

# **Department of Finance**

## **Working Paper**

### **It Takes Two: The Incidence and Effectiveness of co-CEOs**

By

Matteo P. Arena

Stephen P. Ferris

Emre Unlu

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## **College of Business Administration**



# It Takes Two: The Incidence and Effectiveness of co-CEOs

Matteo P. Arena<sup>♦</sup>  
Department of Finance  
Marquette University

Stephen P. Ferris  
Department of Finance  
University of Missouri

Emre Unlu  
Department of Finance  
University of Lincoln-Nebraska

## Abstract

This study examines the phenomenon of co-CEOs within publicly traded firms. Although shared executive leadership is not widespread, it occurs within some very prominent firms. We find that co-CEOs generally complement each other in terms of educational background or executive responsibilities. Our results show that firms most likely to appoint co-CEOs have lower leverage, a more limited firm focus, less independent board structure, fewer advising directors, lower institutional ownership and greater levels of merger activity. The governance structure of co-CEO firms suggest that co-CEOships can serve as an alternative governance mechanism, with co-CEO mutual monitoring substituting for board or external monitoring and co-CEO complementary skills substituting for board advising. An event study indicates that the market reacts positively to appointments of co-CEOs while a propensity score analysis shows that the presence of co-CEOs increases firm valuation.

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<sup>♦</sup> Corresponding author  
Email: [matteo.arena@marquette.edu](mailto:matteo.arena@marquette.edu)

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# **It Takes Two: The Incidence and Effectiveness of co-CEOs**

## **1. Introduction**

In spite of extensive interdisciplinary analysis on the effect of senior corporate executive management on corporate decisions and performance (e.g., Barnard (1938), Selznick (1957), Rosen (1990), Bertrand and Schoar (2003), Wasserman (2003), Adams, Almeida, and Ferreira (2005), Tichy and Cohen (1997), Denis and Denis (1995), Weisbach (1995), Parrino (1997), Malmendier and Tate (2005), Dahya, Garcia, and van Bommel (2009)), the present literature fails to examine the effect that alternative structures of CEO leadership might have on corporate performance and behavior. More specifically, existing empirical literature ignores CEO leadership models that involve the sharing of executive power and how such arrangements affect the ability of a CEO to influence corporate behavior. In this study, we examine the effect of shared power on corporate governance, corporate value, and performance by focusing on the case of co-CEOs. We use the Alvarez and Svejenova (2005) definition of co-CEOs as “two executives who, over time, perform the top job together in a coordinated fashion and are held jointly accountable for the company or unit’s results.”

Empirically, the ability of senior management to influence corporate behavior is usually measured indirectly, with most studies using specific events or proxies. Denis and Denis (1995), Weisbach (1995), Parrino (1997), and Huson, Malatesta, and Parrino (2004) focus on the valuation impact of senior management turnover while Malmendier and Tate (2005) analyze the effect of managerial overconfidence on corporate merger and acquisition decisions. Adams et al. (2005) use several proxies for CEO power and find that stocks exhibit

greater variability for firms run by powerful CEOs. Easterwood and Raheja (2008) examine the influence that CEOs have relative to the board of directors when the firm is underperforming. Bebchuk, Cremers, and Peyer (2008) construct CEO salary as a percentage of the aggregate compensation paid to the firm's top 5 executives as a proxy for CEO centrality and find that CEO centrality affects firm performance.<sup>1</sup> In contrast to this previous research, our study provides a unique opportunity for a direct examination of management's ability to influence corporate activity by an analysis of the impact of an alternative leadership structure.

The presence of two individuals simultaneously serving as the CEO of a firm has the potential to influence the firm's decision-making in ways that are very different from that of a solitary CEO. First, co-CEOs often bring complementary skills to the firm's senior leadership position, providing a range of competencies and perspectives that might not be present in a single individual. A co-CEOship also allows for the simultaneous presence of senior leadership at locations that are separated by time and distance or the simultaneous examination of two different issues of strategic importance.

Pearce and Conger (2003) argue that co-leadership is justifiable in many circumstances since senior managers of complex organizations usually do not possess all the skills and competencies necessary for successful leadership. Consequently, more than one leader might be needed to complete the tasks assigned to the CEO. Similarly, O'Toole, Galbraith, and Lawler (2002) posit that two CEOs are better than one when the challenges facing a firm are so complex that they require a set of skills too broad to be possessed by any one individual.

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<sup>1</sup> Exceptions to these approaches are studies by Bertrand and Schoar (2003) and Frank and Goyal (2007) who analyze the effect of management on firm outcomes by using fixed effects in their regression analyses to control for the effect of managers.

The presence of co-CEOs, however, might also result in sub-optimal or disjointed decision-making by the firm. Mintzberg (1989) and Hackman (2002) argue that co-CEO arrangements are plagued by coordination problems and interpersonal conflicts. The strong egos and personalities of CEOs can lead to friction and competition for power between individuals. Any inability of co-CEOs to compromise can cause loss of corporate focus and conflicted decision-making. Because of these factors, Alvarez and Svejnova (2005) view the co-CEO structure as inherently instable and generally not sustainable over a long period of time.

In this study, we pose four broad research questions as they relate to the existence of co-CEOs. Our first question concerns the extent to which a co-CEO structure exists among U.S. public corporations. Although such arrangements might be common among family firms, the practice of co-CEOs for the broader set of publicly traded firms remains unexplored. The literature appears to assume that all firms are led by solitary CEOs.

Our second research question examines the factors that might account for the presence of a co-CEO structure within a firm. The existing literature only hints at what might explain such a leadership arrangement. O'Toole et al. (2002) and Pearce and Conger (2003) argue that co-leadership is the correct organizational structure for complex organizations. Wasserman, Nohria, and Anand (2001) imply that two CEOs might be more appropriate for firms in which the CEO's decisional power is more influential, such as companies with low levels of debt, high amounts of cash, or operating in highly concentrated industries. On the other hand, more powerful CEOs might be less willing to share leadership (Hackman (2002)). Beyond these factors, there is anecdotal evidence suggesting that companies involved in mergers or family affiliations are more likely to appoint co-CEOs. We examine the

significance of these variables later in our empirical analysis.

The third research question is related to our analysis of co-CEO determinants and investigates the nature of a firm's governance structure when corporate executive leadership is shared. It might be that a co-CEOship facilitates the concentration of managerial power within a small group of executives, leading to entrenchment. In this case, we anticipate that existing governance mechanisms are weak and that the co-CEOs are better able to capture the perquisites of an entrenched management. Alternatively, co-CEOs might serve as mutual monitors and the joint leadership of two co-CEOs functions as a substitute for more traditional corporate governance mechanisms. Kandel and Lazear (1992) note that when organizations cannot easily monitor the actions of their agents, they may rely on a process of mutual monitoring to achieve the desired accountability. Additionally, co-CEOs with complementary expertise can supplement or even substitute the advising provided by other board directors. Our logistic regression analysis suggests that co-CEOs offer mutual monitoring and compensate for the reduced advising levels provided by other board members. Moreover, our empirical results regarding compensation levels and the effect of co-CEOs on performance are inconsistent with managerial entrenchment and suggest mutual monitoring. Our model of the decision to appoint co-CEOs is robust to possible endogeneity with the firm's existing governance structure, further supporting the substitute monitoring and advising functions of co-CEOs.

Our last research question focuses on the ability of co-CEOs to provide effective leadership to the firm. Given the potential for shared leadership to impact corporate decision-making, we examine what effect the presence of co-CEOs might exert on both firm performance and value.

Our initial descriptive analysis of co-CEOs provides several interesting results. First, we observe that the average length of co-CEOs is approximately 4.5 years, which is comparable to that of solitary CEOs (Shivdasani and Yermack (1999)), suggesting that this arrangement is more stable than previously believed. We also find that co-CEOships are broadly distributed across industry types. Finally, we observe that co-CEOs generally complement each other in terms of educational background or executive responsibilities.

Our empirical findings show that the most significant determinant of co-CEO arrangements is M&A activity. Firms involved in a merger will sometimes decide to appoint the CEOs of the acquirer and target as co-CEOs of the new firm. Such an arrangement can be used to accelerate merger approval and to ease the implementation of the merger. We also find that companies in which CEOs have more discretionary power (e.g., firms with lower leverage or operating in a more concentrated industry) are more likely to adopt a shared leadership arrangement. We do not find that family firms or more complex firms are more likely to appoint co-CEOs to lead them.

We obtain important results concerning the governance structure of firms with co-CEOs. We find that the power of the CEOs, the percent of independent directors, institutional ownership, and the level of corporate debt are all inversely related to the probability of a co-CEOship. Moreover, the lower number of independent directors for firms adopting co-CEOships requires most of these directors to be members of audit, compensation, and nominating committees leaving less directors to offer advising (according to the measure introduced by Faleye, Hoitash, and Hoitash (2009)). We also establish that there are important differences in compensation between co-CEOs and solitary CEOs, with co-CEOs receiving proportionately significantly less incentive compensation than solitary CEOs. We conclude

from these results that the mutual monitoring and advising provided by shared executive leadership might substitute for more traditional governance mechanisms.

Our results regarding the determinants of shared leadership help explain why co-CEOships are not a common organizational form. Firms with lower leverage, a more limited corporate focus, less independent boards, lower institutional ownership and a higher level of merger activity are more likely to appoint co-CEOs. Only a limited number of firms are able to satisfy these conditions. Particularly, past merger and acquisition activity has the greatest influence on creating a co-CEOship. The relative infrequency of M&As for the average U.S. public corporation provides a partial explanation why co-CEOships rarely occur. Only 3.5% of the firm-year COMPUSTAT observations experience at least one M&A transaction over a three-year period whereas the corresponding percentage for our sample of co-CEO firms is 23%. Further understanding of the relative rarity of co-CEOs might reside in behavioral explanations related to interpersonal conflict, hubris, and managerial over-confidence (e.g., Roll (1986), Hackman (2002), and Malmendier and Tate (2005)).

We also examine the market reaction and performance effects resulting from a co-CEOship. We find that there is a positive market reaction to the announcement of co-CEOs to lead a firm. We discover that the presence of co-CEOs is associated with a higher market-to-book ratio (MB). This result suggests that the design of the leadership structure, such as a co-CEO arrangement, can influence firm value.<sup>2</sup>

Our findings also contribute to our understanding of the relation between top executive functions and firm activity in two ways. First, it complements and supports studies

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<sup>2</sup> There is no inconsistency between this result and the mutual monitoring of co-CEOs which substitutes for other governance mechanisms. Corporate governance is only one of the factors that affect a firm's value. Co-CEOs might improve firm value by complementary expertise and by mutual advising. This is suggested by our finding that 90% of our sample co-CEOships demonstrate complementarity in CEO education, job responsibilities, or both.



such as Bertrand and Schoar (2003) which report a significant managerial influence on firm policies and behaviors. Second, it shows for the first time that a specific executive organizational structure can have a significant impact on firm value.

It is important to note that our findings regarding corporate value do not imply that more firms should adopt a shared leadership structure. We base our valuation analysis on propensity score matched samples and therefore compare the firm's market-to-book ratio with co-CEO leadership to the unobserved market-to-book ratio that would have occurred with a solitary CEO. Improvements in market-to-book ratios only show that firms with shared leadership improved their valuation. Our results do not imply that any firm could appoint co-CEOs and enjoy higher value.

## **2. The determinants of co-CEOs and their relation to governance and firm value**

In this section we further develop the research questions which guide our empirical investigation of co-CEOs in U.S. firms. These questions focus on the incidence and determinants of co-CEOship in the U.S., the nature of the firm's governance when senior corporate leadership is shared, and the effect of shared leadership on firm performance and value.

### *2.1. Determinants of shared leadership*

O'Toole *et al.* (2002) and Pearce and Conger (2003) argue that complex organizations might benefit from the complementary skills of two CEOs. For example, multinational companies might hire a CEO to lead the domestic operations of the firm, and a second CEO to manage its international operations. Furthermore, diversified companies could benefit from co-CEOs that have expertise in different industries. Similar to Coles, Daniel, and

Naveen (2008), we measure firm complexity by firm size and the number of business segments. If complex firms are more likely to benefit from co-CEOs, then these proxies for complexity should be positively related to the probability that a firm has a shared corporate leadership structure.

Companies in which the CEO's decisional power is more influential might also benefit from co-CEO leadership. Specifically, Wasserman et al. (2001) argue that when the external environment, perhaps due to high levels of industry concentration, provides firms with few opportunities, CEOs must make the most of each opportunity. This increases the overall influence of CEOs on firm performance. Further, they note that CEOs have a larger impact on firm performance when financial resources are abundant. Firms with low levels of debt have future borrowing capabilities and are less constrained by covenants while those with large amounts of cash have uncommitted resources available to the CEO. The presence of slack resources allows a CEO to pursue valuable projects or to waste capital on poor investments. In either case, the CEO's resource decisions will impact firm performance. The conjecture that firms with larger free cash flows and less debt are more likely to benefit from co-CEOs is also consistent with Jensen (1986). Jensen contends that agency conflicts are more pronounced when interest and principal payment amounts are smaller, and free cash flow is greater. Therefore, the mutual monitoring provided by co-CEOs might reduce agency costs and could benefit high free-cash-flow, low debt firms.

Based on these arguments, we hypothesize a series of relations. First, we anticipate that leverage is inversely related to the probability of shared corporate leadership. We estimate the firm's debt level by its long-term debt to total assets ratio (D). High amounts of cash suggest greater free cash flow and correspondingly more resources for the CEO to

direct towards preferred investments or perquisite consumption. Thus, we hypothesize that firms with higher levels of free cash flow (*FCF*) are more likely to have co-CEOs. Because industry concentration implies that there might be fewer investment opportunities available to the firm, thereby increasing the importance of each strategic decision by the CEO, we hypothesize that a firm's corresponding industry Herfindahl index (*HERF*) will positively affect its likelihood of having co-CEOs.

According to Mintzberg (1989) and Hackman (2002) the power struggle between co-CEOs is the larger limitation of this organizational structure. As a consequence, more powerful CEOs might be more reluctant to accept to share their leadership. Similar to Adams et al. (2005), we measure CEO power with an indicator equal to 1 if the CEOs are the only insiders of the firm. We expect this indicator variable to be negatively related to co-CEO incidence.

## *2.2. Governance of firms with co-CEOs*

Hermalin and Weisbach (1998) present a model of corporate governance based on the power struggle between the CEO and the board. They argue that boards of directors are less effective at monitoring CEOs who possess high levels of power and prestige. This reduction in the board's monitoring ability might be more pronounced when the leadership of the firm is shared by two CEOs. Thus, co-leadership might concentrate more authority with the CEOs, and further weaken the board's ability to provide oversight. This can result in an increase in the degree of managerial entrenchment. Alternatively, co-CEOs might function as mutual monitors. In this case, co-leadership substitutes for the monitoring of CEOs provided by the board of directors or institutional equity ownership. In addition to monitoring, board directors also provide advising to the firm's management (Adams (2009)).

If co-CEOs complement each other in expertise and in their job responsibility (as confirmed by our univariate analysis) there might be in less need for advising by other board directors.

To empirically examine the nature of the relation between the board and the co-CEOs, we introduce several different variables into our analysis. We measure the monitoring quality of the board by the proportion of independent board members (*PERINDEP*). Similar to Faleye et al. (2009), we measure the advising strength of the board based on how many independent directors are free from committee work (less involved in monitoring). Our advising measure (*ADVISINGBOARD*) equals 1 if only a minority of independent board members serve on at least two of the three major committees of the board (audit, compensation and nominating). We measure the extent of outside monitoring with the percentage of institutional ownership (*INSTOWN*). The design of compensation contracts for senior executives can be used as another governance device within the firm. Consequently, we examine the nature of co-CEO compensation by comparing it with that of solitary CEOs. Most importantly, we analyze the extent to which incentive based compensation is utilized in the payment of co-CEOs. To the extent that co-CEOs provide mutual monitoring, we expect that less incentive-based compensation is necessary.

### *2.3. Effect of co-leadership on firm performance*

This examination of co-CEOs provides an ideal laboratory in which to study the direct impact of top management on firm value and performance. By comparing the performance of firms led by co-CEOs to that of similar companies with solitary CEOs, we evaluate the effect that this alternative leadership structure has on valuation and operating performance. We measure valuation with the market-to-book ratio (M/B) and operating performance with the return on assets (ROA).

### 3. Sample construction and data description

We construct our sample by searching *ProQuest* for press releases and articles that mention co-CEOs between 1998 and 2008. We then eliminate non-U.S. companies, private companies, and public companies not covered by either CRSP or COMPUSTAT. After this further screening, our sample consists of 111 firms with a total of 358 firm-year observations.<sup>3</sup> We then collect co-CEO information, board characteristics, and insider ownership from annual proxy statements, accounting data from COMPUSTAT, and stock prices and returns from CRSP.<sup>4</sup> Data regarding the characteristics of CEO compensation for our co-CEO firms is obtained from annual corporate proxy statements and the EXECUCOMP database. Our sample includes some very large firms such as Verizon Communications and Citigroup, as well as highly recognizable companies such as Bed, Bath & Beyond, and American Eagle Outfitters.

The small size of our sample is not inconsistent with those studies appearing in the literature that examine specialized events or transactions. Because these events often occur infrequently, the empirical analysis is executed with samples much smaller than the large panel data sets of traditional corporate finance studies. For instance, Chalmers, Dann, and Harford (2002) construct a sample of 72 IPO firms to examine the relation between the purchase of D&O insurance by corporate insiders and subsequent performance. Fich and White (2005) examine the issue of why CEOs reciprocally sit on each other boards using a sample of only 70 CEOs. Dunbar and Foerster (2008) investigate the performance of IPOs that were initially withdrawn with a sample of 138 offerings.

To assess the degree of complementarity in the education and executive

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<sup>3</sup> The co-CEO pairs in our sample are 118 because for 7 of our firms at least one of the two co-CEOs change during the sample period.

<sup>4</sup> We retrieve the corporate governance data for the control sample, needed for our logistic regressions, from the IRRC – Risk Metrics database.

responsibilities of the co-CEOs, we access a number of different sources. We first search Marquis' *Who's Who* to obtain relevant biographical data for our sample co-CEOs. We then examine the firm's annual reports and proxy statements for each of the years of the co-CEOship's existence. Further, we search the firm's website for additional information regarding the educational achievements and professional assignments of the co-CEOs. We also use search engines such as Google, Yahoo, and Factiva to identify relevant press releases regarding our sample co-CEOs.

We obtain a description of each co-CEO's job duties from several sources. Based upon a review of annual reports, proxy statements, and various press releases, we are able to ascertain the specific responsibilities assigned to each of the co-CEOs. Overlapping or similar responsibilities in a given area are coded as an uncomplimentary co-CEOship. When information regarding the executive responsibilities of each co-CEO is unavailable, the co-CEOship is excluded from this analysis.

#### **4. The extent and nature of shared executive leadership**

##### *4.1. Profile of the sample firms*

Table 1 contains the initial descriptive statistics for our sample firms and helps establish the relative incidence of co-CEOs among U.S. industries. In panel A, we observe that the 111 sample firms are distributed over seven, one-digit Standard Industrial Classification (SIC) industry groupings. Manufacturers represent nearly a third of the sample (30%), while about a quarter (23%) is contained in service industries. Approximately another quarter (25%) of our sample is located in finance, insurance and real estate. The remaining sample firms are distributed across wholesale-retail trade (13%), transportation and communication (6%), mining and construction (3%) and public administration (1%).

In panel B we examine circumstances surrounding the creation of co-CEOships among our sample firms. We determine that one fifth of the co-CEOships are associated with merger and acquisition (M&A) activity. These co-CEOs arrangements are finalized at the completion of a merger by nominating the CEOs of the two merging companies as co-CEOs of the new company. The non-merger related circumstances include family succession influences (25%), the existence of multiple corporate founders (15%), and its use to smooth the transition between an incumbent CEO near retirement and a new incoming CEO (9%).<sup>5</sup>

We examine the duration of co-CEOships in panel C. We observe that at both the firm and individual level, the average tenure of a co-CEOship is about 4.5 years. This result suggests that co-CEOs have tenures not much shorter than those of solitary CEOs as reported by Shivdasani and Yermack (1999). Interim co-CEOships (those put in place just for transitioning between a retiring CEO and the successor) are the shortest, with an average of about one year. Co-CEOships due to mergers are also quite short with an average of 2.4 years. This result suggests that two CEOs joined together as a result of a merger might launch a power struggle that reduces the length of their shared tenure.

In Panel D we present the role played by co-CEOs on the board of directors of their firms. In the great majority of our firm-year observations (93%), both co-CEOs sit on the board of directors. In 84% of our firm-year observations, at least one of the two co-CEOs is the chair of the board. These results provide preliminary support for our hypothesis that co-CEO mutual monitoring substitutes for other CEO monitoring mechanisms such as separation between the CEO and board chair positions.

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<sup>5</sup> The incidence of family firms in our sample is comparable to the proportion of family firms among all public US corporations. Anderson and Reeb (2003) find that over 35 percent of S&P 500 firms are family controlled; Gadhoum, Lang, and Young (2005) observe that approximately 25 percent of U.S. corporations is controlled and managed by a family.

#### *4.2. Complementarity within the CEO dyad*

The presence of complementarity can be a motivating force for the creation of a co-CEOship and might help explain the subsequent performance of the CEO dyad. In this section we examine the extent to which complementarity exists between the co-CEOs in terms of educational achievement and executive responsibilities. We define complementarity as the presence of off-setting skills, abilities or experiences within the co-CEOship.

We begin our analysis in Table 2 with a series of descriptive statistics regarding the education level and academic fields of study for our sample co-CEOs. In panel A we observe that 56.5% of co-CEOs possess a graduate degree while another 40.2% hold a bachelor's degree. Only about 3.3% of our sample co-CEOs failed to earn a college degree. In panel B we analyze the field of study for the highest education level attained by our sample co-CEOs. We observe that the MBA is the most popular graduate degree and is the most frequently earned degree overall. Over half of the co-CEOs hold an MBA. Business is the most popular undergraduate field of study, with almost 45% of the co-CEOs majoring in this discipline. In Panel C we present the highest educational level of co-CEO pairs. For the majority of our co-CEO pairs (69.7%), at least one co-CEO has a graduate degree.

In Table 3 we examine complementarity among co-CEOs in both their field of academic study and the assignment of executive responsibilities. Our use of educational achievement as a measure of complementarity within a co-CEOship is justified to the extent that formal education is associated with an individual gaining the knowledge, abilities, and skills that will ultimately be useful as a senior executive.

Educational complementarity occurs when one of the co-CEOs has at least one academic degree different from the other co-CEO. The findings in panel A of Table 3 suggest



that educational complementarity is extensive among our sample co-CEOs. Nearly three-quarters of our co-CEO dyads possess at least one different academic degree between them.

Panel B contains our analysis of complementarity based upon the responsibilities assigned to each co-CEO. This complementarity captures the ability of a co-CEO to generate efficiencies in the management of the firm by eliminating redundant supervision and assigning oversight for an area to the best qualified co-CEO.

Panel B shows that most co-CEOships are structured so that executive assignments are complementary in nature and that overlap in responsibilities is eliminated. This suggests that co-CEOships might be able to generate managerial efficiencies by their coordinated assignment of executive oversight responsibilities. Yet, a significant portion of our co-CEOships (i.e, 37.2%) remains uncomplementary with regards to job responsibilities. This suggests that joint or overlapping responsibilities continue to remain an important way of structuring senior executive functions for many co-CEOships. Internal politics, incomplete expertise, or merger negotiations might be among the factors that account for this redundant oversight. Indeed, in untabulated results, we find that 68% of our sample firms adopting a co-CEO structure as the result of a merger have an uncomplementary assignment of executive responsibilities.

In panel C, we examine the extent of joint complementarity in the field of study and the assignment of executive responsibilities. We observe that 42.6% of our co-CEOships demonstrate complementarity in both academic discipline and supervisory duties. Nearly another third of our sample exhibits complementarity in academic preparation, but without a corresponding complementarity in executive responsibilities. The remaining quarter of our sample (25.9%) that is not complementary regarding the field of academic study is

approximately evenly distributed between the complementary and uncomplementary assignment of executive responsibilities. Only 11% of the co-CEOships in our sample fail to demonstrate any type of complementarity.

## **5. Determinants of shared leadership**

In this section we examine the determinants of shared leadership. We examine what financial and industry characteristics might explain a firm's decision to adopt a co-CEO structure. We also analyze the nature of the firm's governance when corporate executive leadership is shared. To begin our analysis, we construct two samples of co-CEO firms. The first is our aggregate set of firms with co-CEOs. The second sample excludes those firms whose co-CEOship is the result of a merger. This allows us to control for the unique governance or negotiation terms often associated with a merger that might lead to the creation of co-CEOs. We also estimate several different specifications of logistic regressions to capture the simultaneous effect of various factors in the decision to create co-CEOs.

### *5.1. Univariate examination of shared leadership*

In Table 4 we provide a comparison of median values of possible determinants of a co-CEO leadership structure between the entire sample, the non M&A subsample, and a control sample consisting of all COMPUSTAT firms with solitary CEOs.

We observe a number of important differences between the co-CEO firms and those that operate with a single CEO. First, we note that co-CEO firms are larger than the solitary CEO firm as measured by the market value of equity. This result holds regardless whether the M&A firms are included or not. Even the non-merger co-CEO firms are about three times as large as the solitary CEO firms. Co-CEO firms also have higher leverage and a greater

number of business segments. These results, however, appear to be driven by the M&A subsample firms; when we exclude the merger-related co-CEO firms, the degree of financial leverage and the number of business segments are not significantly different from the solitary CEO sample.<sup>6</sup>

We also observe some important differences in board structure between co-CEO firms and the control firms. Boards of the co-CEO firms have fewer independent directors and those directors are less available to offer advising. The co-CEO firms, however, tend to have a higher level of institutional equity ownership. Firms that adopt a co-CEOship structure are also less likely to have CEOs as the only insiders of the board (CEOPOWER).

Finally, we observe that the co-CEO firms operate in more concentrated industries than solitary CEO firms. This result is consistent with the implications of Wasserman et al (2001) that co-CEO arrangements might be more valuable in concentrated industries, where CEO decision-making has the potential to make a greater impact.

## *5.2. Multivariate analysis*

In Table 5 we present the results from our multivariate analysis of the relation between firm characteristics and the presence of co-CEOs. We design our regression analysis such that the dependent variable is equal to one when a firm is managed by two CEOs and zero otherwise. We estimate several different models which include or exclude controls for year and industry fixed effects.

We recognize that the relation between governance characteristics such as board size, number of independent directors, institutional ownership, and the presence of co-CEOs might be endogenous. Governance characteristics can, among other factors, determine the

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<sup>6</sup> In a multivariate setting leverage is negatively related to the probability of appointing co-CEOs after controlling for the M&A status of the firm.

probability of shared CEO leadership. Alternatively, the presence of co-CEOs might influence the design of a firm's corporate governance. We control for this potential bilateral causality by estimating a set of logistic regressions in which the independent variables are lagged by one year. As a robustness check, we estimate a set of instrumental variables (IV) probit regressions in which we instrument our governance variables with their one-year lagged counterparts. These results are discussed in Section 8.

Table 5 confirms the existence of a number of significant variables related to the presence of a co-CEOship. We find that smaller companies are more likely to have co-CEOs. This result is the opposite of what found in the univariate analysis presented in Table 4. The governance variables for the single-CEO firms are retrieved from IRRC–Risk Metrics. This database covers a limited set of firms, mostly large. The restriction imposed by our governance database is likely responsible for the negative coefficient of the size variable. We observe that the existence of M&A activity exerts a positive and significant influence on the probability of a co-CEO. Companies with lower levels of debt are also more likely to have co-CEOs as are firms operating in more concentrated industries or with greater free cash flow. Thus, we find that firms in which CEO decision-making is more influential are more likely to have shared executive leadership. This result is consistent with Wasserman et al. (2001) that companies in which the CEOs have more decisional influence might benefit from co-CEO leadership. However, firms in which CEOs have more power on a governance standpoint (being the only insider on the board) are less likely to adopt a shared leadership structure as evidenced by the negative sign and significance of our CEO power indicator variable.

All of the governance variables (i.e., percentage of independent directors, board advising, and institutional ownership) are statistically significant and suggest a direct

causality from a firm's governance characteristics to the decision to hire co-CEOs. We observe that the percentage of independent directors on the board is negatively related to the probability of co-CEOs. This is consistent with the substitute governance effect and our univariate results regarding board independence. Equity ownership by institutional investors, an important source of external monitoring, is inversely related to the likelihood of having co-CEOs. Further, leverage is negatively related to the probability of co-CEO leadership, suggesting that any decrease in monitoring by creditors is offset with a greater probability of the firm selecting co-CEOs. Finally, the advising board variable is negative and significant suggesting that firms with less advising directors are more likely to implement shared leadership. Overall, the findings for these variables support the argument that co-CEOs can substitute, at least partially, for other corporate governance mechanisms.<sup>7</sup>

The negative sign and significance of the advising variable does not directly imply that these boards provide better monitoring. These boards have less independent directors than the average COMPUSTAT firm and therefore the majority must be committee members just to populate such committees. Our results show that boards of firms that decide to appoint co-CEOs have fewer independent directors than the average firm. This result affects both the monitoring and advising activities of the board. Overall, the sign and significance of the coefficients of our logit regressions suggest that co-CEOs substitute for board advising as well as various devices for the internal and external monitoring of CEOs. .

The empirical analyses in Table 5 suggest an explanation why co-CEOships are

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<sup>7</sup> In an alternative model specification described in our robustness analysis, we add a family indicator variable. We find that family is not a significant determinant of the decision to appoint co-CEOs. In an untabulated analysis we add the Gompers, Iishi, and Metrick (2003) index. However, only a small portion of our sample firms are covered by the IRR database, limiting the statistical power of this test. When we estimate this model across the IRR subsample we fail to find statistical significance for the coefficient of the governance index variable.

uncommon. Our results show that relatively lower leverage, narrower firm focus, larger and less independent board structure, lower institutional ownership and greater merger activity increase the likelihood of shared executive leadership. Only a small number of firms can satisfy these conditions. Particularly, past merger and acquisition activity appear to have a dominant influence on the likelihood that a co-CEOship is created. The relative infrequency of merger activity for the average U.S. public firm provides partial insight into why co-CEOships remain an unusual phenomenon. Only 3.5% of the COMPUSTAT firm-year observations have at least one M&A transaction in the past three fiscal years, whereas this percentage is 23% for the co-CEO sample firms. These findings suggest that co-CEOships continue to remain relevant as an alternative governance mechanism, but to a smaller set of firms.

We further examine the nature of changes in the likelihood of a co-CEOship to better understand the effect of past merger activity. Because logistic models are linear in the logistic transformation of probability, but not in probability itself, we evaluate the other control variables at fixed values to compute base case probabilities. For these estimates, we evaluate all other variables at their sample medians and evaluate the merger activity indicator variable at zero. For the base case, the probability of having a co-CEO is 6%. When the merger activity dummy is evaluated at a value of 1, the probability of having a co-CEO becomes 13%, implying an increase by a factor of more than two.

## **6. Relative co-CEO compensation**

There are two questions regarding co-CEO compensation that we investigate in this section. The first concerns the total amount of compensation paid to co-CEOs. That is, are co-

CEOs twice as costly as a solitary CEO or are they proportionally less expensive? If the existence of co-CEOs increases managerial entrenchment and agency conflicts, then co-CEO compensation is likely to be proportionately higher than that of solitary CEOs. Alternatively, if the mutual monitoring derived of co-CEOs is an effective governance mechanism, then co-CEO compensation might be proportionately less than solitary CEO compensation.

The second question concerns the percentage of compensation that is incentive based. Is co-CEO compensation more or less incentive based than that of solitary CEOs? The mutual monitoring of co-CEOs might reduce agency conflict and require less incentive-based compensation on an individual basis. Alternatively, if the presence of co-CEOs shifts power from the board to executive management, then more incentive-based compensation might be needed to reduce agency conflicts.

Table 6 contains our analysis of co-CEO compensation. In this table we compare co-CEO compensation with single CEO compensation for the same firm in the year prior and the year following the existence of a co-CEOship. Median values are reported for all compensation statistics. All dollar amounts presented in the table are inflation adjusted in year 2000 dollars.

We observe in panel A that co-CEOs as a team are more expensive than the traditional solitary CEO. We find, however, that the co-CEO team is not twice as expensive as a single CEO. Median total cash compensation for co-CEOs is 98% higher than that of a solitary CEO. Larger discounts apply to other components of compensation for the co-CEO team. Salary is only 82% higher while the bonus is only 52% greater. More surprisingly, the Wilcoxon test of the median shows that the two co-CEOs together are awarded fewer options and stock grants, with a lower dollar value than solitary CEOs. This difference is consistent

with the reduced need for incentive compensation as suggested by the mutual monitoring hypothesis.

In panel B we examine the various compensation components for the co-CEOs on an individual basis. Consistent with our results for the co-CEO team, we find that co-CEOs individually are paid less than solitary CEOs. The median total cash compensation for co-CEOs is 99% of that for single CEOs, while salary is only 91% as high. The median bonus awarded a co-CEO is 12% lower than that of solitary CEOs. This difference, however, is not statistically significant. Lower cash compensation for co-CEOs might be explained by the fact that co-CEOs share managerial responsibilities and workload.

We also observe in panel B that solitary CEOs receive significantly more incentive compensation than co-CEOs. The mean dollar value of option grants for solitary CEOs is over two and half times as large as that for co-CEOs. The raw number of option grants for solitary CEOs is also over twice as large as that for co-CEOs. When combined with the incentive-based compensation results reported in panel A, we conclude that incentive-based compensation is used less often to reward co-CEOs. This result is consistent with the contention that co-CEOs monitor each other, thereby reducing the need for incentive based compensation to reduce agency costs.<sup>8</sup>

In untabulated results, we further investigate the use of incentive compensation by comparing the bonus-to-salary and bonus-to-total cash compensation ratios between solitary and co-CEOs. We find that the bonus is nearly 45% as large as the salary for solitary CEOs compared to only 32.2% for co-CEOs, although not statistically significant. The corresponding value for bonus-to-total compensation is 31.4% (solitary CEO) and 24.7% (co-

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<sup>8</sup> We also replicate our compensation tests for the M&A sub-sample. The results are not significantly different from those generated with the entire sample.



CEO). These results hold whether the co-CEOs are treated as a team or separately. We also find that the difference between the higher paid co-CEO and the lower-paid co-CEO is not significant.

For the sub-sample of our firms that are covered by EXECUCOMP we also perform other untabulated tests. We examine the compensation gap between co-CEOs and other firm's executives in various ways. First, we replicate the main finding of Kale, Reis, and Venkateswaran (2009) that there is a positive relation between the compensation gap (between CEO and VPs) and performance. Furthermore, we test whether this positive relation is more or less pronounced for co-CEO firms. We find that the positive relation between the compensation gap and performance is no different than that of single-CEO firms. Supporting this finding, we also verify that the compensation gap between CEO and VPs is comparable to the rest of the EXECUCOMP universe. This implies that co-CEO firms do not provide more tournament incentives than single-CEO firms. We conclude that there is no evidence of a co-CEO compensation gap influencing firm performance.

We also analyze pay-performance sensitivity. We find that co-CEO firms have stronger incentive alignments relative to the rest of the EXECUCOMP universe. We measure pay-performance sensitivity, *COCEO\_DELTA*, as the average of (over the two co-CEOs) the change in value of CEO's stock option and common stock portfolio for a one-percent change in the value of the firm's common stock price as calculated by Core and Guay (2002). We find that the co-CEO incentive alignment declines through the tenure of the co-CEOships that are formed and dissolved during our sample period.

## 7. Market reaction and performance effects of shared leadership

In this section we examine the market reaction surrounding the announcements of co-CEO appointments and the impact that shared executive leadership exerts on firm operating performance and valuation. Our operating performance and valuation analysis uses a matched sample constructed on the basis of propensity scores.

### 7.1. *Announcement period returns*

If firms appoint co-CEOs when shared leadership has the potential to improve performance as suggested by Wasserman *et al.* (2001) and Pearce and Conger (2003), then the stock market should react positively to the announcement of the adoption of a co-CEO structure. If, instead, shared leadership produces uncoordinated or poor decision-making by the firm (Mintzberg (1989); Hackman (2002)), then the market should react negatively to co-CEO announcements. The nature of the abnormal returns surrounding an announcement of a co-CEO appointment also has implications concerning whether such an arrangement means greater managerial entrenchment or provides mutual monitoring.

To ensure that our results capture the market reaction to only the creation of a co-CEOship, we eliminate those firms that announce the co-CEO appointment in conjunction with other news (e.g., merger, dividend change, earnings) and those that announce a new co-CEO team, but are already lead by co-CEOs. Further, we lose any sample firms that fail to announce their co-CEOships with a press release or are private in the year preceding the announcement. Our final sample consists of 30 firms. Nevertheless, this small sample still allows for meaningful analysis. Kothari and Warner (2007), for instance, show that for short-window event studies the power of the test is still high even when the observations are between 20 and 30.

We calculate abnormal returns surrounding the announcement date by estimating the

market model over the day -255 to day -46 window relative to the announcement date. The market return is proxied by the CRSP value-weighted market index. We obtain similar results when we estimate the market model with the CRSP equally-weighted market index. Table 7 presents the cumulative average abnormal returns (CAARs) for the day of the announcement (0,0) a two-day period beginning at the announcement date (0,1), and a three-day period centered around the announcement date (-1,1). Since *ProQuest* reports announcements with the date and time at which they were originally released, we believe that the (0,0) and (0,1) intervals provide results that are least likely to be influenced by confounding events.

The CAARs are positive and statistically significant for all three examination windows based on the Brown and Warner (1985) test statistics. The abnormal return for the announcement day is 2.58%. The day (0,1) abnormal return is 2.81%, while the day (-1,1) return is 6.19%. These results provide supporting evidence that firms appoint co-CEOs when shared leadership is believed to be advantageous. These results are also consistent with the mutual monitoring hypothesis.

## 7.2. Propensity score analysis

Using propensity score matching, we compare the expected valuation and operating performance of a firm with co-CEOs to the expected valuation and performance that would have been observed if the firm had a solitary CEO. Using the methodology of Dehejia and Wahba (2002), we implement a commonly used matching algorithm: nearest neighbor matching. The nearest neighbor method selects  $n$  control observations with the closest propensity score for each treatment observation. We begin by computing the propensity scores based on Model 4 of Table 5. Next, we create three control samples based on the nearest neighbor algorithms. We set  $n$  to 1, 4 and 6. We match the control firms with

replacements to ensure high matching quality and stable coefficient estimates.<sup>9</sup>

As suggested by Dehejia and Wahba (2002), we estimate the treatment effect due to the presence of co-CEOs by using weighted least squares regression. Weights are assigned based on the number of times that a firm-year observation is matched as a control variable.<sup>10</sup> We consider two specifications. In the first specification we regress performance measures only on an indicator variable for the presence of co-CEOs. In the second specification we include variables used to compute the propensity scores.

In Table 8 we present the results of weighted least squares regressions with market-to-book and return on assets as the dependent variables. We find that co-CEO firms are associated with higher M/B relative to a matched sample. Regardless of the matching algorithm and presence of the propensity covariates as additional controls, we find that the co-CEO dummy is uniformly significantly positive. This result, however, is not inconsistent with the previous finding that co-CEO mutual monitoring substitutes for other governance mechanisms. The firm's improved valuation might be the result of better decision-making due to the complementary expertise of the two co-CEOs and their mutual advising. As described earlier, 44% of our sample co-CEOships possess complementarity in both CEO education and job responsibilities, while 45% of the co-CEOships exhibit complementarity in either education or job responsibilities. This analysis does not, however, examine whether co-CEOs are able to influence the firm's long-term performance.

It is also important to note that performance results obtained with propensity score

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<sup>9</sup> Propensity scores for co-CEO and non-co-CEO samples overlap significantly. A high degree of overlap provides two benefits. First, our findings become insensitive to the matching algorithm, increasing the reliability of our conclusions. Second, due to large pool of control firm candidates, matching quality increases. We also reconstruct our samples without allowing for replacements and re-estimate the analyses. Our findings remain unchanged.

<sup>10</sup> Our results are not sensitive to the weighing scheme. OLS estimations yield virtually the same results, which are available upon request.

matching cannot be generalized to all firms. Evaluations based on propensity score matched samples compare the value under co-CEO leadership to the unobserved value that would have occurred were that firm lead by a single CEO. The improvements in valuation simply show that firms choosing to implement shared leadership indeed benefit from it. It does not mean that any firm that appoints co-CEOs will necessarily improve its valuation.

## **8. Robustness Tests**

In this section we provide the results from a series of untabulated robustness checks concerning co-CEOships. More specifically, we test to determine the effect that family and founder status have on the likelihood of a co-CEOship as well as provide an alternative test for endogeneity in the relation between co-CEOs and corporate governance.

### *8.1. Family status*

Panel B of Table 1 shows that 25% of the co-CEO firms in our sample are family businesses. This percentage is consistent with the incidence of family businesses among the totality of U.S. public corporations noted by researchers such as Anderson and Reeb (2003) and Gadhoun et al. (2005). This fact suggests that family status might not be a significant determinant of co-CEOships. To determine the extent to which family status affects the likelihood of a co-CEOship, we add a family indicator variable equal to one when a founding family member is on the board or owns at least 20% of the firm to the regressions presented in Table 5. Since the family data is hand-collected, the control sample is restricted to 500 randomly selected firms instead of the totality of the COMPUSTAT universe. We find that the family status indicator variable is statistically insignificant across all model specifications. All other coefficients are qualitatively identical to those presented in Table 5 with no changes

in either their signs or significance levels.

### 8.2. *Founder and interim co-CEOs*

Panel B of Table 1 shows that 15% of co-CEOs are founders of the firm and 9% of the co-CEOships are interim arrangements in which the old CEO and the new one temporarily share executive responsibilities to facilitate transition. While we cannot test if the presence of founders in the company or if succession motives are significant determinants of the decision to appoint co-CEOs, we test if the Table 5 results are robust to the exclusions of founder and interim co-CEOs. We find that the results presented in Table 5 hold even after eliminating all family founder and interim co-CEOs from our sample. Therefore, we conclude that founder or interim co-CEO firms are not responsible for the major results of this study.

### 8.3. *Endogeneity between co-CEOships and Corporate Governance*

Even though reverse causality does not appear to affect our logistic regressions due to the one-year lag between the independent variables and the co-CEO dependent variable, the decision to appoint co-CEOs and our governance variables (board size, percentage of independent directors, and institutional ownership) might be related to some other underlying, unobservable variable. To verify that this type of endogeneity does not affect our empirical findings, we estimate a set of instrumental variable (IV) probit regressions.

Specifically, we replicate the analysis presented in Table 5 using an IV two-stage approach to control for possible endogeneity between co-CEOship and our set of corporate governance explanatory variables. Consistent with Boone, Field, Karpoff, and Raheja (2007), we instrument our governance variables with the lagged values of these variables. We also include the other variables originally included in the Table 5 regressions in these new instrumented regressions. The sign and significance of the coefficients in the second-stage

IV probit regressions are qualitatively identical with those presented in Table 5. Overall, the evidence offered by the IV probit regressions suggests that our results are robust to endogeneity concerns.

## 9. Conclusion

This study provides a number of interesting descriptive statistics regarding the nature of co-CEOs. We find that the creation of co-CEOships is broadly distributed across industries. We further note that complementarity in educational preparation or the assignment of executive responsibilities is widespread in co-CEOships.

We find that there are several factors which are associated with the creation of a co-CEOship. The most significant determinant of co-CEO appointments is M&A activity. Firms involved in a merger will sometimes decide to appoint the CEOs of the acquirer and target as co-CEOs of the new firm. Additionally, consistent with Wasserman *et al.* (2001) we determine that firms in which CEOs have more discretionary power as implied by lower debt levels, higher quantities of excess cash, and greater industry concentration, are more likely to adopt co-CEO leadership structures. Further, we discover that co-CEOs are most likely to emerge in firms that encourage the development of powerful executives through a weak board structure and low levels of leverage or institutional ownership. However, if CEOs have more power in the boardroom they are less likely to share their leadership with a co-CEO. Moreover, we show that complementarity in skills and expertise among co-CEOs supplements board advising. We also find from a series of instrumental variable regressions that the effect of governance on co-CEO creation is robust to possible endogeneity.

Additionally, we discover that co-CEOs are compensated proportionately less than

solitary CEOs. Co-CEOs are relatively less costly across all components of their compensation: fixed salary, bonus, and option grants. This result is inconsistent with entrenchment effects resulting from a co-CEOship since entrenchment would likely produce higher CEO salaries. We find that incentive pay represents a smaller percent of compensation for co-CEOs than for single CEOs. Possibly, incentive compensation is less needed for co-CEOs because of their mutual monitoring.

Finally, we examine the influence that co-CEOs have upon firm valuation and performance. We begin by determining that the market reacts positively to the announcement of co-CEOs, suggesting that the market capitalizes the anticipated reduction in agency costs associated with mutual monitoring. We then describe how the presence of co-CEOs affects corporate valuation and operating performance. Specifically, we observe that the presence of a co-CEO has a positive impact on a firm's market-to-book ratio, a result that is also inconsistent with entrenchment. Since the mutual monitoring of co-CEOs substitutes for other governance mechanisms, the impact of co-CEOships on value might be the result of their complementary skills which supplement the advisory role of the board.

The combined evidence provided by the instrumental variable regressions, the compensation analysis, and the market-to-book results suggests that co-CEOs can serve as an alternative governance mechanism, with their mutual monitoring substituting for more conventional board or external monitoring of CEOs. Co-CEO complementarity also provides a substitute for board advising.

The importance of these findings resides in several areas. First, it establishes that there are effective alternative leadership models to that of the solitary CEO. Our findings regarding job and responsibility complementarity within the co-CEO team suggest that this management



design can focus substantial strengths toward the strategic leadership of the firm. Our results further show that the design of the senior leadership structure can reduce agency problems between management and shareholders. The creation of a co-CEOship that can mutually monitor represents another governance mechanism that can better align shareholder interests with those of corporate insiders.

The evidence presented in this study is inconsistent with the premise that reduced CEO authority leads to lower CEO effort as suggested by Stein (1988), Aghion and Tirole (1997), and Almazan and Suarez (2003). This literature argues that most CEOs prefer to be a solitary CEO and not part of a dual CEO arrangement. Even though the small number of co-CEO firms in our sample initially appears consistent with this argument, we find for those firms that decide to appoint co-CEOs, the resultant sharing of executive authority does not lead to shirking by the CEOs. Finally, our results validate the continued importance of management to the firm's activities. Our findings are consistent with Drucker (1954) claim that managers create, perceive, and pursue opportunities, thus accounting for differences in organizational performance.

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**Table 1**  
**Characteristics of co-CEO Firms**

This table provides descriptive statistics for the sample firms. Panel A presents the distribution of our sample firms by industry based on one-digit SIC codes. Panel B identifies the circumstances associated with co-CEO creation. Panel C provides univariate statistics regarding the tenure of co-CEOs. The first two rows in panel C present co-CEO tenure at the firm level (aggregating subsequent co-CEO tenures for the same firm), at the CEO level, and at the CEO level by motivation. Panel D provides descriptive statistics on co-CEOs' participation to the board as directors and chairs. Panel E and F contain data concerning the employment of co-CEOs preceding and following their tenure as co-CEOs.

*Panel A: Industry distribution*

| Industry  | <i>N</i> | %   |
|---|----------|-----|
| Mining and construction                                   | 3        | 3%  |
| Manufacturing   | 33       | 30% |
| Transportation, communication, electric, gas and services | 7        | 6%  |
| Wholesale-retail trade                                    | 14       | 13% |
| Finance, insurance and real estate                        | 28       | 25% |
| Services  | 25       | 23% |
| Public Administration                                     | 1        | 1%  |

*Panel B: Circumstances associated with co-CEO creation*

| Motivation  | <i>N</i> | %   |
|-------------|----------|-----|
| M&A         | 22       | 20% |
| Family      | 28       | 25% |
| Co-Founders | 17       | 15% |
| Interim     | 10       | 9%  |
| Other       | 34       | 31% |

*Panel C: Co-CEO duration length (in years)*

|                         | <i>N</i> | Mean | Median | Min  | Max   |
|-------------------------|----------|------|--------|------|-------|
| All Sample - Firm Level | 111      | 4.69 | 2.83   | 0.13 | 35    |
| All Sample - CEO Level  | 118      | 4.37 | 2.7    | 0.13 | 32.33 |
| Co-Founders- CEO Level  | 17       | 7.15 | 3.75   | 0.58 | 32.33 |
| Family- CEO Level       | 26       | 6.71 | 6.58   | 0.58 | 26    |
| Interim- CEO Level      | 10       | 1.04 | 0.67   | 0.13 | 3.25  |
| Merger- CEO Level       | 20       | 2.39 | 1.83   | 0.33 | 9.25  |
| Other- CEO Level        | 45       | 3.60 | 1.83   | 0.25 | 17    |

*Panel D: Role of Co-CEOs on the Board of Directors (firm-year observations)*

|  | <i>N</i> | %   |
|--|----------|-----|
| Both co-CEOs are directors               | 334      | 93% |
| One co-CEO is a director                 | 13       | 4%  |
| Neither co-CEO is a director             | 11       | 3%  |
| The co-CEOs are co-Chairs of the Board   | 108      | 30% |
| One co-CEO is the Chair of the Board     | 192      | 54% |
| Neither co-CEO is the Chair of the Board | 58       | 16% |

**Table 2**  
**Descriptive overview of the educational background of co-CEOs**

This table examines the highest educational achievement of co-CEOs on two dimensions: (1) educational level and (2) field of study. Panel A presents the highest educational level for each co-CEO. Panel B lists the field of the highest degree earned by each co-CEO. Panel C presents the highest educational level for each co-CEO pair in the sample.

*Panel A: Highest educational level of co-CEOs*

| Education            | Number | % of non-missing |
|----------------------|--------|------------------|
| Graduate degree      | 104    | 56.52%           |
| Undergraduate degree | 74     | 40.22%           |
| Some college         | 3      | 1.63%            |
| Some high school     | 3      | 1.63%            |
| Missing              | 73     |                  |

*Panel B: Field of study for highest educational level of co-CEOs*

| Education                   | Number | % of non-missing |
|-----------------------------|--------|------------------|
| <i>Graduate degree</i>      |        |                  |
| MBA                         | 53     | 51.46%           |
| Technical                   | 21     | 20.39%           |
| JD                          | 19     | 18.45%           |
| Other                       | 10     | 9.71%            |
| Missing                     | 1      |                  |
| <i>Undergraduate degree</i> |        |                  |
| Business                    | 27     | 44.76%           |
| Technical                   | 12     | 20.34%           |
| Other                       | 20     | 33.90%           |
| Missing                     | 15     |                  |

*Panel C: Highest educational level of co-CEO pairs*

| Education                              | Number | % of non-missing |
|--|--------|------------------|
| Both co-CEOs have graduate degree      | 28     | 25.69%           |
| One co-CEO has graduate degree         | 48     | 44.04%           |
| Both co-CEOs have undergraduate degree | 16     | 14.68%           |
| One co-CEO has undergraduate degree    | 14     | 12.84%           |
| Neither co-CEO has university degree   | 3      | 2.75%            |
| Both missing                           | 9      |                  |

**Table 3****Complementarity in fields of study and the assignment of duty of co-CEOs**

This table examines the extent to which there are differences in assignments of duty and fields of study (measured at the beginning of the co-CEO appointment) between a co-CEO team. Each pair of co-CEO is treated as a single observation. Assignment of duty is classified as complementary if co-CEOs have different responsibilities. Field of study is classified as complementary if one of the co-CEO has at least one different degree than those of the other co-CEO. Due to data limitations, Panel A, B and C are based on 67, 86 and 54 co-CEO firms.

*Panel A: The extent of complementarity in the field of study*

|                     | Complementary | Uncomplementary |
|---------------------|---------------|-----------------|
| Number of firms     | 50            | 17              |
| Percentage of firms | 74.63%        | 25.37%          |

*Panel B: The extent of complementarity in the assignment of co-CEO responsibilities*

|                     | Complementary | Uncomplementary |
|---------------------|---------------|-----------------|
| Number of firms     | 54            | 32              |
| Percentage of firms | 62.79%        | 37.21%          |

*Panel C: Complementarity based on field of study and assignment of co-CEO responsibilities*

|                                |                 | Assignment of co-CEO responsibilities <i>n</i> (%) |                 |
|--------------------------------|-----------------|--|-----------------|
|                                |                 | Complementary                                      | Uncomplementary |
| Field of study<br><i>n</i> (%) | Complementary   | 23 (42.59%)  | 17 (31.48%)     |
|                                | Uncomplementary | 8 (14.81%)   | 6 (11.11%)      |



**Table 4**  
**Univariate Analysis of the Determinants of a co-CEO Structure**

This table presents a univariate comparison of possible determinants of a co-CEOship. The sample period is 1998-2008. *MVE* is the market value of equity in \$ millions (item #19\*item#25). *D* is the ratio of long-term debt to book value of assets (item #9/item #6). *FCF* is the free-cash flow scaled by the book value of assets ([item #13- item #16 – item #15 – item #19 – item #21+Δitem #35]/item #6). *CEOPOWER* equals 1 if the CEO is the only insider on board, otherwise 0. *ADVISINGBOARD* equals 1 if only a minority of independent board members serve on at least two of the three major committees of the board (audit, compensation and nominating). *PERINDEP* is the proportion of independent board members on the board. *INSTOWN* is the proportion of institutional ownership. *SEGNUM* is the number of business segments. *HERF* is a revenue-based Herfindahl index computed at 3-digit SIC level.

| Variable             | co-CEO Sample<br>(1)   |          | co-CEO Sample<br>(without M&A)<br>(2)                        |          | COMPUSTAT Sample<br>(3)                                      |          | <i>p</i> -values for differences<br>in medians (or means when<br>reported) |        |
|----------------------|--|----------|--|----------|--|----------|--|--------|
|                      | Medians<br>(Means are<br>provided<br>for dummy<br>variables) | <i>N</i> | Medians<br>(Means are<br>provided<br>for dummy<br>variables) | <i>N</i> | Medians<br>(Means are<br>provided<br>for dummy<br>variables) | <i>N</i> | (3-1)  | (3-2)  |
| <i>MVE</i>           | 387.47   | 334      | 336.83   | 256      | 117.95   | 73,843   | 0.0000   | 0.0000 |
| <i>D</i>             | 0.1201   | 332      | 0.0943   | 254      | 0.0827   | 73,391   | 0.0055   | 0.1399 |
| <i>FCF</i>           | 0.0472   | 313      | 0.0524   | 240      | 0.0218   | 71,417   | 0.0000   | 0.0001 |
| <i>CEOPOWER</i>      | 0.3916   | 332      | 0.4118   | 255      | 0.5225   | 21,583   | 0.0000   | 0.0004 |
| <i>ADVISINGBOARD</i> | 0.4414   | 333      | 0.4180   | 256      | 0.6316   | 21,583   | 0.0000   | 0.0000 |
| <i>PERINDEP</i>      | 0.5556   | 333      | 0.5714   | 255      | 0.7000   | 21,583   | 0.0000   | 0.0000 |
| <i>INSTOWN</i>       | 0.4136   | 334      | 0.4136   | 256      | 0.2314   | 73,843   | 0.0000   | 0.0000 |
| <i>SEGNUM</i>        | 2.0000   | 289      | 1.0000   | 224      | 1.0000   | 62,585   | 0.0183   | 0.4056 |
| <i>HERF</i>          | 0.1538   | 334      | 0.1573   | 256      | 0.1126   | 73,843   | 0.0037   | 0.0008 |

**Table 5**  
**Multivariate Analyses of the Determinants of a co-CEOship**

This table presents a panel-data logistic analysis of the determinants of a co-CEOship. The sample period is 1998-2008. The dependent variable equals 1 when the firm has two CEOs, otherwise 0. The independent variables are lagged by one year ( $t-1$ ). *LOGMVE* is the natural logarithm of the market value of equity in \$ millions (item #19\*item#25. *D* is the ratio of long-term debt to book value of assets (item #9/item #6). *SEGNUM* is the number of business segments. *FCF* is the free-cash flow scaled by the book value of assets ([item #13- item #16 – item #15 – item #19 – item #21+Δitem #35]/item #6). *HERF* is a revenue-based Herfindahl index computed at 3-digit SIC level. *CEOPOWER* equals 1 if the CEO is the only insider on board, otherwise 0. *ADVISINGBOARD* equals 1 if only a minority of independent board members serve on at least two of the three major committees of the board (audit, compensation and nominating). *PERINDEP* is the proportion of independent board members on the board. *INSTOWN* is the proportion of institutional ownership. *MERGER\_ACTIVITY* equals 1 if the firm acquires a firm over the past three fiscal years, otherwise 0. *SOX* is set to one if the firm-year observation corresponds to post-SOX period, otherwise zero.

|  | Model 1  |                 | Model 2  |                 | Model 3  |                 | Model 4  |                 | Model 5  |                 |
|--|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|
| Independent Variables                        | Estimate | <i>p</i> -value | Estimate | <i>p</i> -value | Estimate | <i>p</i> -value | Estimate | <i>p</i> -value | Estimate | <i>p</i> -value |
| <i>Intercept</i>                             | 1.2656   | 0.0002          | 0.9599   | 0.0078          | 1.1930   | 0.0010          | 0.7401   | 0.0525          | 1.1136   | 0.0022          |
| <i>LOGMVE</i> <sub><i>t-1</i></sub>          | -0.4333  | 0.0000          | -0.4347  | 0.0000          | -0.4316  | 0.0000          | -0.4372  | 0.0000          | -0.4283  | 0.0000          |
| <i>D</i> <sub><i>t-1</i></sub>               | -1.2330  | 0.0003          | -1.3561  | 0.0001          | -0.9268  | 0.0095          | -1.0007  | 0.0069          | -0.9412  | 0.0088          |
| <i>SEGNUM</i> <sub><i>t-1</i></sub>          | -0.1086  | 0.0094          | -0.1162  | 0.0065          | -0.1281  | 0.0022          | -0.1443  | 0.0008          | -0.1336  | 0.0014          |
| <i>FCF</i> <sub><i>t-1</i></sub>             | 0.7149   | 0.0836          | 0.3535   | 0.3771          | 0.7895   | 0.0773          | 0.3921   | 0.3599          | 0.6528   | 0.1395          |
| <i>HERF</i> <sub><i>t-1</i></sub>            | 0.6829   | 0.0819          | 0.7890   | 0.0486          | 0.8323   | 0.0372          | 1.0336   | 0.0118          | 0.9214   | 0.0222          |
| <i>CEOPOWER</i> <sub><i>t-1</i></sub>        | -0.5339  | 0.0007          | -0.4961  | 0.0020          | -0.5056  | 0.0016          | -0.4425  | 0.0069          | -0.4320  | 0.0078          |
| <i>ADVISINGBOARD</i> <sub><i>t-1</i></sub>   | -0.8781  | 0.0000          | -0.9867  | 0.0000          | -0.9089  | 0.0000          | -1.0589  | 0.0000          | -0.9860  | 0.0000          |
| <i>PERINDEP</i> <sub><i>t-1</i></sub>        | -1.6990  | 0.0000          | -1.3512  | 0.0010          | -1.5312  | 0.0002          | -0.9674  | 0.0238          | -1.2234  | 0.0041          |
| <i>INSTOWN</i> <sub><i>t-1</i></sub>         | -3.1472  | 0.0000          | -3.1012  | 0.0000          | -3.2756  | 0.0000          | -3.2123  | 0.0000          | -3.1803  | 0.0000          |
| <i>MERGER_ACTIVITY</i> <sub><i>t-1</i></sub> | 0.9329   | 0.0000          | 0.8810   | 0.0000          | 0.9519   | 0.0000          | 0.8432   | 0.0000          | 0.8856   | 0.0000          |
| <i>SOX</i>                                   |          |                 |          |                 |          |                 |          |                 | -0.4686  | 0.0025          |
| <i>Industry fixed effects</i>                | No       |                 | No       |                 | Yes      |                 | Yes      |                 | Yes      |                 |
| <i>Year fixed effects</i>                    | No       |                 | Yes      |                 | No       |                 | Yes      |                 | No       |                 |
| <i>N</i>                                     | 16,175   |                 | 16,175   |                 | 16,175   |                 | 16,175   |                 | 16,175   |                 |
| <i>Pseudo R</i> <sup>2</sup>                 | 0.224    |                 | 0.238    |                 | 0.261    |                 | 0.279    |                 | 0.264    |                 |

**Table 6**  
**Comparative Compensation Analysis between Solitary and co-CEOs**

This table presents a univariate analysis of CEO compensation for our sample firms. The “Solitary CEO” statistics refer to compensation for our sample firms in the two years preceding and following a co-CEO’s tenure. The “co-CEOs” statistics refer to the CEO compensation for our sample firms during the co-CEO tenure. Total cash compensation (*TOTALCASHCOMP*) is the sum of salary (*SALARY*) and bonus (*BONUS*) measured in dollars. *GRANTS* is the dollar value of new stock grants. *OPTIONS* is the number of new option grants. Total cash compensation, salary, bonus, and grants are reported in 2000 dollars. Panel A presents the sum of the compensation figures for the two CEOs. Panel B presents compensation figures on an individual basis.

*Panel A: Aggregate Compensation*

|                        | Solitary CEO |         | co-CEOs   |         | <i>p</i> -values of differences |        |
|------------------------|--------------|---------|-----------|---------|---------------------------------|--------|
|                        | Mean         | Median  | Mean      | Median  | Mean                            | Median |
| <i>TOTALCASHCOMP</i>   | 969,424      | 489,385 | 1,823,936 | 972,497 | 0.000                           | 0.000  |
| <i>SALARY</i>          | 454,182      | 347,545 | 800,839   | 633,288 | 0.000                           | 0.000  |
| <i>BONUS</i>           | 510,845      | 119,663 | 988,572   | 181,623 | 0.009                           | 0.071  |
| <i>GRANTS</i>          | 352,131      | 0       | 262,753   | 0       | 0.326                           | 0.011  |
| <i>OPTIONS</i>         | 373,811      | 70,000  | 340,779   | 25,000  | 0.749                           | 0.013  |
| <i>Number of Firms</i> | 85           |         |           |         |                                 |        |

*Panel B: Individual Compensation*

|                        | Solitary CEO |         | co-CEOs |         | <i>p</i> -values of differences |        |
|------------------------|--------------|---------|---------|---------|---------------------------------|--------|
|                        | Mean         | Median  | Mean    | Median  | Mean                            | Median |
| <i>TOTALCASHCOMP</i>   | 969,424      | 489,385 | 911,968 | 486,248 | 0.645                           | 0.095  |
| <i>SALARY</i>          | 454,182      | 347,545 | 400,420 | 316,644 | 0.069                           | 0.014  |
| <i>BONUS</i>           | 510,845      | 119,663 | 494,286 | 90,811  | 0.880                           | 0.263  |
| <i>GRANTS</i>          | 352,131      | 0       | 131,377 | 0       | 0.001                           | 0.005  |
| <i>OPTIONS</i>         | 373,811      | 70,000  | 170,389 | 12,500  | 0.008                           | 0.000  |
| <i>Number of Firms</i> | 85           |         |         |         |                                 |        |

**Table 7**  
**Abnormal Announcement Returns**

This table presents abnormal announcement returns of firms announcing a switch from a classic single CEO leadership structure to a co-CEO structure. We calculate the abnormal announcement returns by means of a market model with an estimation period of 255 days that terminates 46 days before the announcement. We exclude firms that announce the initiation of a co-CEOship in combination with other events (merger, dividend change or initiation, etc.). The market returns used in the model are the CRSP value-weighted returns. CAAR is the cumulative average abnormal return, Z-statistic is based on Patell (1976) test, and *t*-statistic is adjusted for time series correction of Brown and Warner (1985).

| Event window | <i>N</i> | CAAR  | Z-statistic | <i>t</i> -statistic |
|--------------|----------|-------|-------------|---------------------|
| (0,0)        | 30       | 2.58% | 2.711       | 2.568               |
| (0,1)        | 30       | 2.81% | 2.065       | 1.975               |
| (-1,1)       | 30       | 6.19% | 3.626       | 3.558               |

**Table 8**  
**Operating Performance and co-CEOs**

This table examines valuation and operating performance differences between co-CEO and non-co-CEO firms using matched samples. Matching is based on propensity scores computed as the predicted probabilities of establishing co-CEO stewardship based on nearest neighbor matching. Matching is done on the common support of the propensity scores. For brevity the coefficient estimates for co-CEO dummy ( $\alpha_1$ ) from the following weighted least squares regressions are reported:

$$M/B_t = \alpha_0 + \alpha_1 COCEO\_DUM_t + \varepsilon \quad [1]$$

$$M/B_t = \alpha_0 + \alpha_1 COCEO\_DUM_t + \underline{\alpha} \underline{X} + \varepsilon \quad [2]$$

$$ROA_t = \alpha_0 + \alpha_1 COCEO\_DUM_t + \varepsilon \quad [3]$$

$$ROA_t = \alpha_0 + \alpha_1 COCEO\_DUM_t + \underline{\alpha} \underline{X} + \varepsilon \quad [4]$$

Valuation, *M/B*, is measured as the natural logarithm of market to book ratio computed as the ratio of market value of assets to book value of assets ([item #6 - item #60 + item #74 + item #19\*item#25]/item #6). Operating performance, *ROA*, is measured as the ratio of operating income before depreciation to book value of assets (item #13/item #6). *COCEO\_DUM<sub>t</sub>* equals to 1 when the firm has two CEOs, otherwise equals to 0.  $\underline{X}$  denotes the vector of covariates used to compute the propensity scores in Model 4 of Table 5. Weights are assigned based on the number of occurrences for each matched firm-year observation.

| Equation                       | Nearest neighbor ( <i>n</i> ) |                 |              |                 |              |                 |
|--------------------------------|-------------------------------|-----------------|--------------|-----------------|--------------|-----------------|
|                                | <i>n</i> = 1                  |                 | <i>n</i> = 4 |                 | <i>n</i> = 6 |                 |
|                                | $\alpha_1$                    | <i>p</i> -value | $\alpha_1$   | <i>p</i> -value | $\alpha_1$   | <i>p</i> -value |
| [1] M/B                        | 0.3009                        | 0.0000          | 0.3009       | 0.0000          | 0.3009       | 0.0000          |
| [2] M/B                        | 0.1993                        | 0.0000          | 0.1973       | 0.0000          | 0.1980       | 0.0000          |
| [3] ROA                        | -0.0159                       | 0.1864          | -0.0159      | 0.1403          | -0.0159      | 0.1348          |
| [4] ROA                        | -0.0166                       | 0.0719          | -0.0125      | 0.1362          | -0.0121      | 0.1461          |
| Number of treated observations | 241                           |                 | 241          |                 | 241          |                 |
| Number of matched observations | 241                           |                 | 964          |                 | 1,446        |                 |