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## Abstract

This master thesis examines the level of cash holdings in Norwegian private firms in the period 2004 to 2014. We compare family firms to non-family firms and explore whether there are differences in their cash holding policies. Furthermore, we test whether inside versus outside management in family firms has an impact on cash holdings. Lastly, we look at the influence of founders in contrast to non-founders in family managed firms on cash holdings. We find that family firms hold significantly less cash than non-family firms. Moreover, we find that inside CEOs hold less cash than outside CEOs in family firms. Lastly, we find that founders hold slightly more cash than non-founders in family managed firms. Our findings contradict previous research. However, our research is based on private as opposed to public firms and might offer some new insight.

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## 1 Introduction

In this paper, we study the relationship between corporate cash holdings and family control in privately held firms. Family-owned firms constitute a large part of the economic environment, and the economic importance of such firms has been emphasized in the relatively new branch of research exploring family firms. Family firms are a common organizational structure all over the world. In Italy, France and Germany the percentage of family businesses is more than 60% (Faccio and Lang 2002). In the US family firms make up approx. 80% of all firms (Daily and Dollinger 1992), while for Norway the share exceeds 2/3 (Berzins and Bøhren 2013). Still, research on family firms is a recent phenomenon, and theory aiming specifically at explaining the peculiarities of private family firms is limited. This has implications for studying cash holdings in family firms, since theory primarily has been developed for and evolved around larger, publicly traded corporations. Furthermore, data on private family firms has generally been hard to obtain since such firms are not subject to the same disclosure requirements as are public firms.

In this study we have access to a unique and confidential dataset on the majority of Norwegian limited liability firms, which traces firm ownership to ultimate owners, and identifies family relationship between owners, board members, and CEOs using data on kinship, marriage, and adoption spanning four generations and extending out to third cousins (Che and Langli 2015).

Our first objective is to explore how cash holdings differ in private family-owned firms versus non-family firms. Non-family owners are likely to hold single firms as part of a broader, diversified portfolio. Contrarily, family ownership tends to entail a higher ownership share and a presence of family members in leading positions in the firm – making family investors less diversified in terms of wealth. This dynamism implies a rationale for families to hold more cash in order to secure future wealth prospects – that is, they may be more precautionary and have higher incentives for securing the long-term survival of the firm.

We introduce the appealing concept of socioemotional wealth (SEW) as a pivotal driver in the decision-making processes of family firms, hereunder decisions relating to cash holding policy. The concept of socioemotional wealth, or “affective endowments”,

refers to the utilities family owners derive from the non-economic aspects of the business, such as identity, the ability to exercise family influence, and the preservation of the family dynasty and values (Gómez-Mejía et al. 2007). The socioemotional attachment a family owner has to the firm may help explain why family firms hold more cash due to precautionary motives.

Opposing the arguments above, this paper will also argue that family firms may hold less cash than non-family firms. The main reason for this is that the traditional notions of free cash flow theory is a poor fit for family firms due to the distinct governance structure they comprise. Family control is a central issue in mitigating agency conflicts between managers and shareholders due to the close ties an owner-family has to the firm at hand.

We then move to examine how different ownership, management and governance structures affect cash holding policies in family firms. First, we distinguish between family management and professional management in family-owned firms. In a setup where a member from the owning family runs the firm, we expect that interests between the owner and the manager will be perfectly aligned. Oppositely, when the family owner hires an outside CEO, the notions from agency/FCF theory become more relevant as the owner and the manager may have different interests for the firm. Hence, we investigate whether a family owner's decision to employ a professional CEO over a family member affects cash policy decisions.

Lastly, this paper looks at the differences in cash policy of family firms run by the founder, as opposed to a non-founding manager. The founder CEOs commitment to securing the long-term survival of the firm can potentially strengthen precautionary motives for holding cash, which would result in higher cash holdings. Furthermore, a founder may hold more cash to exploit investment opportunities that other types of managers would not easily see.

The paper is organized as follows. Section 2 reviews the relevant literature and develops our hypotheses. Section 3 introduces the empirical methodology employed and specifies our regressions. In section 4 the results are presented and discussed. Section 5 concludes.

## 2 Literature Review and Hypothesis

In this section we review the relevant literature on cash holding theory. Firstly, we look at general theory explaining why firms hold cash. Secondly, we examine the theories and determinants of the cash holding level in a firm. Lastly, we explore what makes family firms different from non-family firms, and how their decisions on cash holding policy may differ.

### 2.1 Motives for Holding Cash

We define cash holdings as cash and cash equivalents in line with the definition used in international accounting standards. Cash holdings in a firm plays multiple roles. The transaction cost motive explains that a business needs to hold a certain operational level of cash in order to cover its transaction needs. Raising capital externally comes with a cost, which often includes a fixed component, not related to the size of the loan (Petersen and Rajan 2000). Hence, covering small day-to-day transactions with external financing is costly in the long run, and holding some cash for this purpose is reasonable. The precautionary motive argues that firms keep excess liquidity to meet unexpected contingencies (Kim, Mauer and Sherman 1998). The nature of these contingencies is such that forecasting is difficult, and hence the level of cash holdings for precautionary use is problematic to assess. The speculative motive argues that firms maintain excess liquidity to take advantage of profitable future investment opportunities. However, Kim, Mauer and Sherman (1998) argue that in a perfect financial market neither motive is compelling, since external funds for investment in production or to meet temporary operating cash flow shortfalls can always be obtained at a fair price. Hence, firms should optimally maintain zero excess liquidity.

### 2.2 What Is the “Right” Amount of Cash to Hold?

#### *Static Tradeoff Theory*

The static trade-off model is originally a theory used to describe the capital structure of a firm. It states that a company seeks an optimal capital structure, determined by that the present value of tax shields should equal the financial distress costs of debt. A value-maximizing firm is thus expected to apply this optimal level of debt and equity. Changes in the capital structure is then modelled using a mean-reversion model, where random events shifts the capital structure away from optimum, and the firm reverts

gradually back towards the mean level (Shyam-Sunder and Myers 1999). Miller and Orr (1966) developed a similar model to explain a firm's cash holdings. They argue that cash also holds costs and benefits, and hence there exists an optimum trade-off between the two. The costs of cash in their paper is the opportunity cost of holding cash due to the low return of liquid assets, and the benefit is the absence of transaction (brokerage) costs compared to obtaining external financing or liquidating assets. This model has later been refined extensively by researchers to include many more costs and benefits from holding cash. Opler et al. (1999) arrived at a much cited model of cash holdings trade-off theory. In their paper, the benefit of holding cash is described as an absence of costs as a result of liquid assets shortage. The model predicts that firms with higher marginal cost of being short of funds will hold more cash cet par. These costs of being short of funds depend on seven variables;

- Magnitude of transaction costs of raising outside funds
- Cost of raising funds through asset sales, dividend cuts, and renegotiation
- Investment opportunities
- Cost of hedging instruments
- Length of the cash conversion cycle
- Cash flow uncertainty
- Absence of economies of scale

Opler et al. (1999) further expanded on the static trade off model by considering the effects of information asymmetries and agency costs of debt, liquid assets and managerial discretion.

Opler et al. (1999) find evidence supporting the static trade-off model. However, they also find out that firms that do well accumulate more cash than the static tradeoff theory would suggest. One advantage of this trade-off theory is that there exists a target level of cash that can be identified to determine whether a firm holds too much cash relative to shareholder wealth maximization.

### *Pecking Order Theory*

The pecking order theory was first introduced by Myers (1984), on the basis of research done by Myers and Majluf (1984). Information asymmetries affect the costs of different

financing sources, creating a hierarchy of preferred funds. According to Myers (1984), a firm adheres to the pecking order if it prefers internal to external financing, and debt to equity if it issues securities. In the pure pecking order theory, the firm has no well-defined target levels of debt. Equity is the least favored option since investors believe that a manager who issues equity thinks that the stock is overvalued, hence they will undervalue the new equity. On the other hand, issuance of debt gives a signal that the manager has strong beliefs about the future prospects of the firm and its abilities to meet its financial obligations. This in turn may lead to a reevaluation of the firm's credit ratings. In conclusion, firms act as if to minimize the asymmetric information costs and other financing costs (Ferreira and Vilela 2004). The pecking order theory is a competing theory to the trade-off model, as firms do not have a target level of debt. In terms of cash holdings, this theory suggests that cash is used as a buffer between retained earnings and investment needs, since firms prefer to use retained earnings to finance future financial needs. When firms have sufficient operational cash flow, they will repay debt and accumulate cash. Thus, firms will use accumulated cash holdings to finance investments, before issuing debt if needed. Ferreira and Vilela (2004) suggests four factors that explain a firm's expected cash holdings according to the pecking order model:

- Investment opportunity set
- Leverage
- Size
- Cash flow

### 2.3 Agency Theory and FCF Theory

*How can ownership structure affect cash holdings?*

Agency theory is predicated on the belief that individual economic agents choose actions that maximize their personal utility. Within the modern corporation, there often exists a separation between the individuals making corporate decisions (managers) and the individuals bearing the wealth consequences of those decisions (shareholders) (Denis, Denis and Sarin 1999). The well-known "separation of ownership and control"-configuration implies that the firm is run by an agent CEO. In turn, we may suspect scenarios where the agent manager undertakes actions that oppose the preference of



shareholders due to achievement of private benefits. Arguments from free cash flow theory imply that managers may want to retain cash in order to get more assets under their control, hence obtaining more discretionary power over the investment decisions of a firm (Ferreira and Vilela 2004; Jensen 1986). That is, they would prefer to hold back the cash rather than increasing payouts to shareholders even when the firm has poor or no investment opportunities (Bates, Kahle and Stulz 2009). An agent CEO may pursue negative NPV projects that serve private benefits with internal cash financing rather than with capital market financing, to ward off potential external scrutiny (Faulkender 2002; Jensen 1986). Alternatively, the agent CEO may hold cash in the firm as a function of individual risk aversion (ref. precautionary motives, wealth portfolio motives). Holding cash in the firm would then create negative shareholder value through agency costs since excess liquidity would potentially be better utilized outside the firm than inside.

Agency costs related to an agent manager-shareholder configuration has one obvious remedy, namely to align the agent's preferences with those of shareholders through managerial ownership (Jensen and Meckling 1976), hence introducing what we label an owner-manager. With increasing managerial ownership, the common notion is that managers increasingly focus their attention on share-value maximization because they partake in potential losses. This is widely applied to combat agency costs faced by shareholders, but from the agent's point of view, managerial ownership also implies a less diversified individual wealth portfolio that may induce more risk-averse behavior. If this is the case, then the firm may continue to hold excess cash since the manager seeks to secure his/her wealth portfolio.

The presence of outside pressures will depend on external ownership dispersion. If there is a sufficient amount of blockholders willing/able to monitor management, then this may help align manager's preferences with those of shareholders, despite managers achieving less diversified wealth portfolios (Jensen 1986). Opposingly, if there is greater dispersion in equity ownership, then a single shareholder may be less inclined to monitor management, since he/she incurs all costs from monitoring while only reaping benefits in proportion to the individual's equity share. In turn, outside monitoring pressures should decrease with increasing equity ownership dispersion, allowing for more managerial autonomy. The alignment effect of external

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blockholders' monitoring can be expected to decrease as managerial ownership increases due to an entrenchment effect (McConnell and Servaes 1990; Morck, Shleifer and Vishny 1988). As managerial ownership increases, managerial control consequently increases, and managers may choose to pursue private benefits at higher portions of shares owned in the firm.

## 2.4 Decisions on Cash Accumulation in Family Firms

The limited material that exists on cash holdings in family firms has been constrained to the study of public firms. Ozkan and Ozkan (2004) find evidence suggesting that public UK family firms hold more cash than public non-family controlled firms do. Kuan, Li and Chu (2011) look at corporate cash policies in Taiwanese listed family firms, and find that cash holdings in family firms exceed those of non-family firms due to a difference in corporate governance characteristics. Caprio, Del Giudice and Signori (2016) look at a cross-section of public European family firms and find that family firms hold significantly more cash than non-family firms, on average.

By limiting studies of cash holdings to public firms, the large and impactful part of the economy that comprise private firms is excluded. It is important to know how corporate decisions are made in private firms, and since the majority of private firms are family owned (Lau and Block 2012) it is equally important to explore the particularities of private family firms. But in doing so, we cannot easily draw analogies from public family-controlled corporations to smaller privately owned firms due to the distinct features and heterogeneous nature of privately held firms. In addition, public firms that hold excess cash have been documented to be traded at a discount, since investors traditionally see cash hoarding as something negative (Caprio, Del Giudice and Signori 2016; Kuan, Li and Chu 2011). For privately held family firms we cannot justify that holding excess cash necessarily is a bad thing. Nor can we say that holding less cash is better. This is because owners of privately held family firms may have non-economic preferences affecting corporate policy processes, and the value that family owners ascribe these preferences is difficult to quantify.

### Why Family Firms May Hold More Cash

In privately held family firms, where ownership commonly exceeds 50 %, and in most cases even 90 %, we should expect that corporate decisions are affected by the goals

and preferences of the few, large owners. Private family firms tend to be closely held, and members from the owning family often take leading positions in the firm (Villalonga et al. 2015). One of the main characteristics of a family firm is the emotional attachment that family owners have to their firm. Several papers argue the consequences of high emotional attachment. Lozano (2015) asserts that emotional attachment leads to family firms striving for different goals and visions than their non-family counterparts. Berrone, Cruz and Gomez-Mejia (2012) argue the case of socioemotional wealth (SEW) in family firms, which is anchored in the behavioral branch of management theory. The SEW approach suggests that family owners are typically committed to preserving the non-financial aspects of the firm, such as legacy, reputation, social ties, family influence and altruistic interests. In turn, family owners are more likely to act conservative and loss-averse in the operation of the business to assure the longevity of the firm (Gómez-Mejía et al. 2007). This line of argument would suggest that family firms ascribe precautionary motives more weight in their cash policy decisions. Hence the non-economic goals of family owners can affect their cash holdings policies. If preservation of socioemotional wealth acts to amplify the precautionary motives for holding cash, we should expect that family firms hold more cash than non-family firms.

Another characteristic of family firms is the desire of family owners to retain sole control over the company (Villalonga et al. 2015), which is apparent in that family firms employ less debt and issue less equity. Ampenberger, Bennedsen and Zhou (2012) find that family firms in general are less leveraged than non-family firms, independent of family firm type. Similarly, Mishra and McConaughy (1999) document lower debt ratios among a small sample of US listed firms. We attribute some of this result to the notion that family owners disfavor funding that dilutes family power or gives outsiders a say in corporate decisions. As a result, although conservative, families may turn to cash as means of payment.

The concentrated ownership structure that is typical to privately held family firms results in family owners being non-diversified in terms of their wealth. When family firms are under family management, human capital is invested as well, leading to even less diversification of wealth. Then, the family has both their current portion of wealth and their future wealth prospects fully dependent on the survival of the firm. This lack

of wealth diversification can potentially affect how a family firm makes cash policy decisions. Having few other options for wealth generation can incentivize the family to keep more cash to smoothen income or to weather out a recession, and they are likely to employ less debt to avoid financial distress (Ampenberger, Bennedsen and Zhou 2012).

### Why Family Firms May Hold Less Cash

Agency costs in public firms tend to materialize through the manager's hoarding of cash (Jensen 1986). Traditional FCF/Agency theory promotes a rigid setup with the well-known separation of ownership and control. This setup is most prevalent among public corporations. In private family firms, ownership is less dispersed and members from the controlling family tend to take controlling positions in the firm. Thus, ownership and control is all but separated and outside ownership occurs infrequently. Following the line of argument in Jensen and Meckling (1976) implicitly, family ownership should minimize agency costs that arise from separation of ownership and control. Considering the ownership levels that are prevalent among private family firms, we should expect fewer conflicts leading to cash hoarding when a firm is family-owned (Anderson, Mansi and Reeb 2003; Claessens, Djankov and Lang 2000; Fama and Jensen 1983; La Porta, Lopez-de-Silanes and Shleifer 1999; La Porta et al. 2000). This is in line with notions from stewardship theory, which suggests a goal congruence between the agent and the principal that is likely to occur in family firms under family management. Rather than the manager acting in self-interest, he or she may act to fulfil the interests of the family due to its pivotal role and power over the firm.

Stewardship theory, as a complementary framework to traditional agency theory, provides useful insights when examining governance issues in private family firms (Che and Langli 2015). Villalonga et al. (2015) argue that family owners are likely to be more dedicated principals because their own wealth is at stake. They further note that in addition to traditional governance mechanisms, a unique set of tools is available to a family owner that enhances governance abilities. These include family assemblies and councils, superior coordinating abilities across the family and effective communication and trust-building that alleviates potential conflicts. If the governance structure that prevails in private family-owned firms by default aligns the interests of

the family owner (principal) and the manager (agent), we should expect that family firms hold less cash.

The view that family firms effectively diminish agency costs of cash holdings is conflicted by empirical evidence from several researchers, who find that family firms tend to hold more cash (Caprio, Del Giudice and Signori 2016; Kalcheva and Lins 2007; Kuan, Li and Chu 2011; Ozkan and Ozkan 2004). One dominant reason can explain the misalignment between theory and empiricism: The studies conducted on family firms comprise public firms only, where the thresholds required to be branded as family firms are set low<sup>1</sup>. This is a natural consequence of studying public firms, since the size and dispersed ownership structure of these firms force researchers to accept lower levels of ownership by families before labelling them family firms. Consequently, there is a subjective component disturbing whether the true effect of family ownership is actually captured. To our knowledge, no consensus exists that establishes the family ownership threshold criteria. As a result, other dynamics come into play that are just as likely to explain the higher levels of cash, such as the level of shareholder protection (Lozano 2015) or the identity of non-family owners (Chen and Chuang 2009).

The issues described above are less problematic when exploring private family firms. Due to the high percentage owned by the family in private firms, the true family effect is more likely to be captured in full since ownership thresholds can be set higher. For unlisted family firms we can set ownership thresholds above 50 %, which should remove doubts as to whether the preferences of the family are reflected in corporate decisions. When the family owns more, the importance of external shareholder protection and the identity of outside shareholders is lessened. Hence we can expect that the inference on private family firms may be more in line with what theory suggests, namely that family-owned constellations are likely to combat agency costs of cash holdings effectively through superior interest alignment and governance.

Since cash holdings decisions in family firms seem to be facilitated by a balance

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<sup>1</sup> Lau and Block (2012) employ a 5 % ownership threshold to label a firm family owned. Caprio et al. (2016) use a 10 % threshold and Ozkan and Ozkan (2004) test for family control at 10 % and 20 % ownership thresholds. Kuan, Li and Chu (2011) let the family ownership threshold vary by checking each firm's critical control level, which should better capture family control influence.

between precautionary motives for holding more cash and diminishing agency conflicts resulting in lower cash holdings, we hypothesize the following:

*Hypothesis 1: Family firms hold more cash than non-family firms*

## 2.5 Inside vs. Outside CEO's in Family Firms

The mechanisms discussed above can be altered by the decision of a family firm to employ a professional (outside) CEO rather than a CEO from inside the owning family. While we would expect a family CEO to perfectly align interests with the interests of the family, a professional CEO is likely to include a different set of considerations in his or her cash policy decisions.

The most pressing issue will be that a separation of ownership and control may lead to higher cash holdings when the CEO is external. Then, theory suggests that agency conflicts may arise due to misaligned interests. Agency conflicts from this configuration is to some extent alleviated by the owning family's ability to govern and influence decisions through an active role in the firm (Villalonga et al. 2015). Hence even a professional CEO may feel pressured to adopt the corporate policies seen fit by the family owner (Lau and Block 2012). On the other hand, the outside CEO is less influenced by the family's non-economic goals since he is not a family member. Furthermore, a professional CEO operates in a competitive labor market in which his/her ability to make good policy decisions is valued. The outside CEO is therefore more inclined to take into consideration the interests of non-family stakeholders, his own interests and what is valued by the market in general. If professional CEO's alleviate some family-specific interests, we expect that cash holdings will be significantly different when a family firm employs a professional CEO.

*Hypothesis 2: Outside CEOs hold less cash than inside CEOs in family firms*

## 2.6 Founder vs. Non-Founder CEO

The role of founders in family firms is an element that has gained attention in the literature. Villalonga et al. (2015) propose that founders in control of family firms are more likely to be dedicated and effective because of the emotional ties a founder has to the firm he/she created. In an earlier paper, Villalonga and Amit (2006) find that founder-led firms outperform other businesses. Their findings are supported by several

papers documenting that founder-firms are traded at a premium (Adams, Almeida and Ferreira 2009; Fahlenbrach 2009; Morck, Shleifer and Vishny 1988; Palia, Ravid and Wang 2008), suggesting that investors value the unique management skills and insights of a founder CEO.

A founder CEO is the type of manager that is most likely to put firm-specific interests before his/her own when making decisions. This is because founder managers yield significant socioemotional wealth from managing the firm – these type of CEOs are heavily invested in the firm in terms of human capital (intellectually) and wealth, and care utmost about the long-term survival and health of the firm.

What are the implications for cash holdings policy when a family firm is managed by the founder? The founder CEOs commitment to securing the long-term survival of the firm can potentially strengthen precautionary motives for holding cash, which would result in higher cash holdings. This is in line with what we argued to be the case for privately held family firms in general. In addition, since we expect a founder CEO to always act in the best interest of the firm, he/she may hold excess cash to exploit investment opportunities that a non-founding manager would forego.

*Hypothesis 3: Founder CEOs hold more cash than non-founder CEOs in family managed family firms*

## 3 Empirical Methods

### 3.1 Sample Selection

We conduct our research on data provided by the Center for Corporate Governance Research (CCGR) on unlisted Norwegian firms. This unique database offers both accounting data and more sensitive corporate governance data, giving us the opportunity to investigate the effects of corporate governance mechanics on cash holdings. We use Norwegian private firms in the period 2004 to 2014 as our sample.

### 3.2 Filters

Below are the filters we used on the data. Before filtering, the dataset had a total of 3.2 million firm-year observations. Most of our filtering is designed to remove firms that show signs of inadequate reporting or other inconsistencies.

1. Keep the sample period 2004-2014
2. Excluded public firms
3. Industry filtering, excluded;
  - a. Non-profit org. and public services
  - b. Financials
  - c. Utilities
  - d. All firms with "0" or missing NACE code
4. Excluded all firms with at least one missing ownership/control variable:
  - a. Largest family ownership
  - b. Largest family has CEO
  - c. CEO birth year
  - d. Board size
5. Excluded all firms which have had
  - a. Negative total assets
  - b. Negative cash
  - c. Negative total equity
  - d. Negative dividends
6. Excluded all firms with inconsistent ratios, i.e  $>1$  (100%)
  - a. Shares owned by largest family
  - b. Leverage ratio  $>1$  and  $<0$
  - c. Cash to total assets ratio
7. Excluded all firms with average revenue less than 1.000.000
8. Excluded all firms with less than 5 consecutive years of observations



We exclude firms with an average revenue below 1 million NOK in order to ensure that our results are not driven by a number of very small firms of little economic importance (Che and Langli 2015). In addition, we remove industries in which regulations reduce the discretionary power the firms have over their cash holding levels. After all filtering, we are left with a sample size consisting of 303,958 firm-year observations, with 34,087 unique firms. We winsorize all financial data at the 1st and 99th percentiles.

### 3.3 Estimation Method

In our research, we closely follow the methodologies outlined in the studies of Caprio, Del Giudice and Signori (2016) and Ampenberger, Bennedsen and Zhou (2012). We will conduct our empirical research in three stages. Firstly, we use univariate and descriptive analysis to highlight some of the immediate differences between family owned and non-family owned firms. Secondly we will run several regression models to isolate and pinpoint the differences in cash holdings between the firm types, as well as the effect of different managers. Lastly, we will run a series of sub-sample estimations and robustness checks.

For the first part of our research, we will look at differences between the two groups using univariate, descriptive analysis. Using t-tests and Wilcoxon sign-rank test we can test both the dependent variable and explanatory variables to check the means and medians for significant variation. In this phase we will also group the firms by the status of the CEO. This way, we can explore whether firms managed by a family or outside CEO show similar or different traits. Using our panel data, we can also examine the groups over time, to see how they have developed in our sample period.

The second and most important part of our research is the regression analysis. In this part, we look at the difference between family owned and non-family owned firms, while controlling for classic determinants of cash holdings. Then we try to explain some of the variation within family owned firms. We will apply both the pooled regression method, as well as the fixed effects model. The pooled regression method delivers the simplest way to utilize panel data for regression purposes. However, it has some severe limitations. The most important one is that it assumes that the average

values of all the variables and the relationships between them are constant over time and across all of the cross-sectional units in the sample (Brooks 2008).

The fixed effects model has some advantages over a pooled regression. The fixed effects model examines variation across time, and more notably is effective in limiting omitted variable bias. Any firm specific variable that is time-invariant will in fact be controlled for with the fixed effects method, even without measuring them. However, this means that the fixed effects model suffers from a severe weakness when trying to highlight the exact effects of a variable. The fixed effects model only shows how variation in the independent variables affect our dependent variable. Hence, independent variables that are constant over time will be omitted. For example: If we want to examine how the dummy variable FAMOWN (family owned) affects cash holdings, the coefficient from the FE model only captures the effect in the cases where a firm goes from being family owned to not family owned, or vice versa, during our sample period. Given that the equity ownership structure of a firm is relatively stable over a certain period of time (Ozkan and Ozkan 2004), this constitutes a problem for our analysis. We used the Hausman test to check whether the random or fixed effects specification was best suited for our dataset. The test concluded that the fixed effects was appropriate. Finally, as an in-between method, we will use a pooled OLS using dummy variables to control for industry and year fixed effects. This will offer the simple pooled OLS methodology, but also compensate for some of the fixed effects that may arise.

### 3.4 Regressions and Variables

For the second part of our empirical research, we will use the following regressions to test our hypothesis:

#### Regression for Family Firms versus Non-Family Firms

$$\begin{aligned} Cash_{i,t} = & \alpha + \beta_1 Famown_{i,t} + \beta_2 Size_{i,t} + \beta_3 Cash\ flow_{i,t} + \beta_4 Cf\ volatility_{i,t} + \\ & \beta_5 Nwc_{i,t} + \beta_6 Capex_{i,t} + \beta_7 Revenue\ growth_{i,t} + \beta_8 Leverage_{i,t} + \\ & \beta_9 Dividend\ indicator_{i,t} + \beta_{10} RoA_{i,t} + \beta_{11} Firm\ age_{i,t} + Dummies + \epsilon_{i,t} \end{aligned}$$

#### *Dependent variable*

*Cash* is defined as cash and cash equivalents divided by total assets.

### *Explanatory variable*

*Famown* is the key independent variable. It is an indicator variable that equals one if the firm is defined as being family owned and zero otherwise. In order to be defined as family owned, the ownership of the largest family must exceed 50 % in terms of ultimate ownership.

### *Control variables*

We follow the literature when selecting control variables (Caprio, Del Giudice and Signori 2016; Che and Langli 2015; Lau and Block 2012; Opler et al. 1999; Ozkan and Ozkan 2004). *Size* is measured as the natural logarithm of total assets. *Cash flow* is measured as cash flow from operations divided by total assets. *Cf volatility* is our proxy for firm risk, and is measured as the standard deviation of cash flows divided by total assets. *Nwc* (net working capital) is used as a proxy for liquidity less cash holdings, and is measured as current assets net of cash minus current liabilities divided by total assets. *Capex* (capital expenditure) is measured as the change in tangible assets in a given year plus depreciation divided by total assets. As a proxy for growth opportunities we have used *revenue growth*. *Leverage* is measured as total interest bearing debt divided by total assets. *Dividend indicator* is a dummy variable that is equals one when a firm paid dividends in a current year and zero otherwise. *RoA* is our measure for profitability and is calculated as net income divided by total assets. *Firm age* is the age of the firm in years.

### *Dummies*

Across our models, this is a collective term for several dummies, and will vary depending on the estimation method used. As previously discussed, we will employ pooled OLS (no dummies), fixed effects (firm dummies) and pooled OLS with industry and year fixed effects (industry and year dummies).

### Regressions for Family Firms

After investigating whether family firms and non-family firms hold different levels of cash, we wish to break down the determinants within family firms further. First we look at family CEOs versus outside CEOs using the following regression:

$$\begin{aligned}
Cash_{i,t} = & \alpha + \beta_1 Family\ CEO_{i,t} + \beta_2 Outside\ CEO_{i,t} + \beta_3 Size_{i,t} + \\
& \beta_4 Cash\ flow_{i,t} + \beta_5 Cf\ volatility_{i,t} + \beta_6 Nwc_{i,t} + \beta_7 Capex_{i,t} + \\
& \beta_8 Revenue\ growth_{i,t} + \beta_9 Leverage_{i,t} + \beta_{10} Dividend\ indicator_{i,t} + \beta_{11} RoA_{i,t} + \\
& \beta_{12} Firm\ age_{i,t} + Dummies + \epsilon_{i,t}
\end{aligned}$$

*Family CEO* is a dummy variable that equals one when the CEO in a family firm is from the largest family and zero otherwise, while *Outside CEO* is a dummy variable that equals one when the CEO of a family firm is an outside CEO, i.e. not from the largest family. Note that there is a third group in the sample, represented by the alpha. These are the firms which are not family owned. All other variables are the same as above.

The next we wished to consider was whether the family CEO is a founder or not affects the cash holding policies of the firms. Hence we run a separate regression with the appropriate dummies:

$$\begin{aligned}
Cash_{i,t} = & \alpha + \beta_1 Founder\ CEO_{i,t} + \beta_2 Non - founder\ CEO_{i,t} + \\
& \beta_3 Outside\ CEO_{i,t} + \beta_4 CEO\ age_{i,t} + \beta_5 Size_{i,t} + \beta_6 Cash\ flow_{i,t} + \\
& \beta_7 Cf\ volatility_{i,t} + \beta_8 Nwc_{i,t} + \beta_9 Capex_{i,t} + \beta_{10} Revenue\ growth_{i,t} + \\
& \beta_{11} Leverage_{i,t} + \beta_{12} Dividend\ indicator_{i,t} + \beta_{13} RoA_{i,t} + \beta_{14} Firm\ age_{i,t} + \\
& Dummies + \epsilon_{i,t}
\end{aligned}$$

The new variables in question here are the dummies for *Founder CEO* and *Non-founder CEO* as well as *CEO age*. We define a CEO as a founder if he is in a family firm, he belongs to the largest family and has been CEO consecutively the entire lifespan of the firm. *Non-founder CEO* equals one if the CEO is in a family firm, he belongs to the largest family, but he has been CEO for a shorter time than the firm age. Expecting that there might be a difference in age between the two groups, we added *CEO age* which is the age of the CEO in years to control for any possible spurious relationships. Note again that there is a final group of firms in the sample, captured by the alpha. This group hold the firms that are not family owned.

### 3.5 Additional Regressions and Robustness Checks

To examine the validity of our main findings, we run multiple robustness checks in the form of alternative specifications of variables or samples. Unless specified, all variables are defined as above.

#### *Alternative family ownership levels*

In accordance with Che and Langli (2015), we use multiple dummies to indicate family ownership of different levels. Hence we can examine whether different levels of ownership affect cash holdings similarly or not. All ownership levels are measured using ultimate ownership. *FO50to67* is a dummy variable that equals one if the largest family owns more than 50 %, but less than two thirds. *FO67to90* is a dummy variable that equals one if the largest family owns at least two thirds, but less than 90 %. *FO90to99* is a dummy that equals one if the largest family owns at least 90 %, but less than 100 %. *FO100* is a dummy that equals one if the largest family owns the entire firm. For this test we only test Hypothesis 1 using all estimation methods.

#### *Alternative definitions of test variables*

Lau and Block (2012) employ different definitions of family and founder firms. *Founder or family firm* is a dummy that equals one when the firm is either a founder or family firm. A firm is defined as a *Founder firm* if the founder owns more than 50 % and no other family members are CEO, owners or chairperson. To identify the CEO as founder, we require that he has been CEO the entire lifespan of the firm. A firm is defined as a *Family firm* if the largest family owns more than 50 %, and at least two family members are CEO, owners or chairperson. *Family management* means that the largest family has the CEO in a family firm, while *Family ownership* means that the CEO is not in the largest family. Using their definitions, we test all hypothesis using the pooled OLS with year and industry fixed effects methodology.

#### *Alternative definitions of the dependent variable*

Since the cash to total assets ratio is not the only cash holdings measure used in the literature, we also run our cash holdings regressions where the dependent variable is obtained by scaling cash holdings on net assets instead of total assets, and by computing the logarithm of cash holdings to net assets ratio (Caprio, Del Giudice and Signori

2016). Net assets are found by taking the total assets net of cash and cash equivalents. In this test we only use the pooled OLS with year and industry fixed effects methodology.

#### *Alternative sample selection*

We also examine whether our results hold for firms in different size categories (Che and Langli 2015). Using a firms average total assets during our sample period, we divide the firms into tertiles labeled small, medium and large. We redo the main models for Hypotheses 1 and 3 using these subsamples. In this test we only use the pooled OLS with year and industry fixed effects methodology.

### 3.6 Endogeneity

When investigating a causal relationship between ownership structure and cash holdings, it is reasonable to be wary of any endogeneity issues that may arise. Due to this concern, and the fact that it is difficult to test for causation, we will focus more on the relationships instead of the causality in this study (Che and Langli 2015). However, one key feature of private firms is the lack of a liquid market. Hence, private firm owners cannot easily adjust the ownership structure as situations change. This makes the ownership structure of privately held firms more of a predetermined state variable, thus we justify using ownership structure as independent variables in our regressions (Che and Langli 2015; Nagar, Petroni and Wolfenzon 2010). This is further supported by our sample's stable ownership structures. We would argue that it is unlikely that a family will sell its equity based on big or small cash levels, as cash holdings may be adjusted if necessary. However, a firm with a substantial level of cash holdings may be attractive takeover targets, since the acquirer would effectively be buying money. In conclusion, we do not believe that endogeneity issues are causing severe problems in our research.

To test for endogeneity problems, we follow the methodology outlined by Che and Langli (2015). This method is based on the fact that if a variable is constant over time, then consequently it is not affected by changes in any other variables. Hence we examine our ownership variables, and rerun our main regressions on subsamples with constant test variables. Consequently, we can say for certain that the ownership

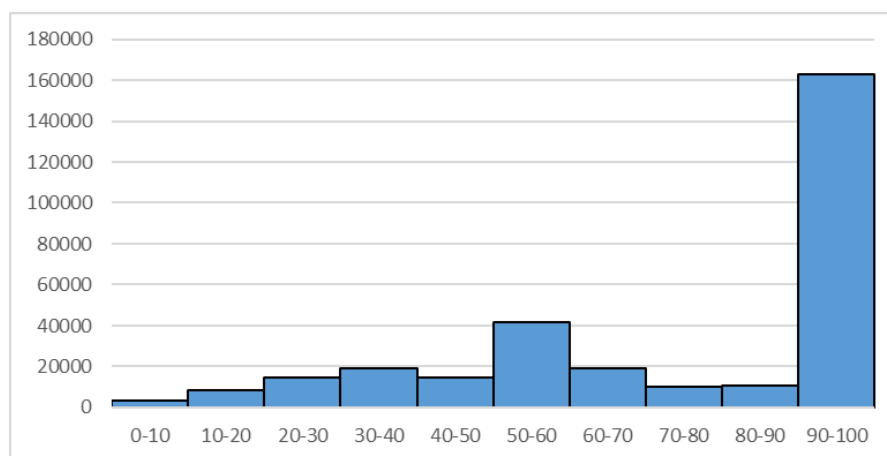
structure is not endogenous in that specific sample. This approach was outlined by Gorton and Schmid (2000) and Stiglitz (1996) (Che and Langli 2015).

## 4 Results

### 4.1 Descriptive Statistics

In Table 1 we have presented summary statistics for all variables used in our regressions. For each variable, we present the number of observations, mean, standard deviation, minimum and maximum values, the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentile. Most variables have 303,958 firm-year observations. However, not all firms reported the cash flows from operations, and revenue growth and capital expenditure are calculated using two years of observations, hence losing all of the first year observations for all firms. The average level of cash holdings in our sample is 28 % of total assets. This is somewhat higher than other studies show (Caprio, Del Giudice and Signori 2016; Harford, Mansi and Maxwell 2008; Lau and Block 2012; Opler et al. 1999). However, these studies were all conducted on listed companies. From the table we can see that 71 % of the firms are categorized as being family owned. Figure 1 below illustrates the ownership distribution in our sample. One distinct feature of these ownership levels is the highly skewed distribution towards families that own 100 % of the firm. In excess of 160,000 observations fall in this category.

*Figure 1: Largest family ownership distribution*



Family firms with inside CEOs make up 63 % of our sample, while family firms with an outside CEO total 8 %. Among the family firms with inside CEO, 36 % of our sample fall in the category founder-managed firms, while 27 % are non-founders. In

addition to the relative high levels of cash holdings, the firms in our sample are characterized by high mean levels of net working capital and low mean leverage at 36 % and 13 % respectively. The average revenue growth is 16.29 % with a very large standard deviation of 69.08, implying that the growth in Norwegian private firms is high but varies significantly. The median revenue growth is only 4.6 %, indicating strong positive skewness. The same traits apply to the return on assets, with a mean of 10 %, standard deviation of 14 % and a median of 8 %. The average firm is 14.34 years old, and the average CEO is 49.52 years old. Lastly, 33 % of the firm-year observations have paid dividends.

## 4.2 Correlation and Multicollinearity

We examine the correlation between all the variables used in our regressions. The correlation matrix is presented in Table 2. The table indicates high correlation between family ownership and family CEO (0.84), and between family CEO and founder CEO (0.56). This is however, unproblematic, as these pairs are not used simultaneously in any model. The remaining correlation coefficients are low, indicating an absence of multicollinearity.



Table 1: Descriptive statistics

Variables	N	Mean	Std. Dev.	min	p25	p50	p75	max
Cash	303,958	0.28	0.24	0.00	0.07	0.23	0.45	0.93
Family ownership	303,958	0.71	0.45	0.00	0.00	1.00	1.00	1.00
Family CEO	303,958	0.63	0.48	0.00	0.00	1.00	1.00	1.00
Outside CEO	303,958	0.08	0.27	0.00	0.00	0.00	0.00	1.00
Founder CEO	303,958	0.36	0.48	0.00	0.00	0.00	1.00	1.00
Non-founder CEO	303,958	0.27	0.45	0.00	0.00	0.00	1.00	1.00
CEO age	303,958	49.52	10.12	17.00	42.00	49.00	57.00	95.00
Size	303,958	15.39	1.35	12.64	14.43	15.29	16.22	19.31
Cash flow	296,444	2.22E-05	2.36E-05	-2.23E-05	2.90E-06	1.49E-05	3.70E-05	8.81E-05
Cfvolatility	303,697	2.37E-05	2.68E-05	1.10E-06	8.87E-06	1.66E-05	2.82E-05	1.86E-04
Nwc	303,958	0.39	0.26	0.00	0.16	0.38	0.60	0.94
Capex	297,015	0.04	0.10	-0.22	0.00	0.00	0.04	0.51
Revenue growth	291,758	16.29	69.08	-93.33	-5.61	4.60	18.81	504.47
Leverage	303,958	0.13	0.21	0.00	0.00	0.00	0.20	0.82
Dividend indicator	303,958	0.33	0.47	0.00	0.00	0.00	1.00	1.00
RoA	303,958	0.10	0.14	-0.31	0.02	0.08	0.17	0.53
Firm age	303,946	14.34	12.77	0.00	6.00	11.00	20.00	161.00

This table shows descriptive statistics (number of observations (N), mean, standard deviation, minimum value, maximum value and the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentile) for the sample used in the main research. Cash is cash and cash equivalents divided by total assets. Family ownership is a dummy variable that equals 1 if the firm is family owned. Family (Outside) CEO is a dummy variable that equals 1 if a family owned firm has a family (outside) CEO. (Non-)Founder CEO is a dummy variable that equals 1 if a family CEO firm has a (non-)founding CEO. CEO age is the age of the CEO in years. Size is the natural logarithm of total assets. Cash flow is the cash flow from operations divided by total assets. Cf volatility is the standard deviation of cash flows divided by total assets. Nwc is the current assets net of cash minus current liabilities divided by total assets. Capex is the change in tangible assets plus depreciation divided by total assets. Revenue growth is the percentage increase in revenue from last year. Leverage is the total interest bearing debt divided by total assets. Dividend indicator is a dummy variable that equals 1 if the firm paid dividends. RoA is net income divided by total assets. Firm age is the age of the firm in years.

**Table 2: Correlations**

	v1	v2	v3	v4	v5	v6	v7	v8	v9	v10	v11	v12	v13	v14	v15	v16	v17	
Cash	v1	1.00																
Family ownership	v2	0.03	1.00															
Family CEO	v3	0.06	0.84	1.00														
Outside CEO	v4	-0.06	0.18	-0.38	1.00													
Founder CEO	v5	0.10	0.47	0.56	-0.21	1.00												
Non-founder CEO	v6	-0.03	0.40	0.48	-0.18	-0.46	1.00											
CEO age	v7	0.03	0.08	0.12	-0.08	-0.03	0.16	1.00										
Size	v8	-0.34	-0.12	-0.19	0.13	-0.23	0.04	0.06	1.00									
Cash flow	v9	0.25	0.12	0.15	-0.06	0.10	0.05	0.15	0.01	1.00								
Cfvolatility	v10	0.15	0.07	0.09	-0.04	0.07	0.03	-0.02	-0.18	0.16	1.00							
Nwc	v11	-0.28	-0.04	-0.06	0.05	-0.03	-0.03	-0.11	-0.15	-0.11	-0.02	1.00						
Capex	v12	-0.14	0.02	0.02	-0.01	0.05	-0.02	-0.07	0.03	-0.06	-0.03	-0.15	1.00					
Revenue growth	v13	0.00	-0.04	-0.04	0.00	0.02	-0.06	-0.08	0.03	-0.08	0.05	0.01	0.06	1.00				
Leverage	v14	-0.46	-0.02	-0.02	0.00	-0.03	0.00	-0.01	0.29	-0.27	-0.20	-0.30	0.16	0.01	1.00			
Dividend indicator	v15	0.18	-0.05	-0.04	-0.01	-0.04	0.00	0.01	0.08	0.01	-0.03	0.00	-0.04	0.00	-0.15	1.00		
RoA	v16	0.33	-0.01	0.00	-0.02	0.05	-0.05	-0.05	-0.03	0.12	0.08	0.00	-0.04	0.17	-0.28	0.38	1.00	
Firm age	v17	-0.07	0.05	0.02	0.04	-0.40	0.44	0.25	0.23	0.10	-0.04	-0.04	-0.06	-0.11	-0.01	0.04	-0.08	1.00

This table shows the correlation coefficients between the variables in our sample. The variables are defined in Table 1.

### 4.3 Univariate Analysis

Table 3 shows descriptive statistics and univariate tests similar to the method outlined in Caprio, Del Giudice and Signori (2016). Each panel distinguishes two mutually exclusive groups of our sample. In panel A, we differentiate between firms defined as being family and non-family owned. In panel B, we split the family owned firms between those with inside and outside management. Lastly, panel C examines the difference between founder and non-founder family CEOs.

From panel A, we can see that family firms hold significantly more cash relative to their size than non-family firms. Family firms on average hold 28.9 %, while non-family firms hold 27.3 % on average. This is consistent with the theory that family firms are loss averse and have a higher socioemotional attachment to the firm. This may also be indicative of the controlling family seeking to take advantage of non-controlling shareholders by hoarding cash for private gain. This is further supported by the fact that family firms are significantly less levered, albeit by only 1.2 %. Family firms pay dividends less frequently than non-family firms. Interestingly, non-family firms experience an average revenue growth of 20.3 %, while family firms only 14.6 %. This may be an indication of family firms' conservative tendencies. However, we know from the descriptive statistics above that revenue growth is highly varying. Another interesting observations is that we cannot significantly distinguish the average return on assets between the two groups, despite family firms having a significantly higher cash flow from operations.

The results from panel B reveal that it makes a difference in many ways whether an inside or an outside CEO manages the firm. Firstly, family firms with a family CEO hold significantly more cash than outside CEOs in family firms. In fact, inside CEOs hold as much as 6.5 % more on average than outside CEOs. This is further indication that families may care more about the survival and longevity of the firm, possibly due to altruism and loss aversion. This claim is further supported by the fact that inside CEO firms have on average 0.6 % less leverage. However, the net working capital of inside CEO firms is 5.3 % less on average, suggesting that the increased cash and decrease of other *nwc* offset each other. Interestingly, inside CEOs have 1.1 % higher return on assets, and higher cash flows on average, indicating that inside CEOs may be

better at managing their firms. Inside CEOs manage firms that are smaller and younger. Lastly, there is no significant difference in the dividend propensity of the two groups.

The last differentiation highlights some significant differences between founder and non-founder CEOs in family owned firms with inside management. In panel C we can see that founder CEOs hold 4.5 % more cash than non-founder CEOs on average. Again this points towards the fact that the founder may be more emotionally attached to the firm and hence becomes more loss averse in the process. Another possibility may be that the founder has the cash at his full disposal to exploit investment opportunities. In this regard, being the founder and CEO of the firm completely eliminates any possible agency conflict and there is no real agency cost of carrying excess cash. Founders also employ less leverage, with 0.8 % less on average than non-founders. Other characteristics are as expected from founder firms vs non-founder. The founder firms are smaller, spend relatively more on capital expenditure (1 % more), experience much larger average revenue growth (8.7 % higher), pay less dividend (3 % less) and are much younger (16 years younger). Lastly, founder firms seem to be more profitable, with a return on assets that is 2.1 % larger on average than non-founder firms.

*Table 3: Univariate analysis*

	Family (215,153 obs)		Non-family (88,805 obs)		Difference Fam. - Non Fam.	
	mean	median	mean	median	mean	median
Panel A. All firms						
Cash	0.289	0.232	0.273	0.217	0.016***	0.016***
Size	15.29	15.19	15.64	15.55	-0.352***	-0.367***
Cash flow	2.41E-05	1.70E-05	1.75E-05	1.04E-05	0.000***	0.000***
Cf volatility	2.49E-05	1.77E-05	2.09E-05	1.44E-05	0.000***	0.000***
Nwc	0.386	0.368	0.407	0.407	-0.021***	-0.039***
Capex	0.039	0.002	0.037	0.006	0.002***	-0.003***
Revenue growth %	14.644	4.157	20.316	5.722	-5.672***	-1.566***
Leverage	0.128	0.000	0.140	0.000	-0.012***	0.000***
Dividend indicator	0.316	0.000	0.362	0.000	-0.046***	0.000***
RoA	0.101	0.081	0.101	0.079	0.000	0.002**
Firm age	14.77	12.00	13.32	10.00	1.453***	2.000***
	Family CEO (191,529 obs)		Non-family CEO (23,624 obs)		Difference Fam. - Non Fam.	
	mean	median	mean	median	mean	median
Panel B. Family Firms						
Cash	0.296	0.242	0.231	0.156	0.065***	0.086***
Size	15.20	15.12	15.99	15.89	-0.789***	-0.774***
Cash flow	2.49E-05	1.79E-05	1.76E-05	1.03E-05	0.000***	0.000***
Cf volatility	2.54E-05	1.82E-05	2.03E-05	1.38E-05	0.000***	0.000***
Nwc	0.380	0.360	0.433	0.443	-0.053***	-0.083***
Capex	0.040	0.002	0.034	0.006	0.006***	-0.004***
Revenue growth	14.393	4.074	16.679	4.863	-2.286***	-0.788***
Leverage	0.127	0.000	0.133	0.000	-0.006***	0.000***
Dividend indicator	0.316	0.000	0.316	0.000	0.000	0.000
RoA	0.102	0.082	0.091	0.073	0.011***	0.009***
Firm age	14.57	12.00	16.34	13.00	-1.768***	-1.000***
	Founder CEO (108,280 obs)		Non-founder CEO (83,241 obs)		Difference Found - Non.found	
	mean	median	mean	median	mean	median
Panel C. Family CEO						
Cash	0.316	0.268	0.271	0.210	0.045***	0.057***
Size	14.98	14.88	15.50	15.43	-0.523***	-0.547***
Cash flow	2.53E-05	1.83E-05	2.43E-05	1.74E-05	0.000***	0.000***
Cf volatility	2.62E-05	1.81E-05	2.44E-05	1.84E-05	0.000***	0.000**
Nwc	0.381	0.359	0.380	0.362	0.001	-0.003
Capex	0.044	0.002	0.034	0.002	0.01***	0.000***
Revenue growth	18.302	5.160	9.530	2.969	8.772***	2.191***
Leverage	0.123	0.000	0.132	0.000	-0.008***	0.000***
Dividend indicator	0.303	0.000	0.333	0.000	-0.03***	0.000***
RoA	0.112	0.091	0.090	0.072	0.021***	0.019***
Firm age	7.59	7.00	23.65	21.00	-16.06***	-14.000***

This table reports the results of the univariate analysis. The variables are defined in Table 1. Each panel reports the mean and median of two mutually exclusive groups, as well as the difference between them. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively, of the test for difference in means (t-test) and medians (Wilcoxon-Mann-Whitney test) between the two groups of each panel.

## 4.4 Regression Results

### Main Models

In this section we present our main findings on the levels of cash holdings in private firms. Table 4 presents the results using several estimation methods and model specifications. Panel A, B and C shows the results using pooled OLS, pooled OLS with industry and year fixed effects, and fixed effects models, respectively. Within each panel, the level of detail increases from model 1 through 3. Model 1 simply includes a dummy variable to assess whether family firms hold more or less cash than non-family firms. Model 2 splits the family firms between those that have a family CEO and those with outside CEO. Finally, model 3 further isolates the effects of inside CEOs between founders and non-founders.

The coefficient for family ownership is negative and statistically significant for panel A and B, while non-significant in panel C. This evidence is contrary to previous studies on family ownership and the levels of cash holdings (Caprio, Del Giudice and Signori 2016; Kalcheva and Lins 2007; Kuan, Li and Chu 2011; Lau and Block 2012; Ozkan and Ozkan 2004), which all suggested that the presence of controlling families is associated with a higher level of cash holdings. The coefficients are -1.68 % and -1.49 % for panel A and B respectively. These results indicate that family firms may be more aggressive in their spending, which is supported by a higher level of capital expenditure in Table 3. Another possible explanation may be that Norwegian private firms are subject to agency problems, and that entrenched managers might hoard more cash than the optimal level. If this is the case, then family ownership may provide a remedy for such problems, limiting the manager's ability to and interest in hoarding cash for private gains.

In regards to panel C, which utilizes the fixed effects estimation method, all ownership variables yield non-significant results. As discussed in section 3.3, we believe that this is due to the weakness of the fixed effects model. The FE model only reports on cases where the ownership structure changes in our sample, but unfortunately our data is characterized with very stable ownership structures. Hence, the FE model struggles to recognize any significant results. We argue that the pooled OLS with year and industry

fixed effects model (panel B) provides a good middle ground, and is the best model we present.

In model 2, the coefficients for family CEO and outside CEO are both significantly negative in panel A and B. From panel B, the coefficients are -1.59 % and -0.89 % for family and outside CEOs respectively. The results indicate that the presence of both family and outside CEOs is associated with lower levels of cash holdings, with family CEOs by the largest factor. This may support the claim that there might be some agency problems regarding the cash holding levels in Norwegian private firms. Outside CEOs in family firms hold less cash than non-family firms, but more than inside CEOs. Hence it may be that the family ownership provides monitoring of the agent CEO, limiting his abilities to aggregate cash at will. In any case it is evidence that family owners exert a certain influence on non-family CEOs (Caprio, Del Giudice and Signori 2016). As above, it may also be that family CEOs spend more on expanding their capital, as supported by Table 3.

The results from model 3 indicate that the separation of inside managers between founders and non-founder matter to a small degree. The coefficients for both founder CEO and non-founder CEO are significantly negative, at -1.46 % and -1.76 %, respectively in panel B. However, when performing a Wald test for equality between these two coefficients, we cannot reject equality between them ( $p=0.1512$ ). In other words, they are not significantly different from one another. The coefficient for outside CEO is also significantly negative, at -0.9%. This result indicates that both founder and non-founder CEOs hold less cash than outside CEOs in family firms, and non-family firms. It may be that founders keep a bit more cash at hand than non-founders due to higher loss aversion or socioemotional attachment to the firm, but we do not find a significant difference. Interestingly, panel A reports a negative significant relationship between CEO age and cash holdings. However, this significance is nullified by the industry and year fixed effects included in panel B.

**Table 4: Regression results for main models**

	Panel A: Pooled OLS			Panel B: Pooled OLS w/industry & year FE			Panel C: Fixed Effects		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Family ownership	-0.0168*** [0.0015]			-0.0149*** [0.0014]			-0.0005 [0.0015]		
Family CEO		-0.0179*** [0.0016]			-0.0159*** [0.0015]			-0.0004 [0.0016]	
Outside CEO		-0.0098*** [0.0026]	-0.0107*** [0.0026]		-0.0089*** [0.0024]	-0.009*** [0.0024]		-0.0008 [0.002]	-0.0008 [0.002]
Founder CEO			-0.0158*** [0.0018]			-0.0146*** [0.0017]			0 [0.0021]
Non-founder CEO			-0.0192*** [0.0021]			-0.0176*** [0.0019]			-0.0008 [0.0019]
CEO age			-0.0003*** [0.0001]			0.0000 [0.0001]			0 [0.0001]
Size	-0.0515*** [0.0006]	-0.0517*** [0.0006]	-0.0516*** [0.0006]	-0.0418*** [0.0007]	-0.0421*** [0.0007]	-0.042*** [0.0007]	-0.0085*** [0.0018]	-0.0085*** [0.0018]	-0.0085*** [0.0018]
Cash flow	771.14*** [30.216]	779.58*** [30.264]	789.01*** [30.575]	581.63*** [36.599]	589.93*** [36.657]	588.09*** [36.693]	277.33*** [25.786]	277.33*** [25.786]	277.06*** [25.78]
Cfvolatility	-189.44*** [28.951]	-187.53*** [28.967]	-191.12*** [28.968]	-15.276 [29.996]	-14.032 [30.001]	-13.99 [30.018]	107.48** [49.199]	107.53** [49.197]	107.75** [49.193]
Nwc	-0.4263*** [0.0036]	-0.4268*** [0.0036]	-0.4279*** [0.0035]	-0.4989*** [0.0036]	-0.4994*** [0.0036]	-0.4993*** [0.0035]	-0.5989*** [0.0037]	-0.5989*** [0.0037]	-0.5989*** [0.0037]
Capex	-0.3079*** [0.0046]	-0.3076*** [0.0046]	-0.3103*** [0.0045]	-0.3596*** [0.0045]	-0.3594*** [0.0045]	-0.3595*** [0.0044]	-0.2724*** [0.0032]	-0.2724*** [0.0032]	-0.2723*** [0.0032]
Revenue growth	-0.0001** [0.00001]	-0.0001** [0.00001]	-0.0001** [0.00001]	0.00003*** [0.00001]	0.00003*** [0.00001]	0.00003*** [0.00001]	0.00005*** [0.00000]	0.00005*** [0.00000]	0.00005*** [0.00000]
Leverage	-0.4848*** [0.0043]	-0.4842*** [0.0043]	-0.4847*** [0.0043]	-0.4314*** [0.0043]	-0.4309*** [0.0043]	-0.4309*** [0.0043]	-0.316*** [0.0047]	-0.316*** [0.0047]	-0.316*** [0.0047]
Dividend indicator	0.035*** [0.0012]	0.035*** [0.0012]	0.0351*** [0.0012]	0.0342*** [0.0012]	0.0342*** [0.0012]	0.0342*** [0.0012]	0.0138*** [0.0007]	0.0138*** [0.0007]	0.0138*** [0.0007]
RoA	0.3022*** [0.0046]	0.3023*** [0.0046]	0.3007*** [0.0046]	0.2921*** [0.0045]	0.2922*** [0.0045]	0.292*** [0.0045]	0.1981*** [0.0032]	0.1981*** [0.0032]	0.1981*** [0.0032]
Firm age	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0005*** [0.0001]	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0005*** [0.0001]	0.0014*** [0.0002]	0.0014*** [0.0002]	0.0014*** [0.0002]
Constant	1.2863*** [0.0097]	1.2907*** [0.0099]	1.3049*** [0.0104]	1.0837*** [0.013]	1.0879*** [0.0132]	1.0863*** [0.0136]	0.648*** [0.0284]	0.6479*** [0.0284]	0.6462*** [0.0285]
Adjusted R-squared	0.523	0.523	0.523	0.563	0.563	0.563	0.447	0.447	0.447
Observations	285,746	285,746	285,746	285,746	285,746	285,746	285,746	285,746	285,746

This table examines the relationship family ownership and management, and the level of cash holdings. Each panel represents a different estimation method. For each model, cash holdings are regressed on the test and control variables. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.



In regards to our control variables, the results are mostly in line with the existing literature on cash holdings. Firms that are bigger, have healthier net working capital (excluding cash), spend more on new capital and utilize more leverage are all associated with lower cash holding levels. These results are as expected. For instance, firms with higher net working capital are more liquid, reducing the need for excess cash. Also, higher levels of capital expenditure and debt requires the use of cash, hence justifying the negative coefficient of the two variables (Caprio, Del Giudice and Signori 2016). On the other hand, firms that are more profitable and have higher cash flows are associated with higher cash holding levels. This is unsurprising, as the more cash a firm generates, the higher the cash holdings will be. Surprisingly, the coefficient for our dividend indicator is significantly positive. Traditionally, paying dividends is associated with less cash, since it is essentially a distribution of cash. In our case however, the results suggest that firms that pay dividends have more cash. This indicates that in our sample, a firm only pays dividends when it has excess cash. Cash flow volatility, revenue growth and firm age yielded inconsistent yet significant results across our estimation methods.

Our regression results represent a contradiction to our univariate analysis. It would appear from the univariate tests that family firms hold more cash, that family CEOs hold more than outside CEOs and finally that founders hold more cash than a non-founder. However, once you control for firm specific characteristics the effect is in fact the opposite in our sample. Overall, the results from Table 4 show that family firms on average hold significantly less cash than non-family firms. This contradicts Hypothesis 1. Additionally, we find that family firms that are managed by an inside CEO on average hold less cash than family firms managed by outside CEOs. This contradicts Hypothesis 2. Finally, both founder and non-founder CEOs in family firms hold less cash than both outside CEOs in family firms, and non-family firms. However, the difference between founders and non-founders is not significant. Hence, we do not find support for Hypothesis 3.

### Robustness Tests Using Alternative Definitions and Measures

In this section we seek to examine the robustness of our findings to see whether our results are sensitive to alternative definitions of key variables, as well as alternative specifications of our subsamples. First, we look at varying levels of family ownership.

Secondly we investigate the effect of alternative definitions of ownership variables. Thirdly we check if the results are sensitive to alternative definitions of cash holdings. Lastly we divide the sample into three subsamples based on firm size. All variables, estimation methods, specifications and definitions are listed in section 3.

*Alternative family ownership levels*

Fearing that a single classification of family firms based on 50 % ownership might be too reductive, we investigate four distinct levels of family ownership. Table 5 reports the results of these regressions. Both the pooled OLS and pooled OLS with industry and year fixed effects model report that all four family firm definitions hold significantly less cash than non-family firms. This is in line with our main findings, but it highlights a distinct U-shaped pattern. As the ownership of the largest family increases above 50 %, they hold less and less cash on average. However, at 100 % the cash holdings increase slightly relative to the group prior. All other results are in line with our main findings.

**Table 5: Regression results using varying levels of family ownership**

	Pooled OLS w/ind.		
	Pooled OLS	& year FE	Fixed Effects
FO50to67	-0.0081*** [0.0023]	-0.0074*** [0.0022]	0.0016 [0.0018]
FO67to90	-0.0119*** [0.0025]	-0.0116*** [0.0023]	0.0009 [0.002]
FO90to99	-0.0259*** [0.0035]	-0.0196*** [0.0032]	-0.0007 [0.0025]
FO100	-0.0189*** [0.0017]	-0.017*** [0.0016]	-0.003* [0.0018]
Size	-0.0516*** [0.0006]	-0.042*** [0.0007]	-0.0086*** [0.0018]
Cash flow	782.16*** [30.261]	591.83*** [36.592]	277.75*** [25.784]
Cf volatility	-188.59*** [28.961]	-13.454 [30.004]	105.24** [49.174]
Nwc	-0.427*** [0.0036]	-0.4995*** [0.0036]	-0.599*** [0.0037]
Capex	-0.3076*** [0.0046]	-0.3593*** [0.0045]	-0.2723*** [0.0032]
Revenue growth	-0.00001** [0.00001]	0.00003*** [0.00001]	0.00005*** [0.00000]
Leverage	-0.4846*** [0.0043]	-0.4313*** [0.0043]	-0.316*** [0.0047]
Dividend indicator	0.0347*** [0.0012]	0.034*** [0.0012]	0.0138*** [0.0007]
RoA	0.3019*** [0.0046]	0.292*** [0.0045]	0.1981*** [0.0032]
Firm age	-0.0006*** [0.0001]	-0.0006*** [0.0001]	0.0014*** [0.0002]
Constant	1.2891*** [0.0098]	1.0872*** [0.0132]	0.6505*** [0.0284]
Adjusted R squared	0.523	0.563	0.447
Observations	285,746	285,746	285,746

This table examines the relationship between family ownership and the levels of cash holdings, using varying levels of family ownership (CHE). For each model, cash holdings are regressed on the test and control variables. FO50to67 is a dummy variable that equals 1 if the largest family ownership is higher than 50% and less than two thirds. FO67to90 is a dummy variable that equals 1 if the largest family ownership is at least two thirds and lower than 90%. FO90to99 is a dummy variable that equals 1 if the largest family ownership is at least 90% and less than 100%. FO100 is a dummy variable that equals 1 if the largest family ownership is 100%. All other variables are defined in Table 1. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.

*Alternative definitions of test variables*

According to Miller et al. (2007), the results from empirical research on family firms are sensitive to the definition of family firms. Along with the previous section, we further investigate whether our results exhibit this sensitivity by using alternative definitions of family and founder firms outlined by Lau and Block (2012). The results are presented in Table 6. From model 1 we note that if the firm is either a founder or family firm, the results are close to identical to that of our main findings. This is mostly due to the fact that a founder is simply a family firm with only the founder in the largest family, hence these models are close to identical. However, model 2 shows us that using these alternate definitions, there is virtually no difference between founder firms and family firms with significantly negative coefficients of -1.49 % and -1.50% respectively. A Wald test also confirms that these coefficients are not significantly different from one another. Finally, model 3 reports the same relationships and conclusions between the groups as our main findings. All groups hold significantly less cash than non-family firms, with family management the least (-1.61 %), founder firms somewhat more (-1.52 %) and family ownership (i.e. outside CEO) holding the most cash of the three (-0.74 %). All other coefficients are identical in terms of sign and significance. All in all, our key findings remain the same.

**Table 6: Regression results using alternative definitions of explanatory variables**

	(1)	(2)	(3)
Founder or family firm	-0.0149*** [0.0014]		
Founder firm		-0.0149*** [0.0024]	-0.0152*** [0.0024]
Family firm		-0.0150*** [0.0015]	
Family management			-0.0161*** [0.0015]
Family ownership			-0.0074*** [0.0025]
CEO age			0.00001 [0.0001]
Size	-0.0418*** [0.0007]	-0.0418*** [0.0007]	-0.0421*** [0.0007]
Cash flow	581.63*** [36.599]	581.62*** [36.601]	590.44*** [36.669]
Cf volatility	-15.276 [29.996]	-15.28 [29.997]	-13.867 [30.022]
Nwc	-0.4989*** [0.0036]	-0.4989*** [0.0036]	-0.4994*** [0.0035]
Capex	-0.3596*** [0.0045]	-0.3596*** [0.0045]	-0.3593*** [0.0044]
Revenue growth	0.00003*** [0.00001]	0.00003*** [0.00001]	0.00003*** [0.00001]
Leverage	-0.4314*** [0.0043]	-0.4314*** [0.0043]	-0.4308*** [0.0043]
Dividend indicator	0.0342*** [0.0012]	0.0342*** [0.0012]	0.0342*** [0.0012]
RoA	0.2921*** [0.0045]	0.2921*** [0.0045]	0.2922*** [0.0045]
Firm age	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0006*** [0.0001]
Constant	1.0837*** [0.013]	1.0836*** [0.013]	1.0879*** [0.0135]
Adjusted R-squared	0.563	0.563	0.563
Observations	285,746	285,746	285,746

This table examines the relationship between family ownership and management, and the levels of cash holdings, using alternative definitions of explanatory variables (LAU). For each model, cash holdings are regressed on the test and control variables. All models employ the pooled OLS method with industry and year fixed effects. Founder or family firm is a dummy that equals 1 when the firm is either founder or family firm. Founder firm is a dummy variable that equals 1 if the founder owns more than 50 % and no other family members are CEO, owners or chairperson. Family firm is a dummy variable that equals 1 when the largest family owns more than 50 %, and the family is larger than one. Family management is a dummy that equals 1 if the largest family owns more than 50 %, and the CEO is from the largest family. Family ownership is a dummy variable that equals 1 if the largest family owns more than 50 % and the CEO is not in the largest family. All other variables are defined in Table 1. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.

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*Alternative definitions of the dependent variable*

Since cash and cash equivalents divided by total assets is not the only measure utilized in the literature, we also examine whether our findings are robust to alternative definitions. The results are shown in Table 7. Model 1 to 3 use cash divided by net assets, while model 4 to 6 uses the natural logarithm of cash divided by net assets. Both new variables are winsorized at the 1st and 99th percentiles. We find that in fact our findings are weakened in models 1 to 3. Family ownership is still negative significant at the 5 % level in model 1, with a coefficient of -1.94 %. However, model 2 and 3 show non-significant results for outside CEO and founder CEO. Family CEOs and non-founder CEOs still hold significantly less cash than non-family firms however. We also note that the adjusted r squared has decreased from 0.563 in our main model to 0.316 using this alternate definition of the dependent variable.

Model 4 to 6 yield the same conclusions as our main models. Family firms hold significantly less cash than non-family firms (model 4) at the 1 % significance level. Both family CEOs and outside CEOs in family firms hold less cash, with family CEOs holding less than outside CEOs (model 5). Finally, we observe in model 6 that outside CEOs, founder CEOs and non-founder CEOs all hold significantly less cash than non-family firms. The relationship between them is consistent with our previous findings. I.e outside CEOs hold the most of the three, founder CEOs hold less than outside CEOs, and non-founder CEOs hold the least. Again however, the difference between founder CEOs and non-founder CEOs is non-significant. The adjusted r squared for models 4 to 6 have a value of 0.518, which is close to our main model at 0.563. In conclusion we can see that our findings are somewhat sensitive to the definition of cash holdings. However, all significant conclusions are the same in terms of signs, significance and relative coefficients. Hence, we have confidence in our main models.

**Table 7: Regression results using alternative definitions of dependent variable**

	Cash/Net assets			Ln(Cash/Net assets)		
	(1)	(2)	(3)	(4)	(5)	(6)
Family ownership	-0.0194** [0.0099]			-0.1281*** [0.0112]		
Family CEO		-0.0244** [0.0103]			-0.1301*** [0.0116]	
Outside CEO		0.0132 [0.0152]	0.0183 [0.0153]		-0.1152*** [0.0203]	-0.1154*** [0.0204]
Founder CEO			-0.0147 [0.0128]			-0.1284*** [0.0131]
Non-founder CEO			-0.0498*** [0.0129]			-0.1324*** [0.0151]
CEO age			0.0032*** [0.0006]			0.0000 [0.0005]
Size	-0.1762*** [0.0046]	-0.1776*** [0.0047]	-0.1767*** [0.0047]	-0.3509*** [0.0056]	-0.3514*** [0.0056]	-0.3514*** [0.0056]
Cash flow	4003.4*** [317.8]	4048*** [317.82]	3931.6*** [316.31]	5983.8*** [266.01]	6001.5*** [266.51]	5999.3*** [267.04]
Cf volatility	798.81*** [234.96]	805.92*** [234.87]	844.58*** [235.38]	-431.12** [213.71]	-428.3** [213.76]	-428.37** [213.86]
Nwc	-2.7455*** [0.0329]	-2.7479*** [0.0329]	-2.7392*** [0.0326]	-2.8643*** [0.0255]	-2.8652*** [0.0255]	-2.8652*** [0.0255]
Capex	-2.224*** [0.0325]	-2.223*** [0.0325]	-2.2081*** [0.0321]	-1.7053*** [0.0359]	-1.7049*** [0.0359]	-1.7051*** [0.0358]
Revenue growth	0.00017*** [0.00005]	0.00017*** [0.00005]	0.00019*** [0.00005]	0.00025*** [0.00004]	0.00025*** [0.00004]	0.00025*** [0.00004]
Leverage	-1.5918*** [0.0254]	-1.5892*** [0.0254]	-1.5828*** [0.0253]	-3.301*** [0.0368]	-3.2999*** [0.0368]	-3.3*** [0.0368]
Dividend indicator	0.036*** [0.0093]	0.0364*** [0.0093]	0.0353*** [0.0093]	0.3471*** [0.0093]	0.3472*** [0.0093]	0.3472*** [0.0093]
RoA	1.2719*** [0.0408]	1.2722*** [0.0408]	1.2835*** [0.0406]	1.8989*** [0.0316]	1.899*** [0.0316]	1.8988*** [0.0315]
Firm age	-0.003*** [0.0004]	-0.003*** [0.0004]	-0.003*** [0.0005]	-0.0025*** [0.0005]	-0.0025*** [0.0005]	-0.0024*** [0.0006]
Constant	4.2574*** [0.0849]	4.2802*** [0.0864]	4.1176*** [0.0902]	4.7639*** [0.1081]	4.773*** [0.1088]	4.7713*** [0.1117]
Adjusted R-squared	0.316	0.316	0.316	0.518	0.518	0.518
Observations	285,534	285,534	285,534	285,534	285,534	285,534

This table examines the relationship between family ownership and management, and the levels of cash holdings, using alternative definitions of the dependent variable. For model 1-3, the dependent variable is cash and cash equivalents divided by net assets. Net assets is calculated as total assets minus cash. For model 4-6, the dependent variable is the natural logarithm of cash and cash equivalents divided by net assets. All other variables are defined in Table 1. All models employ the pooled OLS method with industry and year fixed effects. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.

*Alternative sample selection*

In this subsection, we test whether our main findings hold for different firm size categories. Using the average of total assets, we have divided our sample into three subsamples labeled small, medium and large. The results are presented in Table 8. We only report the simplest and most complicated specifications here, and each panel compares the size categories for the same specification. From panel A we see that our main findings are confirmed in all three subsamples. We do see however, an interesting pattern emerge; As the size increases, the coefficient of family ownership approaches zero. This indicates that as the firms grow larger, family ownership makes a lesser impact on the cash holdings. We argue that as family firms grow larger, they behave more in line with widely held firms. We also note that the adjusted r squared decreases from 0.641, to 0.521 to 0.435 for small, medium and large firms respectively. This further supports the claim that family ownership becomes less important in describing variation in cash holdings as the size of the firm increases.

The results from panel B are very similar to those of panel A: Outside CEO, founder CEO and non-founder CEO are all significant and negative for all subsamples. Additionally, for every variable their respective coefficients approach zero as the size increases. This is the same pattern as in panel A, and further strengthens the claim that family ownership and inside vs outside CEO management matters less for cash holdings as the size of the firm increase. The adjusted r squared are the same as in panel A, which indicates that the ownership and management structure is better at explaining variation in cash holdings of smaller firms than larger firms. In small and medium firms, the relationship between the coefficients are consistent with our main findings. However, for large firms, the non-founder CEO coefficient is larger than for outside and founder CEOs. Non-founder CEO for large firms is also only significant at the 10 % level, indicating that for large firms, the difference between non-family firms and family firms with a non-founding family CEO is small and weakly significant. An interesting observation is that cash flow volatility is only significant in the medium sized firms. All other coefficients are identical in terms of sign and significance. All in all, our key findings remain the same.



## Tests for Subsamples

*Table 8: Regression results using subsamples of firms based on firm size*

	Panel A			Panel B		
	Small	Medium	Large	Small	Medium	Large
Family ownership	-0.0221*** [0.0024]	-0.0171*** [0.0025]	-0.0067*** [0.0022]			
Family CEO						
Outside CEO				-0.0147*** [0.0047]	-0.0116*** [0.0044]	-0.0085*** [0.0033]
Founder CEO				-0.022*** [0.0026]	-0.0145*** [0.003]	-0.0085*** [0.0031]
Non-founder CEO				-0.0269*** [0.0036]	-0.0212*** [0.0034]	-0.0048* [0.0028]
CEO age				0.0003*** [0.0001]	-0.0003*** [0.0001]	0.0003** [0.0001]
Size	-0.03*** [0.0019]	-0.0191*** [0.0026]	-0.0309*** [0.0013]	-0.0301*** [0.0019]	-0.019*** [0.0026]	-0.0308*** [0.0013]
Cash flow	279.29*** [56.512]	445.73*** [65.618]	850.8*** [65.14]	272.28*** [56.919]	461.12*** [65.613]	837.12*** [65.153]
Cf volatility	-65.03 [47.846]	191.31*** [57.467]	-63.153 [54.778]	-61.078 [47.912]	188.73*** [57.411]	-60.5 [54.813]
Nwc	-0.6945*** [0.0053]	-0.4953*** [0.0063]	-0.319*** [0.0063]	-0.6943*** [0.0053]	-0.4969*** [0.0063]	-0.3178*** [0.0062]
Capex	-0.512*** [0.0083]	-0.3498*** [0.0079]	-0.2199*** [0.0067]	-0.5105*** [0.0083]	-0.3521*** [0.0079]	-0.2182*** [0.0067]
Revenue growth	0.00004*** [0.00001]	0.00003*** [0.00001]	0.00002* [0.00001]	0.00004*** [0.00001]	0.00003*** [0.00001]	0.00002** [0.00001]
Leverage	-0.5713*** [0.0087]	-0.4961*** [0.0076]	-0.2763*** [0.0058]	-0.5702*** [0.0087]	-0.4965*** [0.0076]	-0.2756*** [0.0058]
Dividend indicator	0.0307*** [0.002]	0.0323*** [0.0021]	0.0297*** [0.002]	0.0304*** [0.002]	0.0323*** [0.0021]	0.0295*** [0.002]
RoA	0.1934*** [0.0061]	0.3038*** [0.0085]	0.3689*** [0.0097]	0.1944*** [0.0061]	0.3021*** [0.0084]	0.3709*** [0.0097]
Firm age	-0.0009*** [0.0001]	-0.0006*** [0.0001]	-0.0002** [0.0001]	-0.0009*** [0.0002]	-0.0004*** [0.0001]	-0.0003*** [0.0001]
Constant	1.0333*** [0.0307]	0.7508*** [0.0424]	0.8117*** [0.0257]	1.0186*** [0.0312]	0.764*** [0.0426]	0.7952*** [0.0264]
Adjusted R-squared	0.641	0.521	0.435	0.641	0.521	0.435
Observations	92,612	95,701	97,433	92,612	95,701	97,433

This table examines the relationship between family ownership and management, and the levels of cash holdings, for three different subsamples based on total assets. Based on the firms average total assets in the sample period, the firms are divided into the small, medium and large tertiles. For each model, cash holdings are regressed on the test and control variables. All variables are defined in Table 1. All models employ the pooled OLS method with industry and year fixed effects. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.

### Endogeneity Tests

Fearing that there might be some endogeneity issues with our independent variables, we conduct a series of regressions using subsamples with certain constant independent variables. This method is outlined in Che and Langli (2015). From the first few rows of Table 9, we can see the number of observations and percentage of our sample which has the independent variable in question constant. In our sample, 45.68 % of the firm-year observations have constant family ownership, 77.75 % have constant family CEO, and 87.84 % have constant founder CEO. This is an indication of the very stable nature of the ownership and management structure in our sample. All results from this test are in line with our main findings, which includes the signs, significance, relative size of coefficients and coefficients of determination. The most notable deviations are the coefficients for family CEO and outside CEO in model 2. These coefficients are both more negative than in our main finding (-1.99 % and -1.06 % compared to -1.59 % and -0.89 %), and still significant. All in all, the stable nature of the test variables and the consistent results from these regression tests indicate that our main findings are not distorted by any severe endogeneity.

**Table 9: Tests of endogeneity**

Constant variable	Family ownership	Family CEO	Founder CEO
No. Of observations	138,854	236,323	266,992
Percentage	45.68 %	77.75 %	87.84 %
	(1)	(2)	(3)
Family ownership	-0.0141*** [0.0028]		
Family CEO		-0.0199*** [0.0018]	
Outside CEO		-0.0106*** [0.0032]	-0.0083*** [0.0027]
Founder CEO			-0.0152*** [0.002]
Non-founder CEO			-0.018*** [0.0021]
CEO age			-0.0000 [0.0001]
Size	-0.0406*** [0.0011]	-0.0428*** [0.0008]	-0.042*** [0.0007]
Cash flow	685.61*** [52.674]	633.8*** [41.503]	614.37*** [39.214]
Cf volatility	13.988 [44.749]	-16.93 [34.624]	-16.668 [32.313]
Nwc	-0.5276*** [0.0051]	-0.5034*** [0.004]	-0.4978*** [0.0038]
Capex	-0.3866*** [0.0064]	-0.3701*** [0.0051]	-0.3632*** [0.0048]
Revenue growth	0.00004*** [0.00001]	0.00004*** [0.00001]	0.00004*** [0.00001]
Leverage	-0.4501*** [0.0065]	-0.4359*** [0.0049]	-0.4335*** [0.0046]
Dividend indicator	0.0306*** [0.0019]	0.0335*** [0.0014]	0.0343*** [0.0013]
RoA	0.2791*** [0.0066]	0.2887*** [0.0051]	0.2881*** [0.0048]
Firm age	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0005*** [0.0001]
Constant	1.0851*** [0.0194]	1.1124*** [0.0151]	1.0939*** [0.0148]
Adjusted R-squared	0.565	0.562	0.56
Observations	130,386	221,951	251,476

This table examines the relationship between family ownership and management, and the levels of cash holdings, taking into account Endogeneity issues. Column (1) presents results for firms that have constant family ownership throughout the sample period. The remaining two columns reports results using subsamples that have constant family CEO and founder CEO, respectively. For each model, cash holdings are regressed on the test and control variables. All variables are defined in Table 1. All models employ the pooled OLS method with industry and year fixed effects. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.

### Tests Using Additional Control Variables and Further Research

Our research has focused on effect of the ownership of the largest family as well as the identity of the CEO on the level of cash holdings in Norwegian private firms. The past few years have shown that cash holdings is a popular topic in corporate governance research. We recognize that there are numerous angles to take when exploring the determinants of cash holdings. We have therefore done several tests where we include additional test variables highlighting their effects on our results. The results are reported in Table 10. Malmendier, Tate and Yan (2011) found significant relationships with managerial characteristics and corporate financing decisions, hence we test the impact of CEO gender in model 1. Ozkan and Ozkan (2004) focused on the effects of managerial ownership on cash holdings, therefore we included ultimate ownership by CEO in model 2. The structure of the board is also a prominent topic (Kuan, Li and Chu 2011; Ozkan and Ozkan 2004), hence we explore CEO board involvement, board size and board independence in model 3 and 4. Lastly we control for one owner effects in model 5 (Che and Langli 2015). We find that in our sample, male CEOs hold 1.79 % less cash than their female counterparts, significant at the 1 % level. Shares owned by the CEO does not significantly affect cash holdings in the sample. This is not surprising as our sample consist of mostly family firms with either strong alignment (inside CEO) or strong firm monitoring incentives (outside CEO). We find that if the CEO is a board member, the firms on average hold 0.7 % less cash, perhaps indicating an effect of increased discretionary power of the CEO. Surprisingly, we find that a larger board size is significantly associated with higher average cash levels in our sample. This may indicate that larger boards are less efficient (Agoraki, Delis and Staikouras 2010; Huther 1997). Contrarily, the independent board ratio is not significant. Finally, we find that firms with only one owner hold 0.31 % less cash significant only at the 10 % level. All in all, there are a plethora of corporate governance factors to research further to gain a more complete understanding of the cash holding levels of firms.

**Table 10: Regression results including additional control variables**

	(1)	(2)	(3)	(4)	(5)
Family ownership	-0.0149*** [0.0014]	-0.0153*** [0.0016]	-0.0141*** [0.0014]	-0.011*** [0.0015]	-0.0136*** [0.0016]
CEO gender	-0.0179*** [0.0022]				
CEO ownership		0.0000 [0.0000]			
CEO board indicator			-0.007*** [0.002]		
Board size				0.0039*** [0.0006]	
Independent board ratio				-0.0029 [0.0018]	
One owner					-0.0031* [0.0016]
Size	-0.0413*** [0.0007]	-0.0417*** [0.0007]	-0.0422*** [0.0007]	-0.043*** [0.0007]	-0.0419*** [0.0007]
Cash flow	584.38*** [36.563]	579.91*** [36.622]	591.27*** [36.64]	601.96*** [36.634]	585.86*** [36.579]
Cf volatility	-9.7872 [30.022]	-15.375 [29.99]	-15.392 [29.996]	-15.252 [30.031]	-14.379 [29.992]
Nwc	-0.4985*** [0.0036]	-0.4989*** [0.0036]	-0.4992*** [0.0036]	-0.4998*** [0.0035]	-0.4991*** [0.0036]
Capex	-0.3586*** [0.0045]	-0.3596*** [0.0045]	-0.3596*** [0.0045]	-0.3589*** [0.0045]	-0.3595*** [0.0045]
Revenue growth	0.00003*** [0.00001]	0.00003*** [0.00001]	0.00003*** [0.00001]	0.00003*** [0.00001]	0.00003*** [0.00001]
Leverage	-0.4306*** [0.0043]	-0.4315*** [0.0043]	-0.4306*** [0.0043]	-0.4304*** [0.0043]	-0.4313*** [0.0043]
Dividend indicator	0.0342*** [0.0012]	0.0341*** [0.0012]	0.0343*** [0.0012]	0.0339*** [0.0012]	0.0341*** [0.0012]
RoA	0.2929*** [0.0045]	0.292*** [0.0045]	0.2928*** [0.0045]	0.2943*** [0.0045]	0.2923*** [0.0045]
Firm age	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0006*** [0.0001]	-0.0006*** [0.0001]
Constant	1.0918*** [0.0131]	1.0823*** [0.0134]	1.0957*** [0.0136]	1.0914*** [0.0132]	1.0858*** [0.0131]
Adjusted R squared	0.563	0.563	0.563	0.563	0.563
Observations	285,746	285,746	285,746	285,746	285,746

This table examines the relationship between family ownership and the levels of cash holdings, using additional control variables. For each model, cash holdings are regressed on the test and control variables. CEO gender is a dummy variable that equals 1 if the CEO is male. CEO ownership is the equity ownership of the CEO using ultimate ownership. CEO board indicator is a dummy variable that equals 1 if the CEO is a chairperson. Board size is the total number of seats on the board. Independent board ratio is the number of independent board members divided by board size. One owner is a dummy variable that equals 1 if number of owners equals one. All other variables are defined in Table 1. All models employ the pooled OLS method with industry and year fixed effects. Standard errors (in brackets) are clustered by firm. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent levels, respectively.

## 5 Conclusion

The purpose of this thesis is to examine whether family firms resort to different cash holdings policies than non-family firms. Family firms constitute a significant portion of the economy, hence understanding their characteristics is important research. We examine Norwegian private firms in the period from 2004 to 2014, using multiple quantitative methods to cross check our findings.

We start by testing whether family firms hold more or less cash than non-family firms. Secondly we investigate whether the family owned firms hold more or less cash if they are managed by an inside CEO or an outside CEO. Moreover, we question if the role of founders as managers has an impact on the cash holding policies of inside managed family firms. Lastly we conduct a series of robustness checks using alternative definitions of variables and sample selections.

We find that family firms hold significantly less cash than non-family firms. This contradicts our hypothesis as well as previous research on the topic. However, previous studies are all conducted on public firms outside Norway. Our findings may indicate that Norwegian private firms are subject to some agency problems, and that these are partially remedied by family ownership. Moreover, we find that within family firms, those managed by a family CEO hold less cash than those managed by an outside CEO. Once more our findings contradict our hypothesis and previous research. This is further evidence that there may be agency issues present in Norwegian private firms. We would expect families to engage in near perfect monitoring of outside CEOs, nevertheless our findings indicate that outside CEOs exert a certain influence on the cash holding policies of family firms. Lastly we find that both founder CEOs and non-founder CEOs hold significantly less than outside CEOs and non-family firms. However, we find that the difference between founder CEOs and non-founder CEOs is not significant.

All in all, our results are mostly robust to alternative definitions of variables and different sub-samples. Alternative family ownership levels, definitions of family firms and founders yielded results in line with our main findings. However, our findings were partially weakened by defining cash as cash over net assets. Applying the logarithm operator to this definition however, aligned our findings once more. Furthermore, we

observed that our findings are less significant among large family firms than small and medium sized based on our sample. Lastly, we believe that our findings are not severely distorted by any endogeneity issues.

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## 7 Appendices

### *Appendix 1: List of CCGR items used*

Item	Description
2	CEO gender
4	CEO birth year
6	Enterprise type
11	Total operating revenue
13	Acquisition cost of goods sold
15	Depreciation
39	Net Income
41	Dividends
51	Total fixed assets (tangible)
63	Total fixed assets
76	Cash and cash equivalents
78	Total current assets
87	Total equity
94	Liabilities to financial institutions
100	Certificate loan
101	Liabilities to financial institutions
124	Cash flow
402	OSE listing status
602	Board Size
11103	Industry codes at level two
13420	Company age
15302	Largest family sum ult ownership
15304	Largest family has CEO
15306	Largest family size (ultimate ownership)
17001	Listing status on Oslo Børs
18005	The number of indepdent board members
18007	Is CEO a board member
18011	The share owned ultimately by the CEO(item_5)
18013	The number of consecutive years that the current CEO has been employed as CEO.

### 7.1 Preliminary Thesis

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# BI Norwegian Business School

## Preliminary Thesis Report

Study program:

MSc in Business and Economics

Major in Finance

Title:

The effects of managerial equity ownership on corporate cash holdings: An empirical investigation of Norwegian companies.

Name of supervisor:

Charlotte Østergaard

Exam code:

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2.2	What is the “right” amount of cash to hold?.....	2
2.3	Agency theory and FCF theory.....	4
3	Empirical methods.....	7
3.1	Data.....	9
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## 1 Introduction

In this paper we study the relationship between the equity ownership structure of a firm and its cash holdings. We focus on the effects of managerial equity ownership, board structure and ownership and control factors on corporate cash holdings. In a perfect Miller and Modigliani universe, theory would suggest that there is no need to hold excess cash. Contrarily, three main motives have been argued to explain why firms tend to hold cash: the transaction costs motive, the precautionary motive and the speculative motive (Keynes 2006). While early papers focused on the fundamental rationale for firms to hold cash, a growing body of research now investigates the determinants. Observed amounts of cash holdings have been increasing over time (Bates, Kahle and Stulz 2009) and several theories attempt to explain how firms determine the correct level of cash to hold. Pecking order, static trade-off and free cash flow theory tend to be readily applied, yet more research should examine the possible implications of agency theory. One area that needs further examination is the effects that the ownership structure of a firm may have on the level of cash holdings, and the agency problems that can arise.

We contribute to the discussion by attempting to clarify the implications that different equity ownership and control structures introduces for corporate cash holdings. We develop an approach based on agency theory, focusing mainly on the effect of CEO equity ownership, board structure and ultimate controller identity on cash holdings. In doing so, our discussion elucidates how the cash holdings preference of managers and shareholders may differ given the ownership structure of a firm. If managers derive private benefits from holding cash, a firm can maintain a level of cash holdings in excess of what shareholders find necessary. We distinguish between owner-managers and agent managers, and argue that their incentives for holding cash can both differ and coincide. The structure of the board and the general dispersion in equity ownership have traditionally been important in describing the ownership structure of a firm, thus we investigate potential effects of these variables on cash holdings. Thereunder, we examine whether the presence of external blockholders introduces managerial constraints due to increased monitoring of the firm.

The remainder of this paper is organized as follows. In section 2 we review related literature and theory, and outline relevant expectations regarding the influence of ownership and control variables on cash holdings. Section 3 provides a brief overview of empirical methods and data. Section 4 presents results. Section 5 concludes.

## 2 Literature review

### 2.1 Motives for holding cash

We define cash holdings as cash and cash equivalents in line with the definition used in international accounting standards. Cash holdings in a firm plays multiple roles. The transaction cost motive explains that a business needs to hold a certain operational level of cash in order to cover its transaction needs. Raising capital externally comes with a cost, which often includes a fixed component, not related to the size of the loan (Petersen and Rajan 2000). Hence, covering small day to day transactions with external financing is costly in the long run, and holding some cash for this purpose is reasonable. The precautionary motive argues that firms keep excess liquidity to meet unexpected contingencies (Kim, Mauer and Sherman 1998). The nature of these contingencies are such that forecasting is difficult, and hence the level of cash holdings for precautionary use is problematic to assess. The speculative motive argues that firms maintain excess liquidity to take advantage of profitable future investment opportunities. However, Kim, Mauer and Sherman (1998) argues that in a perfect financial market, neither motive is compelling since external funds for investment in production or to meet temporary operating cash flow shortfalls can always be obtained at a fair price. Hence, firms should optimally maintain zero excess liquidity.

### 2.2 What is the “right” amount of cash to hold?

#### *Static tradeoff theory*

The static trade-off model is originally a theory used to describe the capital structure of a firm. It states that a company seeks an optimal capital structure, determined by that the present value of tax shields should equal the financial distress costs of debt. A value-maximizing firm is thus expected to apply this optimal level of debt and equity. Changes in the capital structure is then modelled using a mean-reversion model, where random events shifts the capital structure away from optimum, and the firm reverts

gradually back towards the mean level (Shyam-Sunder and Myers 1999). Miller and Orr (1966) developed a similar model to explain a firm's cash holdings. They argue that cash also holds costs and benefits, and hence there exists an optimum trade-off between the two. The costs of cash in their paper is the opportunity cost of holding cash due to the low return of liquid assets, and the benefit is the absence of transaction (brokerage) costs compared to obtaining external financing or liquidating assets. This model has later been refined extensively by researchers to include many more costs and benefits from holding cash. Opler et al. (1999) arrived at a much cited model of cash holdings trade-off theory. In their paper, the benefit of holding cash is described as an absence of costs as a result of liquid assets shortage. The model predicts that firms with higher marginal cost of being short of funds will hold more cash cet par. These costs of being short of funds depend on seven variables;

- Magnitude of transaction costs of raising outside funds
- Cost of raising funds through asset sales, dividend cuts, and renegotiation
- Investment opportunities
- Cost of hedging instruments
- Length of the cash conversion cycle
- Cash flow uncertainty
- Absence of economies of scale

Opler et al. (1999) further expanded on the static trade off model by considering the effects of information asymmetries and agency costs of debt, liquid assets and managerial discretion.

Opler et al. (1999) find evidence supporting the static trade-off model. However, they also find out that firms that do well accumulate more cash than the static tradeoff theory would suggest. One advantage of this trade-off theory is that there exists a target level of cash, hence we can identify whether or not a firm holds too much cash relative to shareholder wealth maximization.

#### *Pecking order theory*

The pecking order theory was first introduced by (Myers 1984), on the basis of research done by Myers and Majluf (1984). Information asymmetries affect the costs of different

financing sources, creating a hierarchy of preferred funds. According to Myers (1984), a firm adheres to the pecking order if it prefers internal to external financing, and debt to equity if it issues securities. In the pure pecking order theory, the firm has no well-defined target levels of debt. Equity is the least favored option since investors believe that a manager who issues equity thinks that the stock is overvalued, hence they will undervalue the new equity. On the other hand, issuance of debt gives a signal that the manager has strong beliefs about the future prospects of the firm and its abilities to meet its financial obligations. This in turn may lead to a reevaluation of the firm's credit ratings. In conclusion, firms act as if to minimize the asymmetric information costs and other financing costs (Ferreira and Vilela 2004). The pecking order theory is a competing theory to the trade-off model, as firms do not have a target level of debt. In terms of cash holdings, this theory suggests that cash is used as a buffer between retained earnings and investment needs, since firms prefer to use retained earnings to finance future financial needs. When firms have sufficient operational cash flow, they will repay debt and accumulate cash. Thus, firms will use accumulated cash holdings to finance investments, before issuing debt if needed. Ferreira and Vilela (2004) suggests four factors that explain a firm's expected cash holdings according to the pecking order model:

- Investment opportunity set
- Leverage
- Size
- Cash flow

### 2.3 Agency theory and FCF theory

*How can ownership structure affect cash holdings?*

Agency theory is predicated on the belief that individual economic agents choose actions that maximize their personal utility. Within the modern corporation, there often exists a separation between the individuals making corporate decisions (managers) and the individuals bearing the wealth consequences of those decisions (shareholders) (Denis, Denis and Sarin 1999). The well-known "separation of ownership and control"-configuration implies that the firm is run by an agent CEO. In turn, we may suspect scenarios where the agent manager undertakes actions that oppose the preference of



shareholders due to achievement of private benefits. Free cash flow theory arguments imply that managers may want to retain cash in order to get more assets under their control, hence obtaining more discretionary power over the investment decisions of a firm (Ferreira and Vilela 2004; Jensen 1986). That is, they would prefer to hold back the cash rather than increasing payouts to shareholders even when the firm has poor or no investment opportunities (Bates, Kahle and Stulz 2009). An agent CEO may pursue negative NPV projects that serve private benefits with internal cash financing rather than with capital market financing, to ward off potential external scrutiny (Faulkender 2002; Jensen 1986). Alternatively, the agent CEO may hold cash in the firm as a function of individual risk aversion (ref. precautionary motives, wealth portfolio motives). Holding cash in the firm would then create negative shareholder value through agency costs since excess liquidity would potentially be better utilized outside the firm than inside.

Like the pecking order theory, FCF theory does not imply a target level of cash holdings. Several studies have explored this theory. Dittmar, Mahrt-Smith and Servaes (2003) found evidence indicating that firms in countries with greater agency problems hold more excess cash. Harford, Mansi and Maxwell (2008) and Dittmar and Mahrt-Smith (2007) found that entrenched managers are more likely to build excess cash balances, but that the excess cash is quickly spent (Bates, Kahle and Stulz 2009).

Agency costs related to an agent manager-shareholder configuration has one obvious remedy, namely to align the agent's preferences with those of shareholders through managerial ownership (Jensen and Meckling 1976), hence introducing what we label an owner-manager. With increasing managerial ownership, the common notion is that managers increasingly focus their attention on share-value maximization because they partake in potential losses. This is widely applied to combat agency costs faced by shareholders, but from the agent's point of view, managerial ownership also implies a less diversified individual wealth portfolio that may induce more risk-averse behavior. If this is the case, then the firm may continue to hold excess cash since the manager seeks to secure his/her wealth portfolio. Opler et al. (1999) describe the dynamism adequately:

“Management's holdings of shares help align its interests with those of shareholders. At the same time, however, these holdings protect management against outside pressures, and may make management more risk-averse (see Stulz, 1988). If holding cash is costly and management tends to hold more cash than is optimal from the perspective of maximizing shareholder wealth, then one would expect cash holdings to fall with managerial ownership. However, to the extent that managerial ownership makes management more risk averse, then one would expect cash holdings to increase with managerial ownership”

The presence of outside pressures will depend on external ownership dispersion. If there is a sufficient amount of blockholders willing/able to monitor management, then this may help align manager's preferences with those of shareholders, despite managers achieving less diversified wealth portfolios (Jensen 1986). Opposingly, if there is greater dispersion in equity ownership, then a single shareholder may be less inclined to monitor management, since he/she incurs all costs from monitoring while only reaping benefits in proportion to the individual's equity share. In turn, outside monitoring pressures should decrease with increasing equity ownership dispersion, allowing for more managerial autonomy. The alignment effect of external blockholders' monitoring can be expected to decrease as managerial ownership increases due to an entrenchment effect (McConnell and Servaes 1990; Morck, Shleifer and Vishny 1988). As managerial ownership increases, managerial control consequently increases, and managers may choose to pursue private benefits at higher portions of shares owned in the firm. This notion justifies the inclusion of blockholders as a factor in explaining corporate cash holdings. Furthermore, it is relevant to assess different proportions of managerial ownership to measure entrenchment effects on cash holdings.

Ozkan and Ozkan (2004) introduce board composition and the identity of ultimate controllers as potential determinants of cash holdings in UK firms. Their findings suggest that the board composition has no significant impact on cash holdings, but that the identity of ultimate controllers seem to matter in their sample. Specifically, a distinction is made between families and institutions as ultimate controllers. The rationale for assessing the identity of ultimate controllers is to determine whether

different categories/facets imply differences in direct monitoring of management, which in turn may affect cash holding decisions.

We acknowledge the possible relation between a firm's growth opportunities and its cash holdings, in line with the rationale of speculative motives for holding cash. As an extension, we may expect that the private motives of an agent-manager, or the entrenchment effects of managerial ownership become less significant with increasing growth opportunities in the firm. Hence it can be argued that the presence of growth opportunities can have a positive alignment effect on the interests of shareholders versus management. This notion is supported by the recent work of Ozkan and Ozkan (2004).

### 3 Empirical methods

In our research, we closely follow the methodologies outlined in the studies of Ozkan and Ozkan (2004) and Opler et al. (1999). We will conduct our empirical research in three stages. Firstly, we will determine whether firms have a target level of cash. Secondly, we analyze which variables affect the level of cash in a firm. Lastly, we try to specify a dynamic mean reverting model of cash holdings in the firm.

The first analysis is to examine whether a firm has a target level of cash or not. To do so, we apply a simple first order autoregressive model for each firm similar to that of Opler et al. (1999):

$$\Delta(\text{Cash}/\text{Assets})_t = \alpha + \beta\Delta(\text{Cash}/\text{Assets})_{t-1} + \varepsilon_t$$

The delta indicates the first differenced operator, and time steps are annual. If firms do in fact have a target level of cash holdings, we expect  $\beta$  to be significantly negative. This would indicate that there are systematic factors that keep the level of cash within a reasonable bound. Otherwise we reject the hypothesis that firms have a target level of cash holdings. Note also that if we find evidence of a target level, this does not contradict the pecking order theory. For this test we include all firms with at least five years of data on cash holdings in the period 1994 to 2013.

For the second part of our research, we will study which variables affect a firm's level of cash holdings. Here we will apply several regressions to cross-examine our results.

Like both Opler et al. (1999) and Ferreira and Vilela (2004), we will first use the Fama and MacBeth (1973) model. This model estimates a cross section each year, hence cancelling out any serial correlation in the residual we might have gotten using a time series method. For the Fama and MacBeth method, we use the interval 2000-2013, since this is the period for which we have data available on ownership and control. The second method we apply is a pooled time-series cross-sectional regression. Here we incorporate all available information in the time frame 2000-2006 in a panel data regression. We chose to limit the sample to 2006 in order to avoid the disturbances caused by the financial crisis. We will also include dummy variables for each year, and a dummy variable for industry, adjusting for any macroeconomic and industry variations that lie outside our model.

Lastly we will apply a similar to that of Ozkan and Ozkan (2004). This model uses a cross-sectional cash model using average values for the independent firm characteristic variables over the last four years. At the time of writing, we have not fully specified our regressions. We know however, the general setup similar to that of Ozkan and Ozkan, and an example of the last regression mentioned above is:

$$\begin{aligned} CASH_i = & \alpha_i + \beta_1 CFLOW_i + \beta_2 LIQ_i + \beta_3 LEV_i + \beta_4 MKTBOOK_i + \beta_5 SIZE_i \\ & + \beta_6 MAN + \beta_7 MAN_i^2 + \beta_8 MAN_i^3 + \beta_9 BLOCK_i + \beta_{10} CEOBOARD_i \\ & + \beta_{11} FAMILYCEO_i + \varepsilon_i \end{aligned}$$

As explained, CASH would be measured in 2006, while the explanatory variables would be the average over the last four years. The exact definition of the variables, and specification of the regression will be performed at a later stage of the thesis.

The final part of our empirical research is to identify a dynamic partial adjustment model, similar to that of Ozkan and Ozkan (2004). The approach recognizes that there may be delays when a firm adjusts their current cash levels towards their target due to frictions like transaction and adjustment costs. Ozkan and Ozkan suggested the following regression. We do not have our fully specified at this point, but it will be similar in nature. In the expression,  $i$  is the firm-indicator and  $t$  indicates the time.

$$\begin{aligned} CASH_{it} = & \gamma_1 CASH_{it-1} + \gamma_2 CFLOW_{it} + \gamma_3 LIQ_{it} + \gamma_4 LEV_{it} + \gamma_5 BANKDEBT_{it} \\ & + \gamma_6 MKTBOOK_{it} + \gamma_7 SIZE_{it} + \gamma_8 DIVIDEND_{it} + \alpha_i + \alpha_t + u_{it} \end{aligned}$$

### 3.1 Data

We conduct our research on data provided by the Center for Corporate Governance Research (CCGR) on both listed and unlisted Norwegian firms. The CCGR sample consists of six tables:

Account\_Data: Accounting data from 1994 to 2013.

Consolidated\_Account\_Data: Consolidated accounting data for 1994 to 2013.

Industry\_Code: NACE industry codes for the companies from 1998 to 2013. A company can be member of more than one industry.

Ownership\_Control: Governance data from 2000 to 2013.

Misc\_1994: Misc data from 1994 to 2013.

Misc\_2000: Misc data from 2000 to 2013.

The full list of relevant variables may be found in appendix 1.

## 4 References

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## 5 Appendices

### **Appendix 1: List of variables identified**

We identify the following variables as relevant to this point:

Cash and cash equivalents: item\_15076

Total assets: item\_15063 + item\_15078

Liabilities to financial institutions: item\_15101 + item\_15100

Cash flow volatility: volatility(item\_15124)

Industry codes: item\_11102 and item\_11103

Listing status on Oslo Børs: item\_17001

Share owned by CEO: item\_13601

Board size: item\_602

Largest owner identity: item\_230-235

Number of block holders: item\_226

Share owned by block holders: item\_228

Number of independent board members: item\_18005

Is CEO a board member: item\_18007

Ultimate CEO ownership: item\_18012