Divisional Managers and Internal Capital Markets

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Abstract

Using hand-collected data on divisional managers at the S&P 500 firms, we provide one of the first studies of their role in internal capital budgeting. Divisional managers with connections to the CEO receive more capital. Managers' informal connections, such as social ties to the CEO, outweigh measures of managers' formal influence, such as board membership and seniority, and affect both the appointment of managers and subsequent capital allocations to their divisions. The impact of connections on investment efficiency depends on the tradeoff between agency and information asymmetry. When governance is weak, connections reduce investment efficiency and erode firm value by fostering favoritism. When information asymmetry is high, managerial ties increase investment efficiency and firm value by facilitating information transfer. Overall, we provide novel evidence on the role of formal and informal managerial influence inside conglomerates.

Keywords: internal capital markets, divisional managers, social networks, agency, asymmetric information

JEL classification: G31, G32

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Divisional managers play an important role in theories of internal capital markets. The bright side view posits that internal capital markets benefit from stronger control rights and superior information provided by divisional managers, which enable the CEO to make better allocation decisions.[1] The dark side view states that internal capital markets suffer from agency motives of divisional managers and the CEO, who pursue their private interests.[2] The importance of divisional managers in the theoretical literature is supported by recent survey evidence. Graham, Harvey, and Puri (2010) find that the CEO's opinion of a divisional manager is the second most important factor in internal capital allocation after the NPV rule. Yet we know relatively little about how the relationships between the CEO and divisional managers affects capital budgeting.

In this paper, we provide this evidence by constructing a hand-collected dataset of divisional managers at the S&P 500 firms and studying the effect of managers' characteristics and connections to the CEO on capital allocation decisions. In particular, we evaluate the involvement of divisional managers in the firm via various channels, ranging from formal, such as board membership and seniority, to informal, such as social connections to the CEO via prior employment, educational institutions, and nonprofit organizations. Using measures of divisional managers' formal and informal influence, we investigate its effect on investment efficiency and conglomerate value, thus extending the literature on the value of diversification.

Servaes (1996), Lins and Servaes (1999) and Denis, Denis, and Yost (2002) show that diversification erodes firm value in the U.S., abroad, and across national markets. In contrast, other studies argue that diversification increases firm value, resulting in better capital allocation (Khanna and Tice, 2001) and higher investment efficiency (Kuppuswamy and Villalonga, 2010).

[1] The "bright side" of internal capital markets, broadly referred to as "winner-picking", has been proposed in Alchian (1969) and Weston (1970). More recently, this theory is discussed in Gertner, Scharfstein, and Stein (1994), Stein (1997), Matsusaka and Nanda (2002), and Maksimovic and Philips (2002), among others.

[2] The "dark side" of internal capital markets has been discussed in Milgrom (1988), Milgrom and Roberts (1988), Scharfstein and Stein (2000), Rajan, Servaes, and Zingales (2000), and Wulf (2009). For an overview of theories of internal capital markets, see Stein (2003) and Maksimovic and Philips (2007).

We study whether and how internal connections of divisional managers affect capital allocation and investment efficiency in conglomerates and how this effect varies across firms.

We consider several non-mutually exclusive hypotheses. The first view, which we label the *favoritism* hypothesis, is that the CEO attempts to extract private benefits by allocating more capital to divisional managers connected to the CEO. Examples of the private rents extracted by the CEO could include personal benefits from helping his or her friends or better job security, among others. This scenario would be consistent with the view that CEOs use their discretion in capital allocation decisions for self-benefitting purposes (e.g., Denis, Denis, and Sarin, 1997). This hypothesis predicts higher capital allocations to divisional managers connected to the CEO and a negative effect on investment efficiency and firm value, as in Scharfstein and Stein (2000) and Rajan, Servaes, and Zingales (2000).

The second hypothesis, to which we refer as *bridge building,* following Xuan (2009), posits that the CEO uses capital allocation to build rapport with divisional managers. Under this scenario, the CEO allocates more capital to *unconnected* divisional managers in an effort to win their support. This reverse favoritism can be motivated by the CEO's effort to entrench himself in the firm by capturing unconnected managers. This hypothesis predicts higher capital allocation to divisional managers unconnected to the CEO and a negative effect on investment efficiency and firm value.

A third hypothesis, which we label the *information* hypothesis, posits that the CEO allocates capital across divisions in an effort to maximize firm value, but has imperfect information about investment opportunities in each division. All else equal, the CEO allocates more capital to divisions with a higher precision of information signal about investment

opportunities.[3] If social connections between the CEO and divisional managers increase the quality of information about divisions' investment opportunities, they are likely to reduce the information asymmetry and improve investment efficiency in the firm. This hypothesis predicts higher capital allocations to divisional managers connected to the CEO and a positive effect on investment efficiency and firm value. More broadly, this hypothesis is consistent with the role of managerial connections as a channel of information transfer (Cohen, Frazzini, and Malloy, 2008, 2010; Engelberg, Gao, and Parsons, 2010).

A fourth possibility is that characteristics of divisional managers and their internal connections to the CEO play little role in resource allocation. For example, career concerns of managers under close monitoring (e.g., Fama 1980) represent one mechanism limiting the efficacy of managerial ties. Alternatively, governance mechanisms such as independent boards of directors, compensation contracts, and large shareholders may also render the effect of managerial ties ineffective. This hypothesis predicts no relation between managerial connections and capital allocation, and is consistent with efficient investment driven by divisions' investment opportunities.

Our empirical results indicate that managers with informal connections to the CEO are allocated more capital, controlling for divisions' size, performance, proxies of investment opportunities, and other characteristics. This result persists across various measures of divisional investment and various types of social connections, such as ties via prior employment, education, and nonprofit organizations. We find that a one standard deviation increase in a divisional manager's ties to the CEO is associated with 8.5 percent more capital allocated to his division or

[3] The setting in which information asymmetry within a firm introduces frictions in capital allocation is modeled in Harris, Kriebel and Raviv (1982); Antle and Eppen (1985); Harris and Raviv (1996, 1998); Bernardo, Cai and Luo (2001, 2004). These models generally predict a negative relation between the information asymmetry about the division's investment opportunities and the amount of capital investment.

approximately $5.3 million in additional annual capital expenditure in a division with median characteristics. Connections to the CFO and the board have a weak positive effect.

We study two channels through which connected divisional managers may receive capital: (1) appointment of connected managers to capital-rich divisions (the *appointment* channel) and (2) extra capital allocations to connected managers after the appointment (the *capital allocation* channel).

To capture the effect of the appointment channel, we focus on the turnover of divisional managers and investigate the relation between divisional managers' characteristics and their assignment to divisions. We find that divisional managers connected to the CEO are appointed to divisions which historically receive somewhat more capital, as measured by capital expenditure in the year immediately preceding the manager's appointment. This effect is somewhat smaller, and accounts for about one third of our estimates of the extra capital allocated to divisions run by connected managers. We find no evidence that connected divisional managers are assigned to larger divisions or to divisions in the core business of the firm.

To disentangle the capital allocation channel from the appointment channel, we exploit the shock to managerial connections at the time of the CEO turnover. In particular, our tests focus on the amount of capital allocated to divisional managers after their connections to the CEO change, but their appointment at the division remains constant. This identification strategy also allows us to control for unobservable characteristics of a divisional manager that could be correlated with connections, to the extent that these characteristics remain unchanged within a short time window around the CEO turnover.

We estimate that the effect of the capital allocation channel is about twice as large as that of the appointment channel. This evidence suggests that well-connected managers get extra

funds even after controlling for the appointment process (see Edward and Hadlock (2004) for the analysis of managerial appointments).

Our dataset also enables us to compare the relative influence of divisional managers' informal connections with proxies of their formal influence within the firm. We find that the effect of informal connections (social ties) between divisional managers and the CEO dominates measures of managers' formal power, such as board membership, tenure, seniority, and compensation. One explanation for this finding is that social ties provide managers with a better access to the CEO and that interaction via informal channels is more effective or more difficult to monitor.

Greater capital allocations to connected managers are consistent with both the favoritism and the information hypotheses. To distinguish between these views, we investigate the effect of managerial ties on investment efficiency and firm value. Following the literature (e.g., Lang and Stulz, 1994; Ozbas and Sharfstein 2010), we measure investment efficiency as the sensitivity of divisional capital expenditure to investment opportunities (division's imputed Tobin's Q). To estimate the effect on firm value, we use the excess value of the conglomerate relative to single-segment firms in the same industries (e.g., Berger and Ofek, 1995; Ahn and Denis, 2004).

Our results indicate that at firms with weaker governance, as proxied by the Gompers, Ishii, Metrick (2003) index, low managerial equity ownership, and low institutional holdings, managerial connections are associated with lower investment efficiency and lower firm value, consistent with the *favoritism* hypothesis. In conglomerates with high information asymmetry, as measured by the dispersion in analysts' earnings forecasts, average forecast error, and the number of available analyst forecasts, managerial ties are positively related to investment efficiency and firm value, consistent with the *information* hypothesis.

Overall, our evidence suggests that informal connections between divisional managers and the CEO have a significant effect on internal capital markets via the appointment of divisional managers and subsequent capital allocations across divisions. These connections play a dual role: they create value when information asymmetry is high and destroy value when agency problems are severe.

An important consideration in interpreting our evidence is the inherent endogeneity in internal capital allocation. In particular, one challenge in identifying the impact of managerial ties on capital allocation lies in accounting for potential reverse causality, a scenario in which managers who receive more funds develop stronger connections with the CEO. To address this issue, we exclude all connections formed during the divisional manager's tenure at the firm and all connections with ambiguous or missing dates, and obtain similar results.

Another important concern is that divisional managers' connections may proxy for their skill. For example, if CEOs are more likely to have attended top universities, a divisional manager who shares an educational tie with the CEO may possess better skill and receive more capital on the basis of higher ability. Alternatively, if senior managers have more connections, social ties may reflect managerial experience. To account for managerial skill, we control for division's operating performance, as well as for an array of proxies for managerial experience, seniority, education level, and the quality of educational institution. All of our results are robust to these specifications.

The rest of the paper is organized as follows. Section 1 reviews related literature. Section 2 describes the data. Section 3 presents the main empirical results. Section 4 discusses investment efficiency and firm value. Section 5 provides robustness tests and extensions. The article concludes with summary and commentary.

1. Related Literature and Contribution

Internal capital budgeting is a fundamental corporate decision, but, as Stein (2003) points out, it remains one of the least understood in corporate finance. In particular, there is an ongoing debate in the literature about the managerial involvement in capital allocation – one of the drivers of the opposite predictions in the theories of capital markets. For example, Meyer, Milgrom, and Roberts (1992), Rajan, Servaes, and Zingales (2000), and Scharfstein and Stein (2000) build theoretical models in which divisional managers erode firm value through lobbying and rent seeking. In contrast, Wulf (2009) models a setting in which divisional managers have private information about their divisions and, under proper incentive structure, can supply valuable signals about investment opportunities.

Despite the recognized importance of divisional managers in internal capital markets, there has been little empirical evidence on their role in capital budgeting. One recent exception is the work by Glaser, Lopez-de-Silanes, and Sautner (2010), which studies the internal capital market of one firm – a European conglomerate. The authors show that managerial influence, inferred from the variables collected in an internal survey, plays an important role in the distribution of cash windfalls at their conglomerate but has little effect on planned investment. The micro-level evidence from this case study supports the conjecture that divisional managers can influence at least some capital allocation decisions at a given firm. This result stresses the importance of a systematic examination of the interaction between divisional managers and the CEO to assess its effect on investment efficiency and firm value – the questions which are difficult to answer by examining one firm but are critical for distinguishing between the dark side and the bright side theories of internal capital markets.

The first goal of our paper is to study the effect of formal and informal influence of divisional managers on investment efficiency and firm value. Our second goal is to investigate

whether and how this influence varies with internal governance and information asymmetry, thus directly testing the predictions of the theory of internal capital markets. These research questions require detailed data on divisional managers from a large cross-section of firms, a limitation that explains why we know relatively little about these fundamental issues in internal capital budgeting. To bridge this gap, we collect a comprehensive dataset on divisional managers in the S&P 500 firms and empirically test the bright and dark views on the interaction between divisional managers and the CEO. By looking across firms and industries, we are also able to distinguish the settings in which this interaction can have opposite effects on firm value and to identify the conditions when a particular effect dominates. This analysis helps reconcile diverging theoretical predictions in the prior literature.

Our analysis of managerial influence on firm value adds to prior research on the valuation of multidivisional firms. The empirical findings regarding the overall investment efficiency and value of conglomerates are mixed. Earlier work by Lang and Stulz (1994), Berger and Ofek (1995) and others suggests that diversified firms are discounted relative to their standalone counterparts, thus implying that diversification destroys value. However, Campa and Kedia (2002) and Villalonga (2004) raise important methodological issues and show that after controlling for endogeneity and selection bias, the diversification discount disappears or reverts to a premium. Whited (2001) and Colak and Whited (2007) highlight another key factor in measuring the effects of diversification by stressing the importance of accurate measurement of Tobin's Q.

We refrain from drawing conclusions about the overall value of diversification. Rather, we focus on the marginal impact of managerial interaction and internal power on firm value. However, to mitigate the effect of potential measurement error resulting from imperfect inferences based on single-segment firms, we exploit time-series variation in managerial

influence within each conglomerate, such as the turnover of divisional managers and the changes in managerial connections. To the extent that the changes in internal managerial ties within conglomerates are not correlated with the measurement error in Tobin's Q, the admittedly imperfect proxies for investment opportunities would bias us against identifying the effect of managerial influence on capital allocation and investment efficiency.

Our evidence on the role of managerial influence in capital allocation complements prior research on the drivers of capital distribution in multidivisional firms and on the benefits and costs of internal capital markets. In a recent study, Fee, Hadlock, and Pierce (2009) show that multinational firms have robust internal capital markets and actively move capital within the firm to finance investment decisions. Some of the benefits of internal markets include more effective reallocation of capital in response to competitive threats (Khanna and Tice, 2001), internal risk sharing (Khanna and Yafeh, 2005), intra-firm liquidity provision (Gopalan, Nanda, and Seru, 2007), and support of distressed segments (Gopalan and Xie, 2008), among others. Further, Kuppuswamy and Villalonga (2010) document significant gains in the relative value of multidivisional firms during the 2008-2009 financial crisis, a result that the authors link to debt coinsurance and more efficient investment of multidivisional firms.

In contrast, conglomerates also face various agency costs and frictions in the capital budgeting process. Ahn and Denis (2004) show that diversified firms allocate investment funds less efficiently than their single-segment peers and find that breaking up conglomerates via spinoffs improves investment efficiency and firm value. In a recent study, Ozbas and Scharfstein (2010) find that conglomerates exhibit lower sensitivity of investment to Q than stand-alone firms. The authors show that this difference is larger for conglomerates in which the management has a small ownership stake and attribute their results to agency problems at multidivisional firms.

Our paper adds to this literature by identifying two key firm-level characteristics critical for evaluating the tradeoffs in corporate diversification – information asymmetry and internal corporate governance. In this respect, we identify an important channel through which internal governance affects firm value, thus adding to the research on governance and performance (e.g., Cremers and Ferrell, 2009, among many others).

Our analysis of managerial interaction also adds to the growing literature on social networks in finance. Prior studies document the importance of social networks for key corporate decisions, such as executive compensation (Engelberg, Gao, and Parsons, 2009; Hwang and Kim, 2009a), financial policy (Fracassi 2008), governance (Fracassi and Tate, 2009), access to capital (Hochberg, Ljungqvist, and Lu, 2007; Engelberg, Gao, and Parsons, 2010), incidence of fraud (Chidambaran, Kedia, and Prabhala, 2010), earnings management (Hwang and Kim, 2009b), and acquisition activity (Cai and Sevilir, 2009; Ishii and Xuan, 2009; Schmidt, 2009).

These prior studies on social networks focus on the connections between the board members and CEOs, either within a firm or across companies. Yet many key operating decisions are made by executive managers at lower levels of seniority, such as chief financial officers, executive vice presidents, and divisional managers. We fill this gap by providing evidence on social networks between the top management and other senior executives and studying their effect on investment efficiency and firm value. To our knowledge, this paper is also one of the first empirical analyses of formal and informal managerial influence in internal capital markets.

2. Sample and Data

2.1 Firms and Divisions

We begin constructing our sample with a set of all firms included in the S&P 500 index during any year in our sample period, January 2000 to December 2008. We start our sample in 2000,

since the coverage of BoardEx in earlier years is very limited.[4] Following the empirical literature on capital allocation, we exclude financial firms and regulated utilities, since they are subject to capital structure regulations. Since we are interested in capital allocation across business segments, we exclude firms that report only one division and firms whose financial data at the level of business segments are unavailable on Compustat.[5] We also exclude divisions with zero sales, such as corporate accounts, and various allocation adjustments, such as currency translations. After applying these filters, we end up with an initial sample of 363 multidivisional firms.

Next, we collect data on divisional managers responsible for each business segment by reading biographical sketches of our firms' executives in annual reports. We consider a manager to be in charge of a division if he or she is the highest-level executive with direct responsibility over the particular business segment during a respective time period. Divisional managers typically have the title of divisional president, executive vice president, or senior vice president. In many cases, divisional managers' responsibilities are relatively transparent from their job title, biographic summary, the firm's organizational structure, and the description of segments in the annual report.

For example, according to Compustat, ADC Telecommunications (ADCT) had three business segments in 2008: Connectivity, Professional Services, and Network Solutions. By referencing the annual report of ADCT, we find that Patrick O'Brien, President, Connectivity, was in charge of the connectivity division in 2008. Next, we collect the starting and ending dates of each manager's divisional presidency. To obtain these dates, we supplement the annual data

[4] Other researchers using BoardEx typically begin their sample period in 2000 for similar reasons (Fracassi and Tate, 2009 and Engelberg, Gao, and Parsons, 2009).

[5] For a year-firm-division observation to be included in our sample, we require that at least CapEx and book value of assets be reported.

from form 10-K with executive biographies from the Forbes Executive Directory, Reuters, and Marquis's Who's Who databases, as well as a firms' press releases, to determine the month and year of each manager's appointment.

In some cases, there is no one-to-one correspondence between divisional managers in the annual report and the segment data in Compustat. These differences arise when a firm's segment reporting on Compustat is done at a more aggregate level compared to its divisional structure (e.g., by combining several divisions into one reporting unit). For example, Crane Company reports financial data for five segments in 2008, including a segment called Aerospace and Electronics. By reading the sections on executive management and segment reporting in Crane's annual report, we find that the Aerospace unit and the Electronics unit, while combined in financial reporting, are each overseen by their own divisional president: David Bender, Group President, Electronics and Gregory Ward, Group President, Aerospace. In this case, we assign both group presidents to the Aerospace and Electronics division. We manually reconcile each such difference to ensure accurate matching and to avoid the loss of observations. Situations in which multiple managers are assigned to the same division reported on Compustat are relatively rare and constitute 14 percent of our sample.

If more than one manager is assigned to a segment reported on Compustat, our empirical tests use the average level of connections for divisional managers in a particular segment. Our results are also similar if we use the maximum level of connections across the divisional managers assigned to a segment.

Last, some firms use a functional organization structure to define the responsibilities of their executives. At such companies, executives are assigned to functional roles, such as vice president of marketing, vice president of operations, and vice president of finance, and each executive supervises his or her entire functional area across all business units. Since we are

unable to establish a clear correspondence between the executive and the business segment, we exclude these firms from our sample. We also eliminate companies that do not provide data on their divisional executives in any of the following sources: annual reports, corporate executive directory, management information on the firm's web site, executive databases, and press releases about appointments of divisional managers.

Our final sample includes 224 firms, 888 divisions, and 2,936 firm-division-year observations, whose summary statistics are shown in Table I. An average (median) conglomerate owns book assets valued at $19.4 ($6.3) billion, has a Tobin's Q of 1.71 (1.53) and operates in 3.4 (3) business segments.

2.2 Capital Allocation

To ensure robustness of our results to various specifications, all of our tests use the three most common measures of capital allocation: (1) capital expenditures, (2) industry-adjusted capital expenditures, and (3) firm- and industry- adjusted capital expenditures. We provide detailed definitions of each capital investment variable in Appendix A. The data on divisional capital expenditures and book assets are collected from Compustat segment files.

Our simplest measure, capital expenditure, is the annual amount of divisional capital expenditure scaled by book assets. Table I shows that the average (median) business segment reports capital expenditures of $198 ($58) million, which represents 3.5 (2.6) percent of book assets.

Our second measure of capital allocation – industry-adjusted capital expenditure – is the divisional capital expenditure (scaled by book assets) minus the average capital expenditure ratio for the industry in which a particular segment operates (proxied by the capital investment of single-segment firms operating in the same three-digit SIC code). The purpose of this adjustment

is to control for industry-level effects in order to remove fluctuations in investment common to the entire sector rather than specific to the particular firm. As shown in Table I, the average (median) values of industry-adjusted capital expenditures are 1.7 (0.6) percent, and there is substantial cross-sectional variation in this measure, suggesting that some divisions get substantially more or less capital than their industry peers.

Our third measure of divisional capital allocation is the industry- and firm-adjusted divisional capital expenditure. In addition to the industry adjustment described above, this measure, first introduced in Rajan, Servaes, and Zingales (2000), also controls for the overall over- or underinvestment at the firm level. For example, if a conglomerate overinvests in all divisions relative to their industry peers, this measure adjusts for this firm-level overinvestment in order to capture only the within-firm tilt toward a particular division. As shown in Table I, the average (median) values of the industry- and firm- adjusted capital expenditures are close to zero. However, this measure has a high standard deviation of 5.9 percent, suggesting that there is substantial heterogeneity in divisional capital allocation relative to the industry and company peers.

2.3 Divisional Managers

Our sample of executives consists of 3,842 people. This group includes 1,105 divisional managers, 299 CEOs, and 2,438 other senior managers and board members who served at our sample firms between 2000 and 2008. To collect biographical information on divisional managers, other executives and directors, we use the following databases: BoardEx of Management Diagnostics Limited, Reuters, Forbes Executive Directory, Marquis Who's Who, and Notable Names Database (NNDB). The combination of these sources allows us to resolve ambiguous and inconsistent entries to ensure data integrity. We also manually clean the BoardEx

data for our sample by correcting errors and duplicates. For example, the Stern School of Business appears in BoardEx under five different names, all of which are assigned distinct IDs.[6] We standardize these data by assigning them a common ID, which we link to the home university – NYU.

Panel A of Table II provides summary statistics for our sample of divisional managers. An average divisional manager is 51 years old, has a firm tenure of 12.1 years, and earns a base salary of $854,000. The vast majority (92 percent) of divisional managers are male, 97 percent hold a bachelor's degree, 65 percent have a master's degree, and 5 percent have a PhD. The most popular graduate degree is in business. More than one third of the managers have an MBA and an additional 10 percent have attended executive education programs. Compared to CEOs and directors, divisional managers tend to be more specialized in their educational background, with fewer than 4 percent holding professional degrees in law or medicine combined.

2.4 Measures of Connections

Individuals who share social ties through mutual qualities or experiences have been shown to have more frequent contact, a greater level of trust, and better mutual understanding (Cross, 2004). If these attributes facilitate information sharing among connected managers, social ties can result in more informed capital budgeting decisions and save resources on producing verifiable hard information. On the other hand, social ties may introduce favoritism and result in a bias known as homophily – an affection for similar others (McPherson, Smith-Lovin, and Cook, 2001). If social networks introduce favoritism, they are likely to cause agency-type distortions in capital allocation. This dual role of social connections, which offers diverging

[6] All of the following appear as different institutions in BoardEx: New York University School of Business; New York University Graduate School of Business Administration; Leonard Stern School of Business, New York University; New York University Graduate School – MBA; and New York University – MBA.

predictions for investment efficiency, provides a useful setting in which we can distinguish between the information and favoritism hypotheses in internal capital budgeting.

Our main focus is on the social ties between divisional managers and the CEO, since the ultimate responsibility for the firm's investment strategy rests with the CEO. We also evaluate the influence of the CFO and the board of directors, who may assist the CEO with strategic resource allocation. Given the central role of the CEO in capital allocation, we use connections to this top executive as our main specification, and provide evidence on the ties to the CFO and the board as extensions of our base results. Consistent with prior literature, we define three types of social networks: ties via education, previous employment, and nonprofit organizations. Panel B of Table II provides a summary of divisional managers' social ties via each of the three networks.

Nonprofit Organizations

Two managers are connected via this measure if they share membership in the same nonprofit. These organizations typically include social clubs, religious organizations, philanthropic foundations, industry associations, and other nonprofit institutions defined in BoardEx as manager's other activities. In our sample, approximately 3.8 percent of divisional managers share a nonprofit connection with the CEO. Further, about 0.8 percent are connected to the CFO, and 10.5 percent are linked to one of the board members. To provide a more refined analysis of nonprofit ties, we also categorize them based on organization type. The purpose of this classification is to evaluate how the relative strength of nonprofit ties depends on the organization focus (e.g., ethnic, religious, professional, or philanthropic, among others). We offer a detailed analysis of nonprofit connections in Section 5.

Education

Educational ties foster a sense of belonging to a common group, which is evidenced by alumni clubs, donations to the home school, and college sports. We define two managers as connected via an educational tie if they belong to the same alumni network, i.e. if they earned degrees from the same university. In our sample, approximately 5.2 percent of divisional managers are connected to the CEO, 3.9 percent are connected to the CFO, and 23.8 are connected to a board member via an alumni network.

The most common university connections are via Harvard (26.7%), Stanford (14.42%), Northwestern (4.2%), and the University of Washington (4.1%). To make sure that our results are not driven by any one educational institution, as a robustness check (unreported) we drop the connections formed via the four largest educational networks (Harvard, Stanford, Northwestern, and Washington), and find very similar results across our main tests.

Some studies have used more restrictive definitions of an educational link by requiring that the individuals earn the same degree in the same year. Although these restrictions dramatically reduce statistical power due to the much lower probability of overlap (about 0.7 percent in our sample), they may be particularly helpful in studies that seek to establish a connection between otherwise unrelated executives working at different firms. The main purpose of these restrictions has been to increase the probability that executives in different firms know each other as a result of a potential encounter in college or in business school. However, since we study connections within one firm, we already know that divisional managers regularly interact with the CEO and the board, and our goal is to investigate the impact of a shared educational link, if any, on information sharing and agency conflicts.

Previous Employment

We define two executives as connected via prior employment if they worked together at another firm or served on the same board of directors. Panel B of Table II shows that 16.3 percent of divisional managers share this connection with the CEO, approximately 8.8 percent are connected to the CFO, and nearly 30 percent have a connection to a board member. The vast majority of connections (around 70 percent) come from the employment during overlapping time periods, and all our results hold if we use this more restrictive definition.

Measuring Internal Connections

To measure the effect of internal connections, we would also like to capture the uniqueness of a particular tie for a given firm, since the evidence in sociology suggests that social ties have a stronger effect if they are rare. For example, if a divisional manager worked with the CEO at another firm, we expect the effect of this connection to be stronger if no other managers share this type of connection. Therefore, to measure the effect of social ties on capital allocation, we evaluate connections of each divisional manager relative to those of other divisional managers in the same firm. This approach also parallels measuring capital allocation of a particular division relative to the allocations of other divisions within the same firm.

To control for the average level of connections within a firm, we define the level of connections for each divisional manager as the difference between the number of his or her connections to the CEO and the average number of connections to the CEO possessed by other divisional managers in the same firm. Intuitively, this approach measures the extent to which a particular manager is better connected to the CEO than other divisional managers in the same firm. More formally, our measure of connections for each divisional manager in a given year is defined as the average number of connections between the divisional manager and the CEO

based on education history, nonprofit work, and prior employment, adjusted for the average number of connections between all divisional managers and the CEO within the same firm:

$$Connected_j = connection_j - \frac{\sum_{k=1}^{n}(connection_k)}{n}$$

where:

n – number of divisional managers in the firm in a given year;

$connection_j$ – average number of connections between manager j and the CEO in a given firm in a given year.

For example, suppose that a divisional manager went to the same school as the CEO and is also a member of the same nonprofit organization, but has no connection to the CEO via prior employment. In this case, the average number of connections for this manager, $connection_j$ = 0.67 (i.e. (1+1+0)/3). Also, suppose that the average number of connections to the CEO for all divisional managers for this firm and this year is 0.2. In this case, the connected variable for this divisional manager is: 0.67 – 0.2 = 0.47. This variable takes on positive (negative) values when a divisional manager is more (less) connected to the CEO than other divisional managers in the same firm in a given year.

The approach of aggregating connections formed via various networks into a summary measure is widely used in the social networks literature (e.g., Fracassi, 2008; Fracassi and Tate, 2009; Hwang and Kim, 2009a, 2009b; Schmidt, 2009; Cai and Sevilir, 2009, among others). However, in addition to our main specification, which relies on an index, we also disentangle the effects of each network. Moreover, we offer additional detail on the drivers of connections within each network by analyzing, for example, how the effect of educational networks varies with degree type and how the strength of nonprofit networks changes depending on the focus of the organization. We provide this additional analysis in Section 5. Overall, we find that

connections formed via various networks have the same directional influence on capital allocation, and that our results hold separately for each of the three networks (education, employment, and nonprofits). This evidence is consistent with Engelberg, Gao, and Parsons (2009), who find that connections formed via various networks have similar directional effects on another aspect of corporate policy – CEO compensation.

Measuring Formal Influence of Divisional Managers

In addition to measures of social ties, which represent informal connections between divisional managers and the CEO, we would also like to capture measures of formal influence of divisional managers within the firm, such as board membership, tenure, seniority, and compensation rank. The goal of this analysis is to compare the relative influence of formal authority versus informal access to the CEO. On the one hand, formal connections, such as membership on the company's board, may provide divisional managers with direct channels of influence on capital budgeting decisions. On the other hand, formal channels of influence are easier to monitor and may be less effective in establishing rapport, compared to connections in informal, more personal settings.

Following a similar approach to that used for social connections, we measure formal influence of divisional managers relative to that of other divisional managers in the same firm. The following example illustrates the construction of the variable *Board member*. Let's suppose that a given divisional manager is a board member at his firm in a particular year. In addition, the said firm has three other divisional managers, one of whom is also a current board member at this firm. The variable *Board member* for our divisional manager is constructed as the difference between the value of this variable for our divisional manager (dummy=1) and the average value of this variable for all managers in the firm, where two divisional managers are board members in their firm (dummy=1) and two other divisional managers are not (dummy=0). Thus, the value

of this variable for our divisional manager will be computed as follows: 1 – (1+1+0+0)/4 = 0.5. Other measures of formal influence are constructed analogously and are described in more detail in Appendix A.

Alternative Measures

We believe that constructing measures of formal and informal influence on a relative basis more closely parallels the concept of measuring investment on a relative basis across divisions. However, our results are qualitatively similar if we use raw measures of formal and informal influence without the adjustment for the average level of connections. These tests are reported and discussed in the robustness section.

3. Empirical Results

3.1 Internal Connections and Capital Allocation

We begin our analysis by presenting univariate results on the relation between managerial connections and divisional capital allocation. Panel A of Table III presents nonparametric evidence on the relation between connections of a divisional manager to the CEO and the amount of capital allocated to the manager's division. The relation is uniformly positive and nearly always significant across all three measures of capital allocation and across multiple specifications – at the level of the firm-year, industry-year, or entire sample. While this evidence is suggestive of a positive association between social ties to the CEO and divisional capital allocation, it considers variables in isolation and does not account for their interaction. Next, we provide regression evidence to examine the effect of managerial ties after controlling for an array of other factors affecting capital allocation.

Panel B of Table III presents the results of pooled regressions of various measures of divisional capital expenditure on the connections of the divisional manager to the CEO and a set of division-level and manager-level control variables. To control for firm-level characteristics and time effects, all regressions include firm- and year-fixed effects. We would also like to account for the correlation in divisional capital investment within the firm, since capital allocations received by one division are likely to affect the amount of capital allotted to other divisions within the firm. To allow for a firm-specific correlation structure of capital investment residuals, we cluster standard errors at the firm level.

In addition to the measures of informal influence (social connections), we also include proxies for the divisional manager's formal influence within a firm – board membership, tenure, seniority, and status as one of the firm's top paid executives listed on Compustat. Detailed definitions of these variables are provided in Appendix A.

We would also like to control for the skill and ability of divisional managers. While managerial ability is inherently difficult to capture, we use the average SAT score of the undergraduate institution attended by the divisional manager as one of the proxies for managerial aptitude. This approach follows several earlier studies that document a strong positive correlation between average SAT scores and managerial skill in other settings (e.g., Chevalier and Ellison, 1999; Li, Zhang, and Zhao, 2010). Using the data from the College Board, we collect the college-average SAT scores reported in 1974 (when the average divisional manager likely applied to colleges) and 2004 (the middle of our sample). While the overall scores have

increased significantly over this period, the relative rankings of colleges based on these scores are very similar. Since our results are similar for the scores in 1974 and 2004, we report results based on the 2004 data, since these data are more complete. For managers with foreign undergraduate degrees (approximately 8% of our sample), we use average scores in our sample. As another proxy for the type of undergraduate institution that may be correlated with managerial ability, we also introduce a dummy indicating whether a manager attended an Ivy League college.

As an additional control for the skill and expertise of divisional managers, we use the operating performance of the manager's division, a variable defined as the ratio of division's operating income to division's book assets. Since division-level operating performance is available for only two thirds of our observations, we report our results both for the entire sample (columns 1-3 of Table III) and for the subsample with available data on divisional performance (columns 4-6 of Table III).

Other independent variables include a set of the following controls: the median Tobin's Q for the division's industry, the segment's cash flow, and the absolute and relative measures of segment size. These variables are moviated by previous research, which identifies the determinants of capital allocation across a firm's operating segments (e.g., Shin and Stulz, 1998; Rajan, Servaes, and Zingales, 2000). Details on these variables are summarized in Appendix A.

The empirical results in Panel B of Table III indicate a positive relation between capital investment and divisional managers' informal ties to the CEO, as captured by the variable

Connected. This relation is consistently significant at the 5% level or better across all measures of divisional CapEx. The economic magnitudes are also substantial: a one standard deviation increase in relative connections of a divisional manager to the CEO is associated with an 8.5 percent increase in division's capital allocation. For a segment manager overseeing a division with median characteristics, this effect is associated with an extra $5.3 million in capital per year.[7] Notably, controlling for division's operating performance (columns 4-6 of Table III) has very little effect on either the magnitude or significance of the effect of managerial connections. This evidence suggests that divisional manager's ties to the CEO capture a significant effect above and over managerial ability, to the extent that this ability is reflected in division's performance.

In contrast to the strong positive effect of social ties, measures of formal influence, such as manager's board membership, tenure, seniority, or high salary are not significantly related to divisional capital allocation. Our results are also similar if we repeat the analysis with any one measure of formal influence or if we combine all measures of formal influence into an index (we discuss this in detail in the robustness section). Overall, our evidence suggests that informal connections dominate formal channels of influence. One possible explanation is that the interaction in informal settings provides managers with a more effective access to the CEO. Another possible explanation is that social ties are less transparent than the measures of formal

[7] These estimates are based on Column (1) of Panel B and are calculated by multiplying the regression coefficient on *Connected* by the standard deviation of *Connected* (0.30), and dividing by the median *CAPEX* (0.39) to obtain the percent increase (8.5%), or multiplying by the median divisional book assets ($1,613.5 million) to obtain the dollar increase ($5.3 million).

influence and are thus more difficult to monitor. In the following sections, we provide additional detail on the interpretation of our results and their effect on investment efficiency and firm value.

An analysis of other control variables suggests that divisional capital allocation is strongly positively related to the industry-level Tobin's Q, a proxy for division's investment opportunities. Our results also suggest that conglomerates invest more in larger segments, as measured by their relative size (i.e. assets) compared to other segments within the firm. Last, the effect of segment cash flow on divisional investment is generally positive, but the significance of this result varies across specifications. The evidence on control variables is consistent with the findings in earlier studies on conglomerates (Shin and Stulz, 1998; Scharfstein 1998).

In summary, managers with greater informal ties to the CEO are allocated more capital. The effect of informal connections reliably dominates measures of formal influence and persists after controlling for division-level factors, investment opportunities, proxies for managerial skill, and other managerial characteristics.

3.2 Turnover of Divisional Managers

The variables of capital investment and investment opportunities in our main regressions in Table III are subject to measurement error, since they are based on proxies for the data available to the CEO but largely unobservable to a researcher. It is possible, for example, that conglomerate divisions are systematically different from their stand-alone counterparts in the same industry. Therefore, as pointed out by Whited (2001), Chevalier (2000), and Colak and Whited (2007), industry Tobin's Q may be a better measure of the investment opportunities in

stand-alone firms than those of conglomerate divisions.

To assess the potential effect of measurement error on our results from panel regressions, we focus on an event study of the turnover in divisional managers. If the connections between a divisional manager and the CEO are positively related to capital investment, we should expect to see an increase in capital investment in divisions where a connected manager replaces an unconnected one, and the opposite trend in divisions where a connected manager departs and is replaced by a less connected one. To the extent that the changes in managerial connections inside the firm are not correlated with measurement error in Tobin's Q and other proxies that may affect our panel regressions, the study of internal managerial turnover can provide a cleaner test of the influence of managerial ties on divisional capital investment.

Table IV presents evidence on the relation between the changes in divisional managers' ties to the CEO and the changes in divisional capital allocation when an unconnected divisional manager replaces a connected one, and vice versa. The main variable of interest, $\Delta Connected$ is a dummy equal to 1 (-1) if the divisional manager's ties to the CEO increase (decrease) as a result of the change in divisional presidency (turnover of divisional managers), and zero otherwise. Other variables are constructed in the same way (as dummies taking on the values of -1, 0, and 1) and include the same set of independent variables as in our main specification, Table III. The sample includes 245 replacement events of divisional managers.

The results on managerial influence in Table IV are consistent with the evidence from pooled regressions. An increase (decrease) in divisional manager's social connections to the CEO is associated with a higher (lower) capital allocation to the manager's division across all measures of capital investment. In contrast, the changes in measures of formal influence and

seniority (e.g., becoming a board member) do not appear to be significantly related to capital allocation, controlling for other factors.

The evidence thus far suggests that divisions overseen by managers connected to the CEO receive significantly more capital, and that the changes in managers' connections are positively associated with the amount of capital investment. Next, to refine our conclusions, we identify the specific mechanisms through which connected divisional managers receive extra capital. In particular, we distinguish between the two main channels that may provide connected divisional managers with extra investment funds: (1) appointment to divisions that tend to receive more capital (the appointment channel), and (2) extra capital allocations after the appointment (the capital allocation channel).

3.3 Channels of Extra Investment Funds: Appointment and Capital Allocation

To capture the effect of the appointment channel, we investigate the relationship between divisional managers' attributes and observable characteristics of the divisions to which they are appointed. To test this relationship, we use regression analysis of the appointments of divisional managers based on segment-year observations in which the divisional manager has changed but the CEO has not. The dependent variable is one of the division's characteristics measured during the year immediately preceding the manager's appointment. Division's characteristics include three measures of lagged CapEx (raw, industry-adjusted, and industry-firm adjusted), relative and absolute size of the division based on book assets, and two proxies for division's importance within the firm: a dummy equal to one if the division is the largest division within the

conglomerate (*Largest segment)* and a dummy equal to one if the division operates in the core line of business of the firm (*Core segment*), as proxied by the 3-digit SIC code.

The independent variables include measures of the newly-appointed manager's social ties to the CEO, manager's formal influence in the firm, and manager's ability, each measured in the year of the appointment and defined analogously to the previous specification. As before, all regressions include firm and year fixed effects and use standard errors clustered at the firm level.

The results in Table V indicate that managers with informal connections to the CEO are appointed to divisions that historically received more capital, as measured by the lagged values of CapEx in the year preceding the appointment. These results are statistically significant at the 10 percent level for raw and industry-adjusted CapEx, and insignificant at conventional levels for industry-firm adjusted CapEx. To provide a perspective on the economic magnitude of this channel, we estimate the fraction of extra capital allocated to a connected divisional manager during his or her tenure through the appointment channel. Specifically, the results in Table III suggest that an increase of one standard deviation in a divisional manager's ties to the CEO corresponds to $5.3 million in extra annual CapEx allocated to the division of the connected manager. Using our data on the starting and ending dates for divisional managers' tenures, we estimate the average tenure of a divisional manager to be 5.7 years, which implies that connected divisional managers receive approximately $5.3 million · 5.7 years = $30.2 million in extra capital during their tenure. Based on Column (1) of Table V, an increase of one standard deviation in ties to the CEO corresponds to $10.9 million more in lagged CapEx, thus suggesting that the appointment channel accounts for approximately 10.9/30.2=36% of the extra capital to allocated to connected divisional managers.

We do not find reliable evidence on the relation between managerial ties to the CEO and assignment to larger divisions or divisions in the core line of business of the firm. Among other

variables, as expected, we find a positive and significant relation between the compensation of divisional managers and their appointments to larger divisions. There is also some weaker evidence that managers with arguably stronger educational backgrounds, as measured by the SAT scores of their undergraduate educational institutions, are assigned to divisions that historically received more investment funds.

Our specification in Table V was developed under the assumption that appointments of divisional managers are based on the historical characteristics of the divisions. It is also possible that appointments of divisional managers incorporate forward-looking information about firm's divisions. For example, well-connected divisional managers may be appointed to the divisions that are expected to receive more capital in the near future. In this case, our estimates of the economic magnitude of the appointment channel likely represent a lower bound for the amount of extra capital obtained by connected divisional managers via this channel.

To capture the effect of the capital allocation channel above and over the appointment channel, we estimate capital allocations to divisional managers that are unrelated to their appointment to a particular division, whether based on divisions' historical or forward looking characteristics. We focus on CEO turnovers, a setting in which a manager's assignment to a division remains constant, but the set of managerial connections to the CEO experiences a shock as a result of a CEO change. Under these circumstances, the relation between the amount of divisional capital investment allocated by the new CEO and a set of managerial connections to the new CEO approximates the magnitude of the capital allocation channel.

Table VI reports estimates from first-difference regressions, in which the dependent variable is the annual change in the ratio of segment-level capital expenditure to book assets, for segment-year observations where the CEO has changed from the previous year but the divisional

manager has not changed. Columns (2), (4), and (6) further control for segments' operating performance, using the sample of divisions with available performance data.

The test specification in Table VI also mitigates potential biases resulting from omitted or unobservable managerial characteristics. Specifically, it is possible that divisional managers' connections proxy for some other omitted variable correlated with capital allocation. Exploiting the shock to managerial connections at the time of CEO turnover mitigates such biases. To the extent that a particular divisional manager's characteristics remain constant within a short time window around the CEO turnover, this approach allows us to capture the effect of a change in managerial connections, while controlling for all other time-invariant managerial attributes.

The results in Table VI suggest that when the CEO changes and as a result the ties between the divisional manager and the CEO strengthen, capital allocation to the division increases. Conversely, when the ties weaken, capital allocation decreases. These results are statistically significant at the 5 percent level or better across all measures of CapEx (raw, industry-adjusted, and industry-firm adjusted), and persist after controlling for managerial ability via segments' operating performance. Since the divisional manager has not changed and the new CEO is unlikely to have influenced the appointment of the divisional manager, which occurred well before the new CEO was appointed, these results indicate that social ties impact capital allocation above and beyond the appointment channel.

To estimate the economic magnitude of the capital allocation channel, we calculate the fraction of extra capital allocated to a connected divisional manager during his or her tenure through this channel. Based on Column (1) of Table VI, an increase of one standard deviation in ties to the CEO corresponds to $22.7 million more in CapEx, thus suggesting that the appointment channel accounts for approximately 22.7/30.2=75% of the extra capital allocated to connected divisional managers. Comparing this magnitude to that of the appointment channel

suggests that the capital allocation channel is about twice as important as the appointment channel.

Note that the economic magnitudes for both the appointment and capital allocation channels represent only rough approximations, since they are estimated using different specifications in samples of different size. For these reasons, the sum of the estimated magnitudes for the appointment channel and the capital allocation channel does not exactly equal 100% of the extra funds received by connected divisional managers via both channels estimated in our main specification. Therefore, these magnitudes are provided only for illustrative purposes to provide general evidence on the relative importance of the two channels.

4. Managerial Connections, Investment Efficiency, and Firm Value

The evidence so far indicates that managers connected to the CEO receive larger capital allocations. These findings are consistent with both the favoritism and information views. In this section, we distinguish between the favoritism and the information hypotheses by studying the effect of connections on investment efficiency and firm value. If social ties fuel favoritism, they are likely to have a negative effect on investment efficiency and value. On the other hand, if social connections foster information sharing, they can reduce information asymmetry and result in more efficient investment. If both effects play a role, we are interested in understating the conditions under which a particular outcome prevails and identifying the dominant effect.

To disentangle the favoritism hypothesis from the information view, we interact the variables of internal connections with measures of agency and information asymmetry. To facilitate equitable comparison, we construct standardized indexes for each of the two attributes. The information asymmetry index combines three separate measures of information asymmetry:

(1) the number of analysts who posted forecasts about the firm in a given year; (2) the standard deviation of earnings forecasts across analysts prior to a quarterly earnings announcement, normalized by the firm's total book assets and averaged across four quarters in a given year; (3) the analyst forecast error, measured as the absolute difference between the mean analyst earnings forecast prior to a quarterly earnings announcement and the actual earnings, normalized by the firm's total book assets and averaged across four quarters in a given year. These measures are discussed collectively in Krishnaswami and Subramanian (1999). The index averages a firm's percentile ranking in the sample according to each measure (for the number of analysts, the reverse ranking is used). We then scale the index to range from zero (low) to one (high).

The agency index combines the following three measures of agency in a similar way: (1) the Gompers, Ishii, and Metrick (2003) index; (2) the percentage of shares held by institutional investors; (3) the fraction of shares held by the top managers (for the latter two, the reverse ranking is used). These measures are discussed collectively in Cremers and Ferrell (2009). Details on each variable are provided in Appendix A.

4.1 Investment Efficiency

To evaluate the aggregate effect of managerial ties on investment efficiency, we study the relation between internal connections and the sensitivity of a firm's capital expenditures to investment opportunities, as proxied by Tobin's Q. Table VII presents results of pooled regressions in which the dependent variable is one of the measures of divisional capital investment. There are two independent variables of interest. The first is the interaction term of managerial ties with agency and information asymmetry indexes. This term captures whether the association between managerial connections and capital investment varies with agency and information asymmetry. The second variable of interest is the triple interaction term of

connections, Tobin's Q, and indexes of agency and information asymmetry. This term captures the effect of connections on the sensitivity of capital allocation to investment opportunities, as proxied by the Tobin's Q of the division's industry. The sensitivity of investment to industry-level Q is a common measure of investment efficiency that has been widely used in other research on conglomerates (e.g., Lang and Stulz, 1994; Shin and Stulz, 1998; Ozbas and Sharfstein, 2010). Other independent variables include the agency and the information asymmetry indexes, their interaction terms, and the same set of controls as in our main specification.

The interaction terms of managerial connections and measures of agency and information asymmetry are positive and significant for all measures of capital investment. This evidence suggests that managerial connections have a stronger effect on capital investment both in settings characterized by higher information asymmetry and in firms with more severe agency problems. These results are consistent with an initial conjecture that managerial ties can play a dual role and amplify each of the two effects.

The coefficients on the triple interaction of social ties, imputed Tobin's Q, and the indexes of agency and information asymmetry provide key evidence on the effect of managerial ties on investment efficiency. In particular, in settings with weaker governance (higher agency index), managerial connections are associated with a lower investment efficiency and a weaker response of capital expenditures to investment opportunities, as predicted in Rajan, Servaes, and Zingales (2000). This negative effect persists uniformly across all measures of capital investment. In contrast, in environments characterized by high information asymmetry, managerial connections are associated with a positive impact on investment efficiency, consistent with the theoretical predictions in Stein (2002). This effect is also uniform across all measures of capital investment.

Overall, the evidence in this section documents a dual effect of managerial ties on capital allocation and provides empirical support for both the favoritism and the information asymmetry hypotheses, which result in the opposite effects on investment efficiency. Next, we analyze the impact of managerial connections on firm value.

4.2 Firm Value

To study the value implications of managerial ties, we examine the relation between the variation in divisional managers' connections across firms and the market value of the conglomerate. In particular, we construct a firm-level measure of the overall level of managerial connections inside a particular conglomerate. This variable, which we label *firm connectedness*, is the asset-weighted average number of connections between all divisional managers and the CEO for a given firm in a given year. More formally, *firm connectedness* is defined as follows:

$$firm\ connectedness = \sum_{j=1}^{n} w_j \cdot connection_j$$

where:

n – number of divisional managers in the firm in a given year;

$connection_j$ – average number of connections between manager j and the CEO in a given firm in a given year;

w_j – the ratio of segment assets to firm assets.

The intuition is that a higher overall level of connectedness between divisional managers and the CEO is likely to amplify the effects of favoritism and information provision on firm value.

To study the effect of connections on firm value, we follow Lang and Stulz (1994) and Berger and Ofek (1995) and define the excess value of a conglomerate as the natural logarithm of the ratio of the conglomerate's market value of equity to the imputed value. A firm's imputed value is the sum of the imputed values of its segments, where each segment's imputed value is

equal to the segment's book assets multiplied by the median ratio of the market to book ratio for single-segment firms in the same industry (same three-digit SIC code).

Admittedly, the approach of using single-segment firms as a benchmark for the valuation of conglomerates' segments is subject to the self-selection bias (i.e. the firm's endogenous decision to diversify) and the measurement error in Tobin's Q. However, to the extent that the dispersion in managerial connections within each conglomerate is not correlated with the measurement error in Tobin's Q, our approach is robust to these issues.

Table VIII presents results of pooled regressions of conglomerates' excess values on firm connectedness and its interaction terms with the agency and information asymmetry indexes. Other independent variables include a set of controls, such as firm size, cash flow, the number of segments, and the intra-firm dispersion in Tobin's Q across its segments.

The primary variables of interest are the interaction terms of the average number of managerial connections inside the firm (i.e. firm connectedness) and the indexes of agency and information asymmetry. Both of these terms are reliably significant at the 5 percent level or better, but have opposite signs. The interaction term of the connectedness and the agency index is negative, suggesting that the internal connections have a negative impact on value at firms with weak governance. The magnitude of the effect is nontrivial: for firms in the top quartile on agency issues, a one standard deviation increase in connectedness is associated with a 6.3 percent reduction in excess value. This evidence is consistent with theoretical frameworks in Meyer, Milgrom, and Roberts (1992), Rajan, Servaes, and Zingales (2000), and Scharfstein and Stein (2000), which predict that internal managerial influence can erode value as a result of rent-seeking and resource misallocation. In our sample, this effect of managerial connections reliably arises for firms with more severe agency problems.

A different set of conclusions emerges when we focus on firms with high information asymmetry. The interaction term of the average connection and the asymmetry index is reliably positive. The economic magnitude is also substantial: for firms in the top quartile on information asymmetry, a one standard deviation increase in connectedness is associated with a 4.1 percent increase in excess value. One possible explanation for this finding is that in environments characterized by high information asymmetry, social ties create value by fostering information sharing and saving on costly information verification, thus addressing a key factor determining a firm's investment efficiency in the theoretical framework of Wulf (2009).

In summary, the effect of social ties on firm value and investment efficiency depends on internal governance and intra-firm information asymmetry. When governance is weak, internal connections erode investment efficiency and firm value, likely as a result of more severe favoritism and rent-seeking. When information asymmetry is high, social ties are positively associated with investment efficiency and firm value, consistent with facilitating the transfer of valuable information from the divisional managers to the CEO.

5. Robustness and Extensions

5.1 Alternative Measures of Connections

Our main specification evaluates connections of each divisional manager relative to those of other divisional managers in the same firm. Specifically, we adjust the manager's level of connections by the average level of connections within a firm. To assess the robustness of our results to alternative measures of divisional managers' formal and informal connections, we also test two alternative specifications.

In the first alternative specification (Columns (1) – (3) of Table IX), we use the raw number of a divisional manager's social ties to the CEO, unadjusted for the average number of

connections of other divisional managers within the same firm. For example, if a divisional manager went to the same school as the CEO and is also a member of the same nonprofit organization, but has no connection to the CEO via prior employment, the unadjusted level of social connections would be 0.67 (i.e. (1+1+0)/3). For consistency, we also use unadjusted measures of formal influence. As shown in Columns (1) – (3), we obtain results that are very similar to those in our main specification. Unadjusted measures of divisional managers' connections to the CEO have a positive effect on all three measures of CapEx, are statistically significant at the 1 percent level, and show coefficients of comparable magnitude to those in our main specification.

In the second alternative specification (Columns (4) – (6) of Table IX), we use an aggregate measure of a manager's formal influence inside the firm. While our previous results suggest that each individual measure of a manager's formal influence does not have a significant effect on capital allocation, it is possible that this effect, if any, could be identified by using an aggregate index of formal influence. This variable definition would also parallel the aggregation of informal ties into an index. To construct an index of a divisional manager's formal influence, we compute the average of the manager's dummy variables for board membership, seniority, long tenure, high salary, Ivy League undergraduate institution, and high SAT scores.

The results in Columns (4)-(6) of Table IX are similar to those in our main specification. In particular, the aggregate measure of a manager's social connections to the CEO (variable *Connected*) is positively related to all three measures of divisional CapEx. This relation is significant at the 1 percent level and comparable in economic magnitude to the main specification. In contrast, the index of formal influence is insignificant across all specifications. These results are consistent with earlier evidence that proxies of divisional managers' formal influence appear to have little effect on capital allocation.

5.2 Reverse Causality between Social Ties and Capital Investment

It is also possible that managers of divisions that receive more capital end up developing closer ties with the CEO. Such a scenario would be consistent with a positive relation between social ties and capital investment, but would reflect the opposite causal direction.

To address this conjecture, we eliminate all connections that were established after the arrival of a divisional manager at the firm of interest. This filter eliminates approximately 18 percent of managerial ties, indicating that the vast majority of connections with available dates were formed before a particular divisional manager began working at a given firm. As an additional filter, we eliminate all managerial connections with ambiguous and missing dates. While most connections with missing dates were almost certainly formed before the appointment of a divisional manager (e.g., connections via undergraduate degrees and connections via prior employment), we feel that this filter provides a conservative robustness check that controls for the possibility of a reverse causality between managerial connections and capital allocation, even if this possibility is remote.

Columns (7) – (9) in Table IX present the results of our main specification estimated after imposing the requirement that all ties via education, membership in nonprofit organizations, and employment have a starting date that precedes the tenure of a particular divisional manager in a given firm. After imposing this restrictive filter, we find a consistently positive relation between a divisional manager's ties to the CEO and capital allocation to his or her division, a result that persists across all three measures of capital investment.

The magnitude of the effect is again both economically and statistically significant. For example, based on Column (7), an increase of one standard deviation in social connections to the CEO corresponds to an increase of $3.6 million in divisional CapEx, a relation significant at the 5 percent level. Overall, this evidence indicates that our findings are unlikely to be explained by reverse causality.

5.3. Which Connections Matter?

So far, we have used an aggregate measure of social ties between divisional managers and the CEO. In this section, we study the individual effects of each type of social networks: prior employment, nonprofits, and education. We also provide a more refined analysis of social ties by identifying the drivers of influence within each network. Finally, we examine the effect of social ties to the CFO and the board.

Panel A of Table X presents the results of pooled regressions of divisional capital allocation on measures of social ties broken down by the type of network. This analysis repeats our base specification, with the exception that connections to the CEO are constructed using only one type of networks: education, employment, or nonprofits. All three types of networks paint a consistent picture: managers with social ties to the CEO are allocated more capital. This result holds uniformly across all network types and across all measures of capital investment, and is statistically significant at the 5 percent level or better in 8 of the 9 specifications.

The economic influence of social ties formed via various channels is also comparable. A one standard deviation increase in social ties formed via an educational network is associated with an 4.6 percent increase in annual capital allocation to the average division. A one standard

deviation increase in connections via prior employment is related to a 6.2 percent increase in the division's investment funds. A one standard deviation increase in ties via nonprofits is associated with a 8.3 percent increase in the division's annual investment. To provide another perspective, the effect of a one standard deviation in social ties to the CEO on capital allocation ranges between $2.9 million and $5.2 million in annual capital funds for the average division, depending on the type of the network. The effect of social ties via nonprofits, such as social clubs or charitable foundations, is marginally greater, perhaps because these interactions allow for closer and more informal contact. Next, we offer more detail on the type of connections within social networks.

We begin with further analysis of educational ties. To provide more refined evidence, we distinguish the following types of managerial degrees: PhD, MBA, Executive education, MD, Law (JD, LLM, LLB, etc.), other master's, and bachelor's. Panel B of Table X provides the results of our base regressions of capital expenditures on managerial connections via educational networks, in which these ties are broken down by degree type. The results indicate that the effect of educational ties is driven primarily by graduate-level training. MBA ties have the strongest effect, followed by executive education. One explanation for the strength of graduate education ties is that these connections were formed more recently and represent much smaller and more selective groups, which likely foster tighter connections and a stronger sense of common belonging. For example, an increase of one standard deviation in connections to the CEO via an MBA network is associated with a 11.3 percent increase in capital expenditures or an extra $7.0 million in investment funds. This effect is stronger than that of any other educational connection.

Next, we examine nonprofit activities in more detail. To provide a more refined analysis of connections, we classify nonprofit organizations into the following seven groups: (1) ethnic

and national, (2) education and science, (3) philanthropy, (4) social and sports clubs, (5) religious, (6) professional, and (7) hobbies. Our choice of categories is guided by the most frequent organization types. These categories cover 57 percent of organizations in our sample, with 38.9 percent of managers holding membership in at least one of the organizations. The remaining nonprofit institutions, which we classify as other organizations, either represent infrequent categories or have objectives that are too broad or ambiguous. Appendix B provides details on our classification methodology and criteria for each organization group.

Table B-I shows the proportion of each category of nonprofits in our sample. The most popular nonprofit categories among executives in our sample include education and science (24.9 percent), philanthropy (18.5 percent), ethnic and national organizations (5.4 percent), and social and sports clubs (4.2 percent). Next, we examine which organization category fosters the strongest connections, as measured by their effect on internal capital allocation.

Panel C of Table X presents the results of our base regressions of capital investment on managerial connections via nonprofits, in which these ties are broken down by organization category. We find that the strongest connections are forged via philanthropic activities and social clubs, such as golf, tennis, or country clubs. One interpretation of this evidence is that these organizations foster stronger ties as a result of closer, less formal interaction based on shared interests and beliefs.

The economic magnitude of these connections is substantial. For example, a one standard deviation increase in connections via philanthropic activities is associated with a 13.4 percent increase in capital expenditures, an amount equivalent to $8.4 million in extra annual investment funds for the average division. Our findings on the relative strength of social ties are consistent with evidence from sociology that common interests and informal environments amplify the strength of social interactions, compared, for example, to the ties forged in more formal settings,

such as professional nonprofit organizations and industry associations. If shared interests foster greater trust among the managers and allow for closer and more frequent interaction (Cross, 2004), these findings identify one possible mechanism through which social networks facilitate information sharing and potential collusion.

So far, our analysis has focused on the connections between divisional managers and the CEO. Next, we consider the effect of social ties to the CFO and the board of directors. While the main decision-making power regarding capital allocation typically rests with the CEO, it is likely that the CFO and the board can provide input into these decisions. To evaluate the effect of divisional managers' connections to the CFO and the board, we use the same methodology as in measuring connections to the CEO.

Table XI presents results of pooled regressions of division-level capital investment on divisional managers' connections to the CFO and the board, measures of formal influence, and a vector of controls. The effect of connections to the board is positive and significant at the 1 percent level for all but one measure of capital investment. However, the economic magnitude of this effect is smaller, possibly because the board of directors is less involved in capital allocation decisions. To illustrate, based on Column (1), the effect of a one standard deviation increase in connections to the board on divisional CapEx is only 37% of the magnitude of the effect of a one standard deviation increase in connections to the CEO (based on Column (1) in Panel B of Table III).

Last, the effect of connections to the CFO is positive but statistically insignificant. One interpretation of this evidence is that the CFO has substantially less discretionary power to tilt a firm's capital allocation toward particular divisions.

Conclusion

This article examines the role of divisional managers in internal capital allocation. We distinguish among several theories of internal capital markets, according to which divisional managers can act as rent seekers, information providers, and CEO advocates. Our empirical findings suggest that the impact of divisional managers on internal capital investment depends on the richness of intra-firm information environment and the strength of corporate governance.

We provide empirical evidence on both the bright and the dark side theories of internal capital markets and demonstrate the conditions under which a particular effect dominates. At firms characterized by high information asymmetry, where divisional managers are most likely to possess valuable information about investment opportunities, social ties between divisional managers and the CEO are associated with higher investment efficiency and higher firm value. On the other hand, at firms with weak governance, which are more prone to agency-driven favoritism in capital budgeting, managerial ties are negatively related to investment efficiency and firm value.

A large body of empirical research has focused on the analysis of chief executive and financial officers. The results in this paper indicate that corporate managers at lower levels of hierarchy – vice presidents and divisional heads – play an important role in a firm's investment strategy and operating efficiency. So far, we know relatively little about senior managers outside of the executive suite. Further analysis of this managerial group can provide new insights into firms' financial decisions and improve our understanding of the internal functioning of a corporation. We view this area as a promising direction for future research.

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Appendix A: Variable Definitions

1. Financial Variables

Note: All names in parentheses refer to the annual Compustat item name.

Capital expenditure – annual capital expenditure of the division (capx) divided by the division's book assets (at).

Industry-adjusted capital expenditure - annual capital expenditure of the division adjusted for the industry-specific variation in investment, as proxied by the median capital expenditure of pure-play firms in the division's industry. Formally,

$$Industry\ adjusted\ capital\ expenditure = \frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}}$$

where j = 1...N denotes segment j, and *ss* refers to single-segment firms in the particular industry based on the 3-digit SIC code.

Industry-firm-adjusted capital expenditure – Industry-adjusted capital expenditure further adjusted for the conglomerate's average investment across divisions. Formally,

$$Industry-firm\ adjusted\ capital\ expenditure = \frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}}\right)$$

where j = 1...N denotes segment j, and *ss* refers to single-segment firms in the particular industry based on the 3-digit SIC code, and w_j is the ratio of segment assets to firm assets.

Tobin's Q – market value of assets (book assets (at) + market value of common equity (csho*prcc) – common equity (ceq) – deferred Taxes (txdb)) / (0.9*book value of assets (at) + 0.1*market value of assets)

Industry-median Tobin's Q – the median Tobin's Q across all single-segment firms in the segment's 3-digit sic code industry.

Segment size – the natural logarithm of the segment's book assets (at) at the beginning of the year.

Segment relative size – book value of segment's assets (at) divided by the sum of book assets across all segments of the firm. Book values are computed as of the beginning of the year.

Segment cash flow – annual net sales (sale) divided by book assets (at) as of the beginning of the year.

Segment operating performance = annual operating profit (ops) divided by book assets (at) as of the beginning of the year.

Excess value – the natural logarithm of the ratio of the conglomerate's market value of equity to the conglomerate's imputed value, computed as the sum of the imputed values of its segments. The imputed value for each segment is equal to the segment's book assets multiplied by the median ratio of the market to book ratio for single-segment firms in the segment's industry (same three-digit SIC code).

2. Demographic Variables

Board member - an indicator that equals 1 if the divisional manager is a member of the board of directors.

Senior – an indicator that equals 1 if a manager's role description on BoardEx includes "senior" or "executive".

Long tenure - an indicator that equals 1 if the divisional manager has been with the company more than 10 years.

High salary - an indicator that equals 1 if the divisional manager is one of the top five paid executives in the company.

Ivy league - an indicator that equals 1 if the divisional manager holds a degree from an Ivy league school.

High avg. SAT score - an indicator that equals 1 if the divisional manager went to school whose average SAT scores in 2004 (median year in our sample) were above the sample median.

Connected - summary measure of internal connections of a divisional manager relative to other divisional managers in the same conglomerate. It is defined as the average connection between the divisional manager and the CEO based on education history, nonprofit work, and prior employment, adjusted for the average number of connections between divisional managers and the CEO within a firm. Formally,

$$Connected_j = connection_j - \frac{\sum_{k=1}^{n}(connection_k)}{n}$$

where:

n – number of divisional managers in the firm in a given year;
$connection_j$ – average number of connections between manager j and the CEO in a given firm in a given year.

Firm Connectedness – asset-weighted average number of connections between all divisional managers and the CEO for a given firm in a given year.

Formal connections index – average value of the divisional manager's dummy variables for board membership, seniority, long tenure, high salary, Ivy League undergraduate institution, and high SAT scores.

3. Information Asymmetry and Governance

Information asymmetry index – an index combining three separate measures of information asymmetry: (1) the number of analysts who posted forecasts about the firm in a given year; (2) the standard deviation of earnings forecasts across analysts prior to a quarterly earnings announcement, normalized by the firm's total book assets and averaged across four quarters in a given year; (3) the analyst forecast error, measured as the absolute difference between the mean analyst earnings forecast prior to a quarterly earnings announcement and the actual earnings, normalized by the firm's total book assets and averaged across four quarters in a given year. The index averages a firm's percentile ranking in the sample according to each measure (for the number of analysts, the reverse ranking is used). We then scale the index to range from zero (low) to one (high).

Agency index – an index combining the following three measures of agency in a similar way to the information asymmetry index: (1) the Gompers, Ishii, and Metrick (2003) index; (2) the percentage of shares held by institutional investors; (3) the fraction of shares held by the top managers (for the latter two, the reverse ranking is used).

Appendix B: Classification of Nonprofit Organizations

Methodology

To provide additional detail on managerial connections via nonprofit organizations, we classify these organizations into seven broad categories based on their focus. Our choice of classification categories (described below) is guided by the most prevalent organization types. Using these most common organization categories, we are able to classify 7,763 nonprofit organizations in our sample (57 percent of our sample). The remaining institutions represent less frequent organization types or organizations with objectives that are too broad or ambiguous. We classify these institutions as other organizations.

The classification is implemented by using a combination of key word searches for unambiguous entries (e.g. "golf club", "tennis club" or "country club") and manual classification based on reading the declared objective of the particular institution on its web page. One organization can be classified into several categories. For example, the Association of Black Engineers overlaps two categories: ethnic and professional. Table B-I describes our classification groups.

TABLE I

Summary Statistics

This table reports summary statistics for the sample, which consists of all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The values reported are time-series averages over the sample period. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. Tobin's *Q* is the market value of assets divided by the book value of assets. Cash flow is income before extraordinary items plus depreciation and amortization. The number of business segments is the number of business segments reported by the firm, excluding auxiliary business segments designed to capture residual operations (e.g., business segments with an identifier equal to 99). The industry-median Tobin's Q is the median Tobin Q across all single-segment firms in the segment's 3-digit SIC code industry. Industry-adjusted CAPEX is CAPEX adjusted for its industry median capital expenditure, formally defined as:

$$\text{Industry-adjusted capital expenditure} = \frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}},$$

$j = 1...N$ denotes segment j, ss refers to single-segment firms. Industry-firm adjusted capital expenditure is industry-adjusted capital expenditure, further adjusted for the firm's average capital expenditure ratio across segments. Formally, it is defined as in Rajan, Servaes, and Zingales (2000):

$$\text{Industry-firm adjusted capital expenditure} = \frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}} \right),$$

where $j = 1...N$ denotes segment j, ss refers to single-segment firms, and w_j is the ratio of segment assets to firm assets.

Variable	Mean	25th percentile	Median	75th percentile	Standard deviation
Company Level					
Tobin's Q	1.705	1.236	1.533	1.959	0.673
Capital expenditure/assets	0.042	0.021	0.033	0.050	0.040
Cash flow/assets	0.086	0.059	0.095	0.129	0.102
Market value, $millions	34,089	5,539	11,055	28,344	87,257
Book assets, $millions	19,409	3,019	6,303	17,205	59,034
Number of business segments	3.425	2.000	3.000	4.000	1.359
Segment level					
Industry median Tobin's Q	1.482	1.185	1.415	1.667	0.404
Capital expenditure, $millions	198	19	58	155	477
Capital expenditure/assets	0.035	0.021	0.026	0.039	0.028
Sales, $millions	3,892	710	1,767	4,139	6,109
Book assets, $millions	3,612	627	1,505	3,613	6,264
Industry adjusted capital expenditure	0.017	-0.011	0.006	0.033	0.072
Industry-firm adjusted capital expenditure	0.000	-0.014	-0.001	0.013	0.059

TABLE II

Divisional Managers

This table describes the 1,105 divisional managers in our sample, which consists of all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. Panel A describes personal characteristics related to the divisional managers' employment in the company, as well as educational background and nonprofit activity. Panel B describes the frequency of connections of the divisional managers to the company's top management. Details on our nonprofit category classification are available in appendix B. Each observation in this table corresponds to a unique year-firm-segment-manager combination.

Panel A: Characteristics of Divisional Managers

Continuous Variables	**Mean**	**Standard deviation**	**N_obs**
Tenure with the company	12.09	10.50	3,174
Age	50.74	6.18	3,103
Compensation ($, thousands)	854	748	3,346
Indicator Variables	**Number**	**Percentage**	**Total Number**
General			
Male	2,932	91.60	3,201
Board member	427	13.34	3,201
Senior	1,755	54.83	3,201
Education			
Bachelor's degree	3,438	97.34	3,532
Master's degree	2,289	64.81	3,532
PhD degree	174	4.93	3,532
MBA degree	1,380	39.07	3,532
Executive education	360	10.19	3,532
Law degree	122	3.45	3,532
MD degree	13	0.37	3,532
Nonprofit work			
Ethnic or national	257	7.28	3,532
Education and science	1,138	32.22	3,532
Philanthropy	843	23.87	3,532
Social or sports clubs	204	5.78	3,532
Religious	59	1.67	3,532
Professional	285	8.07	3,532
Hobbies	315	8.92	3,532

Panel B: Connections between Divisional Managers and Top Management

Connection type	CEO	CFO	Any board member
Education			
Same university	5.18%	3.88%	23.75%
Same degree	43.13%	36.42%	72.25%
Same university and degree	1.35%	1.84%	10.78%
Same university and graduation date	0.69%	0.19%	3.03%
Nonprofit work			
Same organization	3.83%	0.83%	10.52%
Same category	28.43%	13.92%	39.57%
Other employment			
Worked for the same company	16.26%	8.79%	29.95%
Worked for the same company at the same time	10.64%	6.03%	17.87%

TABLE III

Connections of Divisional Managers and Internal Capital Allocation

This table presents evidence on the relation between connections of divisional managers to the CEO and the ratio of segment-level capital expenditure to book assets. Panel A presents difference-in-means estimates, whereas Panel B presents estimates from panel regressions. In Panel A, the sample-wide estimates compare between the average CAPEX across segments divided around the median sample-wide level of adjusted connections. The firm-year estimates compare between segments divided around the median level of adjusted connections in their firm for each year. The industry-year estimates compare between segments divided around the median level of adjusted connections in their industry for each year. The sample consists of all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. CAPEX is the ratio of segment-level capital expenditure to book assets. Industry-adjusted CAPEX is CAPEX adjusted for its industry median capital expenditure, formally defined as:

$$\text{Industry-adjusted capital expenditure} = \frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}},$$

$j = 1...N$ denotes segment j, ss refers to single-segment firms. Industry-firm adjusted capital expenditure is industry-adjusted capital expenditure, further adjusted for the firm's average capital expenditure ratio across segments. Formally, it is defined as in Rajan, Servaes, and Zingales (2000):

$$\text{Industry-firm adjusted capital expenditure} = \frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}} - \sum_{j=1}^{N} w_j \left(\frac{CAPEX_j}{Assets_j} - \frac{CAPEX_j^{ss}}{Assets_j^{ss}} \right),$$

where $j = 1...N$ denotes segment j, ss refers to single-segment firms, and w_j is the ratio of segment assets to firm assets.

Connected is the average connection between the divisional manager and the CEO based on education history, nonprofit work, and prior employment, and is adjusted for the average number of connections between divisional managers and the CEO within a firm. Formally, connected is defined as follows:

$$Connected_j = connection_j - \frac{\sum_{k=1}^{n}(connection_k)}{n}$$

All the regressions in Panel B include year and firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: Nonparametric Evidence

Estimate	Investment measure	Low connections	High connections	Difference	t-statistic
Sample wide	CAPEX	0.0521	0.0524	0.0003	0.0969
	Industry-adjusted CAPEX	0.0163	0.0173	0.0010	0.3571
	Industry- firm-adjusted CAPEX	-0.0010	0.0052	0.0062	2.4261
Firm-year	CAPEX	0.0502	0.0604	0.0102	3.1980
	Industry-adjusted CAPEX	0.0143	0.0273	0.0131	3.9693
	Industry- firm-adjusted CAPEX	0.0006	0.0115	0.0109	3.5503
Industry-year	CAPEX	0.0502	0.0570	0.0068	2.4304
	Industry-adjusted CAPEX	0.0140	0.0235	0.0096	3.3283
	Industry- firm-adjusted CAPEX	0.0008	0.0074	0.0066	2.4913

Panel B: Regression Evidence

Dependent variable	CAPEX	Industry-adjusted CAPEX	Industry- Firm-adjusted CAPEX	CAPEX	Industry-adjusted CAPEX	Industry- Firm-adjusted CAPEX
Model	(1)	(2)	(3)	(4)	(5)	(6)
Connected	0.011*** [2.685]	0.014*** [3.309]	0.014*** [3.429]	0.013** [2.424]	0.015*** [2.834]	0.015*** [2.892]
Industry-median Tobin's Q	0.001 [0.138]	0.017*** [3.688]	0.015*** [3.334]	0.003 [0.400]	0.018*** [2.586]	0.018*** [2.720]
Segment size	-0.028*** [10.592]	-0.027*** [9.875]	-0.024*** [9.007]	-0.042*** [10.590]	-0.041*** [9.912]	-0.042*** [10.507]
Segment relative size	0.078*** [6.452]	0.069*** [5.324]	0.064*** [5.049]	0.128*** [7.005]	0.115*** [5.991]	0.126*** [6.763]
Segment cash flow	0.011** [2.262]	0.008 [1.460]	0.005 [0.981]	0.002 [0.235]	-0.001 [0.112]	-0.005 [0.709]
Segment operating performance				0.025*** [3.449]	0.022*** [2.997]	0.020*** [2.739]
Board member	-0.010* [1.673]	-0.008 [1.274]	-0.008 [1.319]	-0.015* [1.795]	-0.006 [0.731]	-0.007 [0.805]
Senior	0.001 [0.255]	0.002 [0.485]	0.003 [0.524]	0.001 [0.139]	0.008 [1.156]	0.008 [1.229]
Long tenure	0.001 [0.082]	0.003 [0.792]	0.003 [0.809]	0.000 [0.088]	0.003 [0.531]	0.003 [0.559]
High salary	0.001 [0.180]	-0.002 [0.478]	-0.002 [0.525]	0.002 [0.501]	-0.001 [0.150]	0.000 [0.071]
Ivy league	-0.007 [1.354]	-0.007 [1.203]	-0.007 [1.204]	-0.013 [1.621]	-0.013* [1.664]	-0.013* [1.670]
High avg. SAT score	0.003 [0.830]	0.001 [0.006]	0.001 [0.011]	0.007 [1.421]	0.004 [0.843]	0.004 [0.835]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.229	0.215	0.129	0.223	0.226	0.147
N_obs	3,054	2,936	2,936	1,940	1,874	1,874

TABLE IV

The Turnover of Divisional Managers and Internal Capital Allocation

This table presents estimates from first-difference regressions, in which the dependent variable is the annual change in the ratio of segment-level (adjusted) capital expenditure to book assets, for segment-year observations where the divisional manager has changed from the previous year. The base sample includes all multi-division industrial companies in the S&P 500 index over the period 2000-2008, with non-missing segment data on capital expenditures and book assets. All variable definitions are given in Appendix A. All regressions include firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the segment level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Dependent variable	ΔCAPEX		ΔIndustry-adjusted CAPEX		ΔIndustry- Firm-adjusted CAPEX	
Model	(1)	(2)	(3)	(4)	(5)	(6)
ΔConnected	0.023** [2.467]	0.035** [2.268]	0.026*** [2.626]	0.035** [2.180]	0.015*** [2.973]	0.019** [2.277]
ΔIndustry-median Tobin's Q	0.013 [0.648]	0.018 [0.540]	0.011 [0.534]	0.010 [0.287]	0.035* [1.967]	0.044 [1.455]
ΔSegment size	-0.014 [0.528]	0.000 [0.004]	-0.013 [0.483]	0.007 [0.131]	-0.022 [0.885]	-0.004 [0.090]
ΔSegment relative size	0.017 [0.130]	0.051 [0.217]	0.050 [0.375]	0.082 [0.345]	0.079 [0.671]	0.117 [0.558]
ΔSegment cash flow	0.011 [0.208]	-0.053 [0.624]	0.005 [0.097]	-0.063 [0.740]	-0.009 [0.182]	-0.047 [0.627]
ΔSegment operating performance		0.089* [1.839]		0.102** [2.062]		0.062 [1.433]
ΔBoard member	-0.009 [0.589]	-0.036 [1.139]	-0.010 [0.604]	-0.034 [1.051]	-0.017 [1.152]	-0.059** [2.091]
ΔSenior	-0.032*** [2.681]	-0.051** [2.534]	-0.038*** [2.999]	-0.054** [2.589]	-0.022** [1.986]	-0.035* [1.900]
ΔLong tenure	-0.014 [1.410]	-0.013 [0.656]	-0.016 [1.483]	-0.015 [0.727]	-0.007 [0.795]	0.001 [0.028]
ΔHigh salary	-0.010 [0.963]	-0.008 [0.457]	-0.010 [0.903]	-0.009 [0.473]	-0.001 [0.079]	0.002 [0.140]
ΔIvy league	0.003 [0.195]	0.020 [0.764]	0.003 [0.223]	0.023 [0.882]	0.007 [0.517]	0.020 [0.897]
ΔHigh avg. SAT score	-0.027*** [3.004]	-0.035** [2.292]	-0.030*** [3.154]	-0.042** [2.605]	-0.017** [1.991]	-0.019 [1.361]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.540	0.478	0.563	0.491	0.554	0.467
N_obs	245	146	235	141	235	141

TABLE V

The Appointment Channel

This table presents estimates from panel regressions, in which the dependent variable is one of the characteristics of a division to which a particular manager is assigned at the time of turnover. The sample includes segment-year observations where the divisional manager has changed from the previous year but the CEO has not changed. The base sample includes all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. All regressions include year and firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Dependent variable	CAPEX, lagged	Industry-adjusted CAPEX, lagged	Industry-firm-adjusted CAPEX, lagged	Size, lagged	Largest segment dummy, lagged	Relative size, lagged	Core segment
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Connectedness of incoming divisional manager	0.024* [1.771]	0.025* [1.671]	0.021 [1.346]	-0.108 [0.969]	-0.098 [1.282]	-0.030 [0.873]	-0.041 [0.558]
Board member	-0.013 [0.564]	-0.001 [0.037]	-0.005 [0.200]	0.006 [0.027]	-0.080 [0.566]	0.001 [0.022]	-0.164 [1.202]
Senior	0.000 [0.012]	0.004 [0.222]	0.008 [0.415]	0.171 [1.101]	-0.096 [0.906]	-0.046 [0.945]	-0.157 [1.527]
Long tenure	0.008 [0.691]	0.009 [0.676]	0.006 [0.465]	0.089 [0.735]	0.063 [0.768]	0.034 [0.991]	0.130 [1.633]
High salary	-0.002 [0.197]	-0.002 [0.165]	-0.006 [0.438]	0.255** [2.105]	0.238*** [2.869]	0.063* [1.821]	0.043 [0.533]
Ivy league	-0.021 [1.075]	-0.034 [1.596]	-0.044** [2.073]	-0.039 [0.204]	-0.099 [0.753]	-0.047 [0.890]	0.183 [1.443]
High avg. SAT score	0.019 [1.581]	0.026* [1.968]	0.028** [2.119]	0.055 [0.472]	0.052 [0.651]	0.037 [1.126]	-0.092 [1.203]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.569	0.589	0.378	0.794	0.536	0.551	0.549
N_obs	221	221	221	221	221	221	221

TABLE VI

The Capital Allocation Channel: CEO Turnover

This table presents estimates from first-difference regressions, in which the dependent variable is the annual change in the ratio of segment-level capital expenditure to book assets, for segment-year observations where the CEO has changed from the previous year but the divisional manager has not changed. The base sample includes all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. All regressions include firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Dependent variable	ΔCAPEX		ΔIndustry-adjusted CAPEX		ΔIndustry- Firm-adjusted CAPEX	
Model	(1)	(2)	(3)	(4)	(5)	(6)
ΔConnected	0.046*** [2.984]	0.065** [2.568]	0.049*** [3.098]	0.066** [2.556]	0.049*** [3.121]	0.066** [2.566]
ΔIndustry-median Tobin's Q	0.002 [0.068]	0.007 [0.167]	0.002 [0.064]	0.008 [0.192]	0.005 [0.194]	0.006 [0.154]
ΔSegment size	-0.315*** [19.288]	-0.379*** [18.023]	-0.317*** [19.307]	-0.380*** [17.905]	-0.314*** [19.007]	-0.378*** [17.824]
ΔSegment cash flow	0.023 [0.516]	-0.061 [0.747]	0.024 [0.547]	-0.052 [0.635]	0.013 [0.292]	-0.041 [0.499]
ΔSegment operating profit		-0.032 [0.252]		-0.038 [0.291]		-0.035 [0.264]
ΔBoard member	0.018 [0.449]	-0.072 [0.674]	0.021 [0.510]	-0.076 [0.704]	0.019 [0.470]	-0.072 [0.663]
ΔSenior	-0.051** [2.101]	-0.082** [1.994]	-0.050** [2.079]	-0.082* [1.982]	-0.051** [2.087]	-0.083** [2.011]
ΔLong tenure	0.004 [0.176]	0.025 [0.698]	0.003 [0.137]	0.022 [0.603]	0.003 [0.135]	0.020 [0.537]
ΔHigh salary	-0.010 [0.574]	-0.004 [0.137]	-0.009 [0.543]	-0.004 [0.143]	-0.008 [0.436]	-0.004 [0.140]
ΔIvy league	0.145 [1.331]	0.121 [0.691]	0.159 [1.451]	0.096 [0.542]	0.163 [1.483]	0.115 [0.651]
ΔHigh avg. SAT score	0.036 [0.783]	0.019 [0.245]	0.034 [0.734]	0.023 [0.291]	0.031 [0.663]	0.016 [0.207]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.763	0.849	0.765	0.850	0.759	0.849
N_obs	310	168	306	164	306	164

TABLE VII

Information Asymmetry, Agency, and Investment Efficiency

This table presents estimates from panel regressions, in which the dependent variable is the ratio of segment-level capital expenditure to book assets. The sample includes all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. The information asymmetry index combines three separate measures of information asymmetry: (1) the number of analysts who posted forecasts about the firm in a given year; (2) the standard deviation of earnings forecasts across analysts prior to a quarterly earnings announcement, normalized by the firm's total book assets and averaged across four quarters in a given year; (3) the analyst forecast error, measured as the absolute difference between the mean analyst earnings forecast prior to a quarterly earnings announcement and the actual earnings, normalized by the firm's total book assets and averaged across four quarters in a given year. The index averages a firm's percentile ranking in the sample according to each measure (for the number of analysts, the reverse ranking is used). We then scale the index to range from zero (low) to one (high). The agency index combines the following three measures of agency in a similar way: (1) the Gompers, Ishii, and Metrick (2003) index; (2) the percentage of shares held by institutional investors; (3) the fraction of shares held by the top managers (for the latter two, the reverse ranking is used). All regressions include year and firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Dependent variable	CAPEX		Industry-adjusted CAPEX		Industry- Firm-adjusted CAPEX	
Index type	Information asymmetry	Agency	Information asymmetry	Agency	Information asymmetry	Agency
Connected	-0.116** [2.058]	-0.129 [1.560]	-0.112* [1.950]	-0.113 [1.309]	-0.118** [2.085]	-0.090 [1.065]
Index	0.011 [1.262]	-0.001 [0.114]	0.004 [0.508]	-0.002 [0.151]	0.000 [0.029]	-0.002 [0.163]
Industry-median Tobin's Q	0.012 [0.957]	0.001 [0.070]	0.021* [1.702]	0.014 [0.897]	0.012 [0.989]	0.011 [0.714]
Connected x Index	0.074*** [2.787]	0.078** [1.982]	0.072*** [2.651]	0.070* [1.704]	0.074*** [2.788]	0.058** [2.446]
Connected x Industry-median Tobin's Q	0.072** [2.008]	0.054 [1.008]	0.068* [1.843]	0.059 [1.056]	0.072** [1.986]	0.044 [0.814]
Index x Industry-median Tobin's Q	-0.006 [1.043]	0.000 [0.035]	-0.001 [0.252]	0.001 [0.168]	0.002 [0.321]	0.002 [0.250]
Connected x Industry-median Tobin's Q x Index	0.042** [2.498]	-0.033* [1.801]	0.039** [2.267]	-0.034** [2.295]	0.040** [2.401]	-0.026** [2.032]
Segment size	-0.033*** [11.031]	-0.027*** [10.472]	-0.031*** [10.167]	-0.027*** [9.800]	-0.028*** [9.342]	-0.024*** [8.942]
Segment relative size	0.097*** [7.188]	0.077*** [6.327]	0.086*** [6.033]	0.067*** [5.230]	0.083*** [5.881]	0.063*** [4.960]
Segment cash flow	0.011** [2.225]	0.011** [2.332]	0.007 [1.270]	0.008 [1.556]	0.003 [0.592]	0.005 [1.075]
Board member	-0.012* [1.827]	-0.010* [1.744]	-0.008 [1.216]	-0.008 [1.285]	-0.008 [1.223]	-0.008 [1.321]
Senior	0.000 [0.008]	0.001 [0.128]	0.001 [0.114]	0.002 [0.419]	0.001 [0.167]	0.002 [0.458]
Long tenure	0.001 [0.358]	0.000 [0.034]	0.005 [1.075]	0.003 [0.729]	0.005 [1.094]	0.003 [0.757]
High salary	0.002 [0.429]	0.000 [0.016]	-0.002 [0.408]	-0.002 [0.601]	-0.002 [0.463]	-0.002 [0.636]
Ivy league	-0.007 [1.225]	-0.008 [1.413]	-0.008 [1.175]	-0.007 [1.183]	-0.007 [1.144]	-0.007 [1.200]
High avg. SAT score	0.005 [1.358]	0.003 [0.903]	0.001 [0.186]	0.000 [0.064]	0.000 [0.128]	0.000 [0.053]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.234	0.233	0.222	0.217	0.137	0.131
N_obs	3,054	3,054	2,936	2,936	2,936	2,936

TABLE VIII

Connections of Divisional Managers and Excess Value

This table presents estimates from panel regressions, in which the dependent variable is the firm's excess value, defined as the natural logarithm of the ratio of a firm's actual value to its imputed value. A firm's imputed value is the sum of the imputed values of its segments, with each segment's imputed value equal to the segment's assets multiplied by its industry median ratio of market to book assets. Firm connectedness is the asset-weighted average number of connections between all divisional managers and the CEO for a given firm in a given year. The information asymmetry index combines three separate measures of information asymmetry: (1) the number of analysts who posted forecasts about the firm in a given year; (2) the standard deviation of earnings forecasts across analysts prior to a quarterly earnings announcement, normalized by the firm's total book assets and averaged across four quarters in a given year; (3) the analyst forecast error, measured as the absolute difference between the mean analyst earnings forecast prior to a quarterly earnings announcement and the actual earnings, normalized by the firm's total book assets and averaged across four quarters in a given year. The index averages a firm's percentile ranking in the sample according to each measure (for the number of analysts, the reverse ranking is used). We then scale the index to range from zero (low) to one (high). The agency index combines the following three measures of agency in a similar way: (1) the Gompers, Ishii, and Metrick (2003) index; (2) the percentage of shares held by institutional investors; (3) the fraction of shares held by the top managers (for the latter two, the reverse ranking is used).All variable definitions are given in Appendix A. The sample consists of all S&P 500 industrial companies that operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All regressions include year fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Model number	(1)	(2)	(3)	(4)	(5)
Firm connectedness	0.167*** [3.116]	0.131** [2.553]	0.211** [2.028]	0.704*** [4.160]	0.404** [2.012]
Information asymmetry index			-0.177* [1.677]		-0.177* [1.681]
Firm connectedness x Information asymmetry index			0.638*** [3.329]		0.627*** [3.295]
Agency index				-0.532*** [2.817]	-0.553** [2.525]
Firm connectedness x Agency index				-1.172*** [3.575]	-1.218*** [3.575]
Tobin's Q heterogeneity		-0.753*** [7.472]	-0.678*** [6.304]	-0.767*** [7.646]	-0.703*** [6.545]
Number of segments		0.034** [2.040]	0.062*** [3.547]	0.035** [2.090]	0.061*** [3.489]
Cash flow		1.774*** [7.281]	2.626*** [9.113]	1.768*** [7.298]	2.584*** [9.014]
Size		0.025 [1.308]	0.032 [1.582]	0.03 [1.517]	0.042** [2.010]
Year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.022	0.121	0.167	0.133	0.179
N_obs	1,016	975	860	975	860

TABLE IX

Robustness

This table presents estimates from panel regressions, in which the dependent variable is the ratio of segment-level capital expenditure to book assets. The sample consists of all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Description	Unadjusted managerial connections			Index of formal connections			Connections formed before current employment		
Dependent variable	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Connected	0.012*** [3.644]	0.015*** [4.272]	0.013*** [3.900]	0.012*** [3.759]	0.014*** [4.283]	0.013*** [3.924]	0.010** [2.070]	0.009* [1.825]	0.009* [1.858]
Industry-median Tobin's Q	0.001 [0.151]	0.017*** [3.687]	0.015*** [3.366]	0.000 [0.062]	0.017*** [3.623]	0.015*** [3.250]	0.001 [0.150]	0.017*** [3.650]	0.015*** [3.294]
Segment size	-0.028*** [10.666]	-0.027*** [10.017]	-0.024*** [9.103]	-0.028*** [10.724]	-0.027*** [10.092]	-0.024*** [9.209]	-0.028*** [10.612]	-0.027*** [9.903]	-0.024*** [9.036]
Segment relative size	0.080*** [6.598]	0.070*** [5.473]	0.065*** [5.126]	0.080*** [6.618]	0.069*** [5.410]	0.064*** [5.114]	0.078*** [6.435]	0.068*** [5.302]	0.064*** [5.025]
Segment cash flow	0.010** [2.119]	0.007 [1.382]	0.005 [0.961]	0.010** [2.112]	0.008 [1.456]	0.005 [0.978]	0.011** [2.295]	0.008 [1.517]	0.005 [1.041]
Board member	-0.010* [1.960]	-0.009* [1.725]	-0.008 [1.567]				-0.009 [1.529]	-0.007 [1.095]	-0.007 [1.133]
Senior	0.001 [0.321]	0.002 [0.585]	0.000 [0.043]				0.001 [0.265]	0.003 [0.533]	0.003 [0.574]
Long tenure	0.002 [0.660]	0.004 [1.185]	0.002 [0.723]				0.001 [0.137]	0.003 [0.820]	0.003 [0.836]
High salary	0.001 [0.421]	0.000 [0.124]	0.000 [0.052]				0.000 [0.088]	-0.002 [0.562]	-0.002 [0.610]
Ivy league	-0.005 [1.069]	-0.004 [0.773]	-0.006 [1.095]				-0.007 [1.314]	-0.006 [1.126]	-0.006 [1.124]
High avg. SAT score	0.001 [0.388]	-0.002 [0.496]	0.000 [0.065]				0.003 [0.951]	0.001 [0.318]	0.001 [0.320]
Formal connections index				-0.004 [0.510]	-0.004 [0.471]	-0.004 [0.434]			
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.231	0.218	0.130	0.230	0.216	0.129	0.229	0.213	0.126
N_obs	3,054	2,936	2,936	3,054	2,936	2,936	3,054	2,936	2,936

TABLE X

Connection Types of Divisional Managers and Internal Capital Allocation

This table presents estimates from panel regressions, in which the dependent variable is the ratio of segment-level capital expenditure to book assets. The table presents evidence on the effect of various types of social networks on internal capital allocation. Panels A, B, and C provide evidence broken down by network category, university degree, and the type of nonprofit organization, respectively. The classification of nonprofit organizations is provided in Appendix B. The sample includes all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. All regressions include year and firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: Breakdown into Education, Nonprofit, and Employment Connections

Connection type	Education			Nonprofit			Other employment		
Dependent variable	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX
Column number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Connected	0.004* [1.738]	0.006** [2.109]	0.006** [2.183]	0.010** [2.571]	0.013*** [3.107]	0.014*** [3.248]	0.006** [2.210]	0.005** [2.512]	0.003** [2.591]
Industry-median Tobin's Q	-0.006* [1.693]	0.007* [1.759]	0.008** [1.984]	-0.007* [1.720]	0.007* [1.759]	0.008** [1.985]	-0.007* [1.723]	0.007* [1.729]	0.008* [1.953]
Segment size	-0.024*** [9.548]	-0.023*** [8.842]	-0.020*** [7.742]	-0.023*** [9.444]	-0.022*** [8.667]	-0.019*** [7.559]	-0.024*** [9.535]	-0.023*** [8.771]	-0.019*** [7.668]
Segment relative size	0.063*** [5.386]	0.054*** [4.293]	0.047*** [3.842]	0.062*** [5.271]	0.051*** [4.069]	0.044*** [3.608]	0.063*** [5.319]	0.052*** [4.183]	0.046*** [3.728]
Segment cash flow	0.012*** [2.580]	0.009* [1.710]	0.007 [1.334]	0.013*** [2.729]	0.010* [1.917]	0.008 [1.549]	0.013*** [2.689]	0.009* [1.815]	0.007 [1.441]
Board member	-0.009 [1.531]	-0.007 [1.146]	-0.007 [1.203]	-0.010* [1.760]	-0.009 [1.385]	-0.009 [1.453]	-0.009 [1.503]	-0.007 [1.141]	-0.007 [1.200]
Senior	0.002 [0.376]	0.003 [0.658]	0.003 [0.679]	0.001 [0.219]	0.002 [0.431]	0.002 [0.442]	0.001 [0.312]	0.003 [0.652]	0.003 [0.675]
Long tenure	0.000 [0.042]	0.003 [0.797]	0.003 [0.814]	0.000 [0.062]	0.003 [0.652]	0.003 [0.664]	0.000 [0.016]	0.003 [0.695]	0.003 [0.707]
High salary	0.000 [0.058]	-0.002 [0.578]	-0.002 [0.646]	0.000 [0.022]	-0.003 [0.674]	-0.003 [0.745]	-0.001 [0.173]	-0.002 [0.547]	-0.002 [0.604]
Ivy league	-0.007 [1.189]	-0.005 [0.904]	-0.005 [0.967]	-0.006 [1.133]	-0.005 [0.885]	-0.005 [0.948]	-0.006 [1.108]	-0.005 [0.866]	-0.005 [0.930]
High avg. SAT score	0.004 [1.015]	0.001 [0.252]	0.001 [0.234]	0.004 [1.249]	0.002 [0.580]	0.002 [0.570]	0.005 [1.484]	0.003 [0.768]	0.003 [0.764]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.215	0.202	0.115	0.216	0.203	0.117	0.215	0.200	0.114
N_obs	3,054	2,936	2,936	3,054	2,936	2,936	3,054	2,936	2,936

Panel B: Educational Connections

Degree	Bachelor's	Masters	PhD	MBA	ExecEd	Law	MD
Connected	0.004 [1.058]	0.000 [0.030]	-0.015 [0.977]	0.015*** [3.011]	0.011** [2.250]	-0.025 [1.097]	0.000 [0.039]
Industry-median Tobin's Q	0.015*** [3.240]	0.015*** [3.243]	0.014*** [3.192]	0.015*** [3.372]	0.015*** [3.289]	0.015*** [3.226]	0.015*** [3.244]
Segment size	-0.024*** [8.998]	-0.024*** [8.994]	-0.024*** [9.012]	-0.024*** [8.955]	-0.024*** [8.976]	-0.024*** [8.993]	-0.024*** [8.996]
Segment relative size	0.063*** [4.986]	0.063*** [4.951]	0.063*** [4.965]	0.063*** [5.018]	0.062*** [4.929]	0.062*** [4.941]	0.063*** [4.953]
Segment cash flow	0.005 [1.081]	0.006 [1.103]	0.006 [1.094]	0.005 [1.043]	0.005 [1.081]	0.006 [1.122]	0.006 [1.104]
Board member	-0.007 [1.211]	-0.007 [1.143]	-0.007 [1.144]	-0.006 [1.026]	-0.006 [1.037]	-0.007 [1.144]	-0.007 [1.143]
Senior	0.003 [0.579]	0.003 [0.604]	0.003 [0.610]	0.003 [0.615]	0.003 [0.556]	0.003 [0.581]	0.003 [0.603]
Long tenure	0.003 [0.765]	0.003 [0.713]	0.003 [0.715]	0.003 [0.773]	0.003 [0.771]	0.003 [0.725]	0.003 [0.713]
High salary	-0.002 [0.575]	-0.002 [0.565]	-0.002 [0.531]	-0.002 [0.678]	-0.002 [0.535]	-0.002 [0.561]	-0.002 [0.565]
Ivy league	-0.007 [1.177]	-0.006 [1.104]	-0.006 [1.094]	-0.005 [0.952]	-0.006 [1.116]	-0.007 [1.164]	-0.006 [1.107]
High avg. SAT score	0.002 [0.519]	0.003 [0.784]	0.003 [0.784]	0.001 [0.224]	0.003 [0.934]	0.003 [0.851]	0.003 [0.802]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.126	0.125	0.126	0.128	0.127	0.126	0.125
N_obs	2,936	2,936	2,936	2,936	2,936	2,936	2,936

Panel C: Nonprofit Connections

Category	Ethnic or national	Education and science	Philanthropy	Social or sports clubs	Religious	Professional	Hobbies
Connected	0.007 [0.700]	0.000 [0.068]	0.018*** [2.985]	0.031** [2.280]	0.000 [0.917]	0.005 [0.482]	0.007 [0.841]
Industry-median Tobin's Q	0.015*** [3.282]	0.015*** [3.244]	0.015*** [3.277]	0.015*** [3.316]	0.015*** [3.244]	0.015*** [3.255]	0.015*** [3.227]
Segment size	-0.024*** [9.012]	-0.024*** [8.993]	-0.024*** [8.980]	-0.024*** [9.000]	-0.024*** [8.996]	-0.024*** [8.982]	-0.024*** [9.004]
Segment relative size	0.063*** [4.968]	0.063*** [4.945]	0.062*** [4.889]	0.062*** [4.917]	0.063*** [4.953]	0.063*** [4.949]	0.063*** [4.970]
Segment cash flow	0.006 [1.083]	0.006 [1.106]	0.006 [1.131]	0.006 [1.141]	0.006 [1.104]	0.006 [1.096]	0.006 [1.100]
Board member	-0.007 [1.224]	-0.007 [1.144]	-0.008 [1.322]	-0.007 [1.216]	-0.007 [1.143]	-0.007 [1.172]	-0.008 [1.241]
Senior	0.003 [0.567]	0.003 [0.597]	0.003 [0.686]	0.003 [0.577]	0.003 [0.603]	0.003 [0.579]	0.003 [0.602]
Long tenure	0.003 [0.725]	0.003 [0.714]	0.002 [0.488]	0.003 [0.697]	0.003 [0.713]	0.003 [0.748]	0.003 [0.721]
High salary	-0.002 [0.600]	-0.002 [0.563]	-0.002 [0.660]	-0.002 [0.498]	-0.002 [0.565]	-0.002 [0.545]	-0.002 [0.590]
Ivy league	-0.006 [1.061]	-0.006 [1.109]	-0.006 [1.003]	-0.007 [1.159]	-0.006 [1.107]	-0.006 [1.108]	-0.006 [1.140]
High avg. SAT score	0.003 [0.805]	0.003 [0.797]	0.002 [0.721]	0.003 [0.855]	0.003 [0.802]	0.003 [0.801]	0.003 [0.784]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.126	0.125	0.128	0.126	0.125	0.125	0.126
N_obs	2,936	2,936	2,936	2,936	2,936	2,936	2,936

TABLE XI

Connections of Divisional Managers to Board Members and the CEO

This table presents estimates from panel regressions, in which the dependent variable is the ratio of segment-level capital expenditure to book assets. The sample includes all industrial companies in the S&P 500 index, which operate in at least two business segments and provide data on segment capital expenditures and book assets. The sample period is from 2000 to 2008. All variable definitions are given in Appendix A. All regressions include year and firm fixed effects. The t-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, *** = 1%.

Connection type	Any board Member			CFO		
Dependent variable	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX	CAPEX	Industry-adjusted CAPEX	Industry-Firm-adjusted CAPEX
Model	(1)	(2)	(3)	(4)	(5)	(6)
Connected	0.006* [1.681]	0.010*** [2.656]	0.010*** [2.810]	0.003 [0.604]	0.008 [1.397]	0.008 [1.373]
Industry-median Tobin's Q	0.000 [0.057]	0.017*** [3.566]	0.015*** [3.208]	0.001 [0.135]	0.017*** [3.669]	0.015*** [3.311]
Segment size	-0.027*** [10.490]	-0.027*** [9.729]	-0.024*** [8.855]	-0.028*** [10.538]	-0.027*** [9.834]	-0.024*** [8.967]
Segment relative size	0.076*** [6.270]	0.066*** [5.088]	0.061*** [4.803]	0.077*** [6.317]	0.067*** [5.176]	0.062*** [4.899]
Segment cash flow	0.012** [2.469]	0.009* [1.715]	0.006 [1.248]	0.011** [2.393]	0.008 [1.613]	0.006 [1.138]
Board member	-0.011* [1.797]	-0.009 [1.407]	-0.009 [1.463]	-0.010 [1.628]	-0.007 [1.145]	-0.007 [1.183]
Senior	0.001 [0.285]	0.002 [0.440]	0.002 [0.474]	0.002 [0.374]	0.003 [0.639]	0.003 [0.678]
Long tenure	0.000 [0.116]	0.002 [0.586]	0.002 [0.594]	0.000 [0.059]	0.003 [0.658]	0.003 [0.672]
High salary	0.000 [0.119]	-0.002 [0.531]	-0.002 [0.580]	0.000 [0.104]	-0.002 [0.522]	-0.002 [0.569]
Ivy league	-0.007 [1.287]	-0.007 [1.152]	-0.006 [1.151]	-0.007 [1.295]	-0.007 [1.147]	-0.006 [1.143]
High avg. SAT score	0.004 [1.305]	0.002 [0.577]	0.002 [0.576]	0.005 [1.457]	0.003 [0.754]	0.003 [0.766]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.228	0.214	0.128	0.228	0.213	0.126
N_obs	3,054	2,936	2,936	3,054	2,936	2,936

Table B-I: Categories of Nonprofit organizations

This table provides details on our classification of nonprofit organizations according to seven common categories. The classification covers 7,763 organizations (57% of all nonprofit organizations in our sample), which can be unambiguously classified into one or several of the most frequent categories. The frequency column provides the proportion of organizations falling into a particular category among the 7,763 classified organizations. Percent of managers involved is the fraction of executives in our sample (3,842 people) who are associated with at least one organization in the category. The sum of percentages does not equal 100 percent, since one organization can belong to several categories and one executive can be connected to several organizations across multiple categories or not hold membership in any nonprofits.

Category	Description	Examples
Ethnic or national	Organizations with an ethnic, racial, or national focus	100 Black Men; Asian American Federation; Latin American Association; Canadian Club
Education and science	Primary and secondary schools; boards of trustees of colleges and universities; research and science institutes	New Visions for Public Schools; National Science Foundation; Social Science Research Council
Philanthropy	Charitable foundations; volunteer services; community service; health protection; environment protection	Salvation Army; End Hunger Network; Volunteers of America; Foundation for Fighting Blindness; Wildlife Conservation Society
Social or sports clubs	Tennis, golf, and country clubs; other sport clubs; private social clubs	Greenwich Country Club; Churchill Club; Pacific Union Club
Religious	Churches and religious	Church of God; Trinity Presbyterian Church; Christian Theological Seminary
Professional	Professional and industry associations	Software and Information Industry Association; Society of Logistics Engineers; Best Lawyers in America
Hobbies	Various special interest groups, such as art galleries; theater; ballet and dance clubs; wine yards; historical societies; photography; fashion clubs	Harbourfront Art Gallery; Dia Center for the Arts; International Wine & Food Society; Metropolitan Opera; Washington Ballet; No Limits Dance Club