- The effects of ownership structure and concentration on cash holdings -
Abstract

We build upon existing theory and evidence on the relationship between ownership metrics and corporate cash holdings to address three crucial issues: how ownership concentration affects cash holdings; how ownership structure affects cash holdings; whether the Norwegian tax reform of 2006 brought about a change in corporate cash holdings among Norwegian businesses.

In order to answer these questions, we analyzed a sample of over 185 thousand Norwegian firms over a period of fourteen years. Our findings highlight the impact of agency issues on corporate governance- and management decisions alike. It appears that both, ownership concentration and ownership structure cause cash holdings to deviate from their ideal levels, thereby accommodating managers’ and owners’ self-serving interests, while impeding a company’s ability to achieve an equilibrium, in which the marginal cost of cash equals its marginal benefit.
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1 Introduction

The purpose of this Master’s thesis is to analyse the relationship between ownership concentration, ownership structure, and cash holdings among Norwegian firms. We will also examine the effect that the 2006 tax reform had on cash holdings.

Existing literature suggests that ownership concentration affects cash holdings in two ways. Demsetz and Lehn (1985), cited in Anderson and Hamadi (2009, 4), argue that higher ownership concentration effectively means that investors who have high stakes in a particular company are likely to hold less diversified portfolios. Their income is therefore closely tied to the payoffs of a limited number of assets, leading to a more risk-averse style of corporate governance.

Risk aversion among owners causes firms to hold more assets as highly liquid. We therefore expect firms with high levels of ownership concentration to have relatively higher cash holdings than similar firms with lower levels of ownership concentration.

The second way in which ownership may affect cash holdings is through tighter corporate governance. It is easier for few large shareholders to control managers than it is for many relatively smaller shareholders. Hence, owners can exercise more control over managers who would like to retain cash, and force them to disperse it to shareholders. This will decrease cash holdings, as owners are better equipped to force managers to pay out excess cash (Jensen and Meckling, 1976).

We expect the first effect to dominate. We therefore anticipate a positive correlation between ownership concentration and cash holdings.

Agency costs can also arise due to conflicts between different shareholder groups. If insiders have significant control over the firm, they may behave in a way that is not optimal for other minority owners. Managers who hold a majority share of a particular company’s stock have strong incentives to expropriate from other shareholders. Insiders will likely take on projects that are not in the best interest of
the company, but that will benefit themselves instead. Such projects would destroy the overall value of the firm, but be a source of private benefits to the controlling party in the firm instead.

Additionally managers who have significant ownership of the firm have an incentive to pay themselves abnormally high salaries, as well as granting themselves excessive perks. Insiders have a strong interest in keeping relatively much cash on hand to reduce the threat of hostile takeovers and proxy fights, thereby securing their management position in the firm.

We therefore expect that high insider ownership will result in relatively higher cash holdings.

In 2006 a tax reform was instated in Norway, effectively raising taxes on dividend payments to private investors from 0% to 28%, while dividend payments to institutional investors have remained untaxed. It has therefore become more expensive for Norwegian companies to disperse earnings to its shareholders, which leads us to the hypothesis that rather than paying dividends, Norwegian companies will be inclined to retain profits, leading to higher cash reserves. We will analyse how different levels of ownership concentration affect changes in cash holdings before and after the tax reform. We are also interested in the effect of ownership structure on cash holdings during this transition. In particular we will examine the changes in cash reserves for CEO-controlled firms, brought about by the 2006 tax reform, and compared them to changes in other firms.

We postulate four research questions, examining the effect of ownership concentration, ownership structure, and the 2006 tax reform on cash holdings of Norwegian firms:

1. How does ownership concentration affect cash holdings of Norwegian companies?
2. How does insider ownership affect cash holdings of Norwegian companies?
3. How did the 2006 tax reform affect cash holdings of single owner firms compared to non-single owner firms?
4. How did the 2006 tax reform affect cash holdings of manager-controlled firms compared to other firms?
The corresponding hypotheses are:

1. Higher ownership concentration among comparable firms will in aggregate result in higher cash holdings.
2. Insider ownership has a positive impact on cash holdings.
3. After the 2006 tax reform cash holdings of single owner firms increased by more than cash holdings of non-single owner firms.
4. After the 2006 tax reform cash holdings of manager-controlled firms increased by more than cash holdings of other firms.

Examining the effects of ownership concentration and ownership structure on cash holdings is important to gain a better understanding of how cash holdings are affected in ways that do not add value and possibly even hurt the company. Assuming there is an optimal level of cash holdings where the marginal cost of cash equals the marginal benefit, any deviation from such an equilibrium will invariably hurt the firm. It is therefore important to examine how the self-interests of entrenched managers, or poorly diversified shareholders may be in conflict with the best interests of the company. It is notable how external influences such as tax regulations may incentivise firms to deviate from an optimal level of cash reserves.

The remainder of this paper is structured as follows: Chapter 2 provides a literature review of the most relevant papers in this field. Chapter 3 describes the data we used to carry out the analysis. In chapter 4 we describe the methodology we applied. In chapter 5 we present and discuss the results. Chapter 6 summarizes the results and concludes our main findings.

2 Literature review

Cash holdings can affect companies in different ways. Benefits arise from higher liquidity as certain cash reserves allow firms to finance positive NPV projects, even when internal cash flows decline and the company would otherwise need to turn to external capital markets to raise sufficient funds. This is especially important for companies that have limited access to external finance and therefore can only raise new funds at high costs. Another reason that external financing may become prohibitively expensive is the presence of information asymmetries.
Firms, facing information asymmetries, may decide to hold more cash and be financially flexible so they can minimize the costs of external financing, especially when capital markets are imperfect (Almeida, Campello, and Weisbach, 2004; Ozkan A. and Ozkan N., 2004).

The main disadvantage of high cash reserves are increased agency problems. Higher cash holdings may trigger conflicts between managers and shareholders. Managers can use excess cash to overinvest in negative NPV projects or finance private benefits, thus harming shareholders. It is therefore in the interest of owners of companies with potentially large agency problems between managers and shareholders to hold less cash, which instead should be used to pay interests or dividends (Jensen, 1986).

Jensen and Meckling (1976) suggest that firms face significant costs due to separation of ownership and control. As managers have different interests than shareholders, they may be inclined to make decisions that are not in the best interest of the firm and its owners. To solve this problem and align the interests of managers with the interests of shareholders, theory suggests that managers should own part of the company they run. However, with increased managerial ownership, managers may become entrenched, incentivizing them to increase perks for themselves. This way they fully enjoy the benefits but pay for them only partially, as the rest is financed by other shareholders. In the idealistic scenario that managers own 100% of the company, the principle-agent problem would be fully eliminated.

Insider ownership gives managers more power and opportunities to expropriate from other owners. Another way how higher cash holdings can benefit managers is through the effect it has on hostile takeovers. While large cash reserves may cause dissatisfaction among shareholders, Faleye (2004) suggests that corporate liquidity has takeover-deterring effects, as excess cash can be used by managers to defend themselves against both takeovers and proxy fights. He finds that cash-rich firms are unlikely takeover targets. The fact that those firms are not exposed to the market for corporate control increases agency problems, resulting in even higher potential costs of excess cash.
The costs of conflicts between managers’ and shareholders’ interests can be reduced if a firm has powerful and active shareholders with high incentives to perform closer monitoring. Shareholders’ incentives to monitor increase as their ownership share increases. However, ownership concentration (through closer monitoring) can affect the level of cash holdings in both positive and negative ways. Higher ownership concentration gives more power to the largest shareholder who can use this power to reduce cash holdings. At the same time those owners can also monitor managers more efficiently, which reduces the need to decrease the level of cash within the company (Faulkender, 2002).

2.1 Factors affecting cash holdings

Besides ownership structure and ownership concentration there are many other factors that have an effect on the level of cash reserves. Some of those factors are leverage, firm size, profitability, cash flow volatility, and dividends.

Bates, Kahle, and Stulz (2009) find that the cash ratio of US based firms more than doubled in the period between 1980 and 2006. They find that this increase is largely attributable to non-dividend paying firms, as well as firms that had more recent IPOs. The reason for this increase in the cash to assets ratio among these firms is that cash flow risk has increased, which they argue is due to an increase in idiosyncratic risk. Other drivers of excessive cash reserves, they suggest, is an overall decrease in inventory along with an increase in R&D expenditures.

Overall Bates, Kahle, and Stulz (2009) conclude that precaution is the primary determinant of demand for cash, as firms with high cash ratios are typically faced with many risks they cannot hedge against, and therefore prefer to hold cash reserves as a cushion. While they concede to the fact that agency problems may explain cross sectional differences within their sample, they find no aggregate evidence of agency problems affecting cash holdings.

Han and Qiu (2007) show that the impact of cash flow volatility on a firm’s cash holdings depends on the firm’s financial constraints. To achieve a separation between financially constraint and financially unconstraint firms, they divide sampled firms into groups according to their ability to pay out dividends, size, bond ratings and commercial paper ratings. Han and Qiu find that cash flow
volatility is positively related with cash holdings for financially constrained firms, whereas they find no significant correlation between cash flow volatility and cash holdings for financially unconstrained firms. A possible explanation for this finding is that it is more costly for financially constrained firms to raise capital or issue debt, implying a stronger precautionary motive.

Another important variable that affects cash holdings is firm size. Small firms have higher information asymmetries than large firms, which makes external financing more expensive and may impose additional financial constraints on small firms. Therefore, small firms have higher incentives to hold onto cash than large firms, meaning that dividend payout ratios are expected to be lower for small firms. Additionally, financial distress costs are also related to firm size. Small firms are less likely to be diversified, rendering them more exposed to financial distress costs. To reduce those costs small firms need to hold more cash on their balance sheets in order to decrease the probability of financial distress (Faulkender, 2002; Titman and Wessels, 1988).

Martínez-Carrascal (2010) finds that cash reserves of smaller firms are more influenced by different risks than cash reserves of larger firms. Smaller firms adjust their cash holdings in response to cash flow volatility more often and to a greater extent than large firms do. This is mostly because in smaller firms growth opportunities have a stronger effect on cash holdings than in larger firms. She also finds a stronger negative relationship between cash reserves and tangible assets in smaller firms than in larger firms. Since tangible assets can be used as collateral in loan contracts and therefore facilitate external financing, small firms that have more tangible assets can afford to hold less cash reserves and are still able to obtain external financing if necessary. She concludes that small firms adjust their cash policy to different risks they are exposed to.

Dividends paid out to owners reduce free cash flows held within the firm, and thereby reduce managers’ opportunities to spend excess cash for unprofitable projects. Agency costs due to free cash flows can be reduced if managers commit to paying out dividends regularly. We can find proof of this in stock price reductions after dividends have been cut (Jensen, 1986).
In this research paper, Salas (2007) explains how stock prices are affected by changes in a firm’s dividend policy relative to its present level of cash holdings. He found significantly greater changes in stock prices due to modified dividend policies in firms that held larger amounts of cash. Moreover, he found that changes in stock prices due to modified dividend policies are not significantly different from zero in firms with low levels of cash holdings.

Companies also consider their leverage ratio when determining the level of their cash holdings. Guney, Ozkan A. and Ozkan N. (2007) find support for a significant non-linear relationship between cash holdings and leverage. At low levels of leverage the relationship is negative, but becomes positive at high levels. When firms have a low leverage ratio they can use debt as a substitute for cash. They do not need high cash reserves to maintain financial flexibility, as they can obtain external finance relatively easily and at low costs. However, if firms already have high leverage, they are more likely to face financial distress and the costs associated with it. To minimize these costs firms may choose to hold higher cash reserves. As highly leveraged firms are also more likely to be financially constrained they tend to hold more cash in order to avoid a situation where they would not be able to finance new projects. Therefore, the relationship between cash holdings and leverage becomes positive at high levels of leverage.

Existing literature suggests that profitability can have either a positive or negative effect on cash holdings. One possible explanation is that profitable companies retain their profits within the firm, thereby accumulating cash over time. This suggests a positive relationship between profitability and cash holdings. However, it is also possible that firms use profits as a substitute for raising new funds by reinvesting them immediately. They can also use profits to repay debt or pay out dividends. In this case the relationship between profitability and cash holdings would be negative (Niskanen & Steijvers, 2011).

2.2 Norwegian tax reform in 2006

In 2006 Norway implemented a tax reform aiming to reduce differences in taxation of labour and capital income, and evening out the highest tax rates on both sources of income. Prior to the 2006 tax reform taxes on capital income were much lower than taxes on labour income, which was a great motivation for
camouflaging labour income as capital income. Tax savings were quite substantial as labour income was taxed at a rate of up to 64.7%, whereas capital income was taxed at a flat rate of 28% (tax rate for corporate profits) (Ministry of Finance, 2011).

The 2006 tax reform introduced a 28% tax rate on dividends. This new dividend tax, when added to the unchanged 28% tax rate on corporate profits, increased the marginal tax rate on capital income from 28% to 48.16% after the tax reform. The reform also reduced the highest marginal tax rate on labour income from 64.7% to 54.3%. A simultaneous reduction in the labour income tax rate, along with an increase in the capital income tax rate, decreased the differences between both income sources, significantly reducing the profitability of income shifting after 2006 (Ministry of Finance, 2011).

We expect the tax reform to have a substantial effect on cash holdings of Norwegian companies. Agency costs of single owner firms are relatively low, which suggests that those firms can afford to leave more cash within the company and still operate efficiently without being heavily exposed to agency conflicts. We therefore expect to observe a larger increase in cash holdings of single owner firms compared to non-single owner firms after the 2006 tax reform. We also anticipate that cash holdings of manager-controlled firms increased more than cash holdings of other firms.

As the 2006 tax reform increased dividend taxation, it made equity financing more expensive. Since firms paid out more dividends prior to 2006 they were relying more heavily on external financing. Since the 2006 tax reform rendered external financing more expensive, we expect firms to retain more earnings, and therefore shift from external to internal financing.

3 Data

We obtained data on financial parameters, company size, ownership structure, and ownership concentration from the Centre for Corporate Governance Research (CCGR). The data is of high quality, as Norwegian firms annually submit accounting reports certified by a public auditor. This holds for all Norwegian
companies, regardless of their listing status, size, or industry. If firms fail to submit this information, liquidation by the court is automatically triggered (Berzins, Bøhren, and Stacescu, 2011).

3.1 Initial treatment of the dataset

The original dataset contains information on independent limited liability (AS), and public limited liability (ASA) companies. Before running analyses, we treated the dataset according to several criteria. We excluded companies operating in either the insurance or financial industry (codes 64, 65, and 66 according to SIC2007), as well as utility companies, such as electricity, gas, steam, air conditioning, and water supply (codes 35, 36, 37, 38, and 39 according to SIC2007). We omitted these companies from our sample because their cash holdings are largely determined by regulations rather than by the management’s best judgement.

Additionally, we want to avoid non-operating companies. We therefore filtered out observations with negative or zero revenues, total assets, or cash and cash equivalents. We deleted observations that have negative paid-in capital, negative dividends, and negative liabilities to financial institutions, as these observations point to abnormal companies. Additionally, we deleted observations that have return on assets or cash flow volatility to total assets higher than +1 or lower than -1, as these values also point to abnormal firms or potential errors in our sample. Although we discriminate against companies from certain industries by setting a generalized cut-off point for return on assets and cash flow volatility at ±1, we consider this a necessary measure. Setting the constraint at ±1 yields the best results in terms of eliminating outliers, while maintaining a representative sample.

3.2 Specific treatment of the dataset

For every major analysis we conducted, we had slightly different requirements for the dataset. Hence, after running the initial treatment, which each analysis has in common, we applied an additional treatment to the dataset, customizing the data to each of the four major analyses we conducted.

For both, the panel data regression, and the difference-in-difference analysis on ownership concentration we deleted observations with Herfindahl index values that are either missing, larger than 1, or smaller than 0. Similarly, we deleted
observations with Rank1_Owner values that are missing, larger than 100, or smaller than 0. For the difference-in-difference analysis on ownership concentration, we additionally filtered out all companies that have never within our sample period paid out dividends.

For the panel data regression, and the difference-in-difference analysis on ownership structure we deleted observations with missing values for the variables CEO_Family_Shares (shares owned ultimately by the CEO’s family) and Nr_Of_Ye (number of consecutive years the current CEO has been employed as CEO). For the difference-in-difference analysis on Ownership Structure, we additionally filtered out all companies that have never within our sample period paid out dividends.

The period of observation is 2000 – 2013. Our initial dataset includes 1,480,659 observations. For each observation we obtained information on 26 different variables. Our dataset contains information on a large number of Norwegian companies across 14 years. As our sample includes companies that have stopped or started operating at some point during the observation period, we are dealing with an unbalanced panel dataset. Summary statistics for all samples used in different analyses are presented in Appendix 1.

4 Methodology

4.1 Granger causality

The goal of our research is to investigate how cash holdings are affected by several variables. We are not simply looking for correlations between cash holdings and financial ratios, but we’re aiming to identify a cause-effect relationship.

For instance, there might be a strong positive correlation between cash flow volatility and cash holdings. This, however, could mean one of three things: high cash flow volatility causes high cash holdings; high cash holdings cause high cash flow volatility; there is a third, hidden (unobserved) variable that affects both, cash flow volatility and cash holdings.
Since we are not only interested in correlations, but also in the direction of the cause-effect relationship, we ran several causality tests. The basic methodology we used is analogous to that of a Granger causality test, but slightly simplified. This is because we are working with panel data, and Granger causality tests are not very well suited for this type of dataset. Although our methodology is slightly different to that of a Granger causality test, we will, for the remainder of this section, refer to the cause-effect relationship that we are investigating as Granger causality. This is because the relationship between variables we are aiming to identify is Granger causality.

We tested five metrics for Granger causality against cash to total assets. These are cash flow volatility to total assets, dividend ratio, natural logarithm of total assets, return on assets, and leverage ratio. For each of the variables we computed three lag values, L1; L2; L3. L1 being the value of the variable 1 year ago, L2 being the value of the variable 2 years ago, and L3 being the value of the variable 3 years ago.

We ran five Granger causality tests, each consisting of two random effects panel data regression analyses. The dependent variable in the first regression is always cash to total assets. In the second regression, it is the particular financial ratio, whose causality with cash to total assets we’re examining in each particular Granger causality test. The independent variables in both regressions are lag values of the dependent variable (control variable), as well as lag values of the variable whose effect on the dependent variable we are investigating (predictor variable). The results of Granger causality tests are shown in Appendix 2.

For the remainder of this section we will refer to the regression analyses that have cash to total assets as their dependent variable as Regression A. The regressions with one of the five financial ratios as dependent variables will be referred to as Regression B.
e.g.: When testing for Granger causality between cash to total assets and return on assets, we ran two regression analyses:

Regression A: We regress cash to total assets against lag 1 of cash to total assets, lag 2 of cash to total assets, lag 3 of cash to total assets, lag 1 of return on assets, lag 2 of return on assets, lag 3 of return on assets.

Regression B: We regress return on assets against the same independent variables.

For each of the two regressions, if the lag values of the predictor variable prove to be correlated with the dependent variable, there is evidence that the predictor variable Granger-causes the dependent variable. In other words, if at least one of the coefficients of the predictor variable is statistically significant at a 5% confidence interval, we conclude that there is a cause effect relationship between the predictor, and the dependent variable. It is, however, possible that we find evidence for Granger causality in both directions. In this case it is highly likely that a third, unobserved variable drives both dependent variables. We will therefore not make any further inferences about Granger causality between the two variables, subject to the causality test.

In four out of five Granger causality tests (testing cash holdings against cash flow volatility to total assets, natural logarithm of total assets, return on assets, and leverage ratio), we find at least 1 predictor variable to be statistically significant in both, Regression A and Regression B. This result indicates Granger causality in both directions. Hence, there likely exists a third, unobserved variable that affects both variables in each of these Granger causality test.

Examining for Granger causality in dividend ratio, and cash holdings, we find none of the coefficients of the predictor variables in Regression A and B to be statistically significant at a 5% confidence interval. We thus conclude that, within our sample, there is no correlation between dividend ratios and cash holdings.

It is important to stress, however, that this conclusion cannot be generalized, as it is very likely a result of the structure of our sample. We are including all Norwegian companies that operated at any one point between 2000 and 2013 in our sample. It follows that a large part of the sample is made up of relatively small companies, who often do not have a stable dividend policy. Approximately two
thirds of all companies included in our sample have never paid dividends during the entire period they are represented in the sample.

Since we cannot identify a correlation between cash holdings and dividend ratios, we chose to omit dividend ratios as a control variable in both, the regression analysis on the effect of ownership concentration on cash holdings, and the regression analysis on the effect of ownership structure on cash holdings.

### 4.2 Fixed and random effects

Estimating panel data regression models we need to decide between fixed and random effects. In fixed effects models it is possible for intercepts to be different across different companies. However, each company’s intercept has to be constant over time, meaning that it is time invariant. Another disadvantage of fixed effects is that many dummy variables need to be introduced when dealing with many cross-sectional units, resulting in a loss of degrees of freedom (Gujarati, 2003).

In random effects models the intercept does not need to be fixed, since the model assumes it to be random with a mean value for all companies. To obtain an intercept for each individual company, a company specific random error needs to be added to the mean value of the intercept. Therefore, all observations have a shared mean value of the intercept, but each observation’s individual differences are represented by the random error term (Gujarati, 2003).

Random effects models are more suitable when companies’ characteristics are relatively stable over time (time-independent). Approximately 40 per cent of companies in our sample have stable (changes smaller than 5 percentage points) values for ownership concentration variables (Herfindahl index and percentage of equity held by the largest shareholder). Ownership structure is even more constant with approximately 60 per cent of companies not experiencing a significant change in ownership structure, as measured by shares owned by the CEO’s family.

Due to low variability in ownership structure and ownership concentration variables, we decided to use random effects model when running linear panel data regressions.
4.3 Panel data regressions

We analysed the effects of ownership structure and ownership concentration on cash holdings by conducting two separate linear panel data regressions. As cash holdings are not solely affected by ownership variables, we have included additional control variables that affect a company’s cash holdings. Previous research suggests that the most important variables are leverage ratio, firm size, profitability, and cash flow volatility. Below, we first describe the dependent variable in our regressions, followed by the definitions of aforementioned independent variables.

Cash ratio
Existing literature suggests different measures of cash holdings, including cash and short-term investments to sales, cash and short-term investments to assets (Kalcheva and Lins, 2007), natural logarithm of the cash ratio, and marketable securities to total assets (Ozkan A. and Ozkan N., 2004). We decided to use the ratio of cash and cash equivalents to book value of total assets (Cash_TA).

Leverage ratio
We define leverage ratio (Leverage_Ratio) as a sum of short-term and long-term liabilities to financial institutions divided by book value of total assets.

Firm size
We use natural logarithm of the book value of total assets as a proxy for firm size (LN_TA).

Profitability
As a proxy for firms’ profitability we use return on assets (ROA), which we computed as a ratio of income before extraordinary items to book value of total assets.

Cash flow volatility
We define cash flow volatility (CF_Volatility_TA) as a ratio of the difference between current and previous year’s cash flow values to the current book value of total assets.
To analyse the effects of ownership concentration on cash holdings we used two additional variables: Herfindahl index and percentage of equity held by the largest owner. We describe both below.

**Herfindahl index**
Herfindahl index is used to measure concentration of a certain distribution. Herfindahl index of ownership concentration is the sum of squared ownership shares of every single owner. The values of Herfindahl index can vary between 0 and 1. The smaller the value of the Herfindahl index, the more dispersed the ownership. In case of single owner firms Herfindahl index equals 1. In our dataset Herfindahl index (HHI) is based on ultimate ownership.

**Percentage of equity held by the largest owner**
This variable measures the share of equity held by the largest owner. It is important because it shows whether a single owner has a majority stake in a particular company. Percentage of equity held by the largest owner (Rank1_Owner) is also based on ultimate ownership.

**Ownership Concentration Regression Analysis**
We ran the following regression analysis to test the effects of ownership concentration on cash holdings:

\[
Cash_{TA} = \beta_0 + \beta_1 * Leverage_{Ratio} + \beta_2 * LN_{TA} + \beta_3 * ROA + \beta_4 * CF_{Volatility_{TA}} + \beta_5 * Rank1_{Owner} + \beta_6 * HHI
\]

We ran another regression to study the effects of ownership structure on cash holdings. We used shares owned ultimately by the CEO’s family and number of consecutive years that the current CEO has been employed as CEO as proxy variables for ownership structure.

**Shares owned ultimately by the CEO’s family**
This variable (CEO_Family_Shares) shows the percentage of equity controlled by the CEO or his family and tells us if the CEO (together with his family) has a majority stake in the firm. This variable is also based on ultimate ownership.
Number of consecutive years that the current CEO has been employed as CEO

We use this variable (Nr_Of_Ye) as a proxy for managerial entrenchment. With time CEOs obtain more power within the firm, giving rise to agency conflicts.

Ownership Structure Regression Analysis

We ran the following regression to analyse the effects of ownership structure on cash holdings:

\[
Cash_{TA} = \beta_0 + \beta_1 \times Leverage\_Ratio + \beta_2 \times LN\_TA + \beta_3 \times ROA + \beta_4 \times CF\_Volatility\_TA + \beta_5 \times CEO\_Family\_Shares + \beta_6 \times Nr\_Of\_Ye
\]

4.4 Difference-in-difference

To test the hypothesis that the tax reform of 2006 had a different effect on cash holdings for companies with different levels of ownership concentration and different types of ownership structure, we applied the difference-in-difference approach. This approach divides our sample in two groups that have the exact same characteristics, except for one important difference; that is a difference in ownership variables.

In difference-in-difference analyses, one group receives a treatment (the treated group), while the other does not (the control group). Except for the treatment, both groups are exposed to the exact same conditions. The difference-in-difference method analyses the outcome for both groups pre- and after treatment. The control group serves as a base for comparing results and removing biases caused by temporal trends and effects that are induced by factors other than the treatment (Abadie, 2005).

The difference-in-difference method is based on the assumption that the average outcomes of both, the treated and the control group would be the same if neither of those two groups would be exposed to the treatment. This assumption cannot be met if pre-treatment characteristics that affect the outcome variable are not balanced between the treated and the control group (Abadie, 2005).
The Norwegian tax reform of 2006 increased dividend taxation and made dividend payouts more expensive. As dividends are one of the measures that owners can take to reduce agency problems, we expect firms with lower ownership concentration to continue paying out. As there are no agency conflicts for single owner firms, we expect them to reduce or to stop dividend payouts. We applied the difference-in-difference method to test whether this hypothesis holds.

We divided our sample in two groups; one group representing single owner firms (percentage of equity held by the largest shareholder = 100%), the other group representing all non-single owner firms (percentage of equity held by the largest shareholder < 100%). We created an ownership dummy, which equals 0 for non-single owner firms, and 1 for single owner firms. We also created a year dummy variable, which equals 0 for the period before the tax reform (up to and including 2005) and 1 for the period from 2006 on.

Using these dummy variables, we ran a difference-in-difference analysis, testing for differences in cash to total assets between the control group and treated group before the tax reform (base line), and after the tax reform (follow up), as well as testing for the difference between the difference in the base line, and the difference in the follow up (difference-in-difference).

We applied the same methodology when testing for the effects of ownership structure on cash holdings of companies before and after the tax reform. We divided the sample in two groups, creating a CEO dummy that equals 0 for companies in which CEOs’ families own 50% or less of the firm (control group), and 1 for companies in which CEOs’ families own more than 50% of the firm (treated group). We consider companies in which CEOs’ families own more than 50% of the shares family firms. As agency conflicts between managers and owners are not very large for this type of firm, we expect them to retain more cash and to decrease dividend payouts after these become relatively more expensive after the tax reform. We used the same year dummy as described for the ownership concentration difference-in-difference approach.
We ran the same difference-in-difference test that we ran on ownership concentration, this time dividing our sample according to a family ownership criterion.

5 Results and discussion

Examining the effects of ownership concentration, and ownership structure on cash holdings, we ran two separate random effects panel data regression analyses. Both include leverage ratio, firm size, profitability, and cash flow volatility as control variables. They differ with respect to the predictor variables that measure how cash holdings are affected by either ownership concentration, or ownership structure, respectively. All independent variables in both regressions are statistically significant at a 5% confidence interval.

5.1 Explanatory variables

In this section we focus on the results of both regressions with respect to the common explanatory variables. We will generally refer to the regression examining the effects of ownership concentration on cash holdings as regression 1. The regression examining the effects of ownership structure on cash holdings will be referred to as regression 2. When stating values of individual coefficients we will refer first to the output of regression 1, and then to the results of regression 2, separated by a semicolon.

We find that a higher leverage ratio negatively affects cash holdings (-0.305; -0.2991). This is consistent with findings of other research papers, demonstrating a negative correlation between leverage and cash.

Guney, Ozkan A. and Ozkan N. (2007) refer to this as the substitution effect. They suggest that a firm’s leverage can be used as a proxy for its ability to raise new funds, arguing that firms with moderate leverage levels demonstrate their ability to issue new debt if necessary, and therefore do not need to hold more cash as a security. On the other hand firms with excessive debt levels face higher financial distress costs. In order to reduce these costs, firms may choose to hold higher cash reserves, causing a positive correlation between leverage and cash holdings. However, we do not find support for this in our results.
Using the natural logarithm of total assets (LN_TA) as a proxy for firm size, we find a negative correlation between a company’s size and its cash holdings (-.0210; -.0242).

Opler et al. (1999) explain that large firms and firms that have credit ratings have easier access to external capital markets. Those firms can raise enough funds at relatively low costs and therefore do not need to hold excess cash in case a profitable investment opportunity arises. Another explanation is that larger firms will have relatively lower cash reserves due to economies of scale in liquid assets.

We find that profitability (ROA) has a positive effect on cash holdings (.1064; .1125). Existing literature suggests that profitability could have either a positive or negative impact on firms’ cash reserves. High profits may affect a company’s cash holdings positively, because they can be used to increase liquidity, rather than being reinvested. However, firms might view profits as a substitute for raising new funds. Regarding profits as a source of liquidity, firms might use them immediately for funding new projects (Drobetz and Grüninger, 2006).

It is not clear which effect is stronger but it is expected that profitable firms with growth opportunities will tend to spend their profits, while more mature firms with fewer profitable investment opportunities are more inclined to accumulate cash (Drobetz and Grüninger, 2006). We find a positive relationship between profitability and cash, which may be due to mature firms dominating our sample.

With coefficients at 0.0557 and 0.0567 in regressions 1 and 2 respectively, cash flow volatility appears to have a positive effect on cash holdings. Companies with irregular or volatile cash flows tend to hold more cash as a buffer to absorb cash flow shocks. This is especially true for smaller companies that lack access to capital markets, and therefore cannot easily raise new funds when needed. Han and Qiu (2007) find that cash flow volatility is positively related with cash holdings for financially constrained firms, whereas there appears to be no significant correlation between cash flow volatility and cash holdings for financially unconstrained firms. Since most of our sample consists of relatively small firms with limited access to capital markets, we also find a positive relationship between cash flow volatility and cash holdings.
5.2 Ownership concentration

In addition to the control variables leverage ratio, return on assets, total assets, and cash flow volatility, regression 1 includes percentage of equity held by the largest shareholder, and Herfindahl index as proxy variables for ownership concentration.

Table 1: Output for ownership concentration regression

<table>
<thead>
<tr>
<th>Cash_TA</th>
<th>Leverage_Ratio</th>
<th>LN_TA</th>
<th>ROA</th>
<th>CF_Volatility_TA</th>
<th>Rank1_Owner</th>
<th>HHI</th>
<th>sigma_u</th>
<th>sigma_e</th>
<th>rho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coef.</td>
<td>-0.3052793</td>
<td>0.016012</td>
<td>-190.42</td>
<td>0.000</td>
<td>-0.3084215</td>
<td>-0.3021372</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Err.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P&gt;</td>
<td>z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[95% Conf. Interval]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The coefficient for percentage of equity held by the largest shareholder is very small and negative (-0.0003). This variable may be spurious as a proxy for ownership concentration, as it informs solely about the share of the firm owned by the largest shareholder, but fails to account for other owners’ stakes in the company. For example, the second largest owner’s share in the company might be nearly as large as the largest owner’s. It is, however, also possible that the rest of the ownership is highly dispersed. The variable, percentage of equity held by the largest owner omits all information regarding all, but the largest owner. We will, therefore, focus on the Herfindahl index as it contains information on all shareholders.

The regression coefficient for Herfindahl index shows that ownership concentration positively (0.0513) affects cash holdings. Faulkender (2002)
explains that higher ownership concentration can affect cash holdings in two opposing ways. First, higher ownership concentration enables tighter and more effective monitoring, allowing owners to closely observe managerial decisions and actions. Due to strict monitoring managers cannot behave opportunistically and exploit owners. Costs of agency conflicts are lower and owners do not need to remove cash from the firm so as to keep managers from spending cash on unprofitable projects. Higher ownership concentration would therefore lead to higher cash holdings (Faulkender, 2002).

Second, higher ownership concentration enables owners to exercise their power to reduce cash reserves. They can pressure managers into paying out excess cash as dividends, reducing managers’ ability to spend cash on unprofitable projects. Higher ownership concentration would therefore lead to lower cash reserves (Faulkender, 2002).

A positive coefficient for Herfindahl index supports the first argument. The higher the ownership concentration for Norwegian firms included in our sample, the higher the cash reserves they hold. Owners rely on their monitoring abilities and choose to leave excess cash within the company for potential positive future investment opportunities.

5.3 Ownership structure
We chose CEO family shares and number of consecutive years of CEO’s tenure as proxy variables for insider ownership and CEO entrenchment. Both are important features of ownership structure, and considerable determinants of how much cash a company will hold. We find that the coefficients for both variables are statistically significant at a 1 % confidence interval.
CEO family shares, as an explanatory variable, is by no means a complete, exhaustive proxy for insider ownership. A true representation of insider ownership would require the ownership stakes of other high-ranking management board members, such as CFOs, CMOs, COOs, etc. Since it is very hard to come by this data in Norway, we limit our research to CEO’s family shares, but issue a caveat to our readers that insider ownership may at best be approximated by CEO family shares.

The coefficient for CEO family shares is small and positive at 0.00007. It follows that a company that is entirely owned by the CEO’s family, will, on average, have a cash to total assets ratio of up to 0.7% higher than that of a company whose CEO’s family does not hold shares.

Jensen and Meckling (1976) argue that at very high levels of managerial ownership, approaching 100%, agency problems are greatly reduced, and eventually eliminated. Managers would not have any incentives to spend money on unprofitable or unnecessary projects that would be a source of their private benefits, as they would be paying for those benefits themselves. This, in turn
erases the need to keep cash reserves low to take away from managers’ ability to squander cash.

The coefficient for number of years is 0.0046, indicating a significant relationship between CEO entrenchment, and cash holdings. Managers, for various reasons - empire building, ability to take on positive NPV projects, etc - are more likely than not to prefer holding onto cash rather than distributing it to investors. The more a manager is entrenched, the greater his power within the company. CEOs who have been serving a relatively longer tenure therefore have a greater ability to accumulate cash, which they will likely exercise.

Falaye (2004) suggests that corporate liquidity has takeover-deterring effects, as cash holdings can be used by managers to defend themselves against hostile takeovers. It follows that entrenched managers use their power to accumulate more cash, and thereby reinforce their entrenchment within the company.

5.4 Difference-in-difference analysis

We employed the difference-in-difference approach to analyze both, the effect of single ownership, and the effect of family ownership on cash holdings before-, and after the Norwegian tax reform of 2006. In both analyses, the base line is the time period before the tax reform; the follow up is the period after the reform.

In the first test, analysing the effect of ownership concentration, the treated group consists of companies with a single owner; the control group includes all other companies. Results are presented below:
Table 3: Difference-in-difference analysis for ownership concentration

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Control</th>
<th>Treated</th>
<th>DIFF (BL)</th>
<th>Control</th>
<th>Treated</th>
<th>DIFF (FU)</th>
<th>DIFF IN-DIFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash_TA</td>
<td>0.304</td>
<td>0.303</td>
<td>-0.002</td>
<td>0.349</td>
<td>0.376</td>
<td>0.028</td>
<td>0.029</td>
</tr>
<tr>
<td>Std. Error</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>t</td>
<td>457.55</td>
<td>335.50</td>
<td>-1.56</td>
<td>502.97</td>
<td>494.05</td>
<td>26.77</td>
<td>19.26</td>
</tr>
<tr>
<td>P&gt;</td>
<td>t</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.119</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

* Means and Standard Errors are estimated by linear regression
**Inference: *** p<0.01; ** p<0.05; * p<0.1

Before the tax reform the difference in cash to total assets ratio (-.002) is not significant between single owner firms and non-single owner firms. However, after the tax reform cash holdings of single owner firms increased significantly more than cash holdings of other firms. The difference-in-difference is statistically significant.

When the tax reform made dividend payouts more expensive, single owner firms decided to retain cash within the company. Single owner firms, who do not need to deal with agency conflicts, can leave money within the company. It is expected from non-single owner firms to continue paying out dividends, but in smaller proportion, to avoid potential rise of agency conflicts. Our results show support for agency theory. More expensive dividends made both types of companies retain more cash; however the effect was significantly larger for single owner firms.

When analyzing the impact of family ownership, the treated group is made up of all companies whose CEO’s family owns 50% or more of the company’s share; The control group consists of all companies with CEO family ownership under 50%. Results of the analysis are presented below:
Table 4: Difference-in-difference analysis for ownership structure

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Baseline</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash_TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Error</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>t</td>
<td>252.77</td>
<td>451.31</td>
</tr>
<tr>
<td>p&gt;</td>
<td>t</td>
<td></td>
</tr>
</tbody>
</table>

Number of observations in the DIFF-IN-DIFF: 356782
Baseline: 44790 38571 83361
Treated: 139412 134009 273421
Baseline: 184202 172580
R-square: 0.0120

In the baseline period the difference in cash to total assets is merely 0.004 between the control- and the treated group. In the follow up period the difference increases to 0.011.

Since CEO families own over 50% of the company’s shares in the treated group, we consider these companies family firms. As such, agency problems between owners and managers are smaller than they are in the control group. Companies in the treated group therefore hold more cash, as investors need not be as concerned about managers using excess cash to fund projects that are not in the best interest of the owners.

Additionally, such firms tend to be financially constrained, due to family’s desire to retain control. As they usually do not want to dilute their ownership share, such firms have limited access to capital markets. To compensate for that inflexibility firms may choose to hold more cash.

The difference in difference in cash to total assets between both groups is significant at 0.008, confirming our hypothesis that the tax reform of 2006 would pronounce differences in cash holdings between family firms and non-family firms, as dividend pay-outs had become more expensive.
6 Conclusion

Both, ownership concentration and ownership structure appear to have a significant effect on companies’ cash policies, raising questions about the efficacy of existing corporate governance systems; neither the setup of the management board, nor the supervisory board should affect cash holdings, nor any other relevant financial ratio.

We find that ownership concentration, as measured by the Herfindahl index, has a significant positive effect on cash holdings. We attribute this finding to owners’ improved ability to monitor employees, which in turn enables them to maintain more cash within the company, without fear of managers frivolously taking on unprofitable projects.

After the Norwegian tax reform of 2006, we find that excess cash holdings of single owner firms over firms with dispersed ownership are even more pronounced. This observation is likely attributable to smaller agency problems in single owner firms, allowing owners to keep more cash within the company as dividend payouts become more expensive.

We find that CEO entrenchment causes a remarkable increase in cash holdings. Managers are naturally more motivated to hold onto cash than to disperse it to investors. Entrenched CEOs will use their power within the company to achieve higher cash holdings.

Insider ownership, too, has a positive impact on cash holdings. We show that due to relatively smaller agency conflicts that stem from higher CEO and CEO family ownership, companies tend to witness larger cash ratios as insider ownership increases.

Dividing our sample into family firms and non-family firms, according to a CEO family ownership criterion, we find that family firms, on average, hold more cash than other companies. This effect is even more evident after Norway’s 2006 tax reform. Dividends had become more expensive and family firms, more so than other companies, retained cash, rather than paying it out in the form of dividends.
7 References


Appendix 1: Summary statistics

In this section, we provide descriptive statistics for all variables included in each regression analysis presented in this paper. Since each analysis requires a different treatment of the original dataset, we present in this section the exact version of the dataset used in each major analysis in the paper. The exact treatment of the original dataset for each analysis is in the data section on pages 8 to 10, and methodology section on pages 14 through 18.

First, we present the properties of all variables used in the regression analysis examining the relationship between cash holdings and ownership concentration. Second, we discuss the variables employed in the regression analysis examining the effects of ownership structure on cash holdings. Third, we describe the properties of variables in the control group and the treated group of the difference-in-difference analysis on ownership concentration. Forth, we present the variables in the control group and the treated group of the difference-in-difference analysis on ownership structure.

Appendix 1.1: Summary statistics - ownership concentration

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage_R-o</td>
<td>903271</td>
<td>0.1307258</td>
<td>0.2233948</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>LN_TA</td>
<td>903271</td>
<td>14.36133</td>
<td>1.425207</td>
<td>6.907755</td>
<td>24.5861</td>
</tr>
<tr>
<td>FOA</td>
<td>903271</td>
<td>0.0556932</td>
<td>0.214823</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CF_Volatil-A</td>
<td>549840</td>
<td>0.0079948</td>
<td>0.3061583</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>Rank1_Owner</td>
<td>903271</td>
<td>71.7164</td>
<td>27.82353</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>HHI</td>
<td>903271</td>
<td>0.6791613</td>
<td>0.3041965</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The original dataset boasts with nearly 1.5 million observations. After undergoing the initial treatment, erasing outliers and unrepresentative industries, this number shrinks to a little over 900 thousand. At this point, the specific treatment for the ownership concentration analysis reduces the number of observations by merely 233, resulting in a total number of observations of 903,271.
In computing the variable cash flow volatility to total assets we work with lag values at two points:

1. Computing cash flows
2. Computing cash flow changes

Hence, there are missing values for cash flow volatility to total assets for the first two years a company is represented in the dataset, resulting in the number of observations (549,840) being lower in this variable, compared to any other variable presented in the summary statistics.

Leverage is low at only 13%. This is indicative of the nature of our dataset. The overwhelming majority of companies represented are relatively small, non-listed businesses, which often do not have easy access to capital markets. A standard deviation of 22% confirms there is considerable variability in leverage, with very few highly levered companies.

ROA, at 5% on average, is within reasonable bounds. A standard deviation of nearly 22%, however, indicates considerable differences in profitability relative to total assets among companies in our dataset. This variability can perhaps be attributed to the wide range of industries and sectors represented in the dataset, ranging from capital-intensive fields like oil and gas to various sectors in the service industry, requiring comparatively low capital investment.

Cash flow volatility to total assets, too, has a moderate mean of 0.008. Even after introducing constraints of 1 and -1 respectively, this variable has a standard deviation of over 30%.

The variable Rank1_OWNER, measuring the percentage of shares held by the largest owner, is high at 71.7%. This is likely due to our sample largely consisting of relatively small non-listed firms with low ownership dispersion. The Herfindahl index, with a mean of 68%, confirms that ownership within our sample is highly concentrated.
Appendix 1.2: Summary statistics - ownership structure

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage_ratio</td>
<td>644956</td>
<td>.1349236</td>
<td>.2232563</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>LN_TA</td>
<td>644956</td>
<td>14.23882</td>
<td>1.277495</td>
<td>6.907755</td>
<td>22.73679</td>
</tr>
<tr>
<td>ROA</td>
<td>644956</td>
<td>.0604675</td>
<td>.2115291</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CF_Volatil-A</td>
<td>398886</td>
<td>.0089003</td>
<td>.307275</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CEO_Family-s</td>
<td>644956</td>
<td>79.27232</td>
<td>28.04898</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Nr_Of_Ye</td>
<td>644956</td>
<td>6.832049</td>
<td>4.643193</td>
<td>1</td>
<td>19</td>
</tr>
</tbody>
</table>

Since the properties of the variables leverage ratio, ln of total assets, ROA, and cash flow volatility to total assets are very similar in both the regression analysis on ownership structure and ownership concentration, we will not go into further detail in this section, but focus on the variables that are unique to the ownership structure regression.

CEO_Family_Shares is extremely high at 79%. A standard deviation of 28% indicates some variability, but does not mitigate the fact that insider ownership is very commonplace within our sample. Approximately 2/3 of companies in the dataset are majority owned by the CEO, or the CEO’s family. This peculiarity is a direct consequence of the make up of our dataset. Since a large proportion of all companies in our sample is relatively small, and non-listed, it follows that many of them have the same owner and CEO. Since we present a simple average, weighing each company, regardless of firm size, equally, it follows that the mean of CEO Family shares is very high. The number of years a CEO has been in office is approximately seven, with a large standard deviation at 4.6.

Appendix 1.3: Summary statistics - single owner firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage_R-o</td>
<td>194597</td>
<td>.0914475</td>
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<td>1</td>
</tr>
<tr>
<td>LN_TA</td>
<td>194597</td>
<td>14.51812</td>
<td>1.309649</td>
<td>8.006368</td>
<td>24.5861</td>
</tr>
<tr>
<td>ROA</td>
<td>194597</td>
<td>.1083957</td>
<td>.178575</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CF_Volatil-A</td>
<td>140355</td>
<td>.0061857</td>
<td>.2995087</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>Rank1_Owner</td>
<td>194597</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>HHI</td>
<td>194597</td>
<td>1</td>
<td>6.00e-15</td>
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<td>1</td>
</tr>
</tbody>
</table>
Appendix 1.4: Summary statistics - non-single owner firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage_R-o</td>
<td>286002</td>
<td>.106441</td>
<td>.1838043</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>LN_TA</td>
<td>286002</td>
<td>14.71543</td>
<td>1.232628</td>
<td>6.907755</td>
<td>24.25002</td>
</tr>
<tr>
<td>ROA</td>
<td>286002</td>
<td>.107965</td>
<td>.1687847</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CF_Volatil-A</td>
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</tr>
<tr>
<td>Rank1_Owner</td>
<td>286002</td>
<td>51.89205</td>
<td>17.54534</td>
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<td>100</td>
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<td>HHI</td>
<td>286002</td>
<td>.4522756</td>
<td>.1639965</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The dataset, after undergoing the treatment for the difference-in-difference analysis on ownership concentration, consists of approximately 40% single owner firms and 60% non-single owner firms.

Leverage, in single owner firms (treated group), is slightly lower than in non-single owner firms (control group). Both groups are relatively profitable at ROA of approximately 11%. One remarkable feature of the control group is that even among non-single owner firms, the mean of shares owned by the largest shareholder is 51%, with a standard deviation of 17.5%.

Appendix 1.5: Summary statistics - family firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
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<tr>
<td>Leverage_R-o</td>
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<td>.1018341</td>
<td>.1810096</td>
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<td>1</td>
</tr>
<tr>
<td>LN_TA</td>
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<td>14.46853</td>
<td>1.141607</td>
<td>7.600903</td>
<td>22.73679</td>
</tr>
<tr>
<td>ROA</td>
<td>273421</td>
<td>.107011</td>
<td>.1705977</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CF_Volatil-A</td>
<td>196987</td>
<td>.0053594</td>
<td>.2933941</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CEO_Family-s</td>
<td>273421</td>
<td>93.20321</td>
<td>13.80888</td>
<td>50.00125</td>
<td>100</td>
</tr>
<tr>
<td>Nr_Of_Ye</td>
<td>273421</td>
<td>8.361059</td>
<td>4.63212</td>
<td>1</td>
<td>19</td>
</tr>
</tbody>
</table>
Appendix 1.6: Summary statistics - other firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage_R-o</td>
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<td>.1034207</td>
<td>.1793683</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>IN_TA</td>
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<td>14.76023</td>
<td>1.200463</td>
<td>7.600903</td>
<td>21.14497</td>
</tr>
<tr>
<td>ROA</td>
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<td>.1165922</td>
<td>.1653956</td>
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<td>1</td>
</tr>
<tr>
<td>CF_Volatil-A</td>
<td>56900</td>
<td>.009966</td>
<td>.2981579</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>CEO_Family-s</td>
<td>83361</td>
<td>37.49825</td>
<td>13.26364</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Nr_Of_Ye</td>
<td>83361</td>
<td>6.968019</td>
<td>4.470938</td>
<td>1</td>
<td>19</td>
</tr>
</tbody>
</table>

The sample, after treating it for the difference-in-difference analysis on ownership structure, consists of 356,782 observations; 77% family firms and 23% non-family firms.

Leverage is nearly identical at 10%, with similar standard deviations of approximately 18%. There is a notable difference in the mean of ROA between both groups of approximately 1%, suggesting that non family firms, on average, operate more profitably. Cash flow volatility is, on average, over 80% higher for non-family firms, giving rise to the assumption that non-family firms’ higher average ROA is correlated with higher average risk and instability.

CEO Family shares is, within the treated group, very high at 93%, reflecting the high proportion of small, and single owner firms in our sample. The number of years of the CEO’s tenure is on average higher among family firms, which can be easily explained by the fact that the CEO does not need to fear being replaced, as he, or his family, own most of the shares in the company.
Appendix 2: Granger causality results

Appendix 2.1: Granger causality test Cash_TA – Leverage_Ratio

| Cash_TA               | Coef. | Std. Err. | z     | P>|z|  | 95% Conf. Interval |
|-----------------------|-------|-----------|-------|------|-------------------|
| Cash_TA               |       |           |       |      |                   |
| L1.                   | .5423087 | .00161024 | 334.92 | 0.000 | .539125 - .5454823 |
| L2.                   | .1506709 | .0017924  | 87.35  | 0.000 | .1390579 - .1622839 |
| L3.                   | .1015827 | .0015704  | 64.69  | 0.000 | .0985047 - .1046606 |
| Leverage_Ratio        |       |           |       |      |                   |
| L1.                   | -.0779167 | .0021805 | -35.59 | 0.000 | -.08221 - -.0736274 |
| L2.                   | .0145046  | .0025901  | 5.63   | 0.000 | .0095101 - .0194972 |
| L3.                   | -.0010003 | .0030819  | -.35   | 0.727 | -.0031406 - .0011402 |
| _cons                 | .0747615  | .0066087  | 122.81 | 0.000 | .0735585 - .0759644 |

sigma_u  = .05470117
sigma_e  = .12478772
rho      = .16118221 (fraction of variance due to u_i)

Appendix 2.2: Granger causality test Leverage_Ratio – Cash_TA

| Leverage_Ratio        | Coef. | Std. Err. | z     | P>|z|  | 95% Conf. Interval |
|-----------------------|-------|-----------|-------|------|-------------------|
| Cash_TA               |       |           |       |      |                   |
| L1.                   | -.0288364 | .0011771 | -24.80 | 0.000 | -.0311438 - -.0265293 |
| L2.                   | -.0092948 | .0013025 | -7.14  | 0.000 | -.0118476 - -.0067419 |
| L3.                   | -.0070494 | .0011415 | -6.36  | 0.000 | -.0101868 - -.0039121 |
| Leverage_Ratio        |       |           |       |      |                   |
| L1.                   | .7003367  | .0015916  | 440.02 | 0.000 | .6972172 - .7034562 |
| L2.                   | .0537351  | .0018821  | 26.55  | 0.000 | .0500452 - .0574249 |
| L3.                   | .0373331  | .0014988  | 24.51  | 0.000 | .0343951 - .0402708 |
| _cons                 | .0388809  | .0044337  | 87.03  | 0.000 | .0380113 - .0397505 |

sigma_u  = .0402861
sigma_e  = .09107776
rho      = .16363669 (fraction of variance due to u_i)
Appendix 2.3: Granger causality test Cash_TA – LN_TA

|                | Coef. | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------------|-------|-----------|------|------|----------------------|
| Cash_TA        |       |           |      |      |                      |
| L1             | .5544545 | .0015865 | 340.74 | 0.000 | .551736 | .5570548 |
| L2             | .1571898 | .0011988 | 80.09 | 0.000 | .155292 | .1600686 |
| L3             | .1025253 | .0015437 | 66.67 | 0.000 | .1005676 | .1045892 |
| LN_TA          |       |           |      |      |                      |
| L1             | .0230857 | .0007704 | -31.64 | 0.000 | -.0244721 | -.0219933 |
| L2             | .0061299 | .0003105 | 6.73 | 0.000 | .0058354 | .0070144 |
| L3             | .0094104 | .0003192 | 10.49 | 0.000 | .0085388 | .0092829 |
| _cons          | .2111581 | .0035298 | 59.82 | 0.000 | .2042938 | .2180764 |

\( \sigma_u \)  .0542079
\( \sigma_e \)  .12404209
\( \rho \)  .15841572 \( \text{(fraction of variance due to } u_i \text{)} \)

Appendix 2.4: Granger causality test LN_TA – Cash_TA

|                | Coef. | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------------|-------|-----------|------|------|----------------------|
| Cash_TA        |       |           |      |      |                      |
| L1             | -.0467952 | .0035252 | -13.29 | 0.000 | -.0536044 | -.0398961 |
| L2             | .0187384 | .0008803 | 4.83 | 0.000 | .0113328 | .0263436 |
| L3             | .0190711 | .0034073 | 5.00 | 0.000 | .0123964 | .0257923 |
| LN_TA          |       |           |      |      |                      |
| L1             | .8592013 | .0015702 | 547.10 | 0.000 | .8561207 | .8622819 |
| L2             | .0624186 | .0019926 | 31.32 | 0.000 | .0580131 | .0668241 |
| L3             | .0216211 | .0011120 | 21.07 | 0.000 | .0188213 | .0243677 |
| _cons          | .7435561 | .0080982 | 85.18 | 0.000 | .7265079 | .7606043 |

\( \sigma_u \)  .15649783
\( \sigma_e \)  .27122183
\( \rho \)  .24964116 \( \text{(fraction of variance due to } u_i \text{)} \)
Appendix 2.5: Granger causality test Cash_TA – ROA

| Cash_TA | Coef. | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|---------|-------|-----------|-------|------|----------------------|
| L1.     | .5525959 | .0016097 | 342.29 | 0.000 | .5494100 – .5557809 |
| L2.     | .1580424 | .00179 | 88.29  | 0.000 | .154534 – .1615508 |
| L3.     | .1071097 | .001559 | 68.70  | 0.000 | .104054 – .1101654 |
| ROA     |       |          |       |      |                      |
| L1.     | .0262435 | .0014832 | 17.69 | 0.000 | .0233364 – .0291505 |
| L2.     | .0124988 | .0014883 | 8.43  | 0.000 | .0095910 – .015406 |
| L3.     | -.0029124 | .001407 | -2.07 | 0.038 | -.006701 – -.0001547 |
| _cons   | .0587445 | .0004785 | 122.76 | 0.000 | .0578060 – .0596824 |

\[ \text{sigma}_u = .05479016 \]
\[ \text{sigma}_e = .12405518 \]
\[ \rho = .16125915 \quad (\text{fraction of variance due to } u_i) \]

Appendix 2.6: Granger causality test ROA – Cash_TA

| ROA     | Coef. | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|---------|-------|-----------|-------|------|----------------------|
| L1.     | .0628921 | .0017038 | 35.06 | 0.000 | .0592763 – .0665079 |
| L2.     | -.0036888 | .0017919 | -1.67 | 0.096 | -.0075536 – .000176 |
| L3.     | .00605 | .001734 | 3.49  | 0.000 | .0026511 – .0094186 |
| ROA     |       |          |       |      |                      |
| L1.     | .1807823 | .001658 | 100.04 | 0.000 | .1775327 – .1840318 |
| L2.     | .020843 | .0015821 | 13.74 | 0.000 | .0175840 – .0241022 |
| L3.     | .0544318 | .0015717 | 34.63 | 0.000 | .0513512 – .0575123 |
| _cons   | .0200707 | .000593 | 33.85 | 0.000 | .0180084 – .022133 |

\[ \text{sigma}_u = .08105093 \]
\[ \text{sigma}_e = .14006727 \]
\[ \rho = .25070519 \quad (\text{fraction of variance due to } u_i) \]
Appendix 2.7: Granger causality test Cash_TA – CF_Volatility_TA

Random-effects GLS regression
Number of obs = 257943
Group variable: peid
Number of groups = 57835

R-sq: within = 0.0607  Obs per group: min = 1
between = 0.8495  avg = 4.5
overall = 0.7300  max = 9

corr(u_i, X) = 0 (assumed)
Wald chi2(6) = 362716.86
Prob > chi2 = 0.0000

| Cash_TA   | Coef. | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-----------|-------|-----------|------|------|----------------------|
| Cash_TA   |       |           |      |      |                      |
| L1        | .5619924 | .0021461 | 261.87 | 0.000 | .5577862 - .5661987 |
| L2        | .1560842 | .0025254 | 61.80  | 0.000 | .1513444 - .1608444 |
| L3        | .1276393 | .0021639 | 58.99  | 0.000 | .1233981 - .1324357 |
| CF_Volatility_TA |   |           |      |      |                      |
| L1        | -.0033182 | .0011911 | -2.79 | 0.005 | -.0056034 - .0009893 |
| L2        | .0088411  | .0012782 | 0.69  | 0.490 | .0063521 - .0113332 |
| L3        | -.0125319 | .0010358 | -12.10 | 0.000 | -.0145620 - -.0105018 |
| _cons     | .0562175  | .0005841 | 96.26 | 0.000 | .0550728 - .0573622 |

sigma_u = .05276184
sigma_e = .12037437
rho = .16118082 (fraction of variance due to u_i)

Appendix 2.8: Granger causality test CF_Volatility_TA – Cash_TA

Random-effects GLS regression
Number of obs = 257943
Group variable: peid
Number of groups = 57835

R-sq: within = 0.3479  Obs per group: min = 1
between = 0.6543  avg = 4.5
overall = 0.2402  max = 9

corr(u_i, X) = 0 (assumed)
Wald chi2(6) = 94708.19
Prob > chi2 = 0.0000

| CF_Volatility_TA | Coef. | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------------|-------|-----------|------|------|----------------------|
| CF_Volatility_TA |       |           |      |      |                      |
| L1               | -.5250900 | .0021385 | -245.55 | 0.000 | -.5292003 - -.520077 |
| L2               | -.2745134 | .0022663 | -120.47 | 0.000 | -.2789946 - -.2670223 |
| L3               | -.1273346 | .0018579 | -68.51 | 0.000 | -.1300760 - -.1246932 |
| Cash_TA          |       |           |      |      |                      |
| L1               | -.3007659 | .0028383 | -88.36 | 0.000 | -.3082889 - -.2932829 |
| L2               | .1306658 | .0045583 | 28.67  | 0.000 | .1217512 - .1395816 |
| L3               | .0577346 | .0030728 | 14.91  | 0.000 | .0501444 - .0653252 |
| _cons            | .0390265 | .0009633 | 40.51  | 0.000 | .0371386 - .0409147 |

sigma_u = .07898157
sigma_e = .2326164
rho = .10333174 (fraction of variance due to u_i)
Appendix 2.9: Granger causality test Cash_TA – Dividend_Ratio

Random-effects GLS regression
Number of obs = 400428
Group variable: peid
Number of groups = 82014

R-sq: within = 0.0872
between = 0.8396
overall = 0.7126

Obs per group: min = 1
avg = 4.8
max = 11

Wald chi2(6) = 406319.21
Prob > chi2 = 0.0000

corr(u_i, X) = 0 (assumed)

| Cash_TA | Coef.  | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|---------|--------|-----------|-------|------|---------------------|
| Cash_TA | Li.    | 0.5576234 | 0.0015944 | 319.74 | 0.000 | 0.5541085 – 0.5611384 |
|         | L2.    | 0.1607752 | 0.0017008 | 90.28  | 0.000 | 0.1572849 – 0.1642656 |
|         | L3.    | 0.160234  | 0.0015491 | 86.58  | 0.000 | 0.1573197 – 0.1631485 |

| Dividend_Ratio | Coef.  | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------------|--------|-----------|------|------|---------------------|
| Dividend_Ratio | Li.    | -0.0000196 | 0.0000189 | -1.04 | 0.299 | -0.0000382 – 0.0000032 |
|                 | L2.    | -7.70e-06  | 0.0000169 | -0.46 | 0.649 | -0.0000340 – 0.0000254 |
|                 | L3.    | 5.10e-06   | 0.0000172 | 0.30  | 0.766 | -0.0000285 – 0.0000287 |

| _cons | 0.0500406 | 0.0004802 | 122.97 | 0.000 | 0.0500184 – 0.0580083 |

sigma_u | 0.05488048 |
sigma_e | 0.12472365 |
rho | 0.16223035 (fraction of variance due to u_i)

Appendix 2.10: Granger causality test Dividend_Ratio – Cash_TA

Random-effects GLS regression
Number of obs = 398833
Group variable: peid
Number of groups = 82117

R-sq: within = 0.0148
between = 0.1203
overall = 0.0002

Obs per group: min = 1
avg = 4.8
max = 11

Wald chi2(6) = 88.16
Prob > chi2 = 0.0000

corr(u_i, X) = 0 (assumed)

| Dividend_Ratio | Coef.  | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------------|--------|-----------|------|------|---------------------|
| Dividend_Ratio | Li.    | 0.1770097 | 0.1246067 | 1.43  | 0.153 | 0.1603115 – 0.4221344 |
|                 | L2.    | 0.0720071 | 0.1373299 | 0.50  | 0.616 | -0.2097024 – 0.3571853 |
|                 | L3.    | -0.0512516 | 0.1215023 | -0.45 | 0.655 | -0.2023917 – 0.1988885 |

| Cash_TA | Coef.  | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|---------|--------|-----------|------|------|---------------------|
| Cash_TA | Li.    | 0.0020802 | 0.0014794 | 1.41  | 0.160 | -0.0008194 – 0.0044797 |
|         | L2.    | 0.0115517 | 0.0132044 | 8.75  | 0.000 | 0.0089638 – 0.0141397 |
|         | L3.    | 0.0070141 | 0.0013457 | 5.23  | 0.000 | -0.0019235 – 0.0059516 |

| _cons | 0.2253997 | 0.0281069 | 8.02  | 0.000 | 0.1703112 – 0.2804883 |

sigma_u | 0 |
sigma_e | 0.10007869 |
rho | 0 (fraction of variance due to u_i)
/* notes */
clear all

*infile is for text files
infile id gender age gpa act sat actsat athlete using entrance.txt
*insheet is for excel files
insheet using "flavor2.csv", clear
*use is for stata datasets
use entrance.dta, clear
use Data.dta, clear

xtset pcid Year, yearly

// Rename variables with bad names
rename Account_ AR
rename Account0 AP
rename Income_B IBEI
rename Total_As TA
rename Total_Pa TPaidInCap
rename Liabilit FinDebt
rename Company_ CompanyAge
rename Institut Inst Owners
rename Owner_Ra Rank1_Owner
rename PErsonal Pers_Owners
rename Herfinda HHI
rename Largest_ Family_Chair
rename Largest0 Family CEO
rename Shares_C CEO Family_Shares
rename Largest1 Rank1 Family
drop if Revenue <= 0
drop if TA <= 0
drop if CCE <= 0
drop if FinDebt<0
drop if TPaidInCap<0
drop if Dividend <0

//Generates lag values for cash flows
gen LAR = L1.AR
gen LAP = L1.AP
gen LInventor = L1.Inventor

//Cash_Flow_Variable
gen Cash_Flows = Operatin + Deprecia + Impairme - Inventor + LInventor - AR +LAR + AP - LAP + Tax_Paya

order Year pcid Cash_Flows Operatin Deprecia Impairme Inventor LInventor AR LAR AP LAP Tax_Paya

//Cash_Flow_Changes
gen Cash_Flow_Changes = Cash_Flows - LAG_Cash_Flows
gen CF_Volatility_TA = Cash_Flow_Changes/TA

gen Cash_TA = CCE/TA
gen Leverage_Ratio = FinDebt/TA
gen LN_TA = ln(TA)
gen Dividend_Ratio = Dividend/IBEI
gen ROA= IBEI/TA
gen CF_TA = Cash_Flows/TA
drop if Cash_TA > 1
drop if Leverage_Ratio > 1
*Drop_Ratios*

```plaintext
drop if ROA > 1
drop if ROA < -1

drop if CF_Volatility_TA < -1
drop if CF_Volatility_TA > 1 & CF_Volatility_TA < 1000
```

**Destring Industry Codes**

destrings Industry, gen (Industry_New) ignore ("","")

gen Industry_New1 = Industry_New
replace Industry_New1 = int(Industry_New1/100) if Industry_New1 >= 100
replace Industry_New1 = int(Industry_New1/100) if Industry_New1 >= 100

gen Industry_New2 = int(Industry_New - Industry_New1*100) if Industry_New >= 100
replace Industry_New2 = int((Industry_New - Industry_New1*10000)/100) if Industry_New >= 10000

gen Industry_New3 = Industry_New - Industry_New1*10000 - Industry_New2*100
if Industry_New >= 10000

// drop Industry Codes for Utility and Financials

drop if Industry_New1 == 67 & Year < 2007
drop if Industry_New1 == 65 & Year < 2007
drop if Industry_New1 == 66 & Year < 2007
drop if Industry_New1 == 40 & Year < 2007
drop if Industry_New1 == 41 & Year < 2007
drop if Industry_New1 == 37 & Year < 2007
drop if Industry_New1 == 90 & Year < 2007

drop if Industry_New2 == 67 & Year < 2007
drop if Industry_New2 == 65 & Year < 2007
drop if Industry_New2 == 66 & Year < 2007
```
drop if Industry_New2 == 40 & Year< 2007
drop if Industry_New2 == 41 & Year< 2007
drop if Industry_New2 == 37 & Year< 2007
drop if Industry_New2 == 90 & Year< 2007

drop if Industry_New3 == 67 & Year< 2007
drop if Industry_New3 == 65 & Year< 2007
drop if Industry_New3 == 66 & Year< 2007
drop if Industry_New3 == 40 & Year< 2007
drop if Industry_New3 == 41 & Year< 2007
drop if Industry_New3 == 37 & Year< 2007
drop if Industry_New3 == 90 & Year< 2007

drop if Industry_New1 == 64 & Year >= 2007
drop if Industry_New1 == 65 & Year >= 2007
drop if Industry_New1 == 66 & Year >= 2007
drop if Industry_New1 == 35 & Year >= 2007
drop if Industry_New1 == 36 & Year >= 2007
drop if Industry_New1 == 37 & Year >= 2007
drop if Industry_New1 == 38 & Year >= 2007
drop if Industry_New1 == 39 & Year >= 2007

drop if Industry_New2 == 64 & Year >= 2007
drop if Industry_New2 == 65 & Year >= 2007
drop if Industry_New2 == 66 & Year >= 2007
drop if Industry_New2 == 35 & Year >= 2007
drop if Industry_New2 == 36 & Year >= 2007
drop if Industry_New2 == 37 & Year >= 2007
drop if Industry_New2 == 38 & Year >= 2007
drop if Industry_New2 == 39 & Year >= 2007

drop if Industry_New3 == 64 & Year >= 2007
drop if Industry_New3 == 65 & Year >= 2007
drop if Industry_New3 == 66 & Year >= 2007
drop if Industry_New3 == 35 & Year >= 2007
drop if Industry_New3 == 36 & Year >= 2007
drop if Industry_New3 == 37 & Year >= 2007
drop if Industry_New3 == 38 & Year >= 2007
drop if Industry_New3 == 39 & Year >= 2007

******************* Ownership Structure *******************
drop if missing(CEO_Family_Shares)
drop if CEO_Family_Shares > 100
drop if missing(Nr_Of_Ye)

gen CEO_Dummy =1 if CEO_Family_Shares > 50
replace CEO_Dummy = 0 if CEO_Family_Shares <=50

******************* Ownership Concentration *******************
drop if missing(HHI)
drop if HHI>1
drop if HHI<0
drop if missing(Rank1_Owner)
drop if Rank1_Owner>100
drop if Rank1_Owner<0

gen Rank1_Dummy = 1 if Rank1_Owner == 100
replace Rank1_Dummy = 0 if Rank1_Owner < 100

******************* DID *******************
//delete companies that never paid out dividends
gen Dividend_Check = 1 if Dividend !=0
replace Dividend_Check = 0 if Dividend == 0
by pcid, sort: gen Dividend_Check1 = sum(Dividend_Check)
by pcid, sort: egen Dividend_Check2 = max(Dividend_Check1)
drop if Dividend_Check2 == 0

gen Year_Dummy = 1 if Year >= 2006
replace Year_Dummy =0 if Year< 2006
****************************LAG_For_Granger_Causality*****************************

** gen LAG_CF_Volatility_TA = L1.CF_Volatility_TA  
** gen LAG_CF_Volatility_TA2 = L2.CF_Volatility_TA  
** gen LAG_CF_Volatility_TA3 = L3.CF_Volatility_TA  

** gen LAG_Leverage = L1.Leverage_Ratio  
** gen LAG_Leverage2 = L2.Leverage_Ratio  
** gen LAG_Leverage3 = L3.Leverage_Ratio  

** gen LAG_Cash_TA = L1.Cash_TA  
** gen LAG_Cash_TA2 = L2.Cash_TA  
** gen LAG_Cash_TA3 = L3.Cash_TA  

** gen LAG_LN_TA = L1.LN_TA  
** gen LAG_LN_TA2 = L2.LN_TA  
** gen LAG_LN_TA3 = L3.LN_TA  

** gen LAG_Dividend_Ratio = L1.Dividend_Ratio  
** gen LAG_Dividend_Ratio2 = L2.Dividend_Ratio  
** gen LAG_Dividend_Ratio3 = L3.Dividend_Ratio  

** gen LAG_ROA = L1.ROA  
** gen LAG_ROA2 = L2.ROA  
** gen LAG_ROA3 = L3.ROA  

*************************************************************Fixed_Effects_vs_Random_Effects**********************************
/*we use ownership dummies to see whether there are changes in ownership concentration within companies. 
this helped us determine whether we could use fixed effect, random effects regression analysis*/

//Ownership_Changes:
** gen Five = 1 if Rank1_Owner <=5 & Rank1_Owner >=0  
** replace Five = 0 if Rank1_Owner >5
gen Ten = 1 if Rank1_Owner <=10 & Rank1_Owner >5
replace Ten =0 if Rank1_Owner >10 | Rank1_Owner <=5

gen Fifteen = 1 if Rank1_Owner <=15 & Rank1_Owner >10
replace Fifteen =0 if Rank1_Owner >20 | Rank1_Owner <=10

gen Twenty = 1 if Rank1_Owner <=20 & Rank1_Owner >15
replace Twenty =0 if Rank1_Owner >25 | Rank1_Owner <15

gen TwentyFive = 1 if Rank1_Owner <=25 & Rank1_Owner >20
replace TwentyFive =0 if Rank1_Owner >30 | Rank1_Owner <20

gen Thirty = 1 if Rank1_Owner <=30 & Rank1_Owner >25
replace Thirty =0 if Rank1_Owner >35 | Rank1_Owner <25

gen ThirtyFive = 1 if Rank1_Owner <=35 & Rank1_Owner >30
replace ThirtyFive =0 if Rank1_Owner >40 | Rank1_Owner <30

gen Forty = 1 if Rank1_Owner <=40 & Rank1_Owner >35
replace Forty =0 if Rank1_Owner >45 | Rank1_Owner <35

gen FortyFive = 1 if Rank1_Owner <=45 & Rank1_Owner >40
replace FortyFive =0 if Rank1_Owner >50 | Rank1_Owner <40

gen Fifty = 1 if Rank1_Owner <=50 & Rank1_Owner >45
replace Fifty =0 if Rank1_Owner >55 | Rank1_Owner <45

gen FiftyFive = 1 if Rank1_Owner <=55 & Rank1_Owner >50
replace FiftyFive =0 if Rank1_Owner >60 | Rank1_Owner <50

gen Sixty = 1 if Rank1_Owner <=60 & Rank1_Owner >55
replace Sixty =0 if Rank1_Owner >65 | Rank1_Owner <55

gen SixtyFive = 1 if Rank1_Owner <=65 & Rank1_Owner >60
replace SixtyFive = 0 if Rank1_Owner > 70 | Rank1_Owner < 60

gen Seventy = 1 if Rank1_Owner <= 70 & Rank1_Owner > 65
replace Seventy = 0 if Rank1_Owner > 75 | Rank1_Owner < 65

gen SeventyFive = 1 if Rank1_Owner <= 75 & Rank1_Owner > 70
replace SeventyFive = 0 if Rank1_Owner > 80 | Rank1_Owner < 70

gen Eighty = 1 if Rank1_Owner <= 80 & Rank1_Owner > 75
replace Eighty = 0 if Rank1_Owner > 85 | Rank1_Owner < 75

gen EightyFive = 1 if Rank1_Owner <= 85 & Rank1_Owner > 80
replace EightyFive = 0 if Rank1_Owner > 90 | Rank1_Owner < 80

gen Ninety = 1 if Rank1_Owner <= 90 & Rank1_Owner > 85
replace Ninety = 0 if Rank1_Owner > 95 | Rank1_Owner < 85

gen NinetyFive = 1 if Rank1_Owner <= 95 & Rank1_Owner > 90
replace NinetyFive = 0 if Rank1_Owner > 100 | Rank1_Owner < 90

gen Hundred = 1 if Rank1_Owner <= 100 & Rank1_Owner > 95
replace Hundred = 0 if Rank1_Owner > 100 | Rank1_Owner < 95

by pcid, sort: gen Five_Observations = sum(Five)
by pcid, sort: egen Five_Final = max(Five_Observations)

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by pcid, sort: egen Ten_Final = max(Ten_Observations)

by pcid, sort: gen Fifteen_Observations = sum(Fifteen)
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by pcid, sort: egen Twenty_Final = max(Twenty_Observations)
by pcid, sort: gen TwentyFive_Observations = sum(TwentyFive)
by pcid, sort: egen TwentyFive_Final = max(TwentyFive_Observations)

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by pcid, sort: egen Thirty_Final = max(Thirty_Observations)

by pcid, sort: gen ThirtyFive_Observations = sum(ThirtyFive)
by pcid, sort: egen ThirtyFive_Final = max(ThirtyFive_Observations)

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by pcid, sort: egen Forty_Final = max(Forty_Observations)

by pcid, sort: gen FortyFive_Observations = sum(FortyFive)
by pcid, sort: egen FortyFive_Final = max(FortyFive_Observations)

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by pcid, sort: egen Fifty_Final = max(Fifty_Observations)

by pcid, sort: gen FiftyFive_Observations = sum(FiftyFive)
by pcid, sort: egen FiftyFive_Final = max(FiftyFive_Observations)

by pcid, sort: gen Sixty_Observations = sum(Sixty)
by pcid, sort: egen Sixty_Final = max(Sixty_Observations)

by pcid, sort: gen SixtyFive_Observations = sum(SixtyFive)
by pcid, sort: egen SixtyFive_Final = max(SixtyFive_Observations)

by pcid, sort: gen Seventy_Observations = sum(Seventy)
by pcid, sort: egen Seventy_Final = max(Seventy_Observations)

by pcid, sort: gen SeventyFive_Observations = sum(SeventyFive)
by pcid, sort: egen SeventyFive_Final = max(SeventyFive_Observations)

by pcid, sort: gen Eighty_Observations = sum(Eighty)
by pcid, sort: egen Eighty_Final = max(Eighty_Observations)

by pcid, sort: gen EightyFive_Observations = sum(EightyFive)
by pcid, sort: egen EightyFive_Final = max(EightyFive_Observations)

by pcid, sort: gen Ninety_Observations = sum(Ninety)
by pcid, sort: egen Ninety_Final = max(Ninety_Observations)

by pcid, sort: gen NinetyFive_Observations = sum(NinetyFive)
by pcid, sort: egen NinetyFive_Final = max(NinetyFive_Observations)

by pcid, sort: gen Hundred_Observations = sum(Hundred)
by pcid, sort: egen Hundred_Final = max(Hundred_Observations)

drop if Five_Final == YearFinal | Ten_Final == YearFinal | Fifteen_Final == YearFinal | Twenty_Final == YearFinal | TwentyFive_Final == YearFinal

drop if Fifty_Final == YearFinal | Thirty_Final == YearFinal | ThirtyFive_Final == YearFinal | Forty_Final == YearFinal | FortyFive_Final == YearFinal

drop if FiftyFive_Final == YearFinal | Sixty_Final == YearFinal | SixtyFive_Final == YearFinal | Seventy_Final == YearFinal | SeventyFive_Final == YearFinal

drop if Eighty_Final == YearFinal | EightyFive_Final == YearFinal | Ninety_Final == YearFinal | NinetyFive_Final == YearFinal | Hundred_Final == YearFinal

*********************CEO_Family_Shares_Changes********************
gen Twenty = 1 if CEO_Family_Shares <=20
replace Twenty =0 if CEO_Family_Shares >20

gen Forty = 1 if CEO_Family_Shares <=40 & CEO_Family_Shares >20
replace Forty =0 if CEO_Family_Shares >40 | CEO_Family_Shares <=20
gen Sixty = 1 if CEO_Family_Shares <=60 & CEO_Family_Shares >40 replace Sixty =0 if CEO_Family_Shares >60 | CEO_Family_Shares <=40

gen Eighty = 1 if CEO_Family_Shares <=80 & CEO_Family_Shares >60 replace Eighty =0 if CEO_Family_Shares >80 | CEO_Family_Shares <=60

gen Hundred = 1 if CEO_Family_Shares <=100 & CEO_Family_Shares >80 replace Eighty =0 if CEO_Family_Shares >100 | CEO_Family_Shares <=80

***************************Ownership Changes****************
by pcid, sort: gen Twenties_Observations = sum(Twenty)
by pcid, sort: egen Twenties_Final = max(Twenties_Observations)

by pcid, sort: gen Forties_Observations = sum(Forty)
by pcid, sort: egen Forties_Final = max(Forties_Observations)

by pcid, sort: gen Sixties_Observations = sum(Sixty)
by pcid, sort: egen Sixties_Final = max(Sixties_Observations)

by pcid, sort: gen Eighties_Observations = sum(Eighty)
by pcid, sort: egen Eighties_Final = max(Eighties_Observations)

by pcid, sort: gen Hundreds_Observations = sum(Hundred)
by pcid, sort: egen Hundreds_Final = max(Hundreds_Observations)

******************************************************************************Count_Companies******************************************************************************

by pcid, sort: gen nvals = _n == 1
count if nvals == 1
- The effects of ownership structure and concentration on cash holdings -

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INTRODUCTION

The purpose of this Master’s thesis is to analyse the relationship between ownership concentration, ownership structure and cash holdings among Norwegian firms. We will also examine the effect that the 2006 tax reform had on cash holdings.

Existing literature suggests that ownership concentration affects cash holdings in 2 ways.

Demsetz and Lehn (in Anderson & Hamadi, 2009) argue that higher ownership concentration effectively means that investors who have high stakes in a particular company are likely to hold less diversified portfolios. Their income is therefore closely tied to the payoffs of a limited number of assets, leading to a more risk-averse style of corporate governance.

Risk aversion among owners makes firms hold more assets as highly liquid. We therefore expect firms with high levels of ownership concentration to have relatively higher cash holdings than similar firms with lower levels of ownership concentration.

The second way in which ownership may affect cash holdings is through tighter corporate governance. It is easier for few large shareholders to control managers than it is for many relatively smaller shareholders. Hence, owners can exercise more control over managers who would like to retain cash, and force them to disperse it to shareholders. This will decrease cash holdings, as owners are better able to force managers to pay out excess cash.

We expect the first effect to dominate. We therefore anticipate a positive correlation between ownership concentration and cash holdings.

Agency costs can also arise due to conflicts between different shareholder groups. If insiders have significant control over the firm, they may behave in a way that is not optimal for other minority owners. Managers who hold a majority share of a particular company’s stock have strong incentives to expropriate from other shareholders. Insiders will likely take on projects that are not in the best interest of the company, but that will benefit themselves instead. Such projects would
destroy the overall value of the firm, but be a source of private benefits to the controlling party in the firm instead.

Additionally managers who have significant ownership of the firm have an incentive to pay themselves abnormally high salaries, as well as granting themselves excessive perks. Insiders have a strong incentive to keep relatively much cash on hand to reduce the threat of hostile takeovers and proxy fights, and thereby securing their management positions in the firm.

We therefore expect that high insider ownership will result in relatively higher cash holdings.

In 2006 a tax reform was instated in Norway, effectively raising taxes on dividend payments to private investors from 0% to 28%, while dividend payments to institutional investors have remained untaxed. It has therefore become more expensive for Norwegian companies to disperse earnings to its shareholders, which leads us to the hypothesis that rather than paying dividends, Norwegian companies will be inclined to retain profits, leading to higher cash reserves. We will carry out a time series analysis of cash holdings among Norwegian firms, in which we expect to find cash holdings of Norwegian companies to drop significantly before the tax reform, and to rise subsequently to unprecedented levels. The reason for the initial decline in cash holdings is that Norwegian firms will be inclined to pay out as much cash as they can afford before the tax reform will render dividend payments more expensive. Subsequently, because of the higher cost of distributing cash to shareholders, we expect a steady increase of cash holdings to a new equilibrium level that is higher than before the tax reform.

We ask three research questions, examining the effect of ownership concentration, ownership structure, and the 2006 tax reform on cash holdings of Norwegian firms.

How does ownership concentration affect cash holdings?
How does ownership structure affect cash holdings?
How did the 2006 tax reform affect cash holdings?
The corresponding hypotheses are:

Hypothesis one:
Higher ownership concentration among comparable firms will in aggregate result in higher cash holding.

Hypothesis two:
Insider ownership has a positive impact on cash holdings.

Hypothesis three:
Cash holdings have decreased drastically before the tax reform, and increased in the years since the tax reform.

Examining the effects of ownership concentration and ownership structure on cash holdings is important to gain a better understanding of how cash holdings are affected in ways that do not add value and possibly even hurt the company. Assuming there is an optimal level of cash holdings where the marginal cost of cash equals the marginal benefit, any deviation from such an equilibrium will invariably hurt the firm. It is therefore important to examine how the self-interests of entrenched managers or poorly diversified shareholders may conflict with the best interests of the company. It is also significant how external influences such as tax regulations may incentivise firms to deviate from such an optimal level of cash reserves.

DATA

We will obtain data on financial parameters, company size, ownership structure, and ownership concentration of Norwegian companies from 2000 to 2012 from the Center for Corporate Governance research. We will focus our research on limited liability companies (AS) and publically limited companies/corporations (ASA) that are both listed or privately held.

We will focus our research across a wide range of industries with the exception of financial institutions and utility companies. The reason that we decided to omit these two types of companies is that their cash holdings are largely determined by regulations rather than by the managements best judgement.
LITERATURE REVIEW

Cash holdings can affect companies in different ways. Benefits arise from higher liquidity as certain cash reserves allow firms to finance positive NPV projects, even when internal cash flows decline, and the company would otherwise need to turn to external capital markets to raise sufficient funds. This is especially important for companies that have limited access to external finance and that can therefore only raise new funds at high costs. Another reason that external financing may become prohibitively expensive for firms is the presence of information asymmetries. Firms, facing information asymmetries, may decide to hold more cash and be financially flexible so they can minimize the costs of external financing, especially when capital markets are imperfect (Almeida, Campello & Weisbach, 2004; Ozkan A. & Ozkan N., 2004).

High levels of cash accentuate agency problems. Managers can use excess cash to overinvest in negative NPV projects or finance private benefits, thus harming shareholders. It is therefore in the interest of owners of companies with potentially large agency problems between managers and shareholders to hold less cash, which instead should be used to pay interests or dividends (Jensen, 1986).

Jensen & Mecking (1976) suggest that firms face significant costs due to separation of ownership and control. As managers have different interests than shareholders, they may be inclined to make decisions that are not in the best interest of the firm and its owners. To solve this problem and align the interest of managers with the interests of shareholders, theory suggests that managers should own part of the company they run. However, with increased managerial ownership, managers may become entrenched, incentivizing them to increase perks for themselves. This way they fully enjoy the benefits but pay for them only partially, as the rest is financed by other shareholders. In the idealistic scenario that managers owned 100% of the company, the principle agent problem would be fully eliminated.

Shareholders have higher incentives to perform closer monitoring as their ownership share increases. Therefore, higher ownership concentration can lead to
closer monitoring and reduction of agency costs. However, ownership concentration (through closer monitoring) can affect the level of cash holdings in both positive and negative ways. Higher ownership concentration gives more power to the largest shareholder who can use this power to lower cash holdings. At the same time he can also monitor managers more efficiently, which reduces the need to decrease the level of cash within the company (Faulkender, 2002).

Contemporary literature has mixed views on the effect that excessive cash holdings have on hostile takeovers. While large cash reserves may cause dissatisfaction among shareholders, Faleye (2004) suggests that corporate liquidity has takeover-deterring effects, as excess cash can be used by managers to defend themselves against both takeovers and proxy fights. Interestingly he found that while cash rich firms are unlikely takeover targets, the possibility of proxy fights increases with excess cash. Faleye (2004) found that proxy fight targets on average hold 23% more cash than comparable non-targets. He goes on to argue that proxy fights, even when not successful, will likely result in the management defending its position by increasing cash distributions to stockholders, thereby reducing cash holdings.

While according to Faleye (2004), managers have an interest in increasing their cash holdings, so they can fight off possible takeover attempts, Francis, Hasan and Song suggest that managers have other incentives to hoard cash, and that the possibility of a takeover is in fact a disincentive, because the company would become a more likely takeover target. Hence, they argue that firms with limited access to capital markets decrease payouts to investors if they are protected by antitakeover legislation. They thereby accumulate more cash than comparable firms who do not enjoy the same kind of protection.

Bates, Kahle, and Stulz (2009) find that the cash ratio for US based firms more than doubled in the period between 1980 and 2006. They find that this increase is largely attributable to non-dividend paying firms, as well as firms that had more recent IPOs. The reason for the increase in the cash to assets ratio among these firms is that cash flow risk has increased, which they argue is due to an increase in idiosyncratic risk. Other drivers of excessive cash reserves, they suggest, is an overall decrease in inventory along with an increase in R&D expenditures.
Overall Bates, Kahle, and Stulz (2009) conclude that precaution is the primary determinant of demand for cash, as firms with high cash ratios are typically faced with many risks they cannot hedge against, and therefore prefer to hold cash reserves as a cushion.

While they concede to the fact that agency problems may explain cross sectional differences within their sample, they find no aggregate evidence of agency problems affecting cash holdings.

Another notable determinant of a firm’s cash holdings is cash flow volatility. Han and Qiu (2006) show that the impact of cash flow volatility on a firm’s cash holdings depends on the firm’s financial constraints. To achieve a separation between financially constraint and financially unconstraint firms, they divide sampled firms into groups according to their ability to pay out dividends, size, bond ratings and commercial paper ratings. Han and Qiu find that cash flow volatility is positively related with cash holdings for financially constrained firms, whereas they find no significant correlation between cash flow volatility and cash holdings for financially unconstrained firms. A possible explanation for this finding is that it is more costly for financially constrained firms to raise capital or issue debt, which implies a stronger precautionary motive.

Another important variable that affects cash holdings is firm size. Small firms have higher information asymmetries than large firms, which makes external financing more expensive and may impose financial constraints on small firms. Therefore, small firms have more incentives to hold onto cash than large firms, meaning that dividend payout ratios are expected to be lower for small firms. Additionally, financial distress costs are also related to firm size. Small firms are less likely to be diversified, rendering them more exposed to financial distress costs. To reduce those costs small firms need to hold more cash on their balance sheets in order to decrease the probability of financial distress (Faulkender, 2002; Titman & Wessels, 1988).

Dividends paid out to owners reduce free cash flows held within the firm and thereby reduce managers’ opportunity to spend excess cash for unprofitable projects. Agency costs due to free cash flows can be reduced if managers commit
to paying out dividends regularly. We can find the proof for this in stock price reductions when dividends are cut (Jensen, 1986).

Existing literature suggests there is a relationship between dividend policy and cash holdings. However, it is not clear whether cash holdings affect dividend policy or vice versa. In their research paper Al-Najjar and Belghitar (2011) argue that this ambiguity arises because cash holdings and dividend policy are jointly determined by similar variables. When they controlled for endogeneity in their research, they found that cash holdings do not significantly affect dividend policy, nor does dividend policy significantly affect cash holdings.

In his research paper, Salas (2007) explains how stock prices are affected by changes in dividend policy with regards to the level of cash holdings the firm has when dividend policy is changed. He found significantly greater changes in stock prices due to modified dividend policy for firms that held larger amounts of cash. Moreover, he found that changes in stock prices due to modified dividend policy are not significantly different from zero for firms with low levels of cash holdings.

Financially constrained firms are more likely to retain cash so they can use internal funds for financing profitable investments. In this case firms also adjust their dividend policy. The theory suggests that there is an optimal payout policy according to which young, high growth firms limit dividends so they can retain more cash, which is used for financing of all profitable investment opportunities while mature, lower growth firms pay out higher dividends to avoid potential agency or overinvestment problems (Denis & Sibilkov, 2010).

In 2006 Norway implemented a tax reform with the main objective of reducing the differences in taxation of labour and capital income and evening out the highest tax rates on both sources of income. Prior to the 2006 tax reform taxes on capital income were much lower than taxes on labour income, which was a great motivation for camouflaging labour income as capital income. Tax savings were quite substantial as labour income was taxed at a rate of up to 64.7% whereas capital income was taxed at a flat rate of 28% (tax rate for corporate profits) (Ministry of Finance, 2011).
The 2006 tax reform introduced a 28% tax rate on dividends. This new dividend tax added to the unchanged 28% tax rate on corporate profits increased the marginal tax rate on capital income from 28% to 48.16% after the tax reform. The reform also reduced the highest marginal tax rate on labour income from 64.7% to 54.3% after the reform. A simultaneous reduction in the labour income tax rate and along with an increase in the capital income tax rate decreased the differences in between both income sources, significantly reducing the profitability of income shifting after 2006 (Ministry of Finance, 2011).

We would expect the tax reform to have a substantial effect on cash holdings of the firm. As businesses were aware of the anticipated increase in the capital income tax rate, we expect that firms paid out a large share of their liquid assets prior to tax reform. Our assumption is that cash holdings were reduced to minimum levels by the end of 2005. With the implementation of the tax reform in 2006 we would expect firms to retain more cash, causing a gradual increase in cash holdings after 2006.

As the 2006 tax reform increased dividend taxation it made equity financing more expensive. Since firms paid out more dividends prior to 2006 they were relying more on external financing. As external financing became more expensive with 2006 tax reform we expect firms to retain more earnings and therefore shift from relying on external financing to internal financing.
REFERENCE LIST


