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The effect of inheritance taxes on firm investments and growth: Evidence from Norwegian tax reforms

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Abstract

The purpose of this thesis is to investigate the effects of the inheritance tax on the ownership structure, investment and sales growth in companies experiencing a family succession. In this investigation, we utilize the natural experiment provided by the Norwegian tax reforms of 2009 and 2014. The reforms enable us to compare family successions with unrelated transfers using a difference-in-difference-in-differences approach.

The results show that the inheritance tax does not influence the decision of keeping a firm in the family. As such, the ownership-structure is not influenced. Further, we fail to find that investment and growth changes around succession for companies experiencing a family transfer, as a result of the tax reforms.

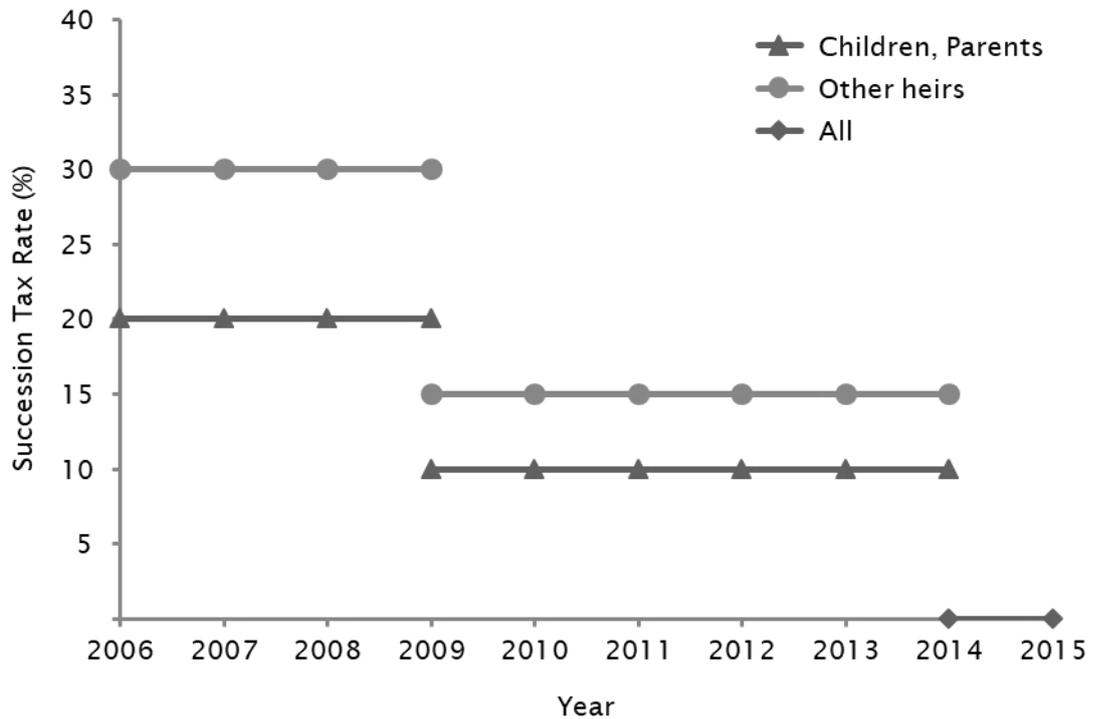
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1. Introduction

Inheritance tax is a tax imposed on a beneficiary when inheriting assets. The tax is triggered at the time when the assets are transferred. This type of taxation has periodically been utilized in Norway to secure state income. Following the political climate, it has been changed several times, before it was removed by the sitting conservative government with effect from 2014 (Skatteetaten, 2020) as described in figure 1.

Figure 1- Succession tax regimes (2006-2015)



An inheritance tax is of the outmost importance to family firms as it can cause a significant tax burden for the beneficiaries. How this tax is dealt with and its relative importance for the firm is dependent on several aspects of the firm and the entrepreneur. For instance, the entrepreneur’s income from other sources and the asset tangibility of the firm is decisive for the tax effect (Tsoutsoura, 2015). Nevertheless, literature suggest that it is likely to have an impact on the operations of a firm experiencing a transfer in ownership.

In our thesis, we seek to precisely understand the impact inheritance taxes can have on family firms experiencing a succession. For instance, it has been suggested that inheritance taxes negatively influence firm investment and growth and might force entrepreneurs to sell of their firms to meet tax obligations (Tsoutsoura, 2015). These potential problems are highly relevant in Norway, where family firms account for

65% of the total number of firms, employing 36% of the labor force and make 19% of the total revenue (Berzins & Bøhren, 2013). These numbers suggest that taxes with adverse effects on family firms might hurt the aggregate economy, as this firm-type plays a significant role. This argument was used both for the significant reduction of the inheritance tax in 2009 and the removal in 2014. In the aftermath, the issue has been a hot political subject, making it even more relevant to investigate.

On the contrary, several papers suggest that inherited firms underperform (Tsoutsoura, 2015). They point to the problem of low-ability heirs, meaning that inheritance taxation might be an important tool to reduce inefficient family-management and replace it with skilled outsiders and diversified owners (Bennedsen et al., 2007). Also, research on Norwegian households suggest that there is a significant negative shift in the labor supply by beneficiaries who inherit more than average amounts (Bø, Halvorsen & Thoresen, 2019). On the other hand, Berzins and Bøhren (2013) find that family firms perform equally good as, if not better than, non-family firms in Norway. This finding suggest that they do not necessarily contribute negatively to the economy.

As we have emphasized above, we find motivation in examining an underexplored topic with great political relevance. Knowing that family firms are important employers in the Norwegian economy, the environment in which they operate is important for the overall job security. Any taxation that influences the family firm's operations is therefore of importance to the society, not only to the managers and owners. This thesis does not take a stand on the efficiency of family owners and managers, but we stress their standing as an important employer.

Also, we see it as necessary that the debate regarding the inheritance taxation become more data driven. As of today, it is to a large extent emotionally loaded, based on arguments of fairness and economic inequality. These are of course important arguments, but we would also like to explore any economic consequences from the tax. These consequences would to a large extent involve a trade-off between a business-friendly climate with low taxation and the importance of state income. The Norwegian state income from inheritance taxation amounted to 1.9 billion NOK in 2013 (SSB, 2015).

Following this discussion, we form our research question:

What effects does the inheritance tax have on investment, sales growth and ownership structure for a firm undergoing a family transaction?

Where investment will be measured by capital expenditures to beginning of year tangible assets and growth will be measured by growth in sales. For the ownership structure, we seek to answer whether firms remain in the family and to what extent they are sold off to foreign investors.

To our knowledge, the only paper addressing this concern is Tsoutsoura (2015). In her paper, she stresses the need for further empirical evidence on the topic. As mentioned above, her findings suggest several adverse effects on family firms from inheritance taxes. Therefore, they are important to consider for the policy makers. As Tsoutsoura only considers Greek data, there is a need of empirical evidence on the relationships in other countries. In our thesis, we hope to contribute by providing relevant empirical evidence

By using Norwegian company data from private firms combined with family data, both provided from the CCGR institute and BI, we investigate how firms have reacted to the mentioned changes to the inheritance tax in 2009 and 2014. These changes provide us with a natural experiment that allows us to investigate how private firms and the owners behave in a world with and without inheritance tax. By using the tax reforms as indicator-variables, we will be able to pick up the effects of the changes. The econometric theory and our model are thoroughly explained in chapter 3.

There is also a significant new component in our thesis, since we will investigate both a reduction in the inheritance tax and the final removal. Norwegian family firms have experienced two inheritance tax shocks of 10% each. Hence, it may be harder to estimate a statistically significant effect of each tax shock in isolation. As such, our empirical setting contrasts Tsoutsoura (2015) study on Greek family firms, as she worked with a single 20% reduction in rates. The difference can assist us in understanding how large the changes in taxation needs to be in order to influence firms experiencing a family transfer.

Our empirical evidence fails to find any adverse effects of the succession taxes on investment and growth around succession for firms that have been transferred within the family. These findings are, together with other arguments, essential for

the policy makers when evaluating whether a succession-tax is appropriate. This is discussed thoroughly in chapter 6.

The remaining part of this paper is structured as follows. First, we take a deep dive in the existing literature on familiar topics. Thereafter, we present the theoretical foundation and methods we use to investigate our topic. Following this, we present our data with some descriptive statistics in our data chapter. This data is then utilized in statistical tests to arrive at our main findings. Lastly, we summarize our findings and write up our conclusions.

2. Literature review

In the following we seek to get an understanding of how transfer taxes affect the heirs and their respective companies. This understanding is built upon leading academic papers.

As mentioned in the introduction, there is a concern that inheritance taxes can negatively influence investment and sales growth, and even force entrepreneurs to sell of their firms. On the other hand, the literature also indicates that inherited firms perform poorly (Villalonga & Amit (2006), Perez-Gonzales (2006), Bennedsen et al. (2007)). This implies that inheritance taxes might be utilized to reduce inefficient family-management (Bloom (2006)). This argument is exemplified by Morck, Stangeland and Yeung (2008), suggesting that the underperformance of heir-controlled firms can in turn cause underperformance of factor productivity and economic growth. This discussion is founded on a belief that inheritance taxes have the potential to influence firm boundaries and ownership.

This link was discovered by Tsoutsoura (2015) when she empirically identified the effects on firm boundaries, growth and investment following a tax reform in Greece from 2002. This tax reform reduced the tax rate on family-succession from 20% to less than 2.4% (Tsoutsoura, 2015). In the paper, she finds a more than 63% increase in family-successions after the tax reform. Moreover, she reveals that succession taxes are associated with lower cash reserves, lower investment, a decline in profitability and slower sales growth. The investment decline is shown to be larger if the entrepreneur has less income from other sources.

The strong relation between the inheritance tax and family-successions points to an inefficient solution following the arguments provided by Morck, Stangeland and Yeung (2008) above. Bø, Halvorsen and Thoresen (2019) also points to

inefficiencies stemming from the fact that people who inherent higher amount of assets work less. Their research provides empirical evidence that supports the Carnegie effect, and suggest that transfer taxes can be beneficial to the economy. Their study was conducted on Norwegian data, making their findings especially relevant to our study.

Our paper, following Tsoutsoura (2015), will also contribute to the literature on family firms by suggesting the succession tax as a fourth decisive factor for firm-policies around successions. The three traditional factors underlined in the literature are (1) nepotism (Burkart, Panunzi and Schleifer (2003), Caselli and Gennaioli (2005), Perez-Gonzales (2006), Bennesen et al. (2007)), (2) infighting among family members (Muller and Warneryd (2001), Bertrand et al. (2008)), and legal limitations to transfer minimal shares to non-controlling heirs (Ellul, Pagano and Panunzi (2010)).

Furthermore, our thesis will be related to previous work on firm boundaries showing how insider incentives influences ownership structure (Coase (1937), Jensen and Meckling (1976), Holmstrom and Roberts (1998), Seru (2014)) as we investigate how inheritance taxation is decisive for transfer of ownership and control. It also seeks to provide evidence to Brunetti (2006) suggesting that inheritance tax force entrepreneurs to sell of their firms.

Several papers suggest a direct relationship between corporate taxes and investments. Hall & Jorgensen (1967) show that increased corporate taxes reduces corporate investment in the United States. Djankov, Ganser, Mcliesh, Ramalho & Shleifer (2010) arrive at a similar result for 85 countries. Whether such an adverse relationship between taxation and investment also hold for transfer taxes has not been empirically tested on cross-country data. The link between corporate taxation and investment is likely to be especially strong for private firms as Campello et al. (2011) shows that relatively to public firms, private firms cost of external finance is likely to be high.

3. Theoretical foundation and methodology

In this section, we present and explain the theoretical foundation used to analyze the research question. We also outline the methodology used for the econometric analysis. Based on this, the research question is divided into several hypotheses that

is suited for empirical testing. Further, we describe how we use descriptive data to get a deeper understanding of the problem at hand.

3.1 Developing the model

This paper investigates the relation between transfer taxes and company characteristics such as investment and sales growth in the time around a transfer of ownership. The actual effect of transfer taxes is explored in several papers as mentioned above, and we build our model based on the models that has been suggested and tested in these papers. We combine the research discussed in the literature review with financial theory on taxation and arrive at the following underlying theory:

a transfer tax will have a significant negative effect on a company's cash holdings, which in turn can affect its ability to invest and thereby utilize its growth opportunities.

The logic supporting this theory is that the transfer of a company will cause a substantial tax burden for the beneficiary. Depending on the beneficiary's financial situation, it might be necessary to sell of liquid assets in the firm that has been transferred (Tsoutsoura, 2015) to pay off the tax. In cases where the liquidity of the firm is negatively affected by the tax payment, it will have less internal financing available for investments. Internal funds are the most important source of finance for investments (Østergaard, 2020). Since external financing is especially costly for private firms (Campello, 2011), this is likely not fully compensated with external financing.

3.2 Methodology

The tax reforms of 2009 and 2014 give us a quasi-experimental setting. This setting allows us to analyze the variation in investment and sales growth for companies experiencing a family transfer, following tax reforms within a country. This is beneficial because we avoid several pitfalls which may occur when comparing tax regimes between countries (Tsoutsoura, 2015). Such comparisons are troublesome due to differences in enforcement, valuation techniques, rate structures, bookkeeping policies etc. (Gale & Slemrod, 2001). Also, there may be differences between the countries that cannot be observed, and hence not controlled for, in cross-country studies (Rodrik, 2005).

We use the within-country variation provided by the tax reforms to investigate the effects of the tax reforms on firms and their owners in the time around a succession. To measure the effects, we use a difference-in-difference-in-differences (DDD) approach. Doing this, we combine the time-series variation provided by the two tax reforms with the cross-sectional variation in succession decisions. Investigating the tax effect on firm investments around succession could also have been done simply by estimating the difference in firm investment in the periods prior to the tax reforms between family and unrelated transfers. This could even be done using data from countries that did not experience any tax changes. Such an approach would allow us to assess the change in investment around succession while controlling for time-invariant firm characteristics. However, the method would have an important drawback because it would not allow us to control for aggregate changes resulting from different economic events or other shocks that might influence successions. This problem can be solved by using a control group (Woolridge, 2012). Unrelated transfers can be used as a control group in our case, since these transactions have remained unaffected by the legislation changes. In our case, we use Norwegian data, and compare the family transitions to firms that are sold to non-relatives. Hence, we are using a difference-in-differences approach that controls for events that influence both groups.

However, the model still cannot separate if the change in investment around succession originates from the tax burden or the identity of the new owner. That is, family or unrelated. This problem is possible to overcome using the tax reforms of 2009 and 2014. The economic intuition is that a departing entrepreneur that sells of his firm will be able to pay his tax burden using the proceeds from the sales. As the entrepreneur is no longer the owner of the firm, he will clearly not use company assets to pay the tax. Therefore, the company's liquidity is not negatively affected. On the other hand, in a family succession it is likely that liquid assets of the company are used to pay the tax burden (especially if the entrepreneur has limited income from other sources). This might be essential for the company's ability to invest. This consequence of the tax burden is (reduced) removed in (2009) 2014. Thereby enabling us to separate the effects of the tax and the identity of the new owner. This difference-in-difference-in differences (DDD) approach thus enables us to investigate the change in investment around succession following a tax reform

by looking at family transfer (treated group) and comparing them to unrelated transfers (control group) before and after the two tax reforms.

3.3 Categorizing of transfers

In order to analyze the research question, we need to define a threshold for transfer size and distinguish between related and unrelated transfers. We define a transfer as a 10% or larger transfer of ownership from the entrepreneur of a non-listed firm. These transfers are then categorized into the two categories family and unrelated. We do this as follows:

A transfer is defined as a family transfer if more than 50% of the of the transfer of ownership from the entrepreneur is received by family of the first degree.

A transfer is defined as an unrelated transfer if less than 50% of the transfer of ownership from the entrepreneur is received by family of the first degree.

The two categories are in practice mutually exclusive as we do not observe any transfers in our sample in which the transferred share has been split equally between family members of first degree and outsider.

We stress that both the transfer threshold at 10% and the categorization process are based on economic intuition. Literature does not provide a specific definition, and we have therefore arrived at the specific threshold in discussions with our supervisor Janis Berzins. The 10% threshold is chosen as we believe this to be an adequate transfer of shares, as to which the entrepreneur should take succession tax consideration into account. The 50% threshold between family and unrelated transfers means that we do not only analyze pure family or unrelated transfers, as a transfer may be characterized as a family transfer if 70% percent of the transferred ownership is received by the family, while the last 30% is received to an unrelated party.

3.4 The DDD analysis

The DDD-methodology is utilized to run tests on the mean investment and sales growth around succession. As explained above, we first find the differences between the investment before and after a transfer for all firms in each period. Thereafter, we take the differences between the changes in investment and sales growth for firms that has experienced a family versus an unrelated transfer. Lastly,

we investigate the difference in this difference between periods (before and after a tax reform). This DDD approach enables us to test how the tax reform has influenced firms experiencing both family and unrelated transfers using simple paired T-tests. We elaborate more on this procedure when discussing the results in chapter 5.

3.5 The OLS analysis

We then investigate the effect, by running a separate regression for each tax reform. That, is, one regression in the time frame 2006-2010 and one for 2011-2015. The dataset utilized for each regression contains data on firms that has experienced a transfer in the relevant years. Hence, we estimate the tax effect on investment in the time around succession. The effect is investigated by estimating the following model:

$$\begin{aligned} \Delta Investment_t &= \alpha_t + \beta_1 PostLaw_t + \beta_2 Family_t + \beta_3 (PostLaw * Family)_t \\ &+ \beta_4 X_t + u_t \end{aligned}$$

where the dependent variable, investment, is the change in investment around a succession. It is defined as the difference between the two-year average ratio of CAPEX to beginning-of-year tangible asset posterior to the transfer and the two-year average ratio prior to the transfer. Further, CAPEX is defined as:

$$CAPEX_t = DA_t + Depreciation_t + Impairment_t - DA_{t-1}$$

where DA is the depreciable assets consisting of fixed and intangible assets plus the deferred tax assets. *PostLaw* is a dummy variable equal to one if the transfer happens after the relevant tax change and zero otherwise. The variable *Family* is a dummy variable that is equal to one if more than 50% of the transferred share is transferred to a family member of the first degree and zero otherwise. The coherent coefficient, β_2 , estimates the difference in investment around succession for family and unrelated transfers in the pre-reform periods. We expect this to be negative, because the tax burden related to a (higher) succession tax would decrease the availability on internal financing in firms that experience a family succession. *PostLaw * Family* is the fundamental variable of interest as it measures whether family and unrelated transfers reacts differently to the tax reforms in terms of their investment levels. Following the intuition provided above, we expect β_3 to be positive because the removal of the tax burden increases the liquidity of the

companies in the time around succession and enables investment. On the other hand, a β_3 of zero would suggest that the inheritance taxation does not influence investment. In fact, we find it to be insignificant, meaning that we do not observe any effect from the taxation in our data. The findings are discussed in detail in chapter 5. Finally, the variable X is a matrix controlling for the size and age of the firms. Size is proxied as the natural logarithm of the book values of fixed assets (in NOK). Firm age is the difference between the succession year and the year of establishment.

As discussed above, we also investigate the effect on sales growth. This is done by changing the dependent variable in the model used for investment. The slightly modified model is as follows:

$$\begin{aligned} \Delta Sales Growth_t & \\ &= \gamma_t + \delta_1 PostLaw_t + \delta_2 Family_t + \delta_3 (PostLaw * Family)_t \\ &+ \delta_4 X_t + \varepsilon_t \end{aligned}$$

where the dependent variable is the change in sales growth around succession, defined as the average sales growth rate post succession minus the average sales growth rate prior to a succession. As for investment, we do not find a significant coefficient β_3 for the interaction term. Similarly, the coefficient δ_3 has an insignificant effect on sales growth. The results are discussed further in chapter 5.

3.6 Methodological pitfalls

When conducting empirical research, it is important to be aware of potential weaknesses and pitfalls related to the methodology applied. In the following, we discuss problems related to our analysis, and how we address them. First, we look at the issues related to timing of the successions.

When looking at the effects from the tax reforms, it is of the utmost importance to understand if the reforms were expected or not. If the reform was indeed expected, it is reasonable to think that some firms may have delayed transfers of ownership to take advantage of the lower inheritance tax. Meaning that one would observe a significant higher number of transfers in the period right after the reform. We investigate this problem in our preliminary analysis (table 5), but we fail to find any significant changes in number of successions. However, we choose to exclude observations happening in the years of 2008 and 2013 from all analyses to remove potential biases related to the years when the tax reforms were voted on.

Another important aspect of the timing issue is whether the tax reform is perceived as permanent or only a momentary change. Treating the change as temporary would likely speed up transfers as firm owners and their heirs would like to benefit from the favorable tax rate before it returned to pre-reform levels. As with the problems related to expectations above, this problem is investigated in the descriptive analysis by looking at numbers of transfers in the post-reform period and the stability of the share of family-successions in the years following the reform.

The DDD approach gives meaningful results, however it is important to highlight one important issue: Firm characteristics related to investment opportunities will presumably codetermine the succession decision. This can for instance be access to project funding from internal cash holdings or interest from external investors. It can also be related to expected growth possibilities, such as the firms' outlook on market share and expansion to new products or geographical areas. The DDD approach is only a suited method if the succession decision is exogenous. That is, the treatment is random (Woolridge, 2012). In other words, it should not be a function of observable or unobservable factors influencing the dependent variable. This assumption is strong because, as explained above, omitted variables that explains the variance in both the succession decision and investment and/or growth possibilities may exist. In other words, exogeneity means that the succession-decision should not be influenced by factors also influencing the investment-opportunities and/or growth opportunities.

Based on economic intuition, it is reasonable to argue that the exogeneity-assumption is likely to fail as we expect that there exist factors influencing both investments and/or growth opportunities as well as the succession-decision. The problem is also discussed in Tsoutsoura (2015). She finds an increasing share of family-successions after the tax reform, suggesting that the succession decision is in fact an endogenous variable. In our descriptive analysis presented in chapter 4, we fail to find an increased share of family succession following the tax reforms (table 5).

In short, we have identified a potential problem of omitted variables influencing both the dependent variable investment (sales growth) and the decision to keep the firm in the family. The consequence would be that the estimated coefficient on all included variables will be biased and inconsistent unless they are all uncorrelated with the omitted variable. As discussed above, this is not likely to be the case. An

example of such a problem could be that in the periods with high taxes, an entrepreneur facing financial constraints could be more likely to sell of his firm. As a result, the OLS specifications will underestimate the true effect on succession tax on investment (Tsoutsoura, 2015). When evaluating our results, we will highlight the problem of endogeneity. This is discussed further in chapter 6.

To overcome the problem, existing literature has suggested the instrumental variable (IV) approach to deal with the problem of endogeneity in succession decision. The succession decision is instrumented using the gender of the first-born child of the entrepreneur (Bennedsen 2007). Unfortunately, this information is lacking in our data. Therefore, we outline this methodology in our proposal to further research in chapter 6. We see this analysis as a natural next step in the research on the effects of succession tax in Norway.

3.7 Hypotheses

In order to investigate our research question, using the methods presented above, we divide it into several hypotheses suited for statistical analyses. In our hypothesis They are the following:

Hypothesis 1: How will the tax reforms influence the firm's ownership structure around a family succession?

H₀: The change in the tax reform will not influence the firm's ownership structure around a family succession.

H₁: We will observe a higher share of family-successions after the tax reforms.

Hypothesis 2: How will the tax reforms influence the firm's investments around a family succession?

H₀: The change in the tax reform will not influence firm's investments around a family succession.

H₁: The tax reforms will influence firm's investments around a family succession.

Hypothesis 3: How will the tax reforms influence the firm's around a family succession?

H₀: The tax reforms will not influence firm's growth around a family succession.

H₁: The tax reforms will influence firm's growth around a family succession.

Hypothesis 1 will be tested using a t-test and is presented together with the descriptive statistics while hypothesis 2 and 3 are tested in the DDD analysis as well as the OLS-regression presented in chapter 5.

3.8 Descriptive statistics

To set the stage for our econometric analysis, we construct relevant descriptive statistics that gives an overview of the data and helps understanding our main research question. We investigate the distribution of family and unrelated transfers in each year and the results are presented in table 5. This is done for all periods. That is, before the first tax change, between the changes and after the last tax change. As such, it serves as a backbone for our model, as it will help us understand to which degree the tax reforms were actual shocks, or if they were expected. This is the case because any expectations of a tax reform could lead firm owners to postpone transactions of ownership to avoid the related cost. In this case, data points during these year(s) could be argued excluded from our econometric model, following the logic presented above. By calculating the distribution of family and unrelated successions for the periods with succession taxes at 20%, 10%, and 0%, we can test hypothesis 1:

H_0 : The change in the tax reform will not influence the firm's ownership structure in the time of succession.

H_1 : We will observe a higher share of family-successions after the tax reforms.

The hypothesis is investigated by testing the significance of the differences in the distribution of family related succession compared to unrelated successions, between the periods. As mentioned, we have two tax-shocks, as the succession tax rate was reduced from 20% to 10% in 2009 and then from 10% to 0% in 2014. Thus, using our descriptive analysis we test whether each of the respective tax reforms has had a significant effect on the succession decision. The test-results are displayed in table 5 in the data chapter and does not provide evidence that we observe a higher share of family transfers after either of the tax reforms. We elaborate more on these results below.

We now move on to analyze differences in selected firm characteristics during the three periods of different succession tax policies. This applies to metrics such as the firm size, investment measured by CAPEX to PPE, growth of sales and the age of

the firm. We seek to understand if there exist any significant differences in firm characteristics between the group of firms that choose family transfers from the group that choose unrelated transfers. This statistic helps us understand if company characteristics are decisive for the transfer decision within a period where the transfer tax is held constant. The results are presented in table 6 and we fail to find any of the characteristics to be decisive for the succession decision. The results are discussed in chapter 4.

As aforementioned, we find our descriptive statistics beneficial to get a basic understanding of the problem at hand. By doing this, we learn what specific aspects of the firms that can be expected to change following the tax reforms.

4. Data

The following section describes the data utilized in this master thesis and how the data is filtered and trimmed. Furthermore, this section will present descriptive statistics and univariate tests to help perceive the body of data. We have retrieved data from The Center of Corporate Governance Research (CCGR) at BI Norwegian Business School. This database provides comprehensive data on Norwegian family firms. Accounting and corporate governance data has been retrieved from the database. Data was available in the period 2000 to 2017. This provides us with a sufficient timeframe, as it enables analysis of successions both prior and posterior to the two tax reforms in 2009 and 2014.

4.1 Data collection

Yearly observations of accounting and corporate governance variables were collected from the CCGR database. The 12 variables needed for our analysis are listed in table 1 (see table 9 in appendix 1 for all extracted variables). From this dataset, we extract the relevant company characteristics, and calculate investment and growth rates, which are used in the main analysis.

Furthermore, we collect transfer-data from our supervisor Janis Berzins. The eight variables in this dataset that are utilized for analysis are listed in table 3 (see table 10 in appendix 2 for all extracted variables). Essentially, this set provides transfer information on the companies in our CCGR dataset.

These two datasets combined contain the needed information to perform the analysis described in chapter 3. By matching the two, we construct one a dataset with the variables ultimately used in our analysis.

4.2 Initial data treatment

In order to perform the analysis, we need to organize the raw data. This process is performed to remove clutter, reduce the amount of unnecessary data, and to make it suited for econometric analysis. In the following we describe the initial data treatment for both the CCGR and the transfer data.

4.2.1 The CCGR data

The 10 variables listed in table 1 were collected from the CCGR database. This provided us with yearly intervals for all the relevant variables, over a 17-year period.

Table 1 – Relevant variables collected from the CCGR Institute Database. All variables with yearly observations.

CCGR Data	
<i>Company ID</i>	<i>Total Assets</i>
<i>Deferred Tax Asset</i>	<i>Total Equity</i>
<i>Depreciation</i>	<i>Total Fixed Assets (tangible)</i>
<i>Impairment</i>	<i>Total Intangible Assets</i>
<i>Revenue</i>	<i>Year</i>

4.2.2 Filtering process of the CCGR-data

The unfiltered dataset retrieved from the CCGR-database contained 4 108 823 rows of data. In order to clean the dataset, we add the constraints summarized in table 2.

Table 2 – Stepwise CCGR Data Filtration

CCGR Data Filtration		
Step	Filters	Remaining rows
0	Unfiltered	4 108 823
1	Successfully imported to Microsoft Access	4 095 224
2	Rows with revenue larger than zero	2 395 218
3	Rows with total fixed assets larger than zero	1 709 663
4	Rows with data between 2003-2017	1 560 732

First, we lose 13 600 rows containing technical errors causing it to be removed from the dataset in Microsoft Access.

We start the filtration process by removing rows with negative revenue. This is done to remove clutter from our dataset. Rows with revenue equal to zero is then removed in order to exclude holding companies from our final sample following the intuition provided by Berzins, Bøhren and Stacesu (2018). Holding companies are characterized by only having financial or interest income. These companies are irrelevant to our analysis as we wish to view to the impact of

succession tax reforms on investments as well as sales growth in operating companies. This step also removes inactive firms.

The investment level before and after the firm transfer is based on a two-year average before and after a transfer. The latest possible transfer-year we can include in our analysis is therefore 2015, meaning that we only observe two years after the final tax-shock. We therefore don not see it as beneficial to analyze more than two years prior to the first shock in 2009. Hence, we remove some of the first years of data. This is also done out of practical reasons, as these analyses demand a lot of computing power. As such, accounting data is included from 2003 to 2017, as this is the time-interval needed to compute average investment and sales growth both prior and posterior for the companies transferred between 2006 and 2015.

4.2.3 The transfer data

Our thesis supervisor Janis Berzins provide a dataset showing companies in the CCGR-database that has experienced a transfer of ownership of at least 10% in the years 2002-2017. This dataset includes the following relevant variables:

Table 3 – Relevant variables produced by Janis Berzins using the CCGR Institute Database. All variables with yearly observations.

Transfer Data	
<i>Age Transferred Firm</i>	<i>Ownership Share Founder</i>
<i>Decrease in Ownership Share Founder</i>	<i>Ownership Share Founder Start</i>
<i>Owner Share Family</i>	<i>Transfer Year</i>
<i>Owner Share Family Start</i>	<i>Year</i>

4.2.4 Filtering process of transfer data

The unfiltered dataset retrieved from Janis Berzins contained 2 943 394 rows of data. In order to clean the dataset, we add the constraints summarized in table 4.

Table 4 – Stepwise Transfer Data Filtration

Transfer Data Filtration		
Step	Filters	Remaining rows
0	Unfiltered	2 943 394
1	Successfully imported to Microsoft Access	2 943 394
2	Firms with transfer year	694 619
3	Firms with transfer year between 2006-2015	351 908

We start by removing firms in which there is not recorded a transfer, as shown in step 2. This is done, because we need to locate the exact transfer year to test the effect of the legislation changes. We continue by removing all transfer years prior to 2006 and posterior to 2015. This is the time interval of interest since it enables us to view the two-year average differences in investments and sales growth both for the presuccession and the postsuccession period.

4.2.5 Matching procedure

Finally, we match the CCGR data with the transfer data. In total we find 10'694 companies for which there both exist CCGR-data and we have a transfer in the relevant time period. However, in order to calculate the two-year average investment prior and posterior to the transfer, we need accounting data for seven consecutive years, starting four years before the transfer. Applying this filter, we are left with 3'634 companies. Using this accounting data, we calculate investment and sales growth. This is combined with the family- and transfer-dummies in the econometric analysis.

When testing our hypotheses on Norwegian data, we wish to have a dataset that is representative of Norwegian private firms. We therefore choose to include all the 3' 634 companies which has met the filtration requirements. There are several reasons to why we refrain from a process which removes potential outliers. We firstly wish to avoid selection bias in our dataset. This bias can emerge when groups of data are picked for analysis in such a way that proper randomization is not achieved (Brooks, 2014). Thus, the sample obtained is no longer representative for the population intended to be analyzed.

Furthermore, it is evident that the characteristics of our final dataset, which is described in detail in chapter 4.3, contains large variances on numerous variables. This may partly be the case due to the smaller size of many of the companies in our sample, which causes smaller NOK increases/decreases in investment and revenue,

to have a large percentage impact on the firm. As such, we refrain from any further data filtration, as the variances represent the characteristics of the Norwegian firms present in our data.

4.3 Descriptive statistics

In this subchapter we present summary statistics of the distribution of succession by family ties in table 5 and firm characteristics in table 6. Furthermore, we present and discuss the test results related to the distributions.

4.3.1 Distribution of family succession by family ties.

Table 5 – Distribution of succession by Family Ties

Distribution of Successions by Family Ties

This table presents the distribution of successions during the sample period. The successions are defined into two categories; when the largest family owner transfers 50% of the transferred amount to a relative of first degree, it is defined as a family succession (column (4) and (5)), unrelated when 50% or more is transferred to outsiders (column (2) and (3)). P-values of the paired T-test of difference in means are denoted in the brackets. ***, ** and * report the level of significance at 1%, 5% and 10% respectively.

Year of Succession	Number of Successions	Unrelated Successions		Family Successions	
	# (1)	# (2)	% (3)	# (4)	% (5)
(Total)	3133	334	0.107	2799	0.893
2006	285	23	0.081	262	0.919
2007	598	57	0.095	541	0.905
2008	328	24	0.073	304	0.927
2009	252	20	0.079	232	0.921
2010	284	23	0.081	261	0.919
2011	294	25	0.085	269	0.915
2012	318	47	0.148	271	0.852
2013	234	38	0.162	196	0.838
2014	275	38	0.138	237	0.862
2015	265	39	0.147	226	0.853
Before First Law Change (2006-2007)	883	80	0.091	803	0.909
After First Law Change (2009-2010)	536	43	0.080	493	0.920

Before Second Law Change (2011- 2012)	612	72	0.118	540	0.882
After Second Law Change (2014- 2015)	540	77	0.143	463	0.857
Difference: (After First Law Change) minus (Before first Law Change)			-0.010 [0.480]		0.010 [0.480]
Difference: (After Second Law Change) minus (Before Second Law Change)			0.025 [0.560]		-0.025 [0.560]

Table 5 reports the distribution of firm transfers during the sample period. Column (1) reports the total number of transfers during the sample period while column (2) and (3) show the distribution for unrelated successions. Finally, column (4) and (5) presents family successions.

The total number of transfers is similar both before and after the two regulatory changes in 2009 and 2014 respectively, except for a larger amount of transfers in 2007. The number of transfers before the first law change in 2009 (2006 to 2007) is 883. In the two years after the law change in 2009 (2009-2010) 536 transfers occurred. The total amount of transfers before and after the second legislation change is quite stable. Changing from 612 to 540 total transfers.

Prior to our descriptive analysis we expected the relative amount of family successions to increase after the first and second legislation change. While we observe a 1.00% increase in the relative amount of family successions after the first

change, we observe a 2.50% decrease after the second legislation change. None of the differences in means are statistically significant at the 10% level. This is a somewhat curious finding, as it suggests that the reduction in succession taxes has in fact failed to increase the relative amount of family transfers. Our initial hypothesis was that a reduction in succession taxes would have a positive effect on number of family transfers, as it became cheaper for the entrepreneur to transfer the firm within the family.

Overall, the results in table 5 show that the reduction in succession taxes had little to no effect on firm transfers, leading to stable fractions of both unrelated and family successions throughout our sample period.

4.3.2 Company characteristics and the succession decision

In the following, we present a table with selected company characteristics for companies that has experienced either a family or unrelated transfer. Investigating this data is beneficial to understand the problem at hand. Also, it is interesting to see whether any of these company characteristics can serve explain the choice of succession. From the table, we see that none of the selected characteristics are significant for this decision. Further discussion of this result follows below.

Table 6 – Summary Statistics for the Years Prior to Succession

Summary Statistics for the Years Prior to Succession

This table presents the summary statistics for the first two years prior to the first law change in 2009. It then presents the two years preceding the tax law changes 2009, including 2009. 2008 is omitted due to reasons discussed in Chapter 3. It then presents the summary statistics for the first two years prior to the second law change in 2014. 2013 is omitted due to reasons discussed in Chapter 3. Finally presenting the two years posterior to the last change in legislation. The successions are defined into two categories; when the largest family owner transfers 50% or more of the transferred amount to a relative of the first degree, it is defined as a family succession (column (2)), unrelated when 50% or more is transferred to outsiders (column (3)). *Ln Assets* is the natural logarithm of the book values of fixed assets (in NOK). *Investment* is the ratio of capital expenditures in year t to beginning-of-year tangible assets. *Firm Age* is the difference between the succession year and the year of establishment. *Sales growth* is defined as the annual percentage increase in sales. Heteroskedasticity-robust standard errors are denoted in the parentheses. P-values of the paired T-test of difference in means are denoted in the brackets. ***, ** and * report the level of significance at 1%, 5% and 10% respectively.

	Before 1 st Law Change (2006-2007)			
	All (1)	Family Succession (2)	Unrelated Succession (3)	Difference of means (4)
No of firms	883	803	80	
Ln Assets	13.625 (1.756)	13.609 (1.741)	13.795 (1.903)	-0.186 [0.404]
Investment	0.220 (0.743)	0.222 (0.767)	0.200 (0.452)	0,022 [0.706]
Firm Age	17.027 (12.221)	17.068 (12.083)	16.613 (13.598)	0.455 [0.773]
Sales growth	0.149 (1.483)	0.152 (1.553)	0.121 (0.268)	0.031 [0.622]
	After 1 st Law Change (2009-2010)			
	All (1)	Family Succession (2)	Unrelated Succession (3)	Difference of means (4)
No of firms	537	493	43	

Ln Assets	13.483 (1.815)	13.443 (1.803)	13.939 (1.906)	-0.496 [0.106]
Investment	0.279 (1.168)	0.252 (1.071)	0.592 (1.952)	-0.340 [0.266]
Firm Age	16.840 (13.241)	16.978 (13.335)	15.226 (12.140)	1.752 [0,380]
Sales Growth	0.042 (0.338)	0.044 (0.350)	0.024 (0.125)	0.020 [0.414]

Before 2th Law Change (2011-2012)

	All (1)	Family Succession (2)	Unrelated Succession (3)	Difference of means (4)
No of firms	612	540	72	

Ln Assets	13.614 (1.791)	13.645 (1.812)	13.381 (1.614)	0.264 [0.203]
Investment	0.390 (2.560)	0.424 (2.721)	0.210 (0.386)	0.214* [0.088]
Firm Age	17.234 (11.919)	17.548 (12.131)	14.875 (9.945)	2.673** [0.040]
Sales growth	0.140 (1.274)	0.148 (1.354)	0.080 (0.158)	0.068 [0.263]

After 2th Law Change (2014-2015)

	All (1)	Family Succession (2)	Unrelated Succession (3)	Difference of means (4)
No of firms	540	464	77	

Ln Assets	13.730 (1.808)	13.733 (1.858)	13.710 (1.483)	0.023 [0.902]
Investment	0.254 (0.994)	0.253 (1.057)	0.255 (0.462)	-0.002 [0.987]
Firm Age	16.670 (11.415)	17.235 (11.682)	13.273 (8.994)	3.962*** [0,0009]

Sales growth	0.133 (1.336)	0.147 (1.441)	0.052 (0.208)	0.095 [0.182]
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Table 6 provides descriptive statistics on firm characteristics throughout the sample period. On average, firms that experience a family succession is similar in size to a firm that experiences an unrelated succession throughout the period. The difference in size between the two groups is insignificant in all periods. Firms that experience a family succession are similar in age around the first legislation change in 2009. Firms undergoing a family succession are however significantly older both before the legislation change in 2014 (2012-2013) and after (2014-2015). They are on average 2.7 years older prior to the second legislation shock and increases to 4 years after to the change. The differences are statistically significant at the 5% and 1% level, respectively.

Investment is measured as the ratio of capital expenditure (CAPEX) in year t to beginning of year tangible assets. In the two periods surrounding the first legislation change, firms with a family succession undertake a similar amount of investments compared to firms with an unrelated transfer, resulting in insignificant differences in means between the two groups. In the period prior to the second legislation change (2011-2012) there is an indication that firms with a family succession undertake a larger investment compared to the unrelated group, shown by a significant difference in mean at the 10% level. We do not however observe the same result in the post reform period. Furthermore, firms with a family succession have a larger growth in sales revenue compared to the unrelated group. The difference in means is higher around the second legislation change, peaking at 9.5% in 2014-2015. The difference is however insignificant at the 10% level throughout the period.

Overall table 6 shows that firms that undergo family successions share firm characteristics with their unrelated counterparts, apart from firm age. The lack of marked differences between firms that experience a family and unrelated succession, means that we are unable to prove that the succession decision is exogenous, using the investigated firm characteristics.

5. Results

In this chapter, we employ the DDD approach to evaluate whether the tax reforms have influenced investment and sales growth for firms experiencing a family

transfer differently from firms experiencing an unrelated transfer. Our analysis is split in two parts. Firstly, we present the results of our difference-in-difference-in-Differences (DDD) analysis in chapter 5.1. The regression results of our ordinary least squares regression will then be presented in chapter 5.2.

5.1 DDD results

Table 7 – Difference-in-difference-in-differences Results

Changes around Successions: Difference-in-Difference-in-Differences (DDD)

The table presents results of the difference-in-difference-in-differences analysis. Successions are classified into two categories: family, when the largest family owner transfers 50% or more of the transferred amount to a relative of the first degree (column (2)), unrelated when 50% or more is transferred to outsiders (column (3)). Panel A1 shows the changes around successions surrounding the first law change in 2009. Panel B1 shows the changes around successions around the second law change in 2014. Differences between family and unrelated successions is reported in column (4). Changes around successions are computed as the difference between the two-year average post-succession investment level and sales growth rate minus the two-year average before succession. Successions that occurred in the year prior to any of the law changes is omitted. Panel A2 and B2 presents the differences between the differences in *investment* and *sales growth* surrounding a given law change. The calculation of the test of DDD in means is attached in appendix 3. This is the difference between the differences (DD) in column (4) in panel A1 and B1, respectively. Heteroskedasticity-robust standard errors are denoted in the parentheses. P-values of the paired T-test of difference in means are denoted in the brackets. ***, ** and * report the level of significance at 1%, 5% and 10% respectively.

PANEL A1: FIRST LAW CHANGE				
Before 1 st Law Change (2006-2007)				
	Type of Succession			
	(1)	(2)	(3)	(4)
	All	Family	Unrelated	Mean DD
No of successions	882	802	80	
	Investment			
(2-year average after) –	-0.272	-0.241	-0.590	0.349
2(year average before)	(4.390)	(4.167)	(6.230)	[0.625]
	Sales Growth			
(2-year average after) –	-0.051	-0.048	-0.086	0.038
2(year average before)	(0.332)	(0.338)	(0.257)	[0.225]
	After 1 st Law Change (2009-2010)			
No of successions	536	493	43	
	Investment			
(2-year average after) –	1.193	1.170	1.456	-0.286
2(year average before)	(36.546)	(37.941)	(12.278)	[0.910]
	Sales Growth			

(2-year average after) – 2(year average before)	-0.010 (0.526)	-0.010 (0.547)	-0.007 (0.181)	-0.003 [0.929]
PANEL A2: DIFFERENCES IN MEAN DD				
Mean DDD				
Combined total no of successions	1 418			
Mean DD investments (2009-2010)- Mean DD Investments (2006- 2007)	-0.635 [0.595]			
Mean DD Sales Growth (2009-2010)- Mean DD Sales Growth (2006- 2007)	-0.041 [0.803]			
PANEL B1: SECOND LAW CHANGE				
Before 2 nd Law Change (2011-2012)				
Type of Succession				
	(1)	(2)	(3)	(4)
	All	Family	Unrelated	Mean DD
No of successions	612	540	72	
Investment				
(2-year average after) – 2(year average before)	0.435 (8.138)	0.347 (8.272)	1.097 (7.067)	-0.750 [0.410]
Sales Growth				
(2-year average after) – 2(year average before)	-0.002 (0.322)	-0.003 (0.334)	0.009 (0.213)	-0.012 [0.692]
After 2 nd Law Change (2014-2015)				
	540	463	77	
Investment				
(2-year average after) – 2(year average before)	0.168 (13.060)	0.221 (14.083)	-0.152 (2.003)	0.373 [0.590]
Sales Growth				
(2-year average after) – 2(year average before)	-0.031 (0.384)	-0.029 (0.405)	-0.041 (0.225)	0.012 [0.711]
PANEL B2: DIFFERENCES IN MEAN DD				
Mean DDD				
Combined total no of successions	1 152			
Mean DD investments (2014-2015)- Mean DD Investments (2011- 2012)	1.123 [0.163]			
Mean DD Sales Growth (2014-2015)- Mean DD Sales Growth (2011- 2012)	0.024 [0.294]			

To analyze the impact of succession taxes on firm investment and sales growth around successions, we first examine the changes in investment and sales growth around successions for family and unrelated transactions. We do this both in the prereform and postreform period, surrounding the changes in 2009 and 2014. Panel A (B) presents the results related to the law change in 2009 (2014). Each panel first presents the two-year average investments after succession minus the two-year average before succession. Investment is defined as the ratio of capital expenditure (CAPEX) in year t to beginning of year tangible assets. Changes in sales growth is presented in the row below. They are computed as the two-year average sales growth after succession minus the two-year average before succession. Sales growth is defined as the annual percentage increase in sales. Columns (1) to (3) corresponds to all transfer, family transfers and unrelated transfer, respectively. Column (4) presents the mean difference in difference between family and unrelated companies.

Panel A1 shows that, under the high tax (2006-2007), investment decline sharply, the impact is seemingly economically significant, as we observe a 24.1 % decrease in the investment ratio. The variance of this result is however very high. As such the result needs to be interpreted with a high degree of caution. Firms experiencing an unrelated succession experience a 59% decline in the investment ratio in the 2006-2007 period. As such, the difference in means between the two groups is substantial, however rendering a statistically insignificant difference as observed in column (4). Sales growth decline by 0.3% for firms undergoing a family succession under the high tax regime, while the unrelated group has an average increase in sales growth of 0.9% in the same period. The difference between the groups is statistically insignificant as observed in column (4). These results suggest that firms undergoing family transactions had no significant difference in sales growth and investment under the high tax regime, relative to the unrelated group.

After the first law change (2009-2010) we observe that investment has increased substantially for firms in both groups. The results suggest that both groups have increased their investments in the period after the tax reduction. The effect seems to be slightly stronger for firms with an unrelated transfer. This result is however tainted by very large standard deviations, resulting in a statistically insignificant mean DD result in column (4). Sales growth decreases for both groups in the 2009-2010 period and the difference is statistically insignificant.

In Panel A2, the DDD estimate shows the effect of the tax reduction on the investment levels and sales growth rate of the two groups. The tax reduction resulted in an 63,5% percentage point lower increase in investment in firms with a family succession than in firms with an unrelated succession. From the results, it is not evident that firms experiencing a family transfer react more strongly to the tax reduction of 2009 than their unrelated counterparts. That is, we do not see a larger change in investment for these firms, relative to the firms experiencing an unrelated transfer. This is both seen by the negative mean DDD result, as well as the statistical insignificance of the result. This is backed up by a similar result on the DDD estimate on sales growth.

Panel B1 investigates what happens when the succession tax is fully removed in 2014. It shows that in the period with succession tax (2011-2012) we observe an increase in investment for both groups. With a statistically insignificant mean DD between them. Sales growth changes by a small amount for both groups, resulting in a statistically insignificant mean DD.

After the second law change (2014-2015) we observe that firms undergoing a family succession has had a substantial increase of 22.1% in investment, while their unrelated counterparts have experienced a decrease of 15.2%. This finding suggests that firms experiencing a family transaction have undertaken a larger amount of investments in the period after the removal of the succession tax relative to the unrelated group. The average mean DD is insignificant due to the large standard deviation. Sales growth is however reduced for both groups in the post reform period, by 2.9% (4.1%) for the family (unrelated) group. The mean difference is statistically insignificant.

In Panel B2, the DDD estimate shows the relative effect of the tax elimination on the investment levels and sales growth of the two groups. The tax removal resulted in a 112.3% percentage point increase in investment in firms with a family succession relative to firms with an unrelated succession. We are however unable to prove a statistically significant difference in investment between the two groups, as a result of succession tax removal. This is evident by the p-value of this result of 0.163.

Summarizing the results above, we fail to observe any distortion in investment in the high tax (prereform) periods. It does however indicate that there may be an

effect on firms in the family group, which have been diluted by the large variance present in the dataset. The tax removal resulted in a 2.4% percentage point increase in sales growth in firms with a family succession relative to firms with an unrelated succession. The mean DDD estimate is positive. It is however insignificant. This suggests that we fail to observe any relative increase in sales growth for firms undergoing a family succession when succession tax on family succession is removed.

5.2 OLS regression results

Table 8 – OLS Results

Effect of Tax on Investment and Sales Growth around Successions: OLS

Estimated coefficients in columns (1) and (2) are from least squares regressions on the differences in *investments* and *sales growth* around the first tax legislation change in 2009. Estimated coefficients in columns (3) and (4) are from least squares regressions on the differences in *investments* and *sales growth* around the second tax legislation change in 2014. Changes in investment are computed as the difference between the average two-year postsuccession investment minus the two-year average before succession. The year of succession is omitted. Changes in sales growth are computed as the difference between the average two-year postsuccession sales growth minus the two-average before succession. The year of succession is omitted. *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. *Firm Age* is the difference between the succession year and the year of establishment. *Ln Assets_{t-2}* is the book value of total assets two years prior to the year of succession. Heteroskedasticity-robust standard errors are reported in the parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Dependent Variable:	OLS 1		OLS 2	
	Differences in Investment Around Succession	Differences in Sales Growth Around Succession	Differences in Investment Around Succession	Differences in Sales Growth Around Succession
	(1)	(2)	(3)	(4)
Family	0.3116 (0.7031)	0.0351 (0.0309)	-0.6990 (0.8748)	-0.0146 (0.0289)
Post_Law *	-0.6758 (2.6351)	-0.0443 (0.0487)	1.1128 (1.1591)	0.0197 (0.0435)
Family Post_Law	2.0803 (2.0183)	0.0815** (0.0399)	-1.2414 (0.8747)	-0.0452 (0.0363)
Firm Age	0.0232 (0.0185)	0.0014*** (0.0005)	-0.0035 (0.0167)	0.0021** (0.0011)

Ln Assets_t-2	-0.1302 (0.1130)	-0.0111 (0.0074)	-0.2031 (0.2081)	-0.1203 (0.0120)
Constant	0.8105 (1.3906)	0.0424 (0.1022)	3.8781 (2.9303)	0.1390 (0.1677)
R ²	0.0012	0.0060	0.0016	0.0088
Number of observations	1 418	1 418	1 152	1 152

Table 8 examines the effect of succession taxes on investment and sales growth around a transaction. Columns (1) and (2) provide OLS estimates on the effects of the first legislation change on investments and sales growth, respectively. While columns (3) and (4) provide OLS estimates on the effects of the second legislation change on investments and sales growth. The dependent variable in column (1) and (3) is the change in investment around succession, defined as the two-year average investment post succession minus the two-year average investment prior to a succession. The dependent variable in column (2) and (4) is the change in sales growth around succession, defined as the average sales growth rate post succession minus the average sales growth rate prior to a succession. In all specifications of the model we control for age (difference between the succession year and the year of establishment) and size (the natural logarithm of two-year lagged assets). *PostLaw* is a dummy variable equal to one if the transfer happens after the relevant tax change and zero otherwise. The variable *Family* is a dummy variable that is equal to one if more than 50% of the transferred share is transferred to a family member of the first degree and zero otherwise.

It is important to underline that the coefficient results of the dummy variables *PostLaw* and *Family* must be interpreted with a high degree of caution, due to the inclusion of the interaction term *PostLaw * Family*. This is because their coefficients represent the partial effect of the dummy variable on the dependent variable when the other dummy variable is equal to zero. The results of the estimated coefficients of *Family* in all four columns therefore suggests that firms with a family transaction had no significant impact on the level of investments nor sales growth in the period prior to a law change. This is evident by the insignificant coefficients in all four columns. *PostLaw* represents the impact of the law change on investments and growth on companies which have experienced an unrelated succession. As such the significance of the coefficient in column (2) simply states that companies which experienced an unrelated succession after 2008 has had a

significantly higher growth rate than companies which experienced an unrelated succession prior to 2008.

The main variable of interest in all four OLS estimates is the fundamental variable *PostLaw * Family* as it measures if family and unrelated transfers reacts differently to the tax reforms in terms of their investment level and/or sales growth rate. The results in table 8 reports insignificant results on this variable on investment level as well as sales growth surrounding both legislation changes. The negative coefficients in column (1) and (2) are in breach with our a-priori hypothesis, as they suggest that a firm undergoing a family transfer experiences a reduced ability to invest and grow following the tax reform. The positive coefficients in columns (3) and (4) are more aligned with our initial hypothesis, suggesting that the reduced tax burden has increased family firm's ability to conduct investments, but these coefficients are as mentioned statistically insignificant.

These findings are consistent with the previous results in the DDD analysis. In the presence of high successions taxes, the model, surrounding both legislation changes, show no evidence of a decline in investment nor sales growth by firms undergoing a family succession relative to those undergoing an unrelated succession. The difference statistically insignificant. Furthermore, the model shows that the tax reduction for family firms does not increase investment nor sales growth for family firms; the average post succession investment and sales growth of firms undergoing a family succession does not increase relative to that for unrelated successions after the tax reform.

6. Conclusions

In this chapter we discuss the methodology and empirical findings. Alternative research strategies are discussed, and we stress their potential influence for the main results. Further, we look at the implications our results have for the parties that are affected by the tax reforms. Finally, we provide suggestions for future research on the topic.

6.1 Summary of results

When summarizing the results of both our descriptive and econometric analysis, it is important to do so in light of our research question:

What effects does the inheritance tax have on investment, sales growth and ownership structure for a firm undergoing a family transaction?

The descriptive analysis in chapter 4.3.1 failed to find a relationship between the relative number of family successions and the inheritance tax shocks. As such we conclude that we do not find succession taxes to influence ownership structure. The continuation of our descriptive analysis investigated whether the firm characteristics firm age, investment level, size and sales growth influenced the decision to keep the firm within the family. We find that the firm characteristics, except for age, failed to influence the succession decision.

We stress that our findings are conditioned on the exogeneity of the succession decision. Our results may have inherent bias and inconsistencies due to the potential violations of this assumption. There may be variables outside our model that impacts the true effect of the tax shocks. Furthermore, the quality of our results can be affected by our decided transfer size threshold of 10% as well as our categorization process of family and unrelated transfers.

To test whether the inheritance tax shocks have impacted investment and sales growth for firms undergoing a family transaction, we employ two econometric analyses. First, we test for mean differences in the two variables, between the groups of successions (family and unrelated) before and after each legislation change. Secondly, we run an OLS regression on the difference-in-difference-in-differences. Both analyses conclude that the succession tax shocks have failed to impact the investment levels and sales growth of firms undergoing a family succession relative to firms in the unrelated group. We therefore reject our a-priori hypothesis.

6.2 Implications for affected parties

The tax reforms are primarily affecting the beneficiaries that are inheriting a firm through a reduced tax burden and the state through lowered tax income. Moreover, it is suggested that it affects the company itself following the logic provided in chapter 3. When analyzing the effects, we choose to divide the parties into the

beneficiaries and their inherited company on the one hand, and the state on the other.

For the beneficiary, it will always be favorable to pay less tax as this increases the beneficiary's wealth. This one-time payment is however also argued to damage the company itself through lowered liquidity resulting from the tax payment as described in chapter 3. Following this intuition, a tax reform lowering the succession tax would be beneficial for the financial strength of these companies.

The empirical analysis from chapter 5 fails to prove that the inherited companies adversely affected by the tax burden. This result is important because the absence of damage to an inherited firm also means that there cannot be an adverse effect on the overall economy resulting from the aggregate tax effect on all transferred firms. As such, the discussion should only consider the beneficiaries burden and the states income. We will not discuss the distribution of wealth between these parties. However, we find that the tax does not seem to have a negative effect on the overall economy.

When deciding on taxation regimes, the state needs to consider how to secure an adequate level of state income while also providing a business-friendly environment. The reason is simple: too high taxes can cause fewer businesses and lower the economic activity with the result of lowered tax income. This logic is presented in the Laffer-curve (Miles, Scott & Breedon, 2012). However, there exist no evidence in our data that such a trade-off exists for the succession tax. Therefore, this type of taxation seems like a favorable to secure state income without harming the economy.

Summing up, our findings suggest that the beneficiaries are better off. Their gain is equal to the tax-income lost by the state. The economy, on the other hand, is left unaffected. This finding suggest that the taxation is merely a matter of wealth distribution and not relevant to wealth creation as suggested in chapter 3.1.

6.3 Recommendations for future research

The research conducted in this paper has provided insight on the succession tax in Norway through investigating its effect around tax reforms. Furthermore, we have identified potential problems related to our research strategy and how this impacts the results discussed above. In the following, we utilize the information gathered in our research to discuss further steps to explore the topic of succession taxes in Norway. Firstly, we discuss how to apply the IV approach.

Since the endogeneity-problem commented may cause the DDD-assumptions to fail, it would be beneficial to employ the instrumental variables (IV) approach. A suited instrument must fulfill two criteria. These are the relevance criteria and the exclusion criteria (Brooks, 2014). The relevance criteria states that the instrumental variable must be of relevance to the instrumented variable. That is, the removed explanatory variable that was affected by the endogeneity issue. Furthermore, the exclusion criteria specify that the instrumental variable must be uncorrelated with the error term. There must also be no direct link between the instrumental variable and dependent variable.

The IV approach is conditioned on the existence of an instrumental variable.

Bennedsen (2007) finds that the gender of the current entrepreneur's first-born child is suited to instrument the succession decision using Danish data. The same is true for Tsoutsoura (2015) using Greek data. Therefore, we suggest that the same instrument is tested on Norwegian data in future research. Firstly, the legitimacy of the instrument must be tested. The relevance criteria can be tested by investigating whether the probability of a family succession is significantly higher if the first-born child is male following the procedure described in Bennedsen (2007).

The assumption of exogeneity, on the other hand, cannot be statistically tested. Therefore, it is necessary to apply economic theory, expert knowledge and intuition (Stock & Watson, 2011). Bennedsen argued that the gender of the first-born child is random. This assumption is likely to hold, especially because he used data where the heirs were born before the widespread use of ultrasound to reveal the gender of the baby. This argument should also be valid for many of the current heirs in our Norwegian data because they are born before the widespread use of ultrasound in

the late 1970s (Norwegian Government, 1996). Applying this logic, it can be argued that the gender of the succeeding manager has no direct influence on firm performance. Although Denmark is closely related to Norway both economically, culturally and geographically, both criteria must be upheld on Norwegian data for the instrumental variable approach to yield meaningful results.

Dependent on obtaining an instrument fulfilling both criteria, future research can investigate the effects on succession taxes using a slightly modified approach. Investment and sales growth are estimated as before, but the dummy variable *Family* and the interaction term *PostLaw * Family* are estimated as follows:

$$Family_i = \alpha 2_t + \delta 1 MaleFirstBorn_i + \delta 2 (MaleFirstBorn_i * Postlaw)_t + \delta 3 X_t + u 2_t$$

$$PostLaw * Family_i = \alpha 3_t + \tau 1 MaleFirstBorn_i + \tau 3 (MaleFirstBorn_i * Postlaw)_t + \tau 3 X_t + u 3_t$$

Where the dummy variable *MaleFirstBorn* is equal to one if the departing entrepreneurs first born child is a male and zero otherwise. The procedure described above removes the problem of the endogenous family succession variable that appears both alone and in the interaction term in the original OLS.

Having discussed the potential use of the IV-approach, we finally move to the discussion of our choice of transaction size and categorization methodology. In our discussion under chapter 3.3 we emphasize that these choices are based on economic intuition, as there exist no clear suggestions in the literature. Therefore, we suggest that the analysis we have performed in our research could be conducted using different thresholds. For instance, pure family transactions could be investigated. It could also be of interest to isolate larger transactions, which causes higher tax burdens.

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Appendices

Appendix 1: Complete list of extracted variables from the CCGR-Institute

Table 9 – Complete Variable list of extracted variables from the CCGR institute

CCGR Data	
<i>Anonymized SSN of CEO</i>	<i>Inventory</i>
<i>Company ID</i>	<i>Largest Family Number of Board Seats (Ultimate Ownership)</i>
<i>Industry Code</i>	<i>Largest Family Number of Owners</i>
<i>Debt Level</i>	<i>Largest Family Size</i>
<i>Deferred Tax Asset</i>	<i>Largest Family Sum Direct Ownership</i>
<i>Depreciation</i>	<i>Largest Family Sum Ultimate Ownership</i>
<i>Direct Ownership held by Families</i>	<i>Liquidity Level 2</i>
<i>Dividends</i>	<i>Number of Owners (Direct Ownership)</i>
<i>Equity held by Owner with Rank 1(%)</i>	<i>Other Interest Expense</i>
<i>Equity held by Owner with Rank 2 (%)</i>	<i>Revenue</i>
<i>Equity held by Owner with Rank 3 (%)</i>	<i>Total Assets</i>
	<i>Total Current Assets</i>
	<i>Total Equity</i>
<i>Impairment</i>	<i>Total Fixed Assets (tangible)</i>
<i>Income before Extraordinary Items</i>	<i>Total Intangible Assets</i>
<i>Industry Code</i>	<i>Year</i>
<i>Interest Expense paid to Companies in the same Group</i>	

Appendix 2: Complete list of extracted variables from transfer dataset

Table 10 – Complete Variable list of extracted variables from the transfer dataset constructed by Janis Berzins

Transfer Data	
<i>Company ID</i>	<i>Year</i>
<i>Personal number, founder</i>	<i>Personal number heir</i>
<i>Year start family</i>	<i>Year end family</i>
<i>Age transferred firm</i>	<i>Transfer year</i>
<i>Gender founder</i>	<i>Birth year founder</i>
<i>Owner share family</i>	<i>Owner share family start</i>
<i>Rank family</i>	<i>Rank family start</i>
<i>Number of shareholders start</i>	<i>Decrease in ownership share founder with family from start</i>
<i>Decrease in ownership share founder from start</i>	<i>Age founder</i>
<i>Age founder start</i>	<i>Ownership share founder</i>
<i>Ownership share founder start</i>	<i>Ownership share founder with family</i>
<i>Ownership share founder with family start</i>	<i>CEO is founder dummy</i>
<i>CEO is founder start dummy</i>	<i>Education founder</i>

<i>Education founder start</i>	<i>Founder is on board dummy</i>
<i>Founder is on board start dummy</i>	<i>Founder is chair of board dummy</i>
<i>Founder is chair of board start dummy</i>	<i>Is salaried founder</i>
<i>Is salaried founder start</i>	<i>Departure year founder</i>
<i>Gender of heir</i>	<i>Age of heir</i>
<i>Role</i>	<i>Cfshare_rel</i>
<i>Cfshare_rel_start</i>	<i>Ch_sh_rel_start</i>
<i>Ch_sh_rel_L1</i>	

Appendix 3: Difference-in-difference-in-differences: test of difference in means

After conducting the test of differences in differences as seen in table 7, we are left with four groups, with sample means: $\bar{x}_{PreLaw,Fam}$, $\bar{x}_{PreLaw,Unr}$, $\bar{x}_{PostLaw,Fam}$ and $\bar{x}_{PostLaw,Unr}$, standard deviations $S_{PreLaw,Fam}$, $S_{PreLaw,Unr}$, $S_{PostLaw,Fam}$ and $S_{PostLaw,Unr}$ with sample sizes $n_{PreLaw,Fam}$, $n_{PreLaw,Unr}$, $n_{PostLaw,Fam}$ and $n_{PostLaw,Unr}$.

The objective is to test whether $d_1 = \bar{x}_{PreLaw,Fam} - \bar{x}_{PreLaw,Unr}$ is significantly different from $d_2 = \bar{x}_{PostLaw,Fam} - \bar{x}_{PostLaw,Unr}$.

We therefore need to determine the distribution of the final random variable (Hoggs, 2010), which represents the difference-in-difference-in-differences. Each of our means has a standard error equal to $\frac{S_{i,g}}{\sqrt{N_{i,g}}}$ for $i \in \{PreLaw, PostLaw\}$ and $g \in \{Fam, unr\}$. This in turn implies that the true means $X_{i,g}$ are distributed as $X_{i,g} \sim N\left(\bar{x}_{i,g}, \frac{S_{i,g}}{\sqrt{N_{i,g}}}\right)$. Since this is a linear combination of Gaussian Random variable we have the normally distributed PDF with:
Mean:

$$\bar{x}_{PreLaw,Fam} - \bar{x}_{PreLaw,Unr} - (\bar{x}_{PostLaw,Fam} - \bar{x}_{PostLaw,Unr})$$

Standard deviation:

$$\sqrt{\frac{S_{PreLaw,Fam}^2}{n_{PreLaw,Fam}} + \frac{S_{PreLaw,Unr}^2}{n_{PreLaw,Unr}} + \frac{S_{PostLaw,Fam}^2}{n_{PostLaw,Fam}} + \frac{S_{PostLaw,Unr}^2}{n_{PostLaw,Unr}}}$$

We then integrate the density of the PDF that is less than 0. If that integral is less than our given level of significance, then the difference is significant. This is the procedure in which obtained the p-values reported in table 7, panel A2 and B2.

