557	0.266	0.625	-0.166
	(-1.10)	(0.35)	(0.31)	(-0.04)
Firm age	-0.002***	-0.002	0.005	0.004
	(-2.65)	(-1.64)	(1.28)	(0.58)
# segments	-0.069***	-0.043**	-0.487***	-0.543***
	(-5.63)	(-1.85)	(-8.28)	(-4.27)
Constant	0.139	0.419	6.634***	4.497**
	(0.47)	(0.97)	(5.03)	(2.12)
Sample Type	Panel	Cross-section	Panel	Cross-section
Year dummies included?	Yes	No	Yes	No
Number of observations	2028	331	2166	331
R^2	0.46	0.66	0.05	0.12
F-Statistic	27.64	20.76	9.32	9.04

Table 4: Heteroscedasticity Tests (Goldfeld-Quandt) for Tobin's Q, ROA and Stock Returns as a function of *IP* index and control variables

Table 4 shows the results of using the Goldfeld-Quandt heteroscedasticity test to test whether the variance in performance is greater in firms in which our measure of CEO influence power (the *IP index*) is larger. We test the null hypothesis that the variance in firms with more powerful CEOs is smaller than in firms with less powerful CEOs against the alternative that it is bigger. We use *IP* index to partition the sample. Table 1 describes the sample and the construction of the variables. For the panel sample we define a firm to have a powerful CEO if *IP* index>1. For the cross-sectional sample we define a firm to have a powerful CEO if *IP* index>1.75. For the cross-sectional sample, we omit all observations for which the *IP* index lies on an open interval of length 0.5 centered on the cutoff point. Panel A shows the results using Tobin's Q as the performance measure. Columns vary by type of model used to construct residuals of Q and by sample type. The full model used to construct residuals is displayed in Table 3: $Q = b_0 + b_1 IP$ index $+ b_2$ CEO ownership+ b_3 CEO ownership squared $+ b_4\, ROA + b_5$ one period lagged ROA + b_6 ln(assets) + b_7 Capex/sales + b_8 Firm age + b_9 # of segments + Year dummies. The cross-sectional regression is estimated on the mean of each variable over the period 1992-1999 for each firm, omitting lagged ROA and the year dummies. Panel B shows the results using *ROA* as the performance measure. The model we use to construct the ROA residuals is displayed in table 3: $ROA = b_0 + b_1 IP$ index $+ b_2$ CEO ownership+ b_3 CEO ownership squared $+ b_5$ ln(assets) + b_6 Capex/sales + b_7 Firm age + b_8 # of segments (+ Year dummies in the panel sample). Panel C shows the results using stock returns as the performance measure. To perform the panel tests we construct the residuals $\hat{u}_i$ from the market model: $SR_{it} = \beta_i MR_t + u_{it}$, where SR denotes monthly stock returns, MR denotes the value-weighted market return and t ranges from 1992-1999. To perform the cross-sectional tests we construct the residuals for each firm as the difference between the average stock return for the firm in the period, and the average market return multiplied by the firm's beta: $u_i = \overline{SR_i} - \beta_i \overline{MR}$.

PANEL A – Dependent variable: Tobin's Q

Sub-sample type	Test Statistic	I	II	III	IV
High *IP* index	Residual sum of squares of Q	81.76	1509.23	202.26	3100.92
	Degrees of freedom	135	1141	146	1344
Low *IP* index	Residual sum of squares of Q	25.91	710.23	110.91	1622.92
	Degrees of freedom	124	855	133	998
F-statistic		2.8978	1.5923	1.6612	1.4188
P-value		2.32E-09	4.12E-13	1.54E-03	2.45E-09
Type of model used to create residuals		Full	Full	None	None
Sample Type		Cross-section	Panel	Cross-section	Panel

Table 4: Heteroscedasticity Tests (Goldfeld-Quandt) for Tobin's Q, ROA and Stock Returns as a function of *IP* index and control variables, continued

See description of Table 4 on the previous page for an explanation of panels B and C.

PANEL B – Dependent variable: *ROA*

Sub-sample type	Test Statistic	I	II	III	IV
High *IP* index	Residual sum of squares of *ROA*	2086.14	42033.40	2964.07	50894.16
	Degrees of freedom	136	1222	146	1346
Low *IP* index	Residual sum of squares of *ROA*	1689.49	20916.76	1899.84	25121.08
	Degrees of freedom	125	914	133	1000
F-statistic		1.1349	1.5030	1.4212	1.5051
P-value		0.2365	4.04E-11	0.0198	4.25E-12
Type of model used to create residuals		Full	Full	None	None
Sample Type		Cross-section	Panel	Cross-section	Panel

PANEL C – Dependent variable: Stock returns

Sub-sample type	Test Statistic	I	II	III	IV
High *IP* index	Residual sum of squares of Stock Returns	0.0276	136.28	0.0297	160.08
	Degrees of freedom	145	15840	145	15840
Low *IP* index	Residual sum of squares of Stock Returns	0.0118	78.54	0.0141	93.94
	Degrees of freedom	133	11854	133	11854
F-statistic		2.1328	1.2983	1.9251	1.2752
P-value		6.05E-06	6.05E-49	7.32E-05	9.61E-44
Type of model used to create residuals					
Sample Type		Cross-section	Panel	Cross-section	Panel

Table 5: Glejser Heteroscedasticity Test for Tobin's Q, *ROA* and Stock Returns as a function of *IP* index and control variables.

Table 5 shows the results of using the Glejser test to test whether the variance in performance is greater in firms in which our measure of CEO influence power is larger. Using both the cross-section and the panel we construct residuals $\hat{u}_i$ for Tobin's Q from the following regression in Table 3: $Q = b_0 + b_1 IP$ index $+ b_2$ CEO ownership $+ b_3$ CEO ownership squared + b_4 $ROA + b_5$ ln(assets)+ b_6 Capex/sales+ b_7 Firm age+ b_8 # of segments +1-digit SIC code dummies (+ b_9 one period lagged ROA + Year dummies in panel sample). The model we use to construct the ROA residuals is displayed in table 3: $ROA = b_0 + b_1 IP$ index $+ b_2$ CEO ownership+ b_3 CEO ownership squared $+ b_5$ ln(assets) + b_6 Capex/sales + b_7 Firm age + b_8 # of segments (+ Year dummies in the panel sample). The cross-sectional regressions are estimated on the mean of each variable over the period 1992-1999 for each firm. To perform the panel tests for stock returns we construct the residuals $\hat{u}_i$ from the market model: $SR_{it} = \beta_i MR_t + u_{it}$, where SR denotes monthly stock returns, MR denotes the monthly value-weighted market return and t ranges from 1992-1999. To perform the cross-section tests we construct the residuals for each firm as the difference between the average stock return for the firm in the period, and the average market return multiplied by the firm's beta: $u_i = \overline{SR_i} - \beta_i \overline{MR}$. We regress the absolute value of the residuals from these regressions on *IP* index and controls including CEO ownership measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, squared CEO ownership, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), Capex/sales and # segments (2-digit SIC segments the firm operates in). Columns vary by performance measure and sample type. All regressions include 2-digit SIC code industry dummies. Robust t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficients on CEO tenure, firm size and # segments are multiplied by 10. The coefficient on firm age is multiplied by 100. The coefficient on CEO tenure squared is multiplied by 1000.

Dependent Variable	Tobin's Q		ROA		Stock Returns	
	I	II	III	IV	V	VI
IP index	0.049*	0.103**	0.077	0.126	0.002***	0.002**
	(1.66)	(2.37)	(0.68)	(0.51)	(2.99)	(2.31)
CEO ownership	7.507***	8.848***	14.864***	29.384**	0.172***	0.036
	(3.50)	(4.24)	(2.67)	(2.20)	(5.36)	(0.86)
CEO tenure	-0.087	-0.189	-0.356	-1.309**	-0.001	-0.003
	(-1.59)	(-1.55)	(-1.11)	(-2.20)	(-0.72)	(-1.07)
CEO tenure squared	0.237	0.584	0.430	3.004*	-0.006	0.004
	(1.37)	(1.56)	(0.44)	(1.79)	(-1.06)	(0.54)
Leverage	-0.836***	-0.945**	-1.465	-4.103**	0.027***	-0.003
	(-4.22)	(-2.41)	(-1.27)	(-2.07)	(5.3)	(-0.59)
Firm size	0.636**	-0.247	-0.107	2.048	-0.004***	-0.009
	(2.49)	(-0.67)	(-0.10)	(1.28)	(-6.8)	(-1.61)
Firm age	-0.209***	-0.109	-0.245	0.103	-0.015***	-0.005***
	(-3.13)	(-1.10)	(-0.78)	(0.19)	(-7.98)	(-3.04)
# segments	-0.492***	-0.257	-2.994***	-4.127***	-0.007**	-0.003
	(-4.73)	(-1.32)	(-6.13)	(-3.77)	(-2.07)	(-0.65)
CEO ownership sq.	-21.004***	-25.793***	-23.113	-70.787*	-0.380***	-0.034
	(-3.41)	(-5.12)	(-1.16)	(-1.67)	(-4.05)	(-0.27)
Capex/Sales	0.528	0.880	1.699	3.043	0.012	0.020
	(1.39)	(1.05)	(1.03)	(0.59)	(1.03)	(1.49)
Constant	0.340	0.207	5.770***	5.161**	0.107***	0.017**
	(0.94)	(0.42)	(4.27)	(2.18)	(13.42)	(2.49)
Sample Type	Panel	Cross-section	Panel	Cross-section	Panel	Cross-section
# Observations	1953	320	2078	320	24540	320
R^2	0.21	0.31	0.11	0.24	0.11	0.28
F-statistic	6.45	2.76	6.94	3.25	24.70	3.73

Table 6: Glejser Heteroscedasticity Test for Tobin's Q, *ROA* and Stock Returns as a function of the components of *IP* index and control variables

In this table we perform the Glejser heteroscedasticity tests using the different components of the *IP index*, namely *succession* (the sum of CEO=Chair, CEO=President and a dummy which is equal to 1 if the firm has no President nor a COO among the five executives reported in Execucomp), *founder* (a dummy which is equal to 1 if the CEO is one of the founders of the company) and *Noins* (a dummy which is equal to 1 if there is no executive on the board other than the CEO). We construct residuals $\hat{u}_i$ for Tobin's Q and ROA using the same model as in Table 5, except that we substitute the three components for *IP* index. Since we use the market model to construct residuals for stock returns, we use the same residuals for stock returns as in Table 5. We regress the absolute value of the residuals from these regressions on *succession, founder* and *Noins* and controls including CEO ownership, measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, its square, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), capex/sales and # segments (2-digit SIC segments the firm operates in). Columns vary by performance measure and sample type. All regressions include 2-digit SIC code industry dummies. Robust t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficients on succession, CEO tenure, firm size and # segments are multiplied by 10. The coefficient on firm age is multiplied by 100. The coefficient on CEO tenure squared is multiplied by 1000.

Dependent Variable	Tobin's Q		ROA		Stock Returns	
	I	II	III	IV	V	VI
Founder	0.413***	0.387***	0.961**	1.282*	0.012***	0.006**
	(4.24)	(2.79)	(2.14)	(1.74)	(4.43)	(2.51)
Succession	0.049	0.740	2.406	1.839	-0.001	0.008
	(0.14)	(1.22)	(1.41)	(0.49)	(-0.14)	(0.79)
Noins	0.035	0.079	-0.213	-0.293	0.003**	0.003
	(0.79)	(0.89)	(-1.07)	(-0.52)	(2.41)	(1.34)
CEO ownership	6.219***	7.632***	8.317	20.805	0.159***	0.029
	(3.06)	(4.35)	(1.51)	(1.51)	(5.04)	(0.75)
CEO tenure	-0.106**	-0.231**	-0.422	-1.155*	-0.001	-0.003
	(-1.98)	(-2.01)	(-1.34)	(-1.85)	(-0.85)	(-1.1)
CEO tenure squared	0.233	0.666*	0.595	2.170	-0.009	0.002
	(1.28)	(1.83)	(0.62)	(1.13)	(-1.59)	(0.26)
Leverage	-0.807***	-0.903**	-1.481	-4.000*	0.027***	-0.003
	(-4.20)	(-2.41)	(-1.28)	(-1.97)	(5.31)	(-0.71)
Firm size	0.687***	-0.240	-0.736	1.177	-0.038***	-0.008
	(2.68)	(-0.72)	(-0.64)	(0.71)	(-6.44)	(-1.62)
Firm age	-0.107	-0.037	-0.182	0.281	-0.012***	-0.004**
	(-1.56)	(-0.38)	(-0.55)	(0.49)	(-6.51)	(-2.2)
# segments	-0.471***	-0.117	-2.813***	-3.882***	-0.007**	-0.002
	(-4.64)	(-0.63)	(-5.79)	(-3.57)	(-1.98)	(-0.62)
CEO ownership sq.	-18.586***	-23.682***	-12.500	-52.627	-0.374***	-0.036
	(-3.00)	(-5.27)	(-0.65)	(-1.22)	(-4.02)	(-0.30)
Capex/Sales	0.664*	0.878	1.435	3.665	0.014	0.020
	(1.68)	(1.18)	(0.88)	(0.77)	(1.14)	(1.55)
Constant	0.336	0.239	6.196***	5.856**	0.108***	0.019***
	(0.97)	(0.53)	(4.60)	(2.40)	(13.58)	(2.76)
Sample Type	Panel	Cross-section	Panel	Cross-section	Panel	Cross-section
# Observations	1953	320	2078	320	24540	320
F-statistic of joint significance test for *founder*, *succession* and *noins*	6.37***	3.26**	2.60**	1.12	9.69***	3.28**
R^2	0.22	0.33	0.12	0.23	0.11	0.28
F-statistic	9.71	3.93	10.11	2.81	22.87	4.00

Table 7: Cross-sectional regressions of standard deviations of Tobin's Q, *ROA*, Monthly Raw and Residual Stock Returns (SR) over the 1992-1999 period on the influence power *IP* index averaged over the 1992-1999 period

Table 7 shows cross-sectional OLS regressions of the standard deviation in performance measures, computed for each firm over 1992-1999 period, on *IP* index plus controls averaged over the 1992-1999 period. Table 1 describes the sample and the construction of *IP* index. Our proxy for Tobin's *Q* is (book value of assets-book value of equity + market value of equity)/book value of assets. ROA =net income before extraordinary items and discontinued operations/book value of assets. Control variables: CEO ownership, measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, its square, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), capex/sales and # segments (2-digit SIC segments the firm operates in). Regressions vary by dependent variable. In Column I the dependent variable is the standard deviation of Tobin's Q over 1992-1999. In Column II the dependent variable is the standard deviation of ROA over 1992-1999. In Columns III-IV the dependent variable is the standard deviation of raw (residual) monthly stock returns (SR) over 1992-1999. We construct the residual stock returns $\hat{u}_i$ from the market model: $SR_{it} = \beta_i MR_t + u_{it}$, where SR denotes monthly stock returns, MR denotes the value-weighted market return and t ranges from 1992-1999. Regressions are estimated on the mean of each independent variable over 1992-1999. The regressions in all columns include 2-digit SIC code dummies. Robust t-statistics are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficient on firm age and # segments are multiplied by 10. The coefficient on CEO tenure squared is multiplied by 1000.

Dependent Variable	Tobin's Q	ROA	Stock Returns	Residual stock returns
	I	II	III	IV
IP index	0.0571	0.927***	0.006***	0.006***
	(0.70)	(2.96)	(2.71)	(2.62)
CEO ownership	7.486	1.925	0.225**	0.224**
	(1.40)	(0.19)	(2.17)	(2.19)
CEO tenure	0.006	-0.100	-0.001	-0.001
	(0.53)	(-1.49)	(-1.03)	(-1.39)
CEO tenure squared	-0.428	2.375	0.002	0.007
	(-1.04)	(1.17)	(0.08)	(0.40)
Leverage	-1.430***	-0.492	0.037***	0.036**
	(-4.38)	(-0.32)	(2.67)	(2.61)
Firm size	0.031	-0.240	-0.009***	-0.009***
	(0.80)	(-1.16)	(-4.95)	(-4.99)
Firm age	-0.022**	0.020	-0.002***	-0.002***
	(-2.02)	(0.32)	(-4.22)	(-3.90)
# segments	-0.362*	-2.360**	-0.002	-0.002
	(-1.85)	(-2.19)	(-0.15)	(-0.22)
CEO ownership squared	-15.145	12.749	0.476	-0.451
	(-1.09)	(0.46)	(-1.57)	(-1.48)
Capex/Sales	1.412	0.587	0.072	0.071
	(1.32)	(0.11)	(1.06)	(1.04)
Constant	-0.130	3.554	0.130***	0.128***
	(-0.17)	(1.53)	(7.03)	(7.02)
Sample Type	Cross-section	Cross-section	Cross-section	Cross-section
# Observations	320	320	320	320
R^2	0.37	0.28	0.57	0.57
F-statistic	4.22	2.22	15.40	14.69

Table 8: Cross-sectional regressions of standard deviations of Tobin's *Q*, Monthly Raw and Residual Stock Returns and ROA over the 1992-1999 period on the components of *IP* index averaged over the 1992-1999 period

Table 8 shows cross-sectional OLS regressions of the standard deviation in performance measures, computed for each firm over 1992-1999 period, on the components of *IP* index, namely *succession* (the sum of CEO=Chair, CEO=President and a dummy which is equal to 1 if the firm has no President nor a COO among the five executives reported in Execucomp), *founder* (a dummy which is equal to 1 if the CEO is one of the founders of the company) and *Noins* (a dummy which is equal to 1 if there is no executive on the board other than the CEO), plus controls averaged over the 1992-1999 period. Our proxy for Tobin's *Q* is (book value of assets-book value of equity + market value of equity)/book value of assets. *ROA* =net income before extraordinary items and discontinued operations/book value of assets. Control variables: CEO ownership, measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, its square, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), capex/sales and # segments (2-digit SIC segments the firm operates in). Regressions vary by dependent variable. In Column I the dependent variable is the standard deviation of Tobin's *Q* over 1992-1999. In Column II the dependent variable is the standard deviation of *ROA* over 1992-1999. In Columns III-IV the dependent variable is the standard deviation of raw (residual) monthly stock returns over 1992-1999. We construct the residual stock returns $\hat{u}_i$ from the market model: $SR_{it} = \beta_i MR_t + u_{it}$, where *SR* denotes monthly stock returns, *MR* denotes the value-weighted market return and t ranges from 1992-1999. Regressions are estimated on the mean of each independent variable over 1992-1999. The regressions in all columns include 2-digit SIC code industry dummies. Robust t-statistics are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficient on CEO tenure squared is multiplied by 1000. The coefficient on firm age and # segments are multiplied by 10.

Dependent Variable	Tobin's Q	ROA	Stock Returns	Residual stock returns
	I	II	III	IV
Founder	0.602***	1.319*	0.021***	0.019**
	(2.69)	(1.74)	(2.68)	(2.38)
Succession	0.005	0.848**	0.004	0.004
	(0.05)	(2.07)	(1.04)	(1.08)
Noins	-0.053	0.964*	0.007	0.007
	(-0.45)	(1.74)	(1.37)	(1.37)
CEO ownership	6.952	1.048	0.205**	0.206**
	(1.41)	(0.10)	(2.00)	(2.03)
CEO tenure	0.005	-0.102	-0.001	-0.001
	(0.43)	(-1.54)	(-1.04)	(-1.39)
CEO tenure squared	-0.676	2.250	-0.005	0.002
	(-1.56)	(1.08)	(-0.24)	(0.10)
Leverage	-1.497***	-0.521	0.035***	0.034***
	(-4.49)	(-0.34)	(2.69)	(2.61)
Firm size	0.038	-0.246	-0.009***	-0.009***
	(1.01)	(-1.17)	(-4.95)	(-4.95)
Firm age	-0.009	0.032	-0.002***	-0.001***
	(-0.82)	(0.49)	(-3.29)	(-3.06)
# segments	-0.302*	-2.388**	-0.001	-0.002
	(-1.70)	(-2.17)	(-0.12)	(-0.19)
CEO ownership squared	-16.154	13.148	-0.486	-0.461
	(-1.19)	(0.47)	(-1.64)	(-1.54)
Capex/Sales	1.348	0.696	0.072	0.071
	(1.32)	(0.14)	(1.07)	(1.05)
Constant	-0.055	3.778	0.134***	0.132***
	(-0.08)	(1.61)	(7.35)	(7.33)
Sample Type	Cross-section	Cross-section	Cross-section	Cross-section
# Observations	320	320	320	320
R^2	0.41	0.29	0.58	0.58
F-Statistic	4.79	2.12	15.85	14.14

Table 9: Tests using lagged extreme performances to predict changes in CEO influence power and lagged changes in CEO influence power to predict extreme performances in the panel sample

We create a dummy variable *Extreme* that equals 1 for either very high or very low values of stock returns and is zero otherwise. We define high performance as a value for the stock return that ranks among the highest 15% of returns for all observations in our sample. Similarly, we define low performance as a value for the stock return ranking amongst the lowest 15% of the distribution of stock returns. In column I we run a Poisson regression of changes in the *IP* index on the first and second lags of *Extreme* and the same controls we have used in the previous tests, namely CEO ownership, measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, its square, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), capex/sales, # segments (2-digit SIC segments the firm operates in), plus year dummies and 2-digit SIC code industry dummies. We transform changes in the *IP* index to ensure it is always positive by adding 4 (the maximum value of *IP* index) to all changes. In column II we run a Probit regression using *Extreme* as the dependent variable, and lagged changes in the *IP* index as explanatory variables, plus the same controls used in the regression in column I. Robust t-statistics are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficient on tenure squared in column I is multiplied by 100. The coefficient on firm age is multiplied by 100.

	Dependent Variable: $(IP\text{ index})_t$ - $(IP\text{ index})_{t-1}$	Dependent Variable: *Extreme*
	I	II
$(\text{Extreme})_{t-1}$	0.007	.
	(0.84)	.
$(\text{Extreme})_{t-2}$	-0.016**	.
	(-1.97)	.
$(IP\text{ index})_{t-1}$ - $(IP\text{ index})_{t-2}$	.	0.165**
	.	(2.05)
$(IP\text{ index})_{t-2}$ - $(IP\text{ index})_{t-3}$	.	0.169**
	.	(2.03)
CEO ownership	0.340	5.269
	(1.24)	(1.59)
CEO tenure	-0.005***	0.005
	(-3.58)	(0.31)
CEO tenure squared	0.009**	-0.038
	(2.44)	(-0.67)
Leverage	-0.015	0.995***
	(-0.51)	(2.41)
Firm size	-0.001	-0.017
	(-0.25)	(-0.31)
Firm age	-0.555	-0.006***
	(-0.36)	(-3.53)
# segments	0.002	-0.100***
	(0.74)	(-2.92)
CEO ownership squared	-1.394	-15.113
	(-1.1)	(-1.16)
Capex/Sales	-0.011	-0.853
	(-0.16)	(-0.71)
Constant	1.43***	0.535
	(34.4)	(0.66)
# Obs.	1616	1173
Pseudo R^2	0.001	0.145
Wald Chi-square	84.56	200.43

Table 10: Cross-sectional regressions of the *founder* variable averaged over the 1992-1999 period on select instruments (first-stage regressions of 2SLS)

Table 10 shows cross-sectional OLS regressions of the average of the *founder* variable computed for each firm over 1992-1999 period on explanatory variables averaged over the 1992-1999 period. These are first-stage regressions of 2SLS regressions that use different instruments for *founder*. The dependent variable is the *founder* variable in all cases. Column I includes the average age of all founders as of 1994 as an instrument. When founders are dead as of 1994, they are assigned the age of 95 years. Column II includes the average of an indicator variable that takes the value of 1 if a given founder is dead as of 1992 and zero otherwise as an instrument. Column III includes the number of founders as an instrument. The other control variables are: CEO ownership, measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, its square, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), capex/sales and # segments (2-digit SIC segments the firm operates in). Regressions are estimated on the mean of each independent variable over 1992-1999. The regressions in all Columns include 2-digit SIC code dummies. Robust t-statistics are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficients on CEO tenure and tenure squared are multiplied by 1000. The coefficients on firm age are multiplied by 1000.

	Dependent variable*: Founder*		
	I	II	III
Founder age	-0.007***	.	.
	(-4.81)	.	.
Founder dead	.	-0.172***	.
	.	(-3.51)	.
Number of founders	.	.	0.035**
	.	.	(2.20)
CEO ownership	0.467	0.893	1.269
	(0.40)	(0.68)	(098)
CEO tenure	-0.112	0.017	-1.033
	(-0.02)	(0.00)	(-0.16)
CEO tenure squared	0.410**	0.371*	0.481**
	(2.12)	(1.74)	(2.32)
Leverage	0.170	0.167	0.173
	(1.02)	(0.92)	(0.90)
Firm size	0.005	-0.004	-0.008
	(0.34)	(-0.25)	(-0.55)
Firm age	-0.932**	-1.338***	-2.189***
	(-2.40)	(-3.33)	(-4.68)
# segments	-0.002	-0.003	-0.006
	(-0.23)	(-0.34)	(-0.76)
CEO ownership squared	2.493	1.969	1.125
	(0.83)	(0.59)	(0.34)
Capex/Sales	-0.061	0.082	0.082
	(-0.14)	(0.18)	(0.18)
Constant	0.419*	-0.036	-0.257
	(1.64)	(-0.16)	(-1.08)
# Observations	316	319	320
R^2	0.54	0.49	0.47
F-statistic	12.31	11.46	11.60

Table 11: Cross-sectional IV and OLS regressions of standard deviations of Tobin's Q, *ROA*, Monthly Raw and Residual Stock Returns (SR) over the 1992-1999 period on the founder variable averaged over the 1992-1999 period

Table 11 shows cross-sectional OLS and IV regressions of the standard deviation in performance measures computed for each firm over 1992-1999 period on the *founder* variable plus controls averaged over the 1992-1999 period. Our proxy for Tobin's Q is (book value of assets-book value of equity + market value of equity)/book value of assets. ROA =net income before extraordinary items and discontinued operations/book value of assets. Control variables: CEO ownership, measured by the ratio of the number of shares owned by the CEO after adjusting for stock splits to total shares outstanding, its square, CEO tenure (the number of years since the CEO was appointed CEO) and its square, leverage (long-term debt/assets), firm size (natural log of assets), firm age (# years since first date of incorporation), capex/sales and # segments (2-digit SIC segments the firm operates in). Regressions vary by dependent variable, estimation method and instruments used. In Panel (a), the dependent variable is the standard deviation of Tobin's Q over 1992-1999. In Panel (b), the dependent variable is the standard deviation of ROA over 1992-1999. In Panels (c) ((d)) the dependent variable is the standard deviation of raw (residual) monthly stock returns (SR) over 1992-1999. We construct the residual stock returns $\hat{u}_i$ from the market model: $SR_{it} = \beta_i MR_t + u_{it}$, where SR denotes monthly stock returns, MR denotes the value-weighted market return and t ranges from 1992-1999. In all Panels, Column I is the OLS regression. Column II includes the average age of all founders as of 1994 as an instrument for *founder*. When founders are dead as of 1994, they are assigned the age of 95 years. Column III uses the average of an indicator variable that takes the value of 1 if a given founder is dead as of 1992 and zero otherwise as an instrument for *founder*. Column IV includes the number of founders as an instrument. Regressions are estimated on the mean of each independent variable over 1992-1999. The regressions in all Panels include 2-digit SIC code dummies. Robust t-statistics are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficients on CEO tenure and tenure squared and on firm age are multiplied by 1000. In Panels C and D, the coefficients on # segments are multiplied by 1000.

Panel A

	Dependent Variable: Std. Dev. of Tobin's Q			
	I	II	III	IV
Estimation method (instrument for founder)	OLS (founder)	IV (founder age)	IV (founder is dead)	IV (number of founders)
Founder	0.599***	1.791***	1.958***	1.497*
	(2.76)	(3.21)	(2.77)	(1.61)
CEO ownership	6.910	5.826	5.455	5.948
	(1.41)	(1.40)	(1.25)	(1.22)
CEO tenure	5.594	2.700	3.923	4.490
	(0.48)	(0.18)	(0.25)	(1.22)
CEO tenure squared	-0.676	-1.143**	-1.238**	-1.047*
	(-1.54)	(-1.99)	(-2.07)	(-1.76)
Leverage	-1.496***	-1.660***	-1.701***	-1.631***
	(-4.58)	(-3.68)	(-3.59)	(-3.97)
Firm size	0.037	0.052	0.054	0.048
	(0.99)	(1.23)	(1.30)	(1.20)
Firm age	-0.858	2.005	2.279	1.215
	(-0.73)	(1.43)	(1.42)	(0.51)
# segments	-0.032*	-0.026	-0.024	-0.027
	(-1.72)	(-1.23)	(-1.10)	(-1.26)
CEO ownership squared	-16.004	-18.574	-18.386	-17.579
	(-1.21)	(-1.50)	(-1.54)	(-1.50)
Capex/Sales	1.360	1.202	1.151	1.222
	(1.37)	(1.09)	(1.03)	(1.17)
Constant	-0.054	0.018	0.054	0.017
	(-0.08)	(0.03)	(0.08)	(0.02)
# Observations	320	316	319	320
R^2	0.41	0.26	0.21	0.32
F-statistic	5.24	4.66	4.76	5.34

Table 11: Cross-sectional IV and OLS regressions of standard deviations of Tobin's Q, *ROA*, Monthly Raw and Residual Stock Returns (SR) over the 1992-1999 period on the founder variable averaged over the 1992-1999 period, continue

See description of Table 11 for an explanation the regressions in these tables.

Panel B

	Dependent Variable: Std. Dev. of ROA			
	I	II	III	IV
Estimation method (instrument for founder)	OLS (founder)	IV (founder age)	IV (founder dead)	IV (number of founders)
Founder	1.244*	6.625***	6.251*	9.591
	(1.70)	(2.71)	(1.80)	(1.08)
CEO ownership	1.688	-2.257	-3.675	-7.253
	(0.17)	(-0.19)	(-0.30)	(-0.42)
CEO tenure	-99.858	-134.49*	-100.60	-110.12
	(-1.49)	(-1.77)	(-1.44)	(-1.30)
CEO tenure squared	1.859	0.207	-0.211	-1.521
	(0.90)	(0.08)	(-0.08)	(-0.32)
Leverage	-0.276	-1.090	-1.033	-1.538
	(-0.18)	(-0.56)	(-0.53)	(-0.59)
Firm size	-0.232	-0.202	-0.172	-0.132
	(-1.08)	(-0.86)	(-0.77)	(-0.50)
Firm age	4.321	17.558**	15.885*	23.599
	(0.66)	(2.26)	(1.72)	(1.03)
# segments	-0.222**	-0.203*	-0.193	-0.173
	(-2.00)	(-1.66)	(-1.59)	(-1.24)
CEO ownership squared	13.659	-0.453	4.911	-0.944
	(0.51)	(-0.01)	(0.16)	(-0.02)
Capex/Sales	1.059	0.559	0.289	-0.223
	(0.21)	(0.10)	(0.05)	(-0.03)
Constant	4.110*	4.830*	4.509*	4.776
	(1.71)	(1.73)	(1.63)	(1.50)
# Observations	320	316	319	320
R^2	0.26	0.11	0.12	0.10
F-statistic	2.58	2.33	2.19	2.25

Table 11: Cross-sectional IV and OLS regressions of standard deviations of Tobin's Q, *ROA*, Monthly Raw and Residual Stock Returns (SR) over the 1992-1999 period on the founder variable averaged over the 1992-1999 period, continued

See description of Table 11 for an explanation the regressions in these tables.

Panel C

	Dependent Variable: Std. Dev. of stock returns			
	I	II	III	IV
Estimation method (instrument for founder)	OLS (founder)	IV (founder age)	IV (founder dead)	IV (number of founders)
Founder	0.020***	0.095***	0.106***	0.049
	(2.65)	(3.65)	(2.88)	(1.12)
CEO ownership	0.206**	0.130	0.104	0.172
	(2.06)	(0.87)	(0.64)	(1.48)
CEO tenure	-0.788	-1.050	-0.923	-0.833
	(-1.05)	(-1.11)	(-0.97)	(-1.06)
CEO tenure squared	-0.069	-0.034	-0.040	-0.018
	(-0.39)	(-1.21)	(-1.28)	(-0.68)
Leverage	0.036***	0.022	0.020	0.030*
	(2.69)	(1.29)	(1.03)	(1.89)
Firm size	-0.008***	-0.007***	-0.007***	-0.008***
	(-4.95)	(-3.77)	(-3.57)	(-4.60)
Firm age	-0.158***	0.241	0.043	-0.090
	(-3.28)	(0.40)	(0.54)	(-0.84)
# segments	-0.100	0.010	0.200	0.090
	(-0.07)	(0.01)	(0.15)	(0.01)
CEO ownership squared	-0.489*	-0.630*	-0.614*	-0.527*
	(-1.72)	(-1.80)	(-1.64)	(-1.76)
Capex/Sales	0.072	0.065	0.061	0.068
	(1.09)	(0.87)	(0.79)	(1.02)
Constant	0.136***	0.147***	0.147***	0.140***
	(7.42)	(5.66)	(5.35)	(6.88)
# Observations	320	316	319	320
R^2	0.57	0.36	0.30	0.54
F-statistic	16.58	8.24	8.78	16.18

Table 11: Cross-sectional IV and OLS regressions of standard deviations of Tobin's Q, *ROA*, Monthly Raw and Residual Stock Returns (SR) over the 1992-1999 period on the founder variable averaged over the 1992-1999 period, continued

See description of Table 11 for an explanation the regressions in these tables.

Panel D

	Dependent Variable: Std. Dev. of residual stock returns			
	I	II	III	IV
Estimation method (instrument for founder)	OLS (founder)	IV (founder age)	IV (founder dead)	IV (number of founders)
Founder	0.018**	0.088***	0.099***	0.066
	(2.33)	(3.60)	(2.86)	(1.55)
CEO ownership	0.207**	0.138	0.111	0.151
	(2.09)	(0.98)	(0.71)	(1.22)
CEO tenure	-1.011	-1.323	-1.140	-1.087
	(-1.42)	(-1.48)	(-1.26)	(-1.36)
CEO tenure squared	-0.008	-0.023	-0.032	-0.018
	(-0.01)	(-0.91)	(-1.08)	(-0.72)
Leverage	0.034***	0.021	0.019	0.025
	(2.63)	(1.30)	(1.04)	(1.56)
Firm size	-0.008***	-0.008***	-0.007***	-0.007***
	(-4.94)	(-3.89)	(-3.62)	(-4.15)
Firm age	-0.142***	0.027	0.048	-0.030
	(-3.04)	(0.46)	(0.63)	(-0.29)
# segments	-0.100	-0.050	0.100	0.070
	(-0.14)	(-0.05)	(0.10)	(0.01)
CEO ownership squared	-0.457*	-0.598*	-0.580	-0.529*
	(-1.62)	(-1.78)	(-1.61)	(-1.68)
Capex/Sales	0.0717	0.065	0.060	0.065
	(1.06)	(0.86)	(0.78)	(0.91)
Constant	0.133***	0.145***	0.144***	0.139***
	7.36	(5.91)	(5.46)	(6.57)
# Observations	320	316	319	320
R^2	0.57	0.37	0.30	0.47
F-statistic	16.05	7.64	7.78	15.67

Figure 1: Best and worst performances and CEO Influence Power

Figure 1 shows plot of Tobin's Q residuals $\hat{u}_i$ for very high and very low values of CEO influence power. Residuals $\hat{u}_i$ are obtained from the following regression in Table 3: $Q = b_0 + b_1 IP$ index $+ b_2$ CEO ownership $+ b_3$ CEO ownership squared $+ b_4$ ROA $+ b_5$ ln(assets) $+ b_6$ Capex/sales $+ b_7$ Firm age $+ b_8$ # of segments, where all variables are averaged over the 1992-1999 time period. We categorize firms' CEOs as having high influence power if their *IP* index is in the 5th quintile. We categorize firms' CEOs as having low influence power if their *IP* index is in the 1st quintile.