Family Agents

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INTRODUCTION

The common way to think about leadership in corporations is that there is a lone CEO at the top, to whom shareholders delegate the task of leading the company on their behalf. Yet, a relevant number of firms are led not just by one but multiple (co-)CEOs (Krause et al., 2015; Yoo et al., 2021). Financial companies such as Goldman Sachs, Merrill Lynch and Deutsche Bank have been run by co-CEOs for decades. Retailers like Spiegel and Whole Foods Market (prior to the acquisition by Amazon) have had two CEOs, whereas Eurospin, a large hard-discount chain in Italy, is currently led by four CEOs (also founders). Software companies like Oracle, SAP and Salesforce have (or have had) two CEOs in charge, just like manufacturing companies such as Luxottica, Prada and Daimler AG. At some point, Samsung even had three CEOs. In aggregate terms, Krause et al. (2015) document that 71 US listed firms had co-CEOs in the period 2000-2011.

Co-CEO leadership is often used by companies in circumstances such as mergers and acquisitions or plans of splitting the firm (Arena et al., 2011), but can also be adopted in normal times out of a desire to involve multiple actors at the apex of the firm (Krause et al., 2015; Miller et al., 2014). Some argue that co-CEO arrangements are justifiable when the firm requires a wide range of (complementary) expertise and skills that exceed one individual's capacity (O'Toole, Galbraith, & Lawler, 2002), whereas others have noted that co-CEOs may face coordination challenges and interpersonal conflicts (Krause et al., 2015).

Our goal here is to study how the presence of co-CEOs affects corporate investment policies under different ownership structures (i.e. family vs. non-family) and governance arrangements. We focus on investment since it represents one of the most important corporate policies, which is closely tied to the ability of firms to grow and perform. Moreover, investment decisions intimately reflect the agency relationships among key decision-makers, and when the firm lacks of unity of command these investment decisions become more complex since interests may diverge and the risk of conflicts increases. By focusing on investment, we also go beyond the dominant approach in the existing literature, which has focused on the direct implications of co-CEO leadership for financial

performance; our investigation is useful to uncover a specific mechanism, unexplored to date, through which shared leadership may harm or benefit companies.

The starting point of our theory is that family firms are generally less prone to overinvestment as compared to non-family firms (Jain & Shao, 2014; Lin, Wang, & Pan, 2016). This is due to the fact that family owners typically hold undiversified portfolios (Steijvers & Voordeckers, 2009) and thus exhibit higher risk aversion, which translates into a lower tendency to make acquisitions (Miller, Le Breton-Miller and Lester, 2010) or devote capital to long-term projects (Anderson et al. 2012). More parsimonious investment policies arise also from the fact that family owners strive to protect their business (Gomez-Mejia et al., 2007), which could be endangered by risky expansionary strategies, and they tend to shy away from external equity financing, which would be required to afford development opportunities but at the same time may dilute the family's control over the business (Croci, Doukas, & Gonenc, 2011). Additionally, by providing a better agency alignment between managers and shareholders, family ownership alleviates the concern that top executives engage in excessive growth for the sake of extracting private benefits. Collectively, these arguments suggest that family firms avoid inefficient or redundant investment.

While these tendencies may well describe the raw difference in investment behavior between family and non-family firms, we posit that family businesses' investment preferences will vary depending on whether the firm is led by a lone CEO or multiple co-CEOs. While multiple co-CEOs in non-family firms may engage in cross-monitoring of each other's actions (Arena et al. 2011), we argue that in the context of family firms multiple CEOs may bring about heterogeneous interests and agendas (Arena et al., 2011) representing different sets of family actors. These features, in turn, raise the tendency to pursue a multitude of individual, potentially uncoordinated, initiatives leading to overinvestment.

We then explore the conditions that shape the magnitude of the association between co-CEOs and family firms' overinvestment. Our previous arguments underscore the importance of balancing co-CEOs' powers and governing their responsibilities in order to avoid that the company engages in

erratic investment strategies. Building on existing research on the governance role of independent directors in family firms (e.g., Anderson et al. 2004), we hypothesize that the tendency of family firms' co-CEOs to engage in overinvestment will be negatively moderated by the share of outside (i.e., non-family and non-executive) members in the board of directors.

From a cross-monitoring perspective, co-CEOs in non-family firms may establish constructive relationships which allow them to control each other's behaviors to make sure that they are working for the common goal of the organization. However, as we will discuss, this perspective is unlikely to apply to *family* co-CEOs who belong to *different family branches* (e.g., cousins). Indeed, this kind of family co-CEOs are likely to be stewards of their immediate family rather than the whole business and may deploy firm resources to benefit their close family members (Miller, Minichilli, & Corbetta, 2013; Schulze et al., 2001). As a result, family co-CEOs may pursue their own family-centered goals, and this will magnify overinvestment problems.

We test our hypotheses on a sample of 3,290 firms in Italy observed from 2012 to 2018, of which 2,115 are family-controlled. Consistent with our theoretical predictions, family firms are less likely than non-family firms to suffer from overinvestment, which we measure as the amount of corporate investment above an optimal level (Richardson, 2006). In an ancillary analysis, we show that these excessive activities are associated with poor accounting performance (consistent with the idea that overinvestment reflects the tendency to engage in wasteful projects). That said, there is a positive interaction effect between family firms and co-CEOs, that is, the presence of co-CEOs in family firms is positively associated with overinvestment activities. Moreover, we find that a higher presence of outsiders in the board of directors negatively moderates the positive effect of family co-CEOs on overinvestment. Finally, we find some evidence suggesting that family firms' overinvestment is mainly driven by family co-CEOs who belong to different family branches.

Our results advance our understanding of the paramount role of corporate governance and leadership arrangements on firms' investment. Specifically, our work indicates that the involvement of multiple family members in leadership positions may be conducive of within-family agency

problems, which are potentially costly for both non-family investors and family shareholders at large. As such, our results contribute to existing insights on how family involvement may generate "race to the bottom" problems that create private benefits for specific family members while harming the whole organization (Bertrand et al. 2008). Similarly, we contribute to the emerging and relevant literature on co-CEOs (Krause et al. 2015; Amore et al. 2017; Hunter et al. 2017) by showing that ownership and governance characteristics represent important contextual factors, useful to discern when co-CEOs can be harmful or valuable for the company. Specifically, we identify an understudied heterogeneity in the structure of family business leadership (lone CEO, and multiple CEOs from a single family or multiple family branches) and show its key influence on investment policies.

THEORY AND HYPOTHESIS

Investment and corporate ownership

Moving away from the traditional analysis of performance differences between family firms and non-family firms (Anderson & Reeb, 2003a; Miller, Le Breton-Miller, Lester, & Canella, 2007), scholars have increasingly focused on investigating family firms' decision-making in the area of R&D and capital expenditures (Block, 2012; Anderson, Duru, & Reeb, 2012; Duran, Kammerlander, Van Essen and Zellweger 2016), acquisitions (Miller, Le Breton-Miller, & Lester, 2010; Gomez-Mejia, Makri and Larraza Kintana 2010; Gomez-Mejia, Makri and Larraza Kintana 2010), financial leverage (Amore, Minichilli, & Corbetta, 2011; Anderson & Reeb, 2003b), and internationalization (Zahra, 2003).

Seeking to understand the origins of such differences, recent studies have tried to unpack the idiosyncratic features of family firms' decision-making by examining the role of owners' goals and priorities (e.g. Chrisman & Patel, 2012; Gomez-Mejıa, Patel & Zellweger, 2018; Leitterstorf & Rau, 2014; Kotlar, Signori, De Massis & Vismara, 2018). Works in this area have shown that family firms tend to invest less in R&D and more in hard assets than non-family firms do (Anderson et al., 2012; Gómez-Mejía et al., 2010; Fan, Zhang, & Zhu, 2021), in order to avoid an excessive exposure to risk,

that may hurt their socioemotional wealth endowment. Under this perspective, family firms will evaluate projects based on both the wish to preserve control and the intrinsic benefits brought by the investment (Gomez-Mejia et al., 2007). The strong desire to retain family control may inhibit family firms from pursuing internationalization strategies (Gómez-Mejía et al., 2010). This attitude is also reflected in the reluctance to engage in acquisitions (Miller, Le-Breton Miller, & Lester, 2010) and in the avoidance of R&D projects (Anderson et al., 2012; Chrisman & Patel, 2012), even though this latter finding could be also explained by differences in the productivity of R&D between family and non-family firms. The will to preserve the family's heritage and control restrains family firms from engaging in risky expansionary strategies and hinders their capacity to finance new investment through external equity capital. Collectively, these arguments suggest that family firms are more discerning than non-family firms when evaluating capital investment projects, and so they are more likely to avoid inefficient or redundant investments. Another reason why family firms might overinvest less than non-family firms is that family involvement drives a better agency alignment between owners and managers. When managers' goals diverge from those of shareholders, the former have the potential to squander the free cash flow inside the firm (Richardson, 2006). Although family firms are not free from agency problems, existing findings suggest that their better principal-agent alignment, as compared with non-family firms (Chrisman, Chua, & Litz, 2004), reduces concerns of empire building. Based on all these arguments, we hypothesize that:

Hypothesis 1: Family ownership is negatively associated with overinvestment.

Co-CEOs arrangement: Family vs. non-family firms

The vast literature on top executives typically assumes that the unity of command is a guiding principle for effective leadership arrangements (Finkelstein, Hambrick and Cannella, 1996; Mintzberg, 1989). However, in many companies this principle is not respected (Krause et al. 2015). When a company is led by multiple CEOs, the decision-making process typically in the hands of one individual is distributed across two or more individuals (co-CEOs).

This leadership arrangement raises the question of whether firms with co-CEOs would out- or under-perform those with a single CEO. The evidence in Krause et al. (2015) suggests that when co-CEOs have a more balanced power, the company's performance is lower. The rationale behind this result is that with ambiguous power structures and unclear leadership, managers tend to solidify their individual informal power through political activities, and this eventually hurts firm performance (Mintzberg, 1989; Shen & Cannella, 2002). In other words, the appointment of co-CEOs can exacerbate problems associated with power grabbing and with the pursuit of specific interests, which arise from the tendency of co-CEOs to pursue individualistic agendas or the agenda of their principals. Relatedly, some studies have found that companies with co-CEOs engage in more M&As activities (Arena, Ferris, & Unlu, 2011), suggesting the presence of empire building and perquisite consumption.

Co-CEO leadership is potentially more problematic when leadership and ownership issues sum up, as it happens in family firms. Indeed, in these organizations political concerns tend to be particularly salient due to the fact that family co-CEOs may follow socioemotional agendas aimed at consolidating their individual power against other family members, and at securing employment within their specific family unit (Aronoff, Astrachan, Mendoza, & Ward, 1997). Similarly, in family firms with multiple members involved in leadership, corporate resources can be used to placate disgruntled relatives. Trying to secure their future control over the firm, family co-CEOs may engage in inefficient overinvestment in order to gain support from other family owners and expand their control of resources. Collectively, these insights suggest that each family co-CEO is likely to have priorities and objectives which may not be perfectly aligned between each other and may not be coherent with those of the whole controlling family. That is, family CEOs may pursue overinvestment by sponsoring projects that are beneficial for them and their family branches but not for the whole controlling family. In addition, due to self-serving cognitive bias (Clapham & Schwenk, 1991), each family co-CEO may perceive that their contribution to the family firm is greater and thus have incentives to further expand its control. This, again, will lead to actions potentially harmful for the

whole family business. As a result, family firms led by multiple co-CEOs will be more likely to engage in overinvestment.

Co-CEO arrangements are less problematic in non-family firms because multiple leaders, who are not the direct expression of specific shareholder groups as in the family business case, are more likely to engage in cross-monitoring (Arena et al., 2011). One professional co-CEO's poor decisions likely hurt the other co-CEO's interests. Thus, they have incentives to collaborate and monitor one another to avoid actions that can harm firm performance (and thus, plausibly, their remuneration). This cross-monitoring mechanism is less likely to be effective in the family firms' context. Assuming that a family CEO provides stability among family branches, family contracting is thought to reduce family CEO employment risk (Gibb Dyer 2006); thus, family CEOs have higher discretion to serve their own interests by shirking or deploying firm resources to benefit close family members (Miller, Minichilli, & Corbetta, 2013; Schulze et al., 2001). Therefore, family co-CEOs may try to avoid intra-group monitoring so that they can make use of firm resources to satisfy their own affective needs and prioritize the welfare of their immediate family members. Moreover, professional co-CEOs are often appointed due to their complementary education and skills, which can substitute board advising (Arena et al., 2011). Different from family co-CEOs, professional co-CEOs are also subject to higher employment risk (Brunello et al., 2003; Gibb Dyer, 2006; Hillier & McColgan, 2009; Volpin, 2002), and their pay is closely linked to firm performance (Chen, Chittoor, & Vissa, 2021).

Based on these arguments, we argue that family firms that appoint multiple CEOs may be more prone to overinvest than those that do not.

Hypothesis 2: The presence of co-CEOs attenuates the negative relationship between family ownership and overinvestment.

The (too) many families within one

To further understand how co-CEOs can drive overinvest in family firms, we restrict our conceptual and empirical analysis to firms controlled by families, and parse different types of co-CEO arrangements.

The first type, which we define "mixed teams", involve both family and non-family (professional) co-CEOs. Different from family co-CEOs, a non-family co-CEO is often selected due to their complementary professional skills, competence, and leadership style. Compared with family CEOs, non-family CEOs are less likely to overinvest because they face a higher employment risk than family CEOs (Brunello et al., 2003; Gomez-Mejia, Larraza-Kintana, & Makri, 2003; Hillier & McColgan, 2009; Volpin, 2002) and their compensation is more sensitive to poor performance (Chen et al., 2021), which can be one of the unintended results of overinvestment.

The second type is that of co-CEOs from one family "branch". This arrangement is common when leadership is shared to accommodate family logics. Complementary skills and competences are not key in the selection of co-leaders, and family CEOs tend to share the same family-centered priorities – which serve as an alignment mechanism that mitigates the potential conflicts and competition for power between the family co-CEOs. In family firms, family co-CEO arrangements have been shown to work well when they are explicitly cemented by close ties such as marriage (Amore et al., 2017), though this conclusion may not apply to all intra-family arrangements.

The third type is that of co-CEOs who belong to different family "branches." While the genesis of this specific arrangement is less predictable than the previous cases, this leadership is often found in mature family businesses in which – as a result of intergenerational transitions – ownership has been fragmented across multiple family heirs and the number of family members involved has increased. Accommodating different family branches in leadership has the potential to represent a different prioritization of non-financial goals of such different branches (Chrisman, Madison, & Kim, 2021). For example, one family branch may want to deploy company resources to benefit their immediate family members and pass the business to the offsprings of the same branch, while others can be more focused on long-term growth, retaining control etc. Under these circustances, conflicts

may easily arise in different crucial areas such as hiring, compensation, succession, and strategic decisions.

We argue that family firms led by co-CEOs suffer from overinvestment especially when the corporate leaders represent different family branches. The first reason is related to altruism, which links an individual's welfare to the welfare of others and allows family members to satisfy both altruistic and egotistic preferences (Lunati, 1997). Altruism can be costly to family firms, because family owner-managers can make use of their control over company's resources to be unusually generous to their family members (Schulze et al., 2001). Importantly, family members tend to be more altruistic toward the members of their nuclear family than those of an extended community (Banfield, 1967). We posit that co-CEOs who behave altruistically toward their immediate family members will only pay a portion of the costs of altruism while gaining the full advantage. As ownership moves from a nuclear family to more dispersed ownership by different family branches, one family branch may become at odds with another (Miller, Amore, Quarato, & Corbetta 2022; Miller, Minichilli, & Corbetta, 2013). As different family branches may attribute success to each own branch and underestimate the contribution of others (Chrisman et al., 2021), co-CEOs may compete for legitimacy and recognition as they perceive that their family branch deserves more control over the whole business. This may result in overinvestment in costly projects aimed (in the short run) at signaling a more prominent position in the ownership coalition.

Relatedly, a key challenge for shared leadership is the co-CEOs' concern of unfair recognition (Arnone & Stumpf, 2010). Family CEOs tend to have close relationships with clients, employees, and other key stakeholders of the family business, and strongly identify with the family firm (Miller, Lee, Chang, & Le Breton-Miller, 2013). However, firm's stakeholders and other family owners themselves may have different opinions on which co-CEO is more capable and reliable, resulting in a larger emotional distance between each family co-CEO and the firm or the extended family. Therefore, both because of the larger emotional distance from other family branches, and the more support and empathy they are likely to get from their immediate family members, family co-CEOs

belonging to different family branches will tend to identify more with the latter. This raises the incentives to secure and expand their control of resources so as to better satisfy the needs of their immediate family members and even pass their control to their children. As a result, family firms will be more likely to suffer from overinvestment as each family co-CEO strives to satisfy the needs of his/her group of current family members. Based on these arguments, we hypothesize that:

Hypothesis 3: The positive effect of co-CEOs on family firms' overinvestment is higher when the family co-CEOs belong to different family branches.

Board composition and monitoring

Building on the notion that directors provide monitoring, advice, and access to resources for the firm, previous literature has extensively explored how the composition of the board of directors can shape firm outcomes (Haynes & Hillman 2010). For instance, studies have found that boards richer in human and social capital can effectively support the CEO in investment decisions (Chen, 2014) and so improve firm performance (Peng, 2004).

In family firms, the role of corporate boards can swing from a largely neutral role, when ownership dominates decisions, to a critical role when ownership becomes uninovocal, complex, and maybe conflictual. In these situations, family firms recognize the need to open their board to outside directors to overcome these challenges and assure the long-term economic success of the firm, and their most immediate action is to appoint outside directors. Outside directors are generally chosen because they can supplement the firm's internal skills or provide access to particular stakeholders that benefit the firm (Cavaco et al., 2017). This is even more true in privately-held family firms, where outside directors do not suffer from the same level of information asymmetry typically present in listed companies (Cavaco et al., 2017). This information advantage provides directors with a clearer assessment of the various relationships with stakeholders (hence increasing their support), and a better understanding of the dynamics among family members.

When effectively engaged in family business governance, outside directors have a unique ability to exercise monitoring due to their independent position as well as the intimate knowledge of the firm and the family (Zattoni et al., 2015). First, outside board members typically have a good deal of legitimacy in the eyes of *all* family members to critically review the firm's strategy and perform reality checks on the family's decisions with regard to the firm; being gatekeepers, outsiders can leverage their role to guide board discussions in a direction that favors the overall company development. Second, outsiders are in a favourable position to mediate the conflicts between family branches. By being helpful to the firm in terms of skills and resources, outside directors can increase the level of trust that the family members and of the co-CEOs have in them, allowing the establishment of an "open and frank" dialogue (Ng & Roberts 2007).

In the presence of co-CEOs arrangements, and building on our earlier discussions, outside directors can be key in mediating the potentially competing interests of family co-CEOs. More than in the presence of unitary leadership, outsiders can leverage their independence, credibility and family knowledge to make the co-CEOs focus on the corporate well-being rather than on the well-being of an individual or individual family branches, thereby reducing the level of overinvestments. In this way, outside directors fully cover their role to best allocate the resources of the firm across projects (Bammens, Voordeckers, & van Gils 2011; Hong, 2020), as the literature has already shown. Based on these arguments, we hypothesize that:

Hypothesis 4: The presence of outside directors negatively moderates the positive relation between co-CEOs and overinvestment within family firms.

METHODOLOGY

Data

To test our hypotheses, we employ a panel dataset of both family and non-family firms from Italy with revenues above 100 million Euro. Different from Krause et al. (2015), our data cover not only listed firms but also privately-held firms and it allows to distinguish between family and non-

family firms using information on firms' ownership structure (see below for details). In addition, our data goes beyond existing studies on shared leadership (e.g. Amore et al. 2017) in that it contains governance and ownership information for both family and non-family firms. Finally, our data allows to measure the fragmentation of leadership positions and thus complement existing studies on the fragmentation of family ownership (Miller et al., 2022; Bertrand et al., 2008).[1]

We obtained accounting data from AIDA (Bureau van Dijk) and information on ownership, board, and executive positions from official public filings of the Italian Chamber of Commerce. We merged data from these two sources for the period between 2012 and 2018. Dropping observations with missing values in the key variables described below, we obtain a final sample of 3,290 unique firms for a total of 14,732 observations.

Measures

Dependent variable

The accounting literature has defined overinvestment as "investment expenditure beyond that required to maintain assets in place and to finance expected new investments in positive NPV projects" (Richardson, 2006, p.160). Specifically, Richardson (2006) operationalizes overinvestment by estimating a regression of "optimal investment" where the dependent variable is given by investment expenditures on new projects and the key explanatory variables are a firm's value over the market value of equity, leverage, cash holdings, age, size (i.e. total assets), and stock returns – all lagged by one year. Additionally, the explanatory variables include past year's investment, year dummies and industry dummies. The fitted values of this regression represent the estimate of the expected level of new investment while the residuals serve to estimate the level of excess investment: they can be either positive, when the firm overinvests relative to its (estimated) optimal value, or negative, when the firm underinvests. We follow this approach using our data (with the main difference that we are

[1] In a robustness test, we check that our results are unaffected by controlling for ownership fragmentation, i.e. the impact of co-CEOs on overinvestment is not a byproduct of ownership dispersion.

unable to use explanatory variables based on stock price data since the vast majority of firms in our sample are unlisted).[2]

Our dependent variable (Overinvestment), aimed at capturing the magnitude of investment in fixed assets in excess of the (estimated) optimal level, is defined as a continuous variable equal to the positive abnormal investment scaled by the level of previous year's total assets, and equal to 0 for firms that invested below their optimal level. Our estimation captures overinvestment for the period 2007 to 2018, and deviations from optimal investment for the period 2008 to 2018. Importantly, in Appendix A1 we validate the notion that the excess investment is indeed counterproductive or redundant by showing a negative association between overinvestment and return on investment one, three, and five years ahead.

Explanatory variables

Testing Hypotheses 1 and 2 involves a measure that distinguishes between family and non-family firms. Defining family firms has been subject to a long discussion among scholars. Here, common to existing works, we identify family firms as companies in which one (or two families, which happens quite rarely) own at least 50% of the equity capital; the threshold is reduced to 25% for publicly listed companies (Andres, 2008; Amore et al., 2011). This variable captures equity in the hands of the whole controlling family.

To operationalize the presence of co-CEOs, we use a dummy variable (co-CEOs) coded as 1 if the firm has multiple CEOs and 0 otherwise. Table 1 illustrates the frequency of each leadership model among our sample firms. As shown, 45.2% of firms have more than one CEO.

---------- Insert Table 1 about here ----------

To test Hypothesis 3, we exploit co-CEOs' family surnames to construct a proxy for the presence of different family branches (vs. a unique family). Specifically, we use a variable identifying

[2] We will go back to this limitation in the concluding section of the manuscript.

whether all co-CEOs have the same family surname, or whether the co-CEOs have two (or more) different family surnames. The former instances include cases of, e.g. siblings or parent and sibling(s), whereas the latter is apt to capture more distant family relationships such as cousins, son/daughter-in-laws etc. To distinguish the presence of different family branches from that of professional CEOs, we construct a dummy equal to 1 if in the team of co-CEOs at least one CEO is not a shareholder or member of the controlling family, and to 0 if all co-CEOs are affiliated with the owners (shareholders or relatives of the latter).

Finally, the moderator of Hypothesis 4 relates to the presence of outsiders in the board of directors. To test this hypothesis, we define outside directors as those members of the board of directors who are not shareholders (nor have a tie with them) and do not have an executive role in the board.

Control variables

We include a number of control variables to account for other factors that might influence firms' investment decisions. First, we control for firm size, measured as the logarithm of total sales (Ln sales), and firm age, also measured as the logarithm of the years since the incorporation of the firm (Ln firm age). These variables are useful to control for differences in investment activity across firms at different stages of development. Second, we control for a firm's financial structure and profitability by including the ratio of debt to total shareholder's equity (Firm leverage), the logarithm of cash holdings (Cash holding), and the ratio of operating profits before interest and taxes (EBIT) scaled by invested capital (ROI). These variables are useful to control for differences in cash flow availability, access to finance and internal liquidity across firms. These accounting controls are lagged by one year to avoid simultaneity problems. One may be concerned about problems of reverse causality, according to which firms appoint co-CEOs to spur firm growth. Albeit imperfectly, using lagged values of the variables in the right-hand side of the regression helps to alleviate this concern.

Third, to account for the role of governance structures, we control for the size of the board of directors, measured as the logarithm of the number of all board members, excluding CEOs. Finally, we account for time and industry effects by including the interaction between year and industry dummies (defined at the 2-digit NACE level). To avoid outlier problems, we winsorized the continuous variables (i.e. overinvestment, firm size, firm leverage, firm cash) at the 1st and 99th percentile. Descriptive statistics are shown in Table 2 and Table 3.

---------- Insert Table 2 and Table 3 about here ----------

RESULTS

To test the effect of family ownership, co-CEO leadership and the moderating factors on firms' overinvestment, we adopt a Tobit model. Because overinvestment does not occur for each firm-year observation, the dependent variable is continuous with a density mass at zero. One of the key assumptions of the Tobit model is that standard errors are heteroskedastic (an assumption which is very likely to be violated in a panel dataset like ours). To alleviate this concern, we use robust standard errors clustered by firm.

Table 4 reports the results obtained regarding our main hypotheses. As show in Column 1, the coefficient of family firms is negative and statistically significant (b = -3.659; $p < 0.001$). Hypothesis 1, which suggests that family ownership has a negative impact on overinvestment, is therefore supported. Hypothesis 2, on the positive moderating role of co-CEOs in family firms, is supported as well, as indicated by the positive and significant interaction term (b = 2.924; $p < 0.05$). Figure 1 plots the regression results from Table 4 (Column 3) and confirms that, on average, family firms are less prone to overinvest than non family firms, but those that appoint multiple CEOs have a stronger tendency to overinvest. In Appendix A1, we validate the notion that overinvestment is harmful by using lead values of the return on investment as dependent variable, and overinvestment (plus the usual set of controls) as explanatory variables. As shown, overinvestment is negatively associated with firm performance. In Appendix A2 we show that the main result in Table 4 holds controlling for

the dispersion of equity stakes across the firms' shareholders (i.e. the Herfindhal-Hirschmann index of concentration across the shareholders).

---------- Insert Table 4 and Figure 1 about here ----------

In Table 5, Column (1) we estimate the relationship between co-CEO leadership and overinvestment within the subsample of family firms. The positive association is confirmed. Next, In Column (2) we estimate the specific effect of the different types of co-CEO leadership as described in Table 1. While all types of co-CEOs are positively associated with overinvestment, the stronger effect on overinvestment is given by the involvement of different family branches in the co-CEOs teams, as suggested in Hypothesis 3: the coefficient is positive, significant and economically larger than that of the other team configurations ($b = 2.362$; $p < 0.01$.[3] Finally, Hypothesis 4, on the negative moderating role of outside directors is marginally confirmed; Table 5, Column (3), shows that the coefficient of the interaction between co-CEOs and the percentage of outside directors is negative and borderline significant ($b = -3.961$; $p < 0.083$).

---------- Insert Table 5 about here ----------

In additional, untabulated, analyses we looked for antecedents of co-CEO leadership: ownership structure is actually one of the driver of leadership structure: a higher disperios of shares, and the presence of multiple family branches and different generations in ownership all significantly increase the likelihood of appointing multiple CEOs; however, as stressed above, our findings are largely robust to controlling for these variables.

DISCUSSION

Our paper challenges the commonly-held assumption that family owners have a monolithic identity and coherent goals and agendas. In so doing, our work expands existing insights of how the

[3] Given the features of the Tobit model, to confirm that co-CEOs representing different family branches tend to overinvest more than mixed teams and co-CEOs representing the same family branch, we compared the average marginal effect: AME is 1.202 for co-CEOs representing the same family branch, 0.908 for mixed teams, and 1.533 for co-CEOs representing multiple family branches.

presence of different family groups, being different family branches, different generations, or rival siblings, can influence the efficiency of corporate decision-making processes (Miller et al. 2022; Bertrand et al. 2008; Schultze et. al. 2003).

Prior studies (e.g. Calabrò et al. 2018; Bennedsen et al. 2007) suggest that choosing family CEOs solely based on family ties or social customs may damage firm performance. Yet, this literature has mostly focused on the comparison between the appointment of family and non-family CEOs. In this study, we focused on another, relatively common, way in which family kinships may affect family business leadership, i.e. the appointment of multiple CEOs.

Our theory has suggested that appointing multiple CEOs as a means of escaping the conflicts that may arise when a sole family member is chosen as CEO (at the exclusion of others) will be costly for the family business. Indeed, the granularity of identities and priorities within the family makes it necessary to set a clear power structure, where shared governance rules allow to make the ownership and leadership structures more effective. Lacking this, the presence of multiple CEOs will give rise to overinvestment problems. Our findings support this view: overinvestment problems are more likely to occur when the presence of different family branches undermines the unity of leadership. To some extent, this is coherent with socio-emotional wealth prescriptions: when the number of family branches grows, with more non-family spouses entering the family, the unitary family ownership and the identification between the family and the family business are hindered, and the relevance of non-economic goals related to the integrity of the family business might diminishes. In such contexts, the probability of opportunistic behaviors by some family members increases. Such opportunistic behaviors can be more consequential when members from different family branches occupy co-CEO positions and have the power to make use of company resources to serve the interests of their family branches at the expenses of other shareholders. On the other side, it is worth mentioning the (partially) alternative explanation that the inefficiency of the investment process (and of the whole decision-making process) is not due to the conflictual and opportunistic behaviour of the family agents, but to the opportunity of the family branches to collude to extract higher personal benefits from the firm.

In both cases, the monitoring role of the board of directors can protect family firms' value (Anderson & Reeb, 2004). We argue that a larger involvement of outside directors leads to effective monitoring of co-CEOs, and that makes a positive impact on the company's decision-making process.[4] The need to set an effective board of directors can be felt by family owners when they become aware of possible misaligned behaviors put in place by the co-leaders. The importance of an effectively designed board of directors in private closely-held family firms arises also because corporate governance rules are not clear for them. Most legislations, including the one of our sample, do not have strict guidelines for boards of private companies. These legislations operate under the implicit assumption that in privately-held firms the ownership will be represented in the decision-making process and can make its own voice heard.

Limitations and extensions

Before concluding, it is worth acknowledging some limitations of our study. First, one main limitation of our dependent variable: the lack of a proxy of the firm's growth opportunities, which are hard to measure in unlisted firms. Finding a measure for firm-specific growth opportunities would drastically improve our ability to measure over-investment. To our knowledge (for a literature review about investment efficiency measures see Gao and Yu, 2020), Richardson's measure is a reliable approach for estimanting overinvestment, which has been widely used in the accounting and economics literature (Biddle et al., 2009; Cheng et al., 2013; McNichols and Stubben, 2008). Future works may develop alternative measures of overinvestment for private firms. Furthermore, researchers could use R&D information to evalutate the investment strategy of a company. In our sample of largely private firms, detailed R&D data were not available.

Second, the appointment of co-CEOs can have disparate antecedents such as ownership dispersion, leadership succession, need of complementary skills etc. Future research may carry out

[4] This result echoes Rajkovic (2020), which finds that the appointment of a lead independent director improves investment efficiency and that the effect is stronger in companies subject to weaker corporate governance standards.

a comprehensive analysis of co-CEO antecendents and delve into the tie between these antecedents and corporate strategies. Moreover, the occurrence of conflicts among family members may influence CEOs' employment risk, eventually reversing the higher stability that current literature suggests; future research may also explore the relationship between family conflicts and family CEOs' employment risk.

Third, while our data allowed us to proxy for the presence of different family branches and different generations in the firm's ownership and governance, we were unable to precisely allocate each member to the exact family branch they belong, and therefore to isolate the power imbalances in terms of equity or voting rights. Future works may try to further untangle firms' ownership composition and its implications for firm performance.

Fourth, our study identifies the board of directors as an effective governance mechanism to monitor the co-CEOs. Examining the composition of the board in terms of human capital, education and professional background could produce useful insights about the optimal board structure in presence of a shared leadership. Furthermore, studying boards' practices and monitoring tasks could help to delve into the mechanisms that protect firm value and to avoid the inefficiencies of shared family leadership.

Fifth, future research could investigate how specific bonding relationships (parents-children, siblings, grandparent-grandchildren, cousins, etc.) influence family co-CEOs' decision-making. Relatedly, future research may try to elicit the interactions occurring among co-CEOs interactions, e.g. by using public appearances, speeches and other textual data.

Finally, it is important to notice that due to the largely time-invariant nature of family co-CEO arrangements we are unable to exploit the dynamics of investment surrounding changes in such a leadership structure. While some of our lagged control variables account for variations in the past exposure to overinvestment problems, our analyses cannot formally rule out problems of reverse causality. All these limitations constitute fruitful opportunities to build more knowledge on the underexplored topic of shared leadership.

References

Amore, M. D., Miller, D., Le Breton-Miller, I., & Corbetta, G. (2017). For love and money: Marital leadership in family firms. *Journal of Corporate Finance*, *46*, 461-476.

Amore, M. D., Minichilli, A., & Corbetta, G. (2011). How do managerial successions shape corporate financial policies in family firms?. *Journal of Corporate Finance*, *17*(4), 1016-1027.

Anderson, R. C., & Reeb, D. M. (2004). Board composition: Balancing family influence in S&P 500 firms. *Administrative science quarterly*, *49*(2), 209-237.

Anderson, R. C., Duru, A., & Reeb, D. M. (2012). Investment policy in family controlled firms. *Journal of Banking & Finance*, *36*(6), 1744-1758.

Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: evidence from the S&P 500. *The journal of finance*, *58*(3), 1301-1328.

Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership, corporate diversification, and firm leverage. *The Journal of Law and Economics*, *46*(2), 653-684.

Andres, C. (2008). Large shareholders and firm performance—An empirical examination of founding-family ownership. *Journal of corporate finance*, *14*(4), 431-445.

Arena, M. P., Ferris, S. P., & Unlu, E. (2011). It takes two: The incidence and effectiveness of co-CEOs. *Financial Review*, *46*(3), 385-412.

Arnone, M., & Stumpf, S. A. (2010). Shared leadership: From rivals to co-CEOs. *Strategy & Leadership*.

Aronoff, C. E., Astrachan, J. H., Mendoza, D. S., & Ward, J. L. (1997). Making sibling teams work. *Family Enterprise, Marietta, GA*.

Bammens, Y., Voordeckers, W., & Van Gils, A. (2011). Boards of directors in family businesses: A literature review and research agenda. *International Journal of Management Reviews*, *13*(2), 134-152.

Banfield, E. C. (1967). The moral basis of a backward society.

Bennedsen, M., Nielsen, K. M., Pérez-González, F., & Wolfenzon, D. (2007). Inside the family firm: The role of families in succession decisions and performance. *The Quarterly Journal of Economics*, *122*(2), 647-691.

Bertrand, M., Johnson, S., Samphantharak, K., & Schoar, A. (2008). Mixing family with business: A study of Thai business groups and the families behind them. *Journal of financial Economics*, *88*(3), 466-498.

Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency?. *Journal of accounting and economics*, *48*(2-3), 112-131.

Block, J. H. (2012). R&D investments in family and founder firms: An agency perspective. *Journal of business venturing*, *27*(2), 248-265.

Brunello, G., Graziano, C., & Parigi, B. M. (2003). CEO turnover in insider-dominated boards: The Italian case. *Journal of Banking & Finance*, *27*(6), 1027-1051.

Calabrò, A., Minichilli, A., Amore, M. D., & Brogi, M. (2018). The courage to choose! Primogeniture and leadership succession in family firms. *Strategic Management Journal*, *39*(7), 2014-2035.

Cavaco, S., Crifo, P., Rebérioux, A., & Roudaut, G. (2017). Independent directors: Less informed but better selected than affiliated board members?. *Journal of Corporate Finance*, *43*, 106-121.

Chen, H. L. (2014). Board capital, CEO power and R&D investment in electronics firms. *Corporate Governance: An International Review*, *22*(5), 422-436.

Chen, G., Chittoor, R., & Vissa, B. (2021). Does nepotism run in the family? CEO pay and pay-performance sensitivity in Indian family firms. *Strategic Management Journal*, *42*(7), 1326-1343.

Cheng, M., Dhaliwal, D., & Zhang, Y. (2013). Does investment efficiency improve after the disclosure of material weaknesses in internal control over financial reporting?. *Journal of accounting and economics*, *56*(1), 1-18.

Chrisman, J. J., Chua, J. H., & Litz, R. A. (2004). Comparing the agency costs of family and non–family firms: Conceptual issues and exploratory evidence. *Entrepreneurship Theory and practice*, *28*(4), 335-354.

Chrisman, J. J., & Patel, P. C. (2012). Variations in R&D investments of family and nonfamily firms: Behavioral agency and myopic loss aversion perspectives. *Academy of management Journal*, *55*(4), 976-997.

Chrisman, J. J., Madison, K., & Kim, T. (2021). A dynamic framework of noneconomic goals and inter-family agency complexities in multi-family firms. *Entrepreneurship Theory and Practice*, 45(4), 906-930.

Clapham, S. E., & Schwenk, C. R. (1991). Self-serving attributions, managerial cognition, and company performance. *Strategic Management Journal*, *12*(3), 219-229.

Croci, E., Doukas, J. A., & Gonenc, H. (2011). Family control and financing decisions. *European Financial Management*, *17*(5), 860-897.

Duran, P., Kammerlander, N., Van Essen, M., & Zellweger, T. (2016). Doing more with less: Innovation input and output in family firms. *Academy of management Journal*, *59*(4), 1224-1264.

Fan, Y., Zhang, F., & Zhu, L. (2021). Do family firms invest more in pollution prevention strategy than non-family firms? An integration of agency and institutional theories. *Journal of Cleaner Production*, *286*, 124988.

Finkelstein, S., Hambrick, D., & Cannella, A. A. (1996). Strategic Leadership, St. *Paul: West*, 161-166.

Gao, R., & Yu, X. (2020). How to measure capital investment efficiency: A literature synthesis. *Accounting & Finance*, *60*(1), 299-334.

Gómez-Mejía, L. R., Haynes, K. T., Núñez-Nickel, M., Jacobson, K. J., & Moyano-Fuentes, J. (2007). Socioemotional wealth and business risks in family-controlled firms: Evidence from Spanish olive oil mills. *Administrative science quarterly*, *52*(1), 106-137.

Gomez-Mejia, L. R., Makri, M., & Kintana, M. L. (2010). Diversification decisions in family-controlled firms. *Journal of management studies*, *47*(2), 223-252.

Gomez-Mejia, L. R., Larraza-Kintana, M., & Makri, M. (2003). The determinants of executive compensation in family-controlled public corporations. *Academy of management journal*, *46*(2), 226-237.

Gomez-Mejia, L. R., Patel, P. C., & Zellweger, T. M. (2018). In the horns of the dilemma: Socioemotional wealth, financial wealth, and acquisitions in family firms. *Journal of management*, *44*(4), 1369-1397.

Gibb Dyer Jr, W. (2006). Examining the "family effect" on firm performance. *Family business review*, *19*(4), 253-273.

Haynes, K. T., & Hillman, A. (2010). The effect of board capital and CEO power on strategic change. *Strategic management journal*, *31*(11), 1145-1163.

Hillier, D., & McColgan, P. (2009). Firm performance and managerial succession in family managed firms. *Journal of Business Finance & Accounting*, *36*(3-4), 461-484.

Hong, B. (2020). Power to the outsiders: External hiring and decision authority allocation within organizations. *Strategic Management Journal*, *41*(9), 1628-1652.

Hunter, S. T., Cushenbery, L. D., & Jayne, B. (2017). Why dual leaders will drive innovation: Resolving the exploration and exploitation dilemma with a conservation of resources solution. *Journal of Organizational Behavior*, *38*(8), 1183-1195.

Jain, B. A., & Shao, Y. (2014). Family involvement and post-IPO investment policy. *Family Business Review*, *27*(4), 287-306.

Kotlar, J., Signori, A., De Massis, A., & Vismara, S. (2018). Financial wealth, socioemotional wealth, and IPO underpricing in family firms: A two-stage gamble model. *Academy of Management Journal*, *61*(3), 1073-1099.

Krause, R., Priem, R., & Love, L. (2015). Who's in charge here? Co-CEOs, power gaps, and firm performance. Strategic Management Journal, 36(13), 2099-2110.

Leitterstorf, M. P., & Rau, S. B. (2014). Socioemotional wealth and IPO underpricing of family firms. *Strategic Management Journal*, *35*(5), 751-760.

Lin, C. J., Wang, T., & Pan, C. J. (2016). Financial reporting quality and investment decisions for family firms. *Asia Pacific Journal of Management*, *33*(2), 499-532.

Lunati, M. (1997). *Ethical issues in economics: From altruism to cooperation to equity*. Springer.

McNichols, M. F., & Stubben, S. R. (2008). Does earnings management affect firms' investment decisions?. *The accounting review*, *83*(6), 1571-1603.

Miller, D., Amore, M. D., Quarato, F., & Corbetta, G. (2022). Family Ownership Dispersion and Dividend Payout in Family Firms. *Journal of Family Business Strategy*, *13*(3), 100436.

Miller, D., Le Breton-Miller, I., & Lester, R. H. (2010). Family ownership and acquisition behavior in publicly-traded companies. *Strategic management journal*, *31*(2), 201-223.

Miller, D., Le Breton-Miller, I., Lester, R. H., & Cannella Jr, A. A. (2007). Are family firms really superior performers?. *Journal of corporate finance*, *13*(5), 829-858.

Miller, D., Le Breton-Miller, I., Minichilli, A., Corbetta, G., & Pittino, D. (2014). When do non-family CEO s outperform in family firms? Agency and behavioural agency perspectives. *Journal of Management Studies*, *51*(4), 547-572.

Miller, D., Lee, J., Chang, S., & Le Breton-Miller, I. (2013). Filling the institutional void: The social behavior and performance of family versus non-family technology firms in emerging markets. In *Handbook of Research on Family Business, Second Edition*. Edward Elgar Publishing.

Miller, D., Minichilli, A., & Corbetta, G. (2013). Is family leadership always beneficial?. *Strategic Management Journal*, *34*(5), 553-571.

Mintzberg, H. (1989). *Mintzberg on management: Inside our strange world of organizations*. Simon and Schuster.

Ng, W., & Roberts, J. (2007). 'Helping the family': The mediating role of outside directors in ethnic Chinese family firms. *Human Relations*, *60*(2), 285-314.

O'Toole, J., Galbraith, J., & Lawler III, E. E. (2002). When two (or more) heads are better than one: The promise and pitfalls of shared leadership. *California management review*, *44*(4), 65-83.

Peng, M. W. (2004). Outside directors and firm performance during institutional transitions. *Strategic management journal*, *25*(5), 453-471.

Rajkovic, T. (2020). Lead independent directors and investment efficiency. *Journal of Corporate Finance*, *64*, 101690.

Richardson, S. (2006). Over-investment of free cash flow. *Review of accounting studies*, *11*(2), 159-189.

Schulze, W. S., Lubatkin, M. H., Dino, R. N., & Buchholtz, A. K. (2001). Agency relationships in family firms: Theory and evidence. *Organization science*, *12*(2), 99-116.

Schulze, W. S., Lubatkin, M. H., Dino, R. N. (2003). Exploring the agency consequences of ownership dispersion among the directors of private family firms. *Academy of management journal*, *46*(2), 179-194.

Shen, W., & Cannella Jr, A. A. (2002). Revisiting the performance consequences of CEO succession: The impacts of successor type, postsuccession senior executive turnover, and departing CEO tenure. *Academy of management journal*, *45*(4), 717-733.

Steijvers, T., & Voordeckers, W. (2009). Private family ownership and the agency costs of debt. *Family Business Review*, *22*(4), 333-346.

Volpin, P. F. (2002). Governance with poor investor protection: Evidence from top executive turnover in Italy. *Journal of Financial Economics*, *64*(1), 61-90.

Yoo, S. W., Lee, G., Shin, J. E., & Kim, J. (2021). Firm performance and the adoption of a co-CEO structure: Evidence from Korea. *Asia Pacific Journal of Management*, *38*(4), 1351-1368.

Zahra, S. A. (2003). International expansion of US manufacturing family businesses: The effect of ownership and involvement. *Journal of business venturing*, *18*(4), 495-512.

Zattoni, A., Gnan, L., & Huse, M. (2015). Does family involvement influence firm performance? Exploring the mediating effects of board processes and tasks. *Journal of Management*, *41*(4), 1214-1243.

Table 1. Frequency of leadership models

Panel A. Leadership in family and non-family firms

	Family firm		Non-family firm	
	Obs.	%	Obs.	%
Single CEO	5,657	54.8	3,311	75.6
Two CEOs	2,019	19.5	618	14.1
Three or more CEOs	2,658	25.7	451	10.3
Total	10,334	100	4,380	100

Panel B. Types of co-CEO among family firms

	Obs.	%
Mixed teams	1,802	38.5
One family branch	1,787	38.2
Multiple family branches	1,088	23.3
Total	4,677	100

Table 2. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Family firm	14,714	0.7122	0.4528	0	1
Co-CEOs	14,714	0.3921	0.4882	0	1
Ln(Firm age)	14,714	3.1991	0.6895	1.0986	5.1059
Ln(Sales)	14,714	12.2767	1.1387	5.1037	14.7538
Ln(Non-CEO directors)	14,714	1.0939	0.7227	0.0000	3.6376
Overinvestment	14,714	14.8507	18.4554	0	75.9219
ROI	14,714	8.3362	8.5352	-29.7800	29.9800
Firm leverage	14,714	5.5281	70.3151	0	7280.268
Cash holdings	14,714	8.7574	2.4301	0	12.4243
Percent. outside directors	10,334	0.1975	0.2543	0	0.9933
Mixed teams	10,334	0.1761	0.3809	0	1
One family branch	10,334	0.1731	0.3784	0	1
More family branches	10,334	0.1071	0.3093	0	1

Table 3. Correlation matrix

	Overinvestment	Family firm	Co-CEOs	One family branch	More family branches	Mixed teams	Percent. outside directors	Ln(Non-CEO directors)	Ln(firm age)	Ln(Sales)	ROI	Firm leverage
Overinvestment	1											
Family firm	-0.0963	1										
Co-CEOs	-0.0255	0.1938	1									
One family branch	-0.0058	-0.0608	0.5040	1								
More family branches	-0.0150	-0.3184	0.3954	-0.1564	1							
Mixed teams	0.0110	0.1216	0.5528	-0.2097	-0.1656	1						
Percent. outside directors	0.2707	-0.4295	-0.1833	-0.1464	-0.0544	0.0208	1					
Ln(Non-CEO directors)	0.2343	-0.2698	-0.2076	-0.1201	-0.0165	-0.0711	0.6036	1				
Ln(firm age)	0.1544	0.0950	0.0936	0.0882	-0.0247	0.0372	-0.0228	0.0988	1			
Ln(Sales)	0.6147	-0.0875	-0.0241	-0.0131	-0.0203	0.0198	0.2201	0.1969	0.0714	1		
ROI	0.1834	0.0040	-0.0021	-0.0100	-0.0084	-0.0100	-0.0479	-0.0467	0.0091	0.0364	1	
Firm leverage	-0.0112	-0.0288	-0.0178	-0.0115	-0.0106	-0.0066	0.0365	0.0144	-0.0255	-0.0044	-0.0294	1
Cash holding	0.3142	0.1594	0.0228	-0.0097	0.0209	0.0220	0.1477	0.1329	0.0490	0.4500	0.0416	-0.0233

Table 4. Main findings

Dependent variable: Overinvestment			
	(1)	(2)	(3)
Family firm	-3.659	-3.838	-4.743
	(0.000)	(0.000)	(0.000)
Co-CEOs		1.194	-1.026
		(0.026)	(0.365)
Family firm × Co-CEOs			2.924
			(0.020)
Ln(Non-CEO directors)	3.965	4.139	4.118
	(0.000)	(0.000)	(0.000)
Ln(firm age)	5.361	5.317	5.313
	(0.000)	(0.000)	(0.000)
Ln(Sales)	14.970	14.960	14.960
	(0.000)	(0.000)	(0.000)
ROI	0.680	0.682	0.685
	(0.000)	(0.000)	(0.000)
Firm leverage	-0.0001	-0.0001	-0.0001
	(0.930)	(0.961)	(0.941)
Cash holdings	-0.194	-0.202	-0.193
	(0.255)	(0.236)	(0.255)
Constant	-190.64	-190.91	-190.43
	(0.000)	(0.000)	(0.000)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year × Industry dummies	Yes	Yes	Yes
Firms	3,290	3,290	3,290
Observations	14,714	14,714	14,714
Pseudo R-squared	0.124	0.1241	0.1243

Clustered p-values in parentheses.

Figure 1. Moderation plot

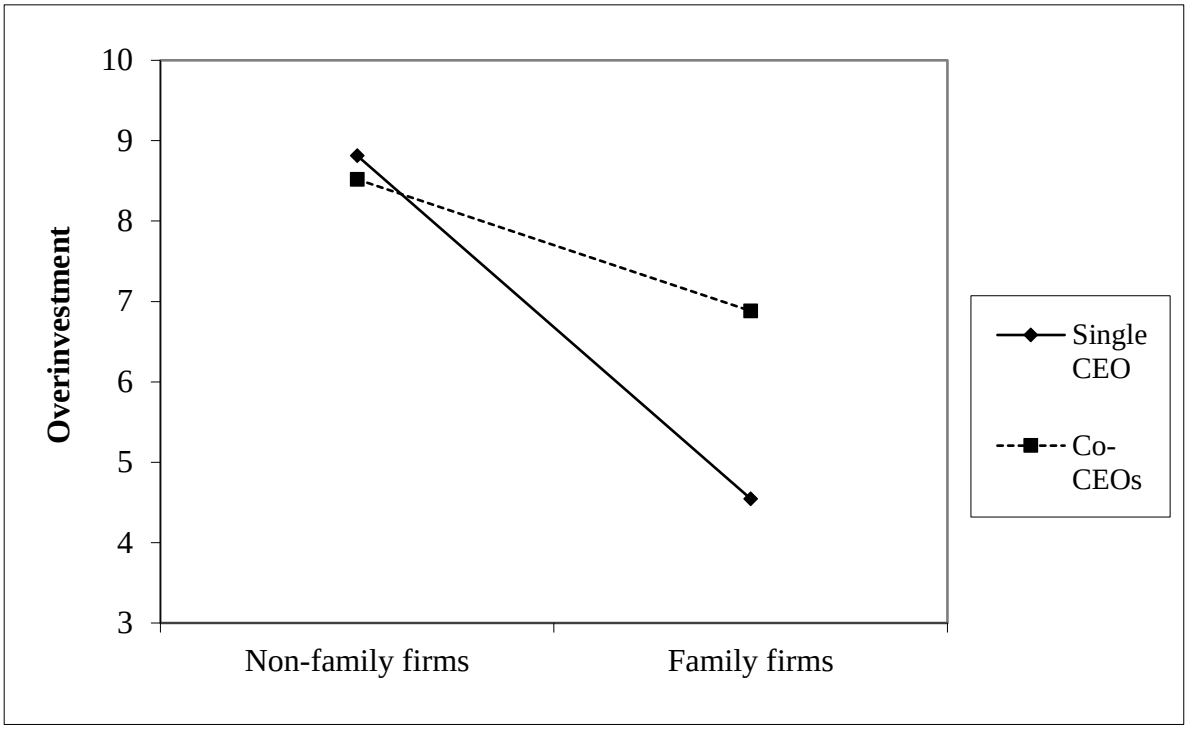

Table 5. Moderation analysis

Dependent variable: Overinvestment			
	(1)	(2)	(3)
Co-CEOs	1.810		2.588
	(0.001)		(0.000)
Mixed teams		1.417	
		(0.0696)	
One family branch		1.865	
		(0.0099)	
Multiple family branches		2.362	
		(0.008)	
Co-CEOs × Percent. outside directors			-3.961
			(0.083)
Percent. outside directors	6.580	6.676	7.911
	(0.000)	(0.000)	(0.000)
Ln(Non-CEO directors)	2.495	2.476	2.542
	(0.000)	(0.000)	(0.000)
Ln(firm age)	5.302	5.307	5.300
	(0.000)	(0.000)	(0.000)
Ln(Sales)	13.69	13.70	13.66
	(0.000)	(0.000)	(0.000)
ROI	0.732	0.732	0.734
	(0.000)	(0.000)	(0.000)
Firm leverage	0.00322	0.00321	0.00308
	(0.618)	(0.617)	(0.628)
Cash holdings	0.674	0.667	0.684
	(0.004)	(0.0045)	(0.0034)
Constant	-185.59	-185.73	-185.80
	(0.000)	(0.000)	(0.000)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year × Industry dummies	Yes	Yes	Yes
Firms	2,115	2,115	2,115
Observations	10,334	10,334	10,334
Pseudo R-squared	0.1409	0.1410	0.1411

Clustered p-value in parentheses.

Appendix A1. Relationship between overinvestment and performance

Dependent variable:	ROI_{t+1}	ROI_{t+3}	ROI_{t+5}
	(1)	(2)	(3)
Overinvestment	-0.0138	-0.0126	-0.0105
	(0.00191)	(0.0314)	(0.0634)
Firm age	0.433	0.385	-1.287
	(0.217)	(0.468)	(0.0472)
Firm size	-0.0485	0.0249	0.0154
	(0.400)	(0.735)	(0.846)
ROI	0.288	0.00673	-0.0774
	(0.000)	(0.497)	(0.000)
Firm leverage	6.08e-06	-0.000262	-0.000219
	(0.000)	(0.156)	(0.510)
Cash holdings	0.0240	-0.0821	-0.0859
	(0.465)	(0.0384)	(0.0586)
Constant	3.1356	6.3116	10.9324
	(0.007)	(0.000)	(0.000)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year × Industry dummies	Yes	Yes	Yes
Observations	41,980	29,586	19,855
R-squared	0.119	0.049	0.055

Clustered p-value in parentheses.

Appendix A2. Control for ownership dispersion

Dependent variable: Overinvestment	
	(1)
Family firm	-4.918
	(0.000)
Co-CEOs	-1.484
	(0.236)
Family firm # Co-CEOs	3.396
	(0.0139)
Ownership concentration	3.050
	(0.00124)
Firm age	5.266
	(0.000)
Firm size	14.20
	(0.000)
Non-CEOs directors	3.133
	(0.000)
ROI	0.680
	(0.000)
Firm leverage	-0.000825
	(0.394)
Cash holding	-0.0972
	(0.588)
Constant	-182.92
	(0.000)
Year dummies	Yes
Industry dummies	Yes
Year × Industry dummies	Yes
Firms	3,004
Observations	12,053
Pseudo R-squared	0.1193

Clustered p-value in parentheses.