The impact of family CEO's ownership and the moderating effect of the

second largest owner in private family firms[*]

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ABSTRACT

This study explores two ownership issues in private family firms. First, we investigate the relationship between the ownership of family CEOs and firm performance, and postulate that this relationship in private family firms is more complex than the inverted "U" relationship found in public family firms. Second, we predict a potential moderating effect of the second largest owner, who may exert a moderating effect on family CEOs. We focus on private family firms as recent studies show that private family firms have distinct features compared to public family firms, and that findings documented in public family firms may not apply to the ubiquitous, but much less studied, private family firms. We have applied agency theory to develop the two hypotheses, used secondary data on a large sample of private family firms, utilized an adjusted conventional quadratic technique to test the hypotheses, and validated the findings using a second method of piecewise linear specification. The results show that the non-linear relationship between the ownership of family CEOs and firm performance is more complicated than the often-documented inverted "U" shape from public firms. Meanwhile, the second largest owner with a high enough ownership stake can impose a positive moderating effect by mitigating potential agency problems caused by family CEOs.

Key words: Family CEO, the second largest owner, moderating effect, private family firms, agency theory, firm performance

1. INTRODUCTION

This study investigates two ownership issues in private family firms: (1) the relationship between the ownership of family CEOs and firm performance, and (2) a potential moderating effect of the second largest owner on performance through monitoring family CEOs. The relationship between family CEOs' ownership and firm performance has been an important research area, though most studies focus on public firms (Chandler 1990; Miller, Le Breton-Miller, and Scholnick 2008; O'Boyle Jr, Pollack, and Rutherford 2012; Villalonga and Amit 2006). The extant evidence from public firms indicates an inverted "U"-shaped relationship between the ownership and firm performance. Nevertheless, the inverted "U" relationship may be an imprecise description particularly in private family firms given their distinct features from public family firms, e.g., family CEOs could have from zero to very high, even 100 percent of ownership in private firms, while ownership of family CEOs in public firms is usually limited.

The second focus of the paper explores a potential moderating effect of the second largest owner, because family CEOs owning a significant portion of shares may expropriate minority shareholders and consequently hurt firm performance (Clark 1986; O'Neal and Thompson 1985). This informal monitoring role could serve as an essential governance mechanism in private family firms, especially when the formal monitoring function of the board of directors is questionable in private family firms (Huse 2000). The scant empirical research of the monitoring role of the second largest owner and the fact that few studies examine monitoring functions beyond the board of directors make the exploration of the second largest owner an interesting and fruitful approach in the context of private family firms (Randøy and Goel 2003).

We chose the setting of private family firms for various reasons.[1] First, private family firms are subject to specific types of agency costs and benefits, which distinguish them from public family firms (Carney, Essen, Gedajlovic, and Heugens 2015). Second, disciplinary actions of the capital market may work for public family firms, but not for private family firms (Mishra, Randoy, and Jenssen 2001). Hence, results generated from publicly held family firms may not be applicable to private family firms (Carney et al. 2015). Third, compared to public firms, the much wider range of family CEO ownership in private family firms, which can reach up to 100%, may make its relationship with firm performance much more complicated. Last, the empirical studies on private family firms are limited, and the studies that do focus on private family firms usually have a small sample size (Sciascia and Mazzola 2008; Westhead and Howorth 2006), which can make results subject to sample selection biases. This study greatly alleviates this concern by using a unique and extensive dataset that covers almost all private limited firms in a period of 13 years from 2000 to 2012 in Norway. The dataset includes ownership traced to ultimate owners, and identifies family relationship using data on kinship, marriage, and adoption.

Agency theory was applied to develop the hypotheses. A family CEO, by definition, is a member of the controlling family and often has an ownership stake in the business. The association between the CEO and the controlling family cultivates the family CEO's responsibility for the reputation and survival of the family business. The ownership of shares by the family CEO would enable goal congruence with other owners. As a result, the classical principal-agent costs due to the separation of owners and

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[1] We thank the reviewer's suggestion for providing theoretical arguments for the differences between private and public family firms.

managers could be significantly mitigated in private family firms (Jensen and Meckling 1976). In addition to the reduced principal-agent costs, family CEOs might focus more on firms' long-term value, which could induce a positive relationship between family CEOs and firm performance.

Nevertheless, private family firms may suffer from other types of agency costs. Agency relationships in private family firms could exist among owners, causing owner related costs (Dawson 2011). A major governance problem in closely held companies is the majority shareholders' expropriation of minority shareholders due to the illiquidity of shares (Nagar, Petroni, and Wolfenzon 2011). It is more likely that family CEOs will expropriate minority owners when the family CEO has a high shareholding. As there are both positive and negative effects associated with the ownership issues of family CEOs, we argue that the relationship between the ownership of family CEOs and firm performance is first positive when the ownership is relatively low, and turns negative when the ownership is relatively high. Furthermore, when family CEOs have 100% ownership, which is unlikely in public firms, we expect that the relationship becomes positive again due to the absence of agency costs among owners. Thus, in the continuous spectrum of the ownership stake, the non-linear feature between ownership and performance may be more complicated than the simple inverted "U" shape relationship documented in the literature on public firms.

Pagano and Roell (1998) argue that expropriation of minority shareholders is perhaps less severe when the ownership stake of non-controlling shareholders is more concentrated. Conditional on family CEOs' expropriation of minority owners, the second largest owner with a high enough ownership stake is the best scenario for a concentrated

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non-controlling shareholder, who would have both economic incentives and executive power to vigilantly watch the family CEOs' potential misbehaving actions. Hence, we predict that a powerful second largest owner has a positive moderating effect on firm performance by exerting potential monitoring functions over family CEOs.

A traditional quadratic technique has been widely used to examine the ownership effect in public firms (Anderson and Reeb 2003; Miller, Breton-Miller, Lester, and Cannella Jr. 2007; Villalonga and Amit 2006). The technique regresses a measure of firm performance on the family CEO ownership and its square. Due to the possibility that a family CEO in private firms can fully own a business, we have modified this technique by adding a dummy variable for family CEOs having 100% of shares. In addition, we have applied the piecewise linear specification (Morck, Shleifer, and Vishny 1988) to validate our results. This method allows heterogeneous slopes between performance and ownership by breaking ownership into multiple segments, and thus enables us to explore the non-linearity in more detail than the quadratic technique. This approach may be especially useful when the ownership of family CEOs has a wide span from 0 to 100%.

The results lend strong support to both hypotheses. The modified quadratic technique shows that the relationship between firm performance and family CEO ownership is positive when the ownership is relatively low, turns to negative when the ownership is relatively high, and is positive again when family CEOs' shareholding is 100%. The piecewise linear specification illustrates a consistent but even more complex non-linear relationship. The second hypothesis that a second largest owner with high enough ownership imposes a positive moderating effect on performance by monitoring family CEOs is also supported by both methodologies.

This study has several main contributions to the literature. First, we examine how a distinct feature of the relationship between the ownership of family CEOs and firm performance in private family firms is different from a simple inverted "U" shaped relationship previously found for public family firms. Second, this study examines the potential moderating effect that the second largest owner with high enough ownership stake can exert over family CEOs, broadening the governance mechanisms in the setting of private family firms. Third, this study may help practitioners and regulators purposefully design ownership structure to reduce potential agency costs in private family firms. Furthermore, it contributes to our understanding of the ownership issues in private family firms.

The rest of the paper is structured as follows. We first establish theoretical background and develop hypotheses in section 2, and then proceed to data and methods in section 3. Section 4 presents descriptive statistics and regression results. We conclude the paper with discussions and future research highlights in section 5.

2. THEORY AND HYPOTHESES DEVELOPMENT

The classical agency theory focuses on the agency relationship between the shareholders (principal) and the managers (agent) due to the separation of ownership and control (Jensen and Meckling 1976). According to this theory, managers may lack the motivation to act in the best interests of owners and maximize their own utility at the expenses of the principal, which is the principal-agent cost. As a result, allocating shares to managers is regarded as an effective incentive mechanism in running public firms.

In private firms, especially private family firms, the story can be different. First, the CEO is often a member of the controlling family (family CEO), and social bonding among family members fosters loyalty and commitment to the family and the firm, thus reducing the classic management bonding cost (Ouchi 1980). Second, most of the family CEOs have shares, and often have a large ownership stake in the firm. Even in the case of low ownership of the family CEO, the rich information exchange between a family CEO and other family owners leads to advantages in monitoring the decision-making of family CEOs (Fama and Jensen 1983). Hence, private family firms are less susceptible to the type of principal-agent problems commonly found in publicly held companies (Carney et al. 2015).

There are, though, distinct features in private family firms that may breed other types of agency costs. The absence of capital market oversight does facilitate the pursuit of noneconomic goals (Chrisman, Chua, Pearson, and Barnett 2012). Controlling shareholders have the ability to exploit minority shareholders in closely held corporations (Nagar, et al. 2011). Stulz (1988) formally modeled the costs of entrenchment of the large shareholders. In such cases, the monitoring function would be essential. As the role of the board is more advisory than disciplinary (Huse 2000), alternative channels of monitoring may be important governance mechanisms in private family firms. The presence of a powerful second largest owner could be such an example. The second largest owner with a high enough ownership stake would have both economic motivations and power to curb any potential expropriation of the family CEOs, therefore increasing firm performance. In the following subsection, we shall investigate the effect of family CEOs' ownership and a potential monitoring role of the second largest owner in private family firms.

2.1 The double-edged sword of family CEOs

Family CEOs in private family firms are likely to have a higher proportion of ownership stake than CEOs of public firms. This high level of ownership concentration in the hands of family CEOs theoretically aligns economic interests between owners and managers (Fama and Jensen 1983; Jensen and Meckling 1976). Hence, family CEOs with investment in the firm are likely to have positive effects on firm performance. It is possible that a family CEO only owns a small proportion of shares in the family firm, and in such a case, the above positive effect becomes dubious (Anderson and Reeb 2003; Villalonga and Amit 2006).

There are other long-term value creations facilitated by family CEOs. For example, family CEOs enjoy social bonding CEOs of public firms may lack (Ouchi 1980). The social bounding indicates the relationship between the family CEOs and other family members involved in the business. As a family member, the family CEO cares about the family's long-term reputation, and thus would be motivated beyond economic incentives. Similarly, family CEOs, through parental altruism, are more likely to take risks that are beneficial to the long-term survival of the company (Kang 1999). The above long-term value creations indicate that family CEOs are capable of initiating and executing long-term oriented strategies. This disposition may be associated with the lengthy tenure of family CEOs, which allows family CEOs to better oversee long-term investments that usually lead to a longer lasting economic impact on firm performance (Anderson and Reeb 2003). When multiple family owners are involved in the business, having a family CEO could enhance the efficiency of executing long-term strategies. Studies show that family owners are demanding and exercise a great amount of influence

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on decision-making (Bertrand and Scholar 2006; Chandler 1990). A family CEO with deep-rooted family history and knowledge of family members may be better equipped to handle family issues and conduct business efficiently. It is reasonable to expect that a high ownership stake is likely to enhance family CEOs' decision-making power over long-term value creating strategies, and as a result, firm performance improves.

The ownership stake of family CEOs could also generate agency problems (Dalton, Hitt, Certo, and Dalton 2007; Gomez-Mejia, Nunez-Nicel, and Gutierrez 2001; Schulze, Lubatkin, Dino, and Buchholtz 2001). Among these problems, entrenchment, expropriation, and adverse selection have gained special recognition. First, entrenchment describes a situation where insiders (e.g., family CEOs) incur additional costs by implementing strategies that deviate from value-enhancing strategies. The degree of entrenchment is positively associated with the level of ownership (Eddleston, Otondo, and Kellermanns 2008; Osward, Muse, and Rutherford 2009). A substantial ownership stake of family CEOs is likely to induce entrenchment behavior, which is spurred further by a failing market disciplinary function associated with private ownership. The direct impact of family CEO entrenchment is declining firm performance (Gomez-Mejia et al. 2001).

The second agency problem concerns expropriation, where large owners take advantage of their ownership power to exploit other small owners' benefits, which negatively affects firm performance (Dalton, Hitt, Certo, and Dalton 2007). Villalonga and Amit (2006) showed that family CEOs with substantial ownership power extract private benefits at the cost of other smaller owners. Hence, in private family firms,

ownership stake may increase the possibility of family CEOs expropriating other owners'

benefits.

The third agency problem addresses the adverse selection in the recruitment

process. While higher pay attracts candidates who are more able in a competitive labor

market, private family firms are less likely to offer qualified candidates the same

attractive compensation package and career development opportunities as public firms

do. The labor market for private family firms is thus less competitive than that for public

firms, and information flow is less transparent for the former than the latter (Fama 1980).

It is not surprising that family CEOs are likely to select family members over qualified

outsiders to fill managerial positions. As a result, the selected family member becomes

less accountable in charge of the firm, which leads to less optimal decisions and

resentment felt by non-family senior managers (Gomez-Mejia et al. 2001; Miller, Steier,

and Le Breton-Miller 2003; Schulze et al. 2001). Such value-destroying decisions may be

difficult to challenge when the decision-makers, family CEOs, are empowered by a

substantial ownership stake.

2.2 The non-linear relationship

So far, we have discussed that the ownership stake of family CEOs can create both

positive and negative effects. We shall now discuss the net effect of this double-edged

sword in this sub-section. Specifically, we will explore how the positive and negative

effects are related to the level of the ownership stake according to agency theory.

A big difference between family CEOs in private family firms and family CEOs

in public family firms is that the extent of ownership of the former can be as high as

100%, while the ownership of the latter is often limited. As the relationship between the

ownership of family CEOs and firm performance in public family firms is shown to be non-linear, e.g., an inverted-U shape (Miller et al. 2007), this relationship in private family firms could also be non-linear; moreover, the wider range of the ownership of family CEOs in private family firms may make this non-linear relationship more complicated. In general, when the ownership of family CEOs is relatively low, it may have a positive relationship with firm performance, as the negative effects could be limited by the relatively low power of family CEOs associated with low ownership. When the ownership of family CEOs is relatively high, the negative effects might dominate due to the increased power related to higher ownership. When family CEOs in private family firms own 100% of the shares, which will not happen in public firms, the story will be different again. We provide some elaborations on these situations below.

When the family CEO's ownership stake is relatively low, there are other owners, who may be as powerful as or even more powerful than the family CEO. In this situation, when the ownership stake of the family CEO increases, conditional on the relatively low magnitude, the benefit gained is likely to be stronger than the agency problems associated with an increasing ownership. The benefit is directly linked to reduced classical agency costs, where ownership functions as an incentive mechanism. Among the three potential agency problems we illustrated earlier, one possible problem is entrenchment. Nevertheless, the entrenchment problem is likely to be watched carefully by the other owners, who may still enjoy a relatively large stake in the firm and are motivated to exercise a monitoring role on the family CEO. The other owners can even form an alliance strong enough to challenge the family CEO on decisions that are not in the best interest of the firm. Consequently, when the ownership of a family CEO starts at a

relatively low level, the positive effect of an increasing ownership stake of the family

CEO might dominate the negative one, and the net effect on firm performance could be

positive.

When the ownership of a family CEO starts at a high level that produces a

dominant ownership power among owners, increasing the ownership of the family CEO

may bring more negative than positive impacts.[2] In this case, an increasing ownership

stake in the hand of the family CEO is likely to increase the decision-making power that

is difficult to challenge. This power enables activities of potential entrenchment and

expropriation to be faced with fewer obstacles, as the oppositions are weakened by a

much lower level of ownership stake than that of the family CEO. The agency costs

increase, and firm performance suffers. This explanation is consistent with the

observation that the market disciplining force dwindles in public family firms after the

ownership of family CEOs increases beyond a certain point (McConnel and Servaes

1990; Schulze et al. 2001; Stulz 1988). The negative impact of entrenchment and

expropriation is likely to overpower the positive impact of ownership as an incentive

mechanism. The net impact of ownership of family CEOs on firm performance may

become negative conditional on a high level of ownership stake of family CEOs.

When the ownership of a family CEO reaches 100% in a private family firm,

there is no ownership dispersion and no agency problem associated with the separation of

ownership and control. The behavior associated with entrenchment or expropriation

would disappear, as the family CEO with a full ownership stake has no other owners to

expropriate or take advantage of. The family CEOs bear all the consequences of any

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[2] It is difficult to pin point the exact thresholds at which the negative effects could take place, which is beyond the scope of this paper.

suboptimal decisions. In this case, firm performance is expected to improve from the earlier scenario when family CEOs have a high, but less than 100%, ownership stake.

To sum up, the ownership effect of family CEOs can produce both positive and negative effects on firm performance in private family firms. We expect that the net effect changes from positive to negative, and then back to the positive when the initial ownership stake of family CEOs increases from a low level to a high level and finally to 100%. Thus, we hypothesize a non-linear relationship between the ownership of family CEOs and firm performance in private family firms.

Hypothesis 1 (H1): The relationship between the ownership of family CEOs and firm performance in private family firms is positive when the ownership is relatively low, negative when the ownership is relatively high, and positive again when family CEOs own 100% of the shares.

2.3 The second largest owner

From the finance field, Shleifer and Vishny (1997, p. 759) argue that "as ownership gets beyond a certain point, large owners gain nearly full control of the company and are wealthy enough to prefer to use firms to generate private benefits of control that are not shared by minority shareholders." The possibility of potential expropriation of minority shares can occur in private family firms as well. However, the expropriation may be less severe if the ownership of a non-controlling shareholder becomes high (Pagano and Roell 1998). A high ownership of the second largest owner would be one appropriate example to illustrate the monitoring function over the largest shareholder.

The empirical examination of the monitoring effect of the second largest owner is scant. The lack of research interest may reflect a norm that the monitoring role is primarily examined through the board of directors (Zahra and Pearce 1989). The fact that few studies examine the monitoring function beyond the board of directors encourages us to explore alternatives, e.g., the second largest owner, which are more suitable in the context of private family firms (Randøy and Goel 2003).

The second largest owner can become an important source of monitoring especially when the board of directors fails to exercise the monitoring role. Huse (2007) shows that although the board of directors is formally in charge of disciplining CEO, the board of directors exercises other functions such as offering services and consoling more often than monitoring. The monitoring role exercised by the board of directors reflects a judicial source of power (Johnson, Daily, and Ellstrand 1996), which is also questionable in small-sized family firms that are not legally required to install an official board. Even when they voluntarily do so, the monitoring function of the board is often inadequate (Huse 2000).

In private family firms, the ownership of the second largest owner is likely to have a positive impact on firm performance through monitoring the family CEO. In public family firms, it is observed in the case of multiple owners; the monitoring function could come from other important owners such as the institutional owners, large blockholders, and large foreign owners (Randøy and Goel 2003). We argue in private family firms, the second largest owner could also serve a similar alternative monitoring function.[3] If decision-making power is in proportion to the ownership structure, and if the

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[3] The second largest owner could be, e.g., a private person, an institutional investor, a foreign investor, or a company.

family CEO has the highest level of ownership, then the second largest owner wields the most powerful decision-making authority next to the family CEO.[4] It is reasonable to assume that the second largest owner cares about managerial actions and is motivated to protect her own wealth. The incentive and power to monitor is likely to be positively associated with the ownership stake of the second largest owners. When the stakes are high, the second largest owner will speak up if the family CEO intends to invest in wasteful projects, make value-destroying decisions, etc., and the family CEO is also likely to address concerns of the second largest owner more often than those of other owners. The agency problems due to entrenchment, exploration, and adverse selection by the family CEO may be reduced under the watchful eye of the second largest owner. Pagano and Roell (1998) predict that expropriation of minority shareholders is likely to be less severe when the ownership stake of non-controlling shareholders is more concentrated, which makes it easier and more effective to monitor the controlling shareholder.

As argued earlier, family CEOs' entrenchment and expropriation could be more pronounced when family CEOs have a higher ownership stake than when they have a lower ownership stake. Hence, the need for monitoring becomes strong when the entrenchment problem is severe, and the detrimental effect of entrenchments on performance is obvious. At the same time, the effectiveness of the monitoring role exercised by the second largest owner may depend on her power and motivations related to the level of her ownership. The second largest owner might need to have high enough ownership to balance the power of the family CEOs.

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[4] When discussing the moderating effect of the second largest owner on family CEO, we assumed that the family CEO is the largest owner.

To sum up, we hypothesize that a powerful second largest owner could positively influence firm performance through monitoring the family CEO's behavior. This brings us to the second hypothesis.

Hypothesis 2 (H2): In private family firms, the second largest owner with a high enough ownership has a positive moderating impact on firm performance through monitoring the family CEO.[5]

3. DATA, METHODS, AND DESCRIPTIVE STATISTICS

3.1 Data

This paper uses secondary data provided by the Center for Corporate Governance Research (CCGR) at BI Norwegian Business School. CCGR has acquired special permission from the Norwegian government to obtain public and private information from all businesses in Norway. The CCGR dataset contains detailed information on the ownership, the relationship among family members, and high quality accounting data for all firms in Norway from 2000 to 2012. Accounting data before 2000 are also used due to having one-year lagged control variables. The data on ownership contain both direct ownership and ultimate ownership, with the latter referring to the combination of direct and indirect holdings. This paper has used ultimate ownership in all the analyses. The information on family relationship allows us to identify whether the CEO belongs to the controlling family or not.

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[5] We describe below how we determined the threshold for ownership of the second largest owner.

There are in total 2.6 million observations for all the firms between 2000 and 2012 in our dataset. We focus on private limited liability firms that are family firms and use the following filtering criteria. We drop firms that (1) are not private limited liability firms, (2) have a minimum annual sales of less than one million kroner (about 150,000 USD),[6] and (3) that are not private family firms, where the definition of private family firms is that the aggregated ownership of all the members in the largest family is higher than 50%. It is generally accepted that a firm is defined as a family firm mainly because of the controlling power that is in the hands of family members. When the aggregated ownership of all the members in a family is more than 50%, it is reasonable to assume that this family has obtained control over the business. The number of observations in each stage during the sample selection process is reported in Appendix A. After dropping observations that have missing values for the variables used in the regressions, we have 494,356 firm-year observations in the final sample.

3.2 The methods and variable measurements

The modified quadratic technique

We use two methods to strengthen the reliability of the results. The first one is a modified version of the traditional quadratic technique, often used to test the relationship between ownership and performance in public firms (Anderson and Reeb 2003). This method regresses a measure of firm performance on the ownership of family CEOs and the square term of the ownership. As we indicated earlier, CEOs of private family firms can obtain 100% ownership, while CEOs of public family firms cannot. We therefore

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[6]We exclude small firms that do not have significant economic importance to preclude that they distort the results.

modify the traditional quadratic regression by adding a dummy variable for family CEOs with full ownership control. In our data, there are many observations where the family CEO is the sole owner. We use the modified quadratic regression (1a) to test the first hypothesis. Two additional effects are added in (1b). These are the direct effect and the moderating effect of the second largest owner. The regression (1b) simultaneously tests hypothesis 1 and 2.

$(1a)\ FirmPerformance = \beta_0 + \beta_1 FamCEOownership + \beta_2 FamCEOownership2 + \beta_3 FamCEO100\% + controls + \sum year + \sum industry + \varepsilon$

$(1b)\ FirmPerformance = \beta_0 + \beta_1 FamCEOownership + \beta_2 FamCEOownership2 + \beta_3 FamCEO100\% + \beta_4 FamCEOxLarge2H + controls + \sum year + \sum industry + \varepsilon$

Dependent variable:

The dependent variable, *FirmPerformance*, measures the performance of private family firms. The return on assets (ROA) has been used as a primary performance indicator in prior studies of ownership issues in family firms (Anderson and Reeb 2003; Miller et al. 2007; Randøy and Goel 2003). We follow the literature and measure ROA in two ways (Anderson and Reeb 2003). In the first approach, we use earnings before interest and taxes (EBIT) divided by the average book value of total assets in the beginning and end of each year (*ROA1*). In the second approach, we use net income divided by the average book value of total assets in the beginning and end of each year (*ROA2*). *ROA1* is used in the main analysis, while *ROA2* is used in robustness tests.[7] In addition, we also use return

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[7] We use ROA1 in the main analyses because ROA1 measures the total profitability of the firm before debt interests and taxes are paid out; this number will not be affected by taxes that could be affected by factors such as loss carry-forward.

on equity (*ROE*) as another proxy for performance. *ROE* equals net income divided by the average of shareholders' equity in the beginning and end of each year. The definitions of all the variables are detailed in Appendix B.

Independent variables

There are four independent variables in regression (1a) and (1b): the ownership of family CEOs (*FamCEOownership*), the squared term of the ownership (*FamCEOownership2*), the dummy variable that equals 1 if the family CEO ownership is 100% and 0 otherwise (*FamCEO100%*), and an interaction between the ownership of the family CEO and a powerful second largest owner (*FamCEOxLarge2H*). In this interaction term, the measurement of a powerful second largest owner is a dummy variable, *Large2H,* which is one when the ownership of the second largest owner is higher than or equal to 1/3, and zero otherwise. The 1/3 ownership is an important threshold because, according to Norwegian corporate law, this holding size can be transformed into voting power on certain issues at the stockholder meeting and is referred as 1/3 super–minority (Bøhren and Ødegaard 2001). We thus use 1/3 as the threshold to distinguish powerful second largest owners from the rest. The first three independent variables, *FamCEOownership*, *FamCEOownership2*, and *FamCEO100%*, are for hypothesis 1. H1 indicates that β_1 is positive, β_2 is negative, and β_3 is positive. The last independent variable is for hypothesis 2, which predicts that β_4 is positive.

Control variables

As illustrated earlier, we investigate a potential moderating effect of the second largest owner. There might also exist a direct effect of the largest owner on firm performance. Hence, we control for the direct effect of the ownership of the second largest owner

(*Large2ownership*).[8] Attributes of family CEOs could be associated with their behaviors and firm performance. For example, the gender of family CEOs might matter for firm performance, so we control for the potential impact of gender differences (Daily, Certo, and Dalton 1999). The age of family CEOs may be associated with their management experience and industry expertise and thus firm performance (Nadkarni and Herrmann 2010). Hence, we include two variables of family CEO attributes as control: one is Male, which equals one if the family CEO is male and zero otherwise, and the second is CEOAge, which measures how old the family CEO is.[9]

We differentiate one-family-owner businesses from family firms with multiple owners from the controlling family, as private family firms with only one family owner might outperform those with multiple family owners due to reduced agency costs within the controlling family. It is noted that conflicts among multiple owners from the controlling family can be difficult to handle, reduce operational efficiency, and lead to poorer firm performance (Gomez-Mejia, Larraza-Kintana, and Makri 2003; Schulze, Lubatkin, and Dino 2003; Westhead, Howorth, and Cowling 2002). The benefit of a special version of the one-family-owner structure is also noted (Miller et al. 2007; Miller et al. 2003), where the lone-founder structure delivers better performance than the multiple-owner structure. We include a dummy variable, *OneFamOwner*, which equals one if there is only one family owner in the private family businesses, and zero otherwise. We expect a positive sign on the coefficient on *OneFamOwner*.

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[8] Though it would be interesting to explore the direct effect of the ownership of the second largest owner, this paper focuses on the moderating impact of the second largest owner with a *high* ownership on firm performance by monitoring family CEOs.
[9] We thank the reviewer for the suggestion of using attributes of family CEOs.

We control for the number of non-family owners in a family firm, and measure it by the natural logarithm of the number of non-family members (*Ln#NonFamOwner*). The presence of multiple non-family owners could increase the operational complexity and may slow down the management efficiency (Miller et al. 2003). On the other hand, the multiple non-family owners might be able to counterbalance the power of the family CEO, hence increase firm performance. Our model examines which effect dominates.

The board characteristics may also matter for firm performance (Huse 2007). We control for the size of the board, measured by the natural logarithm of the number of board members (*LnBoardSize*), and the percentage of board members belonging to the controlling family (*FamOnBoard*), which divides the number of family members in the board by the number of board members.[10] Furthermore, the influence of the controlling family might affect performance. When both the chair of the board and the CEO belong to the controlling family, family influence is likely to be substantial.[11] As this study examines family CEOs, which indicates that the CEO is a member of the controlling family, we capture the additional family influence by the identity of the chair of the board. We define a dummy variable, *FamChair*, which equals one if the chair is a family member and zero otherwise.

As firm performance is auto-correlated, we add one year lagged firm performance as control (*LagROA*). Previous studies have controlled for the size and the age of family firms (Anderson and Reeb 2003). We thus add the one year lagged natural logarithm of total assets, sales, and firm age as controls (*LagLnTA*, *LagLnSales*, and *LagLnFirmAge*).

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[10] The board structure might be less important than the ownership structure for firm performance in private family firms (Che and Langli 2015).

[11] Note that this is different from CEO duality, which refers to the case that the CEO and the chair of the board are the same person.

Other related control variables are one year lagged debt ratio and sales growth (*LagDebtRatio* and *LagSalesGrowth*), as the literature has shown that they are correlated with firm performance (Scherr and Hulburt 2001). *LagROA*, *LagDebtRatio*, and *LagSalesGrowth* are winsorized at the 1th and 99th percentiles to mitigate the potential distortion of outliers. In addition, we include fixed effects on year and industry in all the tests. We also adjust the standard errors by controlling the within-firm correlation (clustered at the firm level).

Piecewise linear specification

Following Morck, Shleifer, and Vishny (1988), we use piecewise linear specification to validate the results based on the adjusted quadratic regression. The piecewise linear method is widely used in different disciplines and its advantage is to allow heterogeneous slopes in different "pieces". Instead of considering the ownership of family CEOs as one continuous variable, this technique breaks it into several segments and examines the association between firm performance and family CEO ownership in different segments. Hence, it examines the relationship in more detail than the traditional quadratic technique.

According to Norwegian corporate law, the following three holding sizes are important: blocking super–minority (1/3), simple majority (1/2), and super–majority (2/3). For example, changes in the corporate charter require a super-majority of 2/3, whereas most other issues need a simple majority of 1/2. Bøhren and Ødegaard (2001) find an over-representation just above the voting power limits of 1/3, 1/2, and 2/3. Hence, we break the ownership level into pieces using the following cut-offs: 1/3 (33%), 50%,

2/3 (67%), and 100%.[12] We construct the following test variables for H1,

FamCEOLT33%, FamCEO33to50%, FamCEO50to67%, FamCEO67to99%, and

FamCEO100%, where FamCEO100% is the same as the one defined above.

To test the moderating effects of the second largest owner for H2, we construct

the independent variables as the interaction terms between *Large2H*, defined previously,

and the independent variables for H1, except for *FamCEOLT33%* and *FamCEO100%*.

When family CEO ownership is less than 33%, it is likely that the CEO is not the largest

owner, and the power of the family CEO could be limited due to her relatively low

ownership stake; other large owners would have the incentives to closely monitor the

CEO. Hence, negative effects associated with family CEOs' entrenchment and

expropriation, among other things, may not be a major concern. When the ownership of

family CEOs is 100%, the family CEO is the sole owner. The second largest owner will

not exist. The mathematical expressions of the independent variables for H2, the

interaction variables, are as follows:

$$FamCEO33to50xLarge2H = FamCEO33to50\% * Large2H$$

$$FamCEO50to67xLarge2H = FamCEO50to67\% * Large2H$$

$$FamCEO67to99xLarge2H = FamCEO67to99\% * Large2H$$

We present the models for testing the hypotheses using the piecewise linear

regressions below.

$(2a)$ $FirmPerformance = \beta_0 + \beta_1 FamCEOLT33\% + \beta_2 FamCEO33to50\% +$

$\beta_3 FamCEO50to67\% + \beta_4 FamCEO67to99\% + \beta_5 FamCEO100\% + controls +$

$\sum year + \sum industry + \varepsilon$

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[12] For brevity, we write 33% and 67% for the thresholds of 1/3 and 2/3.

$(2b)\ FirmPerformance = \beta_0 + \beta_1 FamCEOLT33\% + \beta_2 FamCEO33to50\% +$

$\beta_3 FamCEO50to67\% + \beta_4 FamCEO67to99\% + \beta_5 FamCEO100\% +$

$\beta_6 FamCEO33to50xLarge2H + \beta_7 FamCEO50to67xLarge2H +$

$\beta_8 FamCEO67to99xLarge2H + controls + \sum year + \sum industry + \varepsilon$

We use equation (2a) to test H1 by regressing a measure of firm performance on the five independent variables and the control variables. We use equation (2b) to test both hypothesis 1 and 2 simultaneously. Both the dependent variable and control variables in equation (2a) and (2b) are the same as those in equation (1a) and (1b).

4. DESCRIPTIVE STATISTICS AND RESULTS

4.1 Descriptive statistics

We report the descriptive statistics: the mean (Mean), standard deviation (SD), the minimum (Min), the 5th (P5), 25th (P25), 50th (P50), 75th (P75), and 95th (P95) percentiles and the maximum (Max) values in Table 1. The dependent variable used in the main analyses, return on assets (*ROA1*), has a mean value of 6.7% with a standard deviation of 29%. This indicates that there is a large variation of firm performance in private family firms. The statistics for the second measure of the dependent variable, *ROA2*, are quite similar to, but slightly lower than, those for *ROA1*. This is reasonable as the nominator for *ROA1* is earnings before interest and taxes (*EBIT*), which is usually higher than the nominator for *ROA2* (net income). The return on equity (*ROE*) has a much higher mean

value and standard deviation. This is also reasonable as the denominator of *ROE*, equity, is usually much lower than the total assets, which is the denominator for returns on assets.

The mean value of family CEO ownership (*FamCEOownership*) is 66%, with a standard deviation of 36%. The 5th percentile of the ownership of family CEOs is 0, which indicates that at least 5% of the firm-year observations in the sample have no family CEO ownership. The 25th and 50th percentiles of family CEO ownership are 45% and 70%, respectively. The last three columns of Table 1 indicate that more than 25% of the family CEOs own the entire firm as the family CEO ownership at the 75th percentile is 100%. The next three rows present the squared term of the ownership of family CEOs (*FamCEOownership2*), the indicator variable for family CEOs owning 100% of the shares (*FamCEO100%*), and the interaction term between family CEO ownership and a powerful second largest owner (*FamCEOxLarge2H*). The ownership of the second largest owner (*Large2ownership*) is reported next. The mean value is 16.2% with a standard deviation of 18%. More than 25% of the observations do not have a second largest owner, which is consistent with the fact that more than 25% of the family CEOs own the entire the firm. The median (p50) value of *Large2ownership* is 8%, and the maximum value is 50%.

The next four rows report statistics for *FamCEOLT33%, FamCEO33to50%, FamCEO50to67%,* and *FamCEO67to99%,* which are the test variables for H1 using the piecewise linear specification. The three variables below are the test variables for hypothesis 2 in the piecewise linear regression. Note that although these variables span the whole range of the ownership of family CEOs, that is, from 0 to 100%, the regressions only focus on the segments between the break points, where the values are

continuous instead of constant. For example, *FamCEO50to67%* has a value of 0 when the ownership of family CEOs is less than 50%, and a value of 67% when the ownership is higher than or equal to 67%, and is the same as *FamCEOownership*, a segment with continuous values, when the ownership of family CEOs is between 50% and 67%. Hence, the value of the minimum, 5th, and 25th percentiles are 0%, and the values of 75th, 95th, and the maximum are 67%. The median (p50) of *FamCEO50to67%* is 67% because the median of *FamCEOownership* is 70%, which is higher than 67%. By definition of *FamCEO50to67%,* any value larger than 67% is equal to 67%.

The mean value of *Male* is 84.6%, which means that 84.6% of the family CEOs are male. The average age of family CEOs (*CEOAge*) is 49 years, spanning between a minimum of 20 years old and a maximum of 70 years old. The variable *FamChair* has an average value of 0.89, indicating that 89% of the chair of the board in the sample is associated with the controlling family.

The statistics of *OneFamOwner* show that more than half of the observations in the sample have the one-family-owner structure.[13] The 75th and 95th percentiles of the number of non-family members (*#NonFamOwners*) show that more than 75% of the observations do not have non-family owners and more than 5% of the observations have two or more non-family owners. The largest number of non-family owners is 130, indicating that there are some very big private family firms with a large number of non-family owners. The percentage of board members belonging to the controlling family (*FamOnBoard*) is 84.8% on average and the natural logarithm of the number of board members (*LnBoardSize*) has a mean value of 0.464. The next rows report the one year

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[13] Note one-family-owner structure is different from the one-owner structure, where the former may have (multiple) non-family owners.

lagged control variables. The average (median) total assets (*TA*) is 9,698 (2,072) million

NOK, and the average (median) sales is 10,204 (2,800) million NOK.

4.2 Regression results using the adjusted quadratic technique

This subsection reports the regression results using the modified quadratic technique

(equation 1a and 1b) in Table 2.

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Insert Table 2 here

- - - - - - - - - - - -

Column [1] in Table 2 presents the results of hypothesis 1 using equation (1a) and

column [2] reports the results for testing both hypotheses using equation (1b). In column

[1], the coefficient on family CEO ownership (*FamCEOownership*) is positive and

significant at 0.051, t = 6.49. The coefficient on the squared term of family CEO

ownership (*FamCEOownership2*) is significantly negative at -0.053, t = - 5.63. These two

values suggest an inverted "U" relationship. Furthermore, the coefficient on

FamCEO100% is significantly positive at 0.014, with a t-value of 5.2, indicating a

positive association with firm performance when the family CEO owns 100% of the

shares. As a whole, these three coefficients support H1: the relationship between family

CEO ownership and firm performance is positive when the ownership is relatively low,

negative when the ownership is relatively high, and turns to positive again when it

reaches 100%. This non-linear relationship is more than an inverted "U" shape, as

documented in studies on publicly held firms. The coefficients on the three test variables

(*FamCEOownership*, *FamCEOownership2*, and *FamCEO100%*), reported in column [2],

provide a similar story.

Hypothesis 2 predicts a positive moderating effect of a strong second largest owner on firm performance by monitoring family CEO's behavior. The results are presented in column [2] of Table 2. The moderating term between family CEO ownership and the dummy variable for a strong second largest owner (*FamCEOxLarge2H)* is significantly positive at 0.02, t = 5.84. This result supports hypothesis 2 that a second largest owner with high enough ownership stake could positively affect firm performance by changing the role and power of family CEOs. The results in columns [1] and [2] lend strong support to the two hypotheses.

The results for the control variables in column [1] of Table 2 show that the coefficient for the ownership of the second largest owner (*Large2ownership)*, which measures the direct impact of the second largest owner on firm performance, is positive and significant. Family CEOs that are male (*Male*) and older (*CEOAge*) are positively associated with firm performance. These results are consistent with earlier studies suggesting gender and age matters. The proportion of board members from the controlling family (*FamOnBoard*) has a positive relationship with firm performance, while board size (*LnBoardSize*) has an insignificant impact. Firm performance is positively associated with the one year lagged return on assets (*LagROA*), firm age (*LagFirmAge*), debt ratio (*LagDebtRatio*), and sales (*LagLnSales*), and is negatively associated with total assets (*LagLnTA*) and sales growth (*LagSalesGrowth*) in the previous year.

4.3 Results using different cut-off points for a powerful second largest owner

As there is no theoretical guidance on the cut-off points for the definition of a powerful second largest owner, the choice of using 1/3 in the main tests, though with a good

rationale, is arbitrary. We thus try to use other break points, 25% and 20%, to investigate

whether they indicate high enough ownership for a powerful second largest owner to

have influence on family CEOs. We coded *Large2H25* (*Large2H20)* as 1 if the

ownership of the second largest owner is least 25% (20%) and 0 otherwise, which is a

similar approach to *Large2H*. We construct two interaction terms *FamCEOxLarge2H25*

and *FamCEOxLarge2H20*, which are the product between the ownership of family CEOs

(*FamCEOownership*) and the indicator variable of *Large2H25* and *Large2H20*,

respectively. The results using these two alternative measures for the moderating effect

are reported in column [3] and [4] in Table 2. The coefficients on *FamCEOxLarge2H25*

in column [3] is significantly positive at 0.017 with a t - value of 4.66. Similarly, the

coefficient 0n *FamCEOxLarge2H20* in column [4] is significant and positive at 0.015

with a t - value of 4.19. The coefficients on the three test variables for H1 in both column

[3] and [4] are significant and have the predicted signs.

The results in columns [3] and [4] provide supportive evidence for the main tests

in the first two columns in Table 2. Note that both the magnitude and the t - value of the

coefficient on the moderating term in the last two columns are lower than those in column

[2], which has a stronger second largest owner as the cut-off point is higher (1/3 vs. 25%

and 20%). This indicates that the moderating effect of the second largest owner is

decreasing when her ownership shrinks. We also try a break point of 15% and the

coefficient on the interaction term becomes insignificant.[14]

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[14] We do not report the results when the cut-off point for a powerful second largest owner is 15% for brevity.

4.4 Results using the piecewise linear regressions

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Insert Table 3 here

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The results of the piecewise linear regressions are reported in Table 3.

Column [1] of Table 3 presents the regression results for testing hypothesis 1 using

equation (2a). Column [2] of Table 3 reports the regression results for testing hypotheses

1 and 2 using equation (2b). The coefficients for family CEO ownership at different

ownership segments are significant, but with changing signs. The coefficient on

FamCEOLT33% is positive at 0.027 and significant at the 1% level with a t -value of

3.61. The coefficient on *FamCEO33to50%* changes to negative at -0.024, t = - 4.91,

followed by a positive coefficient on *FamCEO50to67%* at 0.038, t = 12.46. The

coefficient changes back to negative for *FamCEO67to99%* at -0.029, t = -11.36, and

finally it ends with a positive coefficient on FamCEO100% at 0.020, t = 8.94.

In column [2] of Table 3, the coefficients on *FamCEOLT33%*, *FamCEO50to67%*,

FamCEO67to99%, and *FamCEO100%* remain significant and keep the same signs as in

column [1], while the coefficient on *FamCEO33to50%* becomes insignificant. The

coefficients on the independent variables in these two columns indicate a very

complicated non-linear relationship between the family CEO ownership and firm

performance. These results provide additional strong support for a non-linear

relationship, but an even more complex relationship than that stated in Hypothesis 1.

The results for hypothesis 2 based on equation (2b) are presented in column [2] of

Table 3. The coefficient on the moderating term, *FamCEO33to50xLarge2H,* is significant

but negative at -0.015, t = - 2.08. The coefficient on the second moderating term, *FamCEO50to67xLarge2H*, is significant and positive at 0.022, t = 3.27. The coefficient on the third moderating term, *FamCEO67to99xLarge2H*, is also significant and positive at 0.264, t = 1.92. The coefficients on *FamCEO50to67xLarge2H* and *FamCEO67to99xLarge2H* support hypothesis 2 and suggest positive moderating effects of a powerful second largest owner on firm performance when family CEOs hold a high proportion of ownership stake. Especially, as family CEOs with ownership between 67% and 99% (*FamCEO67to99%)* have a negative association with firm performance, the positive coefficient on *FamCEO67to99xLarge2H* suggests that a powerful second largest owner can help mitigate the negative impact of family CEOs on firm performance. In sum, the results in Table 2 and Table 3, based on two different methods, provide strong and consistent supports for both hypotheses.

4.5 Further analyses and discussions

As documented above, columns [3] and [4] in Table 2 show positive moderating effects of the second largest owner when her ownership is at least 25% or 20%, using the modified quadratic technique. We also use the cut-off points of 25% and 20% in the piecewise linear regression and re-run the regression (2b). The un-tabulated results show that coefficients on all the independent variables for H2 become insignificant. This indicates that an ownership of 20% or 25% for the second largest owner is not high enough to exert influence on the behavior of family CEOs when using the piecewise linear regressions. The significant moderating effect of the second largest owner with at least 1/3 ownership from both methods probably results from the voting power related to the blocking super-minority of 1/3 holding size (Bøhren and ødegaard, 2001).

This paper focuses on the monitoring role of a strong second largest owner on family CEOs that are controlling owners. We recognize, though, that the role of the second largest owner could be different depending on the level of the ownership. For example, when family CEO ownership is between 33% and 50%, the results show that a second largest owner with a high ownership stake induces a negative moderating effect. We call for more future research to explore the role and effect of the second largest owner in detail.

5. CONCLUSIONS

This paper examines ownership issues of the family CEO and the second largest owner in private family firms. We find that the relationship between the ownership of the family CEO and firm performance does not follow a simple inverted "U" shape, but is more complex. Particularly, according to the piecewise linear specification, the relationship changes signs several times over the span of family CEO ownership between 0 and 100%. The second main finding is that a powerful second largest owner may have a positive moderating effect on performance by exercising a monitoring function on family CEOs to mitigate their potential negative impacts.

We use two different methodologies to test the hypotheses. The first approach builds on the traditional quadratic technique, often used in the literature of public firms. We modify it to suit our context of private family firms. The second method is the piecewise linear specification, which is widely used in many disciplines and has its distinct advantages. Compared to the modified quadratic technique, the piecewise linear regression enables much closer analyses of the impact of ownership on firm performance.

This is especially useful in the setting of private firms due to the wide range of CEO ownership from 0 to 100%. We have used the level of ownership that generates voting power as a base to design break points. Future studies may apply other rationales to design their thresholds and test whether they could arrive at a similar conclusion of a non-linear relationship.

This paper takes advantage of a unique dataset that contains the ownership of the family CEOs and the second largest owners using ultimate ownership for a large sample of private family firms. While much less has been done on private family firms than on public firms (Carney et al. 2015), the studies that do focus on private family firms usually employ a small sample, which is subject to sample selection biases. This paper greatly alleviates this concern and increases the reliability of the results. Nevertheless, future studies could replicate this study by using other full-scale datasets from a different country to validate our findings.

Appendix A: The number of observations

Year	Stage1	Stage2	Stage3	Stage4	Stage5
2000	145,656	135,557	90,780	67,480	33,920
2001	149,468	138,174	92,138	68,260	35,194
2002	153,912	140,617	93,860	70,388	36,322
2003	155,996	141,498	95,439	71,151	37,539
2004	158,259	143,962	97,608	73,193	38,795
2005	182,689	157,249	102,184	75,828	34,607
2006	208,971	180,247	108,320	81,718	35,145
2007	222,196	191,614	113,051	84,650	36,581
2008	233,955	197,638	115,273	86,571	39,256
2009	238,213	199,880	116,660	87,976	40,451
2010	242,762	203,015	118,922	90,132	41,810
2011	248,352	208,038	122,461	92,767	42,942
2012	261,253	221,619	132,271	97,696	41,794
Total	2,601,682	2,259,108	1,398,967	1,047,810	494,356

This table presents the number of observations per year from 2000 to 2012 in the sample selection process. Stage 1 states the number of observations of the original sample in the dataset. Stage 2 shows the numbers after dropping firms that are not private limited liability firms. Stage 3 deletes small firms that have minimum annual sales less than 1 million Norwegian kroner. Stage 4 reports the sample size after dropping firms that are not private family firms. The last column, stage 5, presents the number of observations in the final sample after excluding observations with missing values.

Appendix B: Variable definitions

Variable		Definition of variables
ROA1	=	Earnings before interest and taxes (EBIT) divided by the average book value of total assets in the beginning and end of each year
ROA2	=	Net income divided by the average book value of total assets in the beginning and end of each year
ROE	=	Net income divided by the average of shareholders' equity in the beginning and end of each year
FamCEOownership	=	The proportion of shares held by the family CEO, who is a member of the largest family using ultimate ownership
FamCEOownership2	=	The squared term of *FamCEOownership*. *FamCEOownership2= FamCEOownership* FamCEOownership*
FamCEO100%	=	1 if *FamCEOownership* equals 1 and 0 otherwise
Large2ownership	=	Fraction of shares held by the second largest owner using ultimate ownership
Large2H	=	1 if *Large2ownership* is larger than or equal to 33% and 0 otherwise
FamCEOxLarge2H	=	The interaction term between *FamCEOownership* and *Large2H*. *FamCEOxLarge2H=FamCEOownership*Large2H*
FamCEOLT33%	=	*FamCEOownership* if *FamCEOownership* is less than 33%, and 33% if *FamCEOownership* is larger than or equal to 33%
FamCEO33to50%	=	0 if *FamCEOownership* is less than 33%, 0.50 if *FamCEOownership* is larger than or equal to 50%, and *FamCEOownership* if *FamCEOownership* is larger than or equal to 33% and less than 50%
FamCEO50to67%	=	*0 if FamCEOownership is less than 50%, ⅔ if FamCEOownership is at least ⅔, and FamCEOownership if FamCEOownership is higher than or equal to 50% and less than ⅔*
FamCEO67to99%	=	0 if *FamCEOownership* is less than ⅔, 1 if *FamCEOownership* is larger than or equal to 99%, and *FamCEOownership* if *FamCEOownership* is at least ⅔ and no more than 99%
FamCEO33to50xLarge2H	=	*FamCEO33to50xLarge2H = FamCEO33to50% * Large2H*
FamCEO50to67xLarge2H	=	*FamCEO50to67xLarge2H = FamCEO50to67% * Large2H*
FamCEO67to99xLarge2H	=	*FamCEO67to99xLarge2H = FamCEO67to99% * Large2H*
Male	=	1 if the family CEO is male and 0 otherwise
CEOAge	=	the age of the family CEO
FamOnBoard	=	Fraction of board members belonging to the largest family
LnBoardSize	=	Natural logarithm of the number of board members
FamChair	=	1 if the Chair of the Board belongs to the controlling family and 0 otherwise
OneFamOwner	=	1 if there is only one of the owners belongs to the controlling family and 0 otherwise
Ln#NonFamOwner	=	Natural logarithm of the number of non-family owners
LagROA	=	One year lagged return on assets (ROA)
LagLnFirmAge	=	One year lagged natural logarithm of the number of years since the firm's incorporation
LagDebtRatio	=	One year lagged total debt to total assets ratio
LagLnTA	=	One year lagged natural logarithm of total assets in million NOK
LagLnSales	=	One year lagged natural logarithm of total revenue from operations in million NOK
LagSalesGrowth	=	One year lagged changes in sales

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Table 1: Descriptive statistics

	Mean	SD	Min	P5	P25	P50	P75	P95	Max
ROA1	0.067	0.29	-2.00	-0.34	-0.05	0.05	0.20	0.52	1.13
ROA2	0.063	0.24	-1.84	-0.27	-0.01	0.06	0.16	0.40	1.06
ROE	0.364	0.75	-1.79	-0.57	0.02	0.22	0.58	1.720	3.80
FamCEOownership	0.660	0.36	0.00	0.00	0.45	0.70	1.00	1.00	1.00
FamCEOownership2	0.568	0.41	0.00	0.00	0.20	0.49	1.00	1.00	1.00
FamCEO100%	0.421	0.49	0.00	0.00	0.00	0.00	1.00	1.00	1.00
FamCEOxLarge2H	0.111	0.22	0.00	0.00	0.00	0.00	0.00	0.60	0.67
Large2ownership	0.162	0.18	0.00	0.00	0.00	0.08	0.33	0.50	0.50
FamCEOLT33%	0.279	0.12	0.00	0.00	0.33	0.33	0.33	0.33	0.33
FamCEO33to50%	0.388	0.20	0.00	0.00	0.45	0.50	0.50	0.50	0.50
FamCEO50to67%	0.429	0.31	0.00	0.00	0.00	0.67	0.67	0.67	0.67
FamCEO67to99%	0.494	0.49	0.00	0.00	0.00	0.70	1.00	1.00	1.00
FamCEO100%	0.421	0.49	0.00	0.00	0.00	0.00	1.00	1.00	1.00
FamCEO33to50xLarge2H	0.100	0.20	0.00	0.00	0.00	0.00	0.00	0.50	0.50
FamCEO50to67xLarge2H	0.059	0.18	0.00	0.00	0.00	0.00	0.00	0.60	0.67
FamCEO67to99xLarge2H	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67
Male	0.846	0.36	0.00	0.00	1.00	1.00	1.00	1.00	1.00
FamCEOAge	49.05	9.95	20	33	42	49	57	65	70
FamChair	0.890	0.31	0.00	0.00	1.00	1.00	1.00	1.00	1.00
OneFamOwner	0.625	0.48	0.00	0.00	0.00	1.00	1.00	1.00	1.00
#NonFamOwners	0.413	1.34	0.00	0.00	0.00	0.00	0.00	2.00	130
Ln#NonFamOwner	0.218	0.42	0.00	0.00	0.00	0.00	0.00	1.100	4.88
FamOnBoard	0.848	0.27	0.00	0.33	0.67	1.00	1.00	1.00	1.00
LnBoardSize	0.464	0.53	0.00	0.00	0.00	0.00	1.100	1.390	2.30
LagROA1	0.071	0.29	-2.00	-0.33	-0.05	0.05	0.20	0.53	1.13
LagLnFirmAge	2.274	0.81	0.00	0.69	1.610	2.300	2.89	3.500	5.12
LagDebtRatio	0.817	0.81	0.00	0.23	0.56	0.76	0.90	1.370	13.24
TA (Million NOK)	9698	91504	0	220	842	2072	5177	24818	1.27E+07
Sales (Million NOK)	10204	72538	1	186	1040	2800	7430	34932	1.93E+07
LagLnTA	7.630	1.45	0.00	5.39	6.70	7.58	8.49	10.06	16.48
LagLnSales	7.885	1.57	0.00	5.27	6.94	7.91	8.87	10.41	16.58
LagSalesGrowth	0.294	1.43	-1.00	-0.45	-0.07	0.04	0.21	1.38	14.46

This table provides descriptive statistics for the variables used in the analyses. The followings statistics are presented: the mean (Mean), the standard deviation (SD), the minimum (Min), 5th, 25th, 50th, 75th, and 95th percentiles, and the maximum (Max). P50[th] percentile is the same as the median. The number of observations is 494,356, except for *ROE*, which is 415,579. All the variables are defined in Appendix B.

Table 2: Results using the modified quadratic regression

	Column [1]	Column [2]	Column [3]	Column [4]
	ROA1	ROA1	ROA1	ROA1
FamCEOownership	0.051***	0.036***	0.030***	0.028***
	6.49	4.46	3.39	3.02
FamCEOownership2	-0.053***	-0.040***	-0.034***	-0.033***
	-5.63	-4.19	-3.3	-3.14
FamCEO100%	0.014***	0.014***	0.014***	0.015***
	5.2	5.24	5.23	5.62
FamCEOxLarge2H		0.020***		
		5.84		
FamCEOxLarge2H25			0.017***	
			4.66	
FamCEOxLarge2H20				0.015***
				4.19
Large2ownership	0.023***	0.002	0.008	0.014***
	4.79	0.41	1.5	2.61
Male	0.013***	0.013***	0.013***	0.013***
	9.66	9.63	9.61	9.62
FamCEOAge	0.000***	0.000***	0.000***	0.000***
	4.46	4.66	4.64	4.56
FamChair	0.010***	0.009***	0.010***	0.009***
	5.44	5.37	5.41	5.36
OneFamOwner	0.005***	0.002	0.002	0.003**
	3.02	1.07	1.53	1.98
Ln#NonFamOwner	0.001	0.003**	0.003**	0.002
	0.98	2.41	2.02	1.6
FamOnBoard	0.016***	0.017***	0.016***	0.017***
	5.78	5.94	5.89	5.94
LnBoardSize	-0.002	-0.001	-0.001	-0.001
	-1.55	-0.88	-1.24	-1.26
LagROA	0.358***	0.358***	0.358***	0.358***
	97.88	97.83	97.87	97.87
LagLnFirmAge	0.003***	0.003***	0.003***	0.003***
	5.1	5.11	5.13	5.16
LagDebtRatio	0.008***	0.008***	0.008***	0.008***
	4.03	4.03	4.03	4.03
LagLnTA	-0.008***	-0.008***	-0.008***	-0.008***
	-14.23	-14.31	-14.24	-14.24
LagLnSales	0.015***	0.015***	0.015***	0.015***
	29.13	29.16	29.11	29.1
LagSalesGrowth	-0.008***	-0.008***	-0.008***	-0.008***
	-19.24	-19.22	-19.23	-19.23
Fixed effect				
-- Year	Yes	Yes	Yes	Yes
-- Industry	Yes	Yes	Yes	Yes
Constant	-0.123***	-0.119***	-0.120***	-0.121***
	-18.1	-17.42	-17.62	-17.77
Observations	494356	494356	494356	494356
Adjusted R^2	0.154	0.154	0.154	0.154

This table presents the regression results using the adjusted quadratic technique. The dependent variable is the return on assets (*ROA1*), which divides the earnings before interest and taxes (*EBIT*) by the average of total assets in the beginning and end of the year. Column [1] presents the regression results for hypothesis 1 (H1) that there is a non-linear relationship between family CEO ownership and firm performance using equation (1a). Column [2] reports the regression results for both hypothesis 1 and hypothesis 2 (H2), where H2 predicts a positive moderating effect of a second largest owner with high enough ownership. The independent variables for H1 are *FamCEOownership, FamCEOownership2*, and *FamCEO100%*. The independent variables for H2 is *FamCEOxLarge2H*, which is an interaction term between *FamCEOownership* and *Large2H*. *Large2H* equals 1 if *FamCEOownership* is at least 1/3, and 0 otherwise. Columns [3] and [4] are similar to column [2], but *FamCEOxLarge2H* is replaced with *FamCEOxLarge2H25* and *FamCEOxLarge2H20*, respectively. *Large2H25* (*Large2H20*) equals 1 if *FamCEOownership* is larger than or equal to 25% (20%) and 0 otherwise. All the variables are defined in Appendix B. Fixed effects on year and industry are included in all the regressions. The t-values are reported in the rows below the coefficients and are adjusted for within-cluster correlation using the Huber White Sandwich Estimator. * (**) [***] indicates significance at the 1, (5), and [10] percent levels using two-tailed tests.

Table 3: Results based on the piecewise linear specification

	Column [1] ROA1	Column [2] ROA1
FamCEOLT33%	0.027***	0.026***
	3.61	3.41
FamCEO33to50%	-0.024***	-0.009
	-4.91	-1.24
FamCEO50to67%	0.038***	0.021***
	12.46	3.45
FamCEO67to99%	-0.029***	-0.024***
	-11.36	-7.30
FamCEO100%	0.020***	0.019***
	8.94	8.49
FamCEO33to50xLarge2H33		-0.015**
		-2.08
FamCEO50to67xLarge2H33		0.022***
		3.27
FamCEO67to99xLarge2H33		0.264*
		1.92
Large2ownership	0.029***	0.027***
	5.77	4.58
Male	0.012***	0.012***
	9.21	9.15
FamCEOAge	0.000***	0.000***
	4.22	4.27
FamChair	0.010***	0.010***
	5.38	5.38
OneFamOwner	0.001	0.00
	0.64	0.22
Ln#NonFamOwner	-0.001	-0.001
	-1.06	-0.85
FamOnBoard	0.017***	0.017***
	5.94	5.90
LnBoardSize	-0.001	-0.001
	-1.00	-0.95
LagROA	0.357***	0.357***
	97.62	97.61
LagLnFirmAge	0.003***	0.003***
	5.31	5.26
LagDebtRatio	0.008***	0.008***
	4.05	4.05
LagLnTA	-0.008***	-0.008***
	-14.24	-14.27
LagLnSales	0.015***	0.015***
	29.19	29.22
LagSalesGrowth	-0.008***	-0.008***
	-19.14	-19.14
Fixed effect		
-- Year	Yes	Yes
-- Industry	Yes	Yes
Constant	-0.121***	-0.120***
	-17.69	-17.56

Observations	494356	494356
Adjusted R^2	0.154	0.155

This table presents the regression results using the piecewise linear specification method. The dependent variable is the return on assets (*ROA1*), which divides the earnings before interest and taxes (*EBIT*) by the average of total assets in the beginning and end of the year. Column [1] presents the regression results for hypothesis 1 (H1) that there is a non-linear relationship between family CEO ownership and firm performance using equation (1a). Column [2] reports the regression results for both hypothesis 1 and hypothesis 2 (H2), where H2 predicts a positive moderating effect of a second largest owner with high enough ownership. The independent variables for H1 are *FamCEOLT33%, FamCEO33to50%, FamCEO50to67%, FamCEO67to99%*, and *FamCEO100%*. The independent variables for H2 are *FamCEO33to50xLarge2H*, *FamCEO50to67xLarge2H*, and *FamCEO67to99xLarge2H*. All the variables are defined in Appendix B. Fixed effects on year and industry are included in all the regressions. The t - values are reported in the rows below the coefficients and are adjusted for within-cluster correlation using the Huber White Sandwich Estimator. * (**) [***] indicates significance at the 1, (5), and [10] percent levels using two-tailed tests.