



BI Norwegian Business School - campus Oslo

GRA 19502

Master Thesis

Component of continuous assessment: Thesis Master of Science

Survival and Succession of CEOs In Norwegian Family Firms

Navn: Robin Hofset,
Samuel Blessing
Elonga

Start: 02.03.2017 09.00

Finish: 01.09.2017 12.00

Samuel B. Elonga

Robin Hofset

MSc in Business
Major in Finance

Date of submission:

31.08.2017

This thesis is a part of the MSc programme at BI Norwegian Business School. The school takes no responsibilities for the methods used, results found and conclusions drawn

Acknowledgements

With a sincere and humbled heart, we first want to thank God the Almighty for making all of this possible by providing us life, endurance, strength and insight.

We also would like to thank all the kind souls that has been supporting us throughout our thesis and research work. A special thanks to our family and friends for their unconditional motivation and faith in us.

Last but not least, we want to thank our supervisor Leon Bogdan Stacescu for his availability, guidance and assistance during our entire work.

Content

Acknowledgements	I
Content	II
Abstract	IV
1. Introduction	1
1.1 Definition of Family Firm	2
1.2 Contribution	3
2. Literature Review	4
3. Theory	6
3.1 System Theory	6
3.2 Agency Theory	8
3.3 Stewardship Theory	10
3.4 Echelons Theory	10
4. Research Questions	11
Hypothesis 1:	12
Hypothesis 2:	12
Hypothesis 3:	12
5. Data	12
5.1 Data filters	13
5.2 Variable Computation	14
6. Methodology	15
6.1 Assumptions	18
6.2 Selection Bias	19
7. Results	19
8. Discussion	21
9. Conclusion	24

10. Limitations	25
Reference List	27
Appendix	29

Abstract

In this paper, we place a magnifying glass above a special type of corporates in the Norwegian economy; the family firms. Specifically, we evaluate the CEO position and inspect factors affecting successions and tenure within these firms. We explore the Centre for Corporate Governance Research (CCGR) data over non-listed firms between year 2000 and 2015 and utilize the proceeding in our survival analysis to examine corporate governance in these complex entities. Using theories on family firms and econometric techniques we both present and discuss results provided by this empirical research. We find that ownership and family relations are the most important determinant of survivability of CEOs in Norwegian family firms. Our results show that family related CEOs survives longer than their counterparts. They consistently own a large fraction of the firms they manage, regardless of firm size. Moreover, indication of nepotism is also found in large firms as they tend to prefer family CEOs in most cases. We do however, not find evidence that large family firm CEOs have longer tenure compared to small family firm CEOs.

1. Introduction

Family firms are often thought of being very small in size. However, this way of thinking can be deceiving. Credit Bank Suisse is producing a database containing the 920 largest family businesses of the world. The database is called “CS Universe 900”. On the list, we find names of big and well-known brands such as Nike, Volkswagen, Foxconn, Samsung Electronics, Walmart and Facebook (Stern 2015). The largest family firm was the Swiss healthcare company Novartis with a market capitalization of \$279 billion. Examples of family firms in Norway are; Aker, Gyldendal, Thon Gruppen, Rieber & Søn and Ferd AS (Berzins & Bøhren 2013). Knowing that most firms in the world in fact are family firms (Morck, Stangeland, and Yeung 1998) and that some of them are large multi-billion-dollar companies, we aim to look deeper into the corporate governance of family firms, and more precisely; family firms in Norway.

Family firms constitute a great part of the Norwegian mainland economy. It might be the illusion of the word “family” that makes most of us picture a tiny store or small business when hearing the expression “family firm”. Studies by Berzins and Bøhren (2013) shows that 65% of all Norwegian firms were in fact family firms. The same study also shows that family firms are much more profitable than non-family firms. They scored on average two percent higher in profitability than other privately-owned firms that were non-family firms. Similar numbers are also found in the United States where over 90% of all corporations were either owned or controlled by a family (Lansberg 1983) (Tagiuri and Davis 1996). Further, the former president of the European commission, José Manuel Barroso stated that "Family firms are crucially important for Europe. They make a significant contribution to Europe's GNP and employment, and tend to be great innovators, with a longer-term vision". Worth mentioning in the light of that quote, is that family businesses account for 50% of Europe's GDP and on average 40-50% of employment in the private sector (“European Family Businesses – Facts and Figures” 2017). Studying family firms can give great knowledge and insight of the Norwegian economy using other lenses than just looking at the oil industry, which is a known driver of the country's economy. Family firms contributes to a

large part of the country's economy. Thus, studying the field of family businesses can contribute to a relatively large increase in value creation. The purpose of this paper is to study a crucial organ of the family firm; its management, and more precisely the survival of CEOs and their successions in Norwegian family firms. Mismanagement or mistiming of successions can be devastating for the firms, and thus for the national economy as well. The consulting giant KPMG presented statistics showing that only 30% of family firms survive into the second generation and, eventually, only 3% of family firms survives into the fourth generation ("Longevity Is in the Family - Not the Business" 2014). KPMG further states that CEO succession is one of the greatest "make it or break it" moments in a company's life (Johnson 2016). We want to investigate the differences in tenure of CEOs in family firms and identify what circumstances and variables that explains both tenure and successions. What happens to tenure when the CEO is a non-family member versus family member? How important is performance in the occurrence of succession and, by ricochet, tenure? Does firm size matter? These are some of the questions that our paper wants to shed light on. This is because we want to take a closer look at the corporate governance of family firms and see if there is a particular recipe surrounding the management of family firms. An inevitable term when studying family firms is nepotism. Exactly how much does relations influence? We want to see if there is evidence of nepotism when observing tenure of CEOs in family firms. Moreover, Performance is known to be an important factor in non-family firms as shown by previous studies (Jenter, Lewellen, 2014; Denis, Denis, 1995) and we want to investigate if it is as important in family firms. Finally, the bigger the organization, the more stakeholders there are, the more pressure and competition there is for the top position. This should have a negative effect on tenure, and we will see if this is the case for family firms or not.

1.1 Definition of Family Firm

There are many different definitions of family firms to take into consideration. The European Union definition of 2009 states that "companies meet the definition of family enterprise if the person who established or acquired the firm (share capital) or their families or descendants possess 25 percent of the decision-making rights mandated by their share of capital". Miller et al. defines this species of

enterprises by asserting that family firms are those in which multiple members of the same family are involved as major owners or managers, either contemporaneously or over time (Miller et al. 2007). The definition that we are going to apply for this paper is a blend between the European Union's definition and Miller et al's. with the addition of a specification on the requirement of ownership. Therefore, for this paper we say that a family firm is defined as a firm where a family is controlling over half the company, meaning owning over 50% of the shares. By family we mean either by blood or by marriage. The ownership requirement of 50% or more is essential for our study in the interest of survival and succession of CEOs, because an ownership of that size implies that the family can appoint the CEO. The same definition is also used by Berzins and Bøhren (2013).

1.2 Contribution

There are many studies on family firms and their corporate governance, however there is very little input on successions and CEO survival. We will contribute by exploring these important key elements. If our research proves to be significant, we can determine that our study can support future research in this field.

Succession is of a high importance for family firms for reasons mentioned above, our study can contribute by filling in on the knowledge gap in this area, or by confirming what is already there. Our study can become valuable for those who wishes to either understand this topic or to further dig in and study this with greater granularity.

In part two of the paper we will take a look at the literature review concerning corporate governance and family firms. In part three we visit theories on family firms and highlight their relevance in respect to our research questions. Part four presents our research questions formulated as hypotheses. Part five and six, deals with the data and methodology, respectively. Then in part seven, eight and nine, we present the results, discuss them and conclude our findings. Lastly, in part ten we discuss some limitations of the research.

2. Literature Review

Today, literature in the field of CEO successions in family firms consists mostly of comparing profitability before and after the succession, and comparing efficiency of appointing either a related CEO or an external CEO. There is scarcity of studies concerning CEO survivability.

Appointing a new CEO during a succession is a key organizational decision and a complex process (Datta, Rajagopalan, and Zhang 2003). When a family firm is to appoint a new CEO, they are left with the choice of either (i) appoint internally in the family, or (ii) appoint externally. Family CEOs could intuitively perform better, as a result of motivation with respect to their family, which externally appointed CEOs do not share (Kandel and Lazear 1992). Instead of having merely money and results as incentive, the related CEO also has his family as incentive to do a good job. However, Bennedsen et al. (2007) found evidence that “family successions have a large negative causal impact on firm performance”. Bennedsen et al.’s study shows that operating profitability falls by at least four percentage points as a result of a family member succeeding as the CEO. Further they claim that they cannot prove that family CEOs are more likely to file for bankruptcy or to be liquidated, compared to non-family CEOs, which is expected due to the lower performance. Bennedsen et al. explains that the reason for the underperformance is due to non-family CEOs being more qualified than the family appointed CEOs. Their study’s results lead us to our hypothesis, which claims that non-family appointed CEO successors have a higher survival rate in firms, than family related CEO successors. We suspect that the succession of a CEO is heavily dependent on the company’s performance before and after the succession. That is, there might be a self-selection bias in the data due to hidden information. In practice, it is displayed when firms of certain characteristics are more likely to take decisions in a way predefined by their characteristic. For example, family firms with bad performance might be more inclined to appoint a new CEO after a period with a family CEO or vice versa. We control for this self-selection bias using propensity scores matching. We’ll come back to that in our methodology section.

Our main findings are that ownership and family relation are the most important determinant of CEO survival in family firms. Being a family CEO increased

survivability, and the more stake a CEO had in the firm, along with family ties, the longer the survival and tenure. More surprisingly however, results showed that performance was insignificant when looking at successions (Appendix F). These finding contrasts what other studies has found when researching turnovers in businesses; indicating that family firms may be atypical entity in this respect.

Jenter and Lewellen discovers a close link between firm performance and CEO turnover. Their research found that 50% of turnovers in the first eight years of tenure were performance induced (Jenter and Lewellen 2014). Enterprises often claim that CEO departure had nothing to do with recent performance, by pointing to the fact the CEO is getting closer to his/her retirement age, or that he/she has decided to spend more time with his/her family. Although this is communicated to the public, data studied presents another image. Furthermore, their research also showed that performance induced turnover probabilities increased slowly with tenure and peaked at year 7-8. These results suggest that the learning of CEO ability is slow, that it might take a few years until you fully know whether a CEO is fully capable to do the job adequately or not. In addition, Denis and Denis (1995) also demonstrated that forced CEO turnovers typically were triggered by poor performance.

Economic theory reads that the board of directors should ignore shocks to firm performance that are caused by other factors beyond the CEO's control and boards doing otherwise are inefficient. However, a paper published by Jenter and Kanaan (2006) showed that CEOs got dismissed after bad performance even when this was due to market or industry trends. The term peer performance, which is the term used to encompass market and industry trends, indicated a weakness in the board's ability to correctly credit or blame CEOs for exogenous shocks, when it was controlled for.

The general idea in this field of study has been that performance in times of recessions is more informative about CEO quality than performance in times of economic boom. Nevertheless, no evidence was found regarding CEOs with longer tenure suffering a smaller impact from the effect of peer performance, than CEOs with shorter tenure. Intuition would have dictated that CEOs with longer tenure ought to be better known to the board for their ability both in good and bad times, and thus that they should be less affected by the effects in recessions, compared to the new CEOs. Moreover, peer performance affected

underperforming CEOs more than outperforming CEOs, indicating that boards fail to fulfill their monitoring role in good times.

Research on family firms in Norway performed by Bøhren and Berzins (2013) identified predominantly many small family firms in Norway, but also some large family firms using the European Union definition of a large firm: “At least 50 employees or at least 80 million NOK in revenues and at least 80 million NOK in assets”. The average share owned by the ultimate owner was 76% in unlisted firms and 30% in listed, indicating a high concentration of ownership among family firms in the land of the fjords. Albeit firm size varied a lot, the concentration of ownership was insignificantly different among unlisted firms.

When it comes to succession planning in family firms, communication has been identified as a critical factor (Morris, Williams, and Nel 1996). Despite being important, Michael-Tsabari and Weiss (2013) claims that little attention has been given as of literature. In their paper, they try to explain the event of succession in a family firm by the use of game theory. Their findings highlight five aspects of communication in succession processes and shows that deficient communication leads to a more problematic dialogue between founder and successor despite having the same attitude towards the succession itself. This paper is simplified, but might help give an insight in why some successions are problematic, while others are not.

There are several well-known theories about corporate governance, but again very little on the specific domains that can only be found in the family business niche. We will here explore some of the theories applicable.

3. Theory

3.1 System Theory

A lot of research on family firms are based on system theory. This theory focuses on perceiving the world as interconnected or interrelated objects. A family is a system of itself and so is a business. Early forms of the application of this theory was often utilized to show how the family system affected either positively, or negatively, the business system (Barrett 2014). Despite the neutral appearance of

the theory, it has more often been used to underline the negative influence the family has on business. Lansberg (1983), an American social psychologist, wrote an important paper where he argued how family norms created human resource problems in the business. Lansberg's baseline is that the family and the business have different reasons for existence. The family's primary social function, he argued, was to assure care and nurturance of its members. Therefore, social relations in the family were designed to meet members' various development goals. The business on the other hand, existed to generate goods and services through organized task behavior. Firms were hence guided by norms and principles that facilitated productivity. These differences in functionality were thereby viewed as sources of problems.

One of these problems was associated with recruitment; also called the problem of selection. Here, founders of family firms are faced with the difficult situation of either hiring or firing an incompetent relative. Because of the family principle of always helping a relative in need, most relatives feel entitled to claim a share of the firm and demand positions and opportunities regardless of their competence. This family rationale conflicts with the business norm of only recruiting those who are the most competent. The action of favoritism towards relatives and friends in job appointment, regardless of their competence, is known as nepotism. The dilemma of possibly breaking up the relationship with a part of the family or seeking the firm's best interest is present in all layers of the enterprise's organizational structure, including the CEO position. The higher up the ladder you go, the heavier and more pressurized the dilemma becomes. Founders often face this burdensome situation when planning for succession. In the US, past statistics showed that the average family firm existed for 24 years (Lansberg 1983). This number, not surprisingly, also corresponded to the average tenure of most founders.

This application of the theory led to a dual system view (Figure 1) where the family system was interrelated with the business system, represented by two overlapping circles.

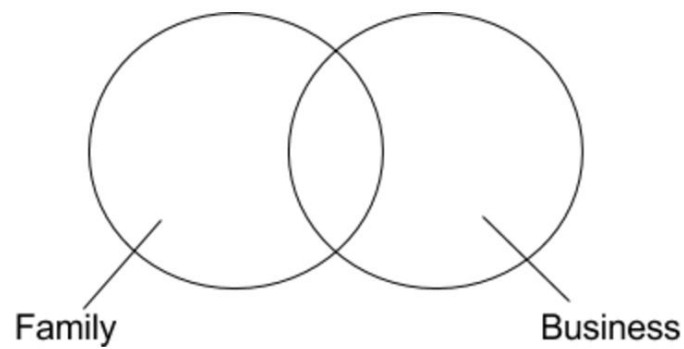


Figure 1: Dual System View

This view however has been criticized for being too simplistic and neglecting other sources of influences. This criticism led to development of a multisystem diagram, also known as the three-circle model (Figure 2) developed by Tagiuri and Davis (1996). They added a third dimension, the dimension of ownership to the venn diagram. It is the addition of the ownership system that introduces agency theory in family firms (Barrett 2014).

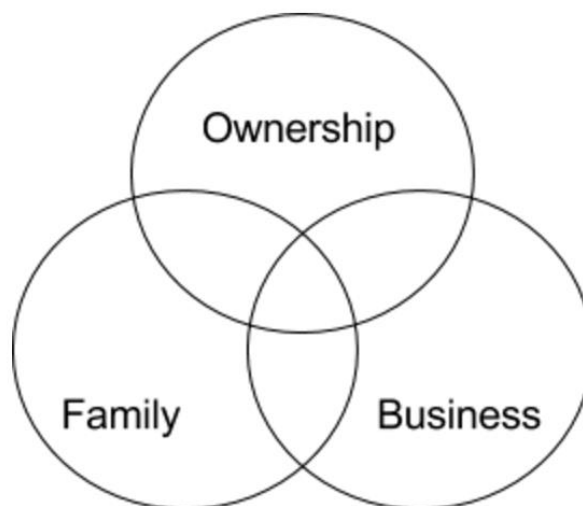


Figure 2: The Three Circle Model

3.2 Agency Theory

When studying the field of corporate governance, the agency theory is central in understanding the relationship between principals and agents. The agency theory argues how there might occur conflicts between the agents and the principals.

A common example is the relationship between a CEO (the agent) and the owners (the principals): The CEO is supposed to work in the owner's best interest, however his own interests might outshine the owner's objectives and give rise to a conflict of interest. Villalonga and Amit (2006) proposes two agency problems

relevant for family firms in their paper. Nevertheless, we have added a third found in Kraiczy (2013):

i) *The Classic Owner-Manager Conflict*

Family ownership doesn't always imply family management as stated earlier in this paper. Many family firms choose to have an external CEO either due to the absence of the needed competence and experience within the family or because of failing to reach an agreement on which family member should lead (Kraiczy 2013). The owner-manager conflict is a trivial conflict situation that occurs in both non-family firms and family firms alike. There is however, a big difference in the complexity of this situation in family firms. According to Villalonga and Amit, this conflict is less prevalent in family businesses due to the fact that the large shareholder (the firm's family) has greater incentives to monitor the manager. Family firms are a special type of investors. They are very interested in firm performance and future perspectives, while often being very weakly diversified with most of their wealth tied up in the company. This is the background of the family's incentives to monitor the manager. The family, being the largest shareholder, can also appoint new managers and keep the right to take important decisions regarding the firm. These factors limit non-family managers possibilities to use firm resources for their own purpose (Kraiczy, 2013).

ii) *Large Shareholder Extracting Private Benefits*

Villalonga and Amit states, however, that agency problem (ii) has potential to be more prevalent, as the family has greater incentives for expropriation. Agency problem (ii) is only current if they do not own 100% of the firm. This is a problem that occurs when the large shareholder, for example a family, uses its power to gain benefits privately, while the smaller shareholders bears the costs.

A third agency problem, not mentioned by Villalonga and Amit, but by Kraiczy, is an agency problem that can only occur in family firms:

iii) *Family Owner Versus Family Manager*

Although family firms hire external managers, most family firms are still run by family members. Ideally the family manager acts in the interest of the family business, agency costs are lowered through the fact that the principal and the agent are unified in the family manager (Kraiczy, 2013).

Family managers are said to be emotionally attached to the company, as their and their family's wealth are tied up to it. This is also supported by the stewardship theory. Conflicts that can arise here are problems related to free-riding of other family members, trespass of ineffective managers and a biased parental view of a child's performance (Kraiczy, 2013).

3.3 Stewardship Theory

The opposite of agency theory, is stewardship theory. Stewardship is defined as a “caring and loyal devotion to an organization, institution, or social group” (Kessler 2013). This can be seen as when the CEO serves the company's, or the owner's', interests before his own. The stewardship theory is, according to Eddleston and Kellermanns (2007), “a suitable perspective in viewing the family as a resource”. They further state that family firm members are found to be more committed to the firm. Eddleston and Kellermanns find, in their paper, evidence that altruism has positive effects on a firm's performance, which implies that families might have a positive impact on a firm, as long as it is properly managed. The same paper states, however, that altruism varies in a fairly large degree among different families, and mending the family relationship is advised for experiencing a positive effect.

3.4 Echelons Theory

The final theory that can help understand our research is the upper echelons theory. Upper echelons theory states that “organizations become reflections of their top executives” (Hambrick and Hambrick 2017). Upper echelons theory views the upper-echelon members as a collective unit, which represents the most important human capital in a firm (Kessler 2013). Human capital is one of the components that comprises intellectual capital. Intellectual capital is frequently associated with firm performance and embodies organizational knowledge (Díaz-Fernández et al. 2015).

With this in mind, we therefore think that a change in management can increase intellectual capital on one dimension but also decrease it in another. CEOs usually know their firms well and gain particular knowledge associated to that specific firm, thus frequent changes in leadership is to be seen as impractical and a weakness for a firm. However, organizations that invest time in mastering

successions can prevent the loss of organizational knowledge and discontinuity experienced during a leadership substitution. One can also think of sports teams on a professional level to understand why many teams prefer to change their management after the end of season; where it is considered as “force majeure” and risky to do otherwise during the season. Again, another example is change of leadership in huge organizations such as democratic countries, where succession work is crucial, and term lengths are usually set to 4-5 years for democratic and pragmatic purposes. One could argue that it would be more democratic to have elections more often, but unlike sports teams, yet similar to most firms, there are no end of seasons and pre-season period for preparation for these organizations. Instead, for both firms and countries, the cycle is like an ongoing relay where each leg heavily affects the outcome of the next leg. In terms of successions, longer legs provide more safety and predictability than shorter legs. This is because the point with the highest uncertainty level in the race is the handoff point; which is where everything can go wrong or well. If the distance of the leg, the term length of an office or the tenure of CEO is too short, the results would be what we’ll call a “blind handoff”. This is a succession where meager amount of information is shared from the outgoing to the ingoing CEO in order to reduce the loss of organizational knowledge. If we take a quick look back to democratic countries again we see that an important part of successful democracies is the arrangement for the transfer of power.

The upper echelon theory shows us not only the importance of leadership in organizations, but it also sheds light on the link between survivability and succession.

4. Research Questions

The main objective of our thesis is to look to at components surrounding survivability and succession of CEOs in family firms. We will examine differences in this area with respect to family related CEOs and non-family related CEOs. We will also look for evidence of nepotism by investigating preferences on CEO type. Lastly, we will look at the effect of firm size on survivability.

Hypothesis 1:

Non-family related CEO successors have a higher survival rate than family related CEO successors.

Bennedsen et al (2007) found that non-family CEO successors are more likely to have attended college and to be more seasoned. As a result, they have a higher degree of competence and perform better than family related CEO successors. Therefore, we suppose they will do a more successful job and thus survive longer.

Our second hypothesis is pointed towards family firms' preference of CEO type given firm size. We want to investigate whether Norwegian family firms have a tendency to hire non-family CEOs when the business is larger and the responsibility greater. This is in the light of the same findings by Bennedsen (2007), which stated that non-family CEOs were better qualified for the top position.

Hypothesis 2:

Larger family firms tend to choose non-family related CEOs.

Finally, our last and third hypothesis is again directed to large family firms. This, in order to investigate differences in the corporate governance of large and small family firms. That is, we want to see whether the firm size affects survivability of CEOs.

Hypothesis 3:

Large family firms' CEOs tend to have higher survivability than smaller family firms' CEOs.

5. Data

We have gathered data from the Centre for Corporate Governance Research (CCGR), which includes accounting data and financial reports of Norwegian firms. Our dataset consists of non-listed stock companies. The Norwegian

“Folkeregisteret”, which contains information about marital status, number of children, divorces etc. is by law not made public, one cannot even retrieve information about oneself. This limits our ability to construct family trees and find our way to family firms by blood or marriage. However, the data set contains a variable that tells us whether the CEO is from the largest family or not looking at ultimate ownership. By the notion of ultimate ownership, we mean the sum of the family’s direct and indirect ownership of the company through other companies (Bøhren 2013). It is also important to note that indirect ownership via holding companies became a widespread trend in Norway after the tax reform in 2016 which resulted in the personal income taxation of dividends and capital gains (Berzins, Bøhren & Stacescu, 2013).

The dataset comprises twenty-two variables, where the first variable in each row is the company ID and twenty-one remaining are descriptive variables linked to that company including the year of observation. The time frame of all observations ranges from year 2000 to year 2015. Which means that if a company has been present in the data during the entire study, we should have a total of sixteen periods (years) of data for that particular company. That may seem like a little number, but when you take into account that the dataset contains 478 249 companies, and each has minimum one period of presence and maximum sixteen, including the twenty-one remaining variables per firm, per year; yields an extensive dataset. In exact numbers, our data set to begin with, contains 3 461 962 observations between years 2000 and 2015.

The dataset, despite its extensiveness, has to be restructured and be subject to various transformations until we can utilize it beneficially for our paper and research questions.

5.1 Data filters

We call our stage of data restructuring for “distillation”. This is the stage where we design filters with certain key characteristics in order to extract the firms that we want to study.

In our first round of distillation, we add filter 1, which removes all companies with zero revenues. This is because we want to make sure that we have firms that are economically active. Sometimes people can register firms, but to only engage in the firm many years later. These could be start-ups, or due to the fact that one is

awaiting for retirement before living out the entrepreneurial dream with less risk, or that one is having a firm as a backup plan in case an opportunity would arise. Either way, these special cases are not in our interest.

In distillation round number two we introduce our second activity requirement with filter 2, which is the removal of all firms with no employees.

In distillation-round three we proceed with the introduction of our family definition, which is an ownership requirement of more than 50%. As mentioned earlier in the paper, there are various ways to determine whether a business is family or not, however we adjust our lenses to focus on ownership as a demarcator.

In our fourth round of distillation we remove all firms where there is no data on the CEO age and gender. This is because without this information on the CEO, it is impossible to determine a succession in the data, and further to create a succession variable to analyze.

Lastly, since we are interested in succession and survivability over time, we remove all firms that have presence of less than 4 years in the data set.

After our distillation process, our dataset is refined to contain 68 421 companies that fulfill our requirements and definition for family firm.

5.2 Variable Computation

Prior to being able to thoroughly analyze the data, we need to perform some data transformations by computing new variables deriving from the existing variables in our possession. We will mention just the most important ones.

First from variables on CEO information, we have computed a succession variable through time, that takes on values 1 in the year where succession occurs and zero if no succession. This variable is a delicate variable as one must make sure that successions reads the change of CEO information within the same firm ID only, or else this misspecification will show a succession each time there is a change of firm; which is untrue. Similar to this, is also the computation of the CEO ID variable crucial for the survival analysis setup.

Second, we use variables providing company information like revenue, number of employees, net income; to create variables to assert for indicators such as performance and company size.

These additional variables allow us to control for what is called hidden information in the data set; the large set of control variables reduces the likelihood for omitted variable bias being a serious issue.

6. Methodology

The way to tackle our research questions, and get to our results, requires the selection of an appropriate model to fit our data. Our dataset follows firm information throughout several years, which implicate that we have a longitudinal data at hand, also known as panel data. Longitudinal data consists of n cases over t time periods, and as mentioned earlier consist $n \times t$ number of observations.

Consequently, data of this nature are said to be in long form. In less technical terms; in long format, each row is one point in time per subject, therefore each subject (firm and CEO) have data in multiple rows. Any variable that doesn't change across time will have the same value in all rows. In our case that could be, for example, variables indicating industry codes, zip codes and corporate form. The long format is imperative in order to be able to perform a proper survival analysis, which is the method that we will apply for this study.

Survival analysis are methods of analyzing data sets where the outcome variable is the time until the occurrence of an event of interest. In our case, the time until the occurrence of a succession. These methods are widely used in the field of medicine concerning treatment effects, epidemiological studies measuring time to recovery or time-to death, hence the name of "*survival analysis*" (Sedgwick 2012; Altman and Bland 1998). The time to event, (succession) and survival (tenure) can be measured in days, weeks, months etc. Our time periods are measured in years which is also the unit embedded in our study. Before we go deeper into survival analysis and explain our choice of model within these analyses, we want to address a question that probably will arise in the well-trained mind if the question has not been posed already. Why not apply a linear regression to model the survival time as a function of covariates? Linear models are extremely popular, widely used and to certain extent easier to work with and interpret. However, imposing a linear relationship can be a huge step away from reality. In our case, there are two major points that moves us away from the more traditional ordinary linear regression.

Reason number one is that linear regression may not be the best choice because of the way it deals with time. Survival times are always positive numbers and their distributions are often skewed. This is because we are always measuring the time till something occurs, we always start from $t=0$ and start to count forward until the event of interest occurs. This means standard statistical methods that assumes normal distributions are ruled out. As we know, normality is a big assumption that can be easily violated, but that we can adjust for to some extent. As far as ordinary regressions are concerned, a meticulous time transformation must be performed in order to bypass that restriction.

Moreover, the reason number two is the handling of censored observations. Censoring is a genre of missing information in the data. Observations are classified as censored when the information about their survival time is unknown or incomplete. For example, our data trails the firms and CEOs from year 2000 to year 2015. If the event of interest, a succession, occurred in the time period post 2015, that is, outside our data, then this firm/CEO is said to be right censored in our study. As the name suggest, it is called right censored in the light of its position on the timeline of the study. The survival time of an entity with this feature in survival analysis is treated to be at least as long as the duration of the study (here sixteen years). Another such incidence, also present in our data, is the dropout of the observed individual. The same way a patient present in a medicine study can be released from the hospital and consequently not finish the study; a firm in our data can go bankrupt before the year 2015 and thus not finish the study, or the firm's profile may change in the subsequent years so that firm does no longer meet our predefined criteria. This could be for instance, that the firm met our requirement of an ownership of at least 50% for the family, but at some point within the study time, is reduced to less than 50%, and thus is retained in our filter. These observations are then called censored. Ordinary least regression lacks an effective way of handling censoring and are therefore an inadequate choice when selecting a model to fit a survival data (Despa, n.d.). What the survival analysis does, according to Despa, is to correctly incorporate information from both censored and uncensored observations. Further, Mario, Gould and Gutierrez (2008) claims that the real problem with linear regression in survival analysis is with the assumed normality.

To model time to event, where the event is succession, we apply the “Cox Proportional Hazard Model” (hereby referred to as “Cox model”). The model was first introduced in 1972 from Dr. Cox (thereby the name) and is one of the most frequently cited articles in statistics and medicine. (Cox 1972). The Cox model is used to evaluate the effect of several factors or covariates at the time a specified event takes place. The number that reveals this relationship is known as the hazard rate. What is here called a “hazard” is simply the event of interest occurring. This means that the hazard rate is the instantaneous probability of the given event occurring at any point in time. The hazard rate can also be understood as the “relative risk”; the risk of the event occurring. We can plot this in a graph against time on X axis and get the hazard function; which is the equation that describe the plotted line.

The Cox model is expressed by the hazard function (“Cox Proportional-Hazards Model” 2017):

$$h(t) = h_0(t) \times \exp(b_1x_1 + b_2x_2 + \dots + b_px_p)$$

where,

- t is the survival time
- $h(t)$ is the hazard function determined by a set of p covariates (x_1, x_2, \dots, x_p)
- the coefficients (b_1, b_2, \dots, b_p) measure the impact of covariates.
- h_0 is called the baseline hazard, it corresponds to the value of the hazard if all x_i are equal to zero (the quantity $\exp(0)$ equals 1). The ‘ t ’ in $h(t)$ reminds us that the hazard may vary over time.

As previously stated, the *hazard rate* is a probability where the range is to lie between 0 and 1. However, since the hazard rate is the expected number of events per one unit of time, it can exceed 1. If the hazard rate is 0.5 at time t and then in our case on average, 0.5 successions are expected per CEO at risk per year. It is also possible to use the reciprocal method to interpret the number, by saying that $1/0.5 = 2$, which means that the expected hazard-free time is 2 years.

Now since we are comparing groups with respect to their hazards, we focus on the *hazard ratio* (or ratio of hazards). The hazard ratio is equal to hazard in the

intervention group divided by the hazard in the control group. Mathematically expressed that is

$$HR = \frac{\Sigma O_{Exp,t} / \Sigma E_{Exp,t}}{\Sigma O_{Unex,t} / \Sigma E_{Unex,t}} = \frac{\Sigma O_{treated,t} / \Sigma E_{treated,t}}{\Sigma O_{control,t} / \Sigma E_{control,t}}$$

The interpretation of the hazard ratio is slightly different, a ratio of 0.5 means that in any particular time, half as many firms in the treatment group are experiencing an event compared to the control group. Conversely a ratio of 1, means that event rates are the same in both groups, and a ratio of 2, means that twice as many in the treatment group experience the event versus the control group (Sedgwick 2012).

6.1 Assumptions

When applying the Cox proportional hazard model, there are some important assumptions to assess before being able to safely apply the model. First and foremost, there is the assumption of “non-informative censoring”. Censoring in survival analysis should be non-informative, meaning that participants who drop out of the study should do so to reasons unrelated to the study (Ranganathan and Pramesh 2012). In our case that translates into firms being dropped out because of the occurrence of a succession. Violation of this assumptions scrutinizes any survival analyses and produces bias in results. This assumption is satisfied in the design of the underlying study, the data. Our dataset continues to follow firms in periods after the event of interest as well. Firms that drop out of our study do so either because they go bankrupt, or does no longer meet our requirements and definition for a family firm.

The second key of assumption of the Cox model is the issue of proportional hazards. This means the effect of the covariates in hazard must be constant over time. This is inspected graphically by looking at the survival curves showing the logarithm of the estimated cumulative hazard functions. The assumptions are said to be satisfied when the lines are roughly parallel (Bewick, Cheek, and Ball 2004) (see appendix A).

Finally, after having checked for these two main assumptions remains the issue of linearity and additivity. That is, since the effect of covariates is to be constant over time, its effect is assumed to be linear (Bewick, Cheek, and Ball 2004; Perme and Andersen 2008). We check for this by plotting a smoothed average over the martingale residual against a covariate Z. In our analysis, the smoother was

roughly flat and horizontal indicating that assumption was satisfied and no transformation was needed (See appendix B).

6.2 Selection Bias

To address the issue of self-selection bias, dealing with whether firms of certain characteristics tend to have predefined decisions, we have used propensity score matching (PSM). The propensity score (Pscore) is the probability that a unit with certain characteristics will be assigned to a treatment group. In our case, that is the probability of a firm possessing certain characteristics (covariates) to experience a succession. This is important to eliminate selection bias by balancing the covariates. The score is used to create a matched set in order to approximate a random experiment. We addressed self-selection in succession using firm size and performance as control variables for matching firms.

The propensity score in our case was insignificant, indicating that there was no selection bias. Moreover, as a confirmation, neither the Pscore nor the two control factors were found to have a significant effect on succession when running the survival analysis.

7. Results

We will in this section present key results relevant to our hypotheses. The first result we present is from the Cox model using only one covariate; “Family Related CEO”. The hazard ratio of approximately 0.21 tells us that there is almost 5 times more successions for non-family related CEOs, compared to family related ones (Table 1).

	Haz. Ratio	Std. Err.	z	P> z
Related CEO	0.2098755	0.0047137	-69.51	0.00

Table 1: Cox Model Output 2

We further perform the same Cox model, now adding six other significant covariates. The Cox regression with the simultaneous effect of the covariates show that the hazard ratio becomes 0.85 for family related CEOs (table 2). This

ratio is substantially different from the previous hazard ratio of 0.2. A hazard ratio of 0.85 indicates that family related CEOs have a 15% lower succession rate compared to the non-family related CEOs. Moreover, the regressions show us that the hazard ratio is decreasing when the share owned by CEO is increasing. Approximately for each percentage owned by the CEO, the hazard ratio is reduced by a factor of almost 2,5%.

The hazard ratio is in addition slightly decreasing with an increasing CEO salary. Number of employees, which implicitly indicates firm size, increases the hazard ratio by a factor of ~1.005 for each extra employee. This implies that the tenure is shortened by having more employees under management; by being a larger company. It is worthwhile to mention that our definition of large firms is “a firm with 50 or more employees” (EU’s definition).

CEO age has a positive effect on tenure, reducing the hazard ratio by 3,6% for each year added. Lastly, number of board members is also found significant, the findings shows that the more members on board increases the rate of succession by a fair amount; approximately 15% for each board member added.

	Haz. Ratio	Std. Err.	z	P> z
Direct Own Family	1.0083410	0.0014313	5.85	0.00
Family Related CEO	0.8526238	0.0306896	-4.43	0.00
CEO Salary	0.9999997	6.29E-08	-6.10	0.00
Share Owned by CEO	0.9755199	0.0006875	-35.17	0.00
Nr. of Employees	1.0048460	0.0005782	8.40	0.00
CEO Age	0.9642737	0.0013982	-25.09	0.00
Nr. of Boardmembers	1.1493170	0.1520990	10.52	0.00

Table 2: Cox Model Output

To aid us in our discussion of the hazard ratios of family, and for better understanding of the whole picture, we present some summary statistics for each covariate with respect to CEO relation to the family (Table 3).

	Mean	Std. Err.	N
CEO Salary			
Family	381,487	1,073	484,120
Non-Family	417,582	1,090	72,217
CEO Share			
Family	76%	0.04	496,167
Non-Family	36%	0.06	58,708
Number of Employees			
Family	5.7	0.01	514,816
Non-Family	8.4	0.05	76,779
CEO Age			
Family	49.2	0.14	514,816
Non-Family	45.8	0.03	76,779
Number of Board Mem.			
Family	1.8	0.01	512,281
Non-Family	2.7	0.04	76,680

Table 3: Mean comparison of "non-family related" and "family related" CEOs

To address the hypothesis on whether large firms tend to choose non-family related CEO over family related CEO, we present the results of frequency distribution below (Table 4). There is a total of 3,468 CEOs in the large family firms subgroup dataset, and results shows that 70% of the large firms are led by a family related CEO. Indicating, with a fair margin, that large family firms tend to choose family related CEOs.

	Freq.	Percent
Non-family related CEO	1,024	29.53
Family related CEO	2,444	70.47
Total	3,468	100

Table 4: Large Firm CEO Distribution

8. Discussion

When looking solely at whether a CEO is related to the family or not, we find that family related CEOs have almost five times longer tenure, compared to non-family related CEOs. This finding does not support hypothesis 1, “*Non-family related CEO successors have a higher survival rate than family related CEO successors*”. Furthermore, looking at several factors simultaneously, which gives us a more reliable hazard ratio, still shows that family related CEOs have longer tenure. Hence, we find no support for hypothesis 1 in our research.

The reason for this could possibly be found in the variable containing information on CEO ownership. We see clearly that family related CEOs consistently own a

large share of the firm (Table 3). This high ownership concentration is present regardless of firm size, which is consistent with what was found by Berzins and Bøhren (2013). Ownership concentration, they argued, reflected how much power and how strong incentives large owners had to involve themselves in company's operations and strategy. Our results showed that family related CEOs on average owned 76% of the shares in the company. By clearly being the largest owner, they also possess the right to appoint the CEO. It is unlikely to expect someone to fire themselves, especially when they have so much power and interest in the company. This idea is also supported when we distinguish between CEOs with majority stake and not, where we find that family relation is insignificant when the CEO is the largest owner (Appendix D).

Results from Bennedsen (2007) favored non-family CEOs over family, by pointing out that they were likely to be more seasoned, educated and have more competence. However, ownership and the power it entails, if not equal, appears to overrule these traits. Moreover, the family CEO is also on average monitored by a smaller board than the non-family CEO is (table 3), making their position less controlled and most likely less influenced by critical owners than their counterpart.

Non-family related CEOs tend to have higher salary than family related CEOs, approximately an average of 36,000 NOK more on a yearly basis. This is not so surprising as for what we know from stewardship theory. Family CEOs often take on the steward role and under-reward themselves in order to reduce costs and assure the continuity of the firm. The regression showed that salary had a positive effect on tenure. By implication this favored tenure for non-family CEO as they on average were rewarded with a higher pay. The positive effect of salary on tenure could be due to the fact that a higher salary make change more difficult and more expensive. We know that the Norwegian labor law is very protective on employment. Although leaders are subjects to a reduced protection, most firms sign contracts including a parachute deal where the subject is entitled to receive generous compensation if employment is terminated. The use of this is most frequent in the rank of executives in companies. This compensation can be a considerable cost for most firms, hence it is reasonable to assume that it might outweigh other factors in the consideration of potential dismissal. Again, from agency theory we also know that salary is also to serve as incentive given by the principal to the agent in order to reduce conflicts of interest. So, an agent with a

good pay is expected to take more care of his position because of the alternative cost of losing the job increases with pay. The appropriate amount of incentive is said to aid alignment of the agent's interest to the principals. This can explain how increasing salary influences tenure positively. Another plausible reason could be that better CEOs receive higher salaries. Thus, as a result of doing a better job, they have longer tenures.

In hypothesis 3, we further anticipated that firm size would affect the hazard ratio. Number of employees was in this research a significant covariate. We recall that this number is the underlying factor used to assess firm size. When the number of employees grows, that is, the firm size, results shows that tenure decreases. This is not evidence supporting hypothesis 3. This could be justified by both internal and external factors in motion. By internal we mean that the complexity, responsibility and tasks associated with the CEO position increases with firm size. The increase of workload can either be wearing out the CEO and/or it can also be more revealing regarding his/her weaknesses. As for the external factors, increase of firm size also allows the firm to attract more talents as the CEO position is becoming more prestigious. Increased competition for the position, both from within and outside the firm, is expected to have stringent effect on tenure.

As CEOs grow older, it is reasonable to expect them to be more experienced and seasoned, and therefore perform better which in turn grants them longer tenure. This is also reflected in the results above. Interestingly, family related CEOs tend to be older, approximately 3.4 years, than non-family related CEOs. There are three possible reasons for that: One could be the that they in fact happened to be both founder and top executive of the firm. Most founders wait until they have worked for a certain period in their lives and accumulated enough capital to start on a venture. This is typically done to reduce the risk of owning one's own firm and being undiversified. Another possible reason, again linked to the founder, is work experience. One can expect that the knowledge capital and experience accumulated over time being employed in a specific industry, could give the individual strong enough "wings to fly on his own". Reason number three could be in the case where family CEOs belongs to second generation of family CEOs, that is that they had to wait for the first generation to retire or quit before taking the position. In general, active founders are the longest tenured members in organizations (Gabrielsson 2017). This is also supported by Lansberg (1983).

Finally, the number of board members, which is our last covariate in our study, had negative impact on CEO tenure. The reason for this might stem from the fact that CEOs' influence decreases when there are more board members monitoring as mentioned above. On average, non-family related CEOs tended to have 3 board members, whereas family related CEOs tended to have 2. Based on traditional corporate governance, the board is the highest company organ supervising executives and responsible for assuring that the administration is navigating towards the vision and goals of the company. This covariate has a coefficient of almost 14% per added board member, in our case again in favor of family CEOs as they on average have fewer members overseeing them. Berzins and Bøhren (2013) presented that in 81% of the cases the family CEO is also the chairman of the board. This reflects again the concentration of power and influence held by family CEOs in family firms.

9. Conclusion

Our research on Norwegian family firms contrasts previous findings on family firms in Denmark by Bennedsen and literature on CEO dismissals.

Andrew Carnegie, a famous American tycoon, stated that “inherited wealth, deadens talent” and therefore chose to give most of his wealth to charity (Economist 2012). In comparison, a famous Norwegian tycoon, Stein-Erik Hagen, stated “In Norway we want to transfer what we have created to the next generation. It is in our blood and culture” he later emphasized his statement by pointing out that Norway is one of the few countries in the western world where there still exist what is called an “Odelsrett” (the right to inherit farm land from your closest relative) (Langberg and Lynum 2017). Mr. Hagen, in contrast to Mr. Carnegie, chose to pass his wealth down through a family company, led by his daughter.

This illustrates the importance of both ownership and family relations in Norwegian family firms. Consistent with the anecdote above, we find that family CEOs have higher survivability and are more preferred to take on the position in both small and large Norwegian family firms.

10. Limitations

With the overwhelming amount of information contained in our dataset, it seems paradoxical to declare some shortcomings. Registrations of these statistical numbers only date back to the beginning of the second millennium, and hence we only have firm data over a time period of a decade and a half. As we have commented earlier concerning censoring, we have very little right censoring as data goes up to 2015. However, because of the left censoring, it is unknown how long a firm has been running and also how long a CEO has been in position prior to year 2000. The Cox model takes account for this, however the maximum tenure time possible in our data is 16 periods, here measured in years. Moreover, some companies had incomplete records in different key variables (e.g. CEO birth year) which made it impossible to construct succession data encompassing their stats and hence they got removed. Another limitation in CEO identification was inability to distinguish between new and old CEO if they both was of the same sex and born in same year, it was then assumed to be the same CEO.

With time however, the dataset will become longer and wider gaining more years and firm information. This will favor various kinds of survival analysis with less data transformation.

When it comes to firm size, we used the EU definition of a firm with more than fifty employees. Another EU definition for a large company is that it must have at least 80 million NOK in revenues and at least 80 million NOK in assets. Our dataset contained information on revenue, however not on assets owned, hence the usage of the first definition. It is possible that using the latter definition would have produced different findings. It is for example known that service companies are less asset intensive than manufacturing companies, but in return more labor intensive. That means there can be huge gap in revenues between two firms from each category, but that they would be classified in same class of large firms in our definition. Conversely a manufacturing company present in our data could be in the high revenue and asset class but end up classified in small firms because it has less than 50 employees. Finally, another indicator limitation is our measurement on firm performance. We have used the gross margin as indicator by dividing net income on revenues. This tell us about a company's ability to generate profit measured in percentages of revenue. This is an important measure, but can

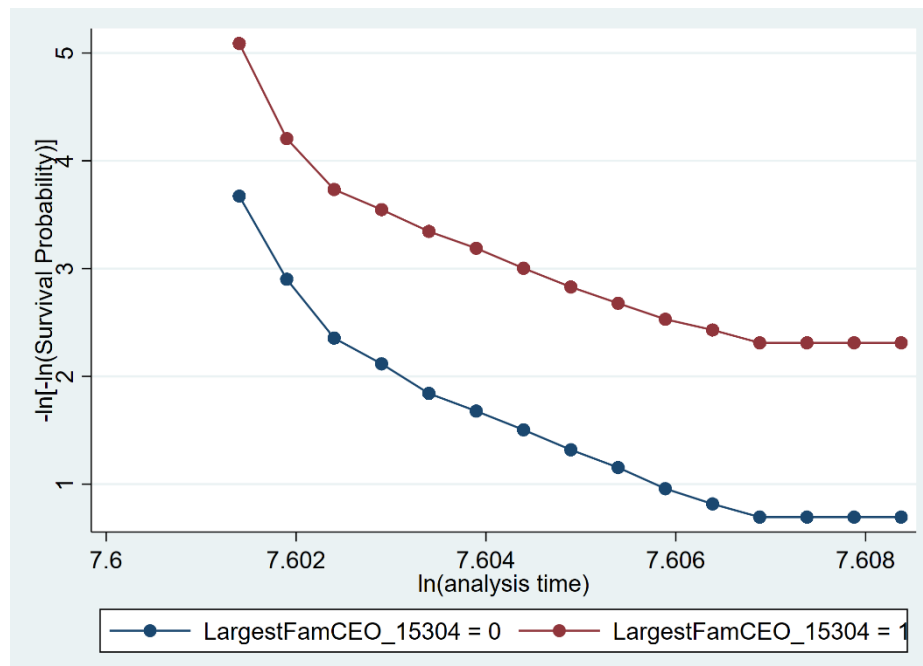
however suffer to account for other relevant information on performance. For example, a firm that had conducted considerable investments activity one year or maintenance work, would have seen their gross margin affected negatively compared to its peers that didn't. Our dataset did not include complete accounting data in order to compute other measures such as return on assets (ROA), or economic value added (EVA) since there was no data on assets or invested capital respectively.

Reference List

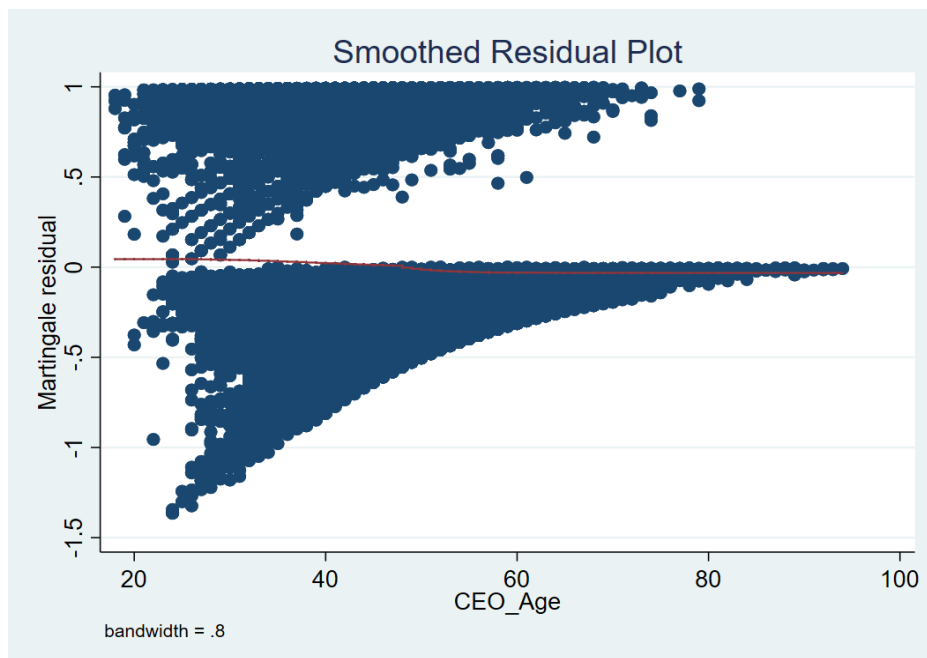
- Altman, D. G., and J. M. Bland. 1998. "Statistics Notes: Time to Event (survival) Data." *BMJ* 317 (7156): 468–69.
- Barrett, Mary. 2014. "Theories to Define and Understand Family Firms," Faculty of Business - Papers, , 168.
- Bennedsen, Morten, Kasper Meisner Nielsen, Francisco Perez-Gonzalez, and Daniel Wolfenzon. 2007. "Inside the Family Firm: The Role of Families in Succession Decisions and Performance." *The Quarterly Journal of Economics* 122 (2): 647–91.
- Berzins, Janis, and Øyvind Bøhren. 2013. "Norske Familiebedrifter--Omfang, Eierstyring Og Lønnsomhet." *Praktisk økonomi & Finans* 30 (03). Universitetsforlaget: 57–73.
- Bewick, Viv, Liz Cheek, and Jonathan Ball. 2004. "Statistics Review 12: Survival Analysis." *Critical Care / the Society of Critical Care Medicine* 8 (5): 389–94.
- Cox, D. R. 1972. "Regression Models and Life-Tables." http://www.stat.cmu.edu/~ryantibs/journalclub/cox_1972.pdf.
- "Cox Proportional-Hazards Model." 2017. Accessed August 3. <http://www.sthda.com/english/wiki/cox-proportional-hazards-model>.
- Datta, Deepak K., Nandini Rajagopalan, and Yan Zhang. 2003. "New CEO Openness to Change and Strategic Persistence: The Moderating Role of Industry Characteristics." *British Journal of Management* 14 (2). Blackwell Publishing Ltd: 101–14.
- Denis, David J., and Diane K. Denis. 1995. "Performance Changes Following Top Management Dismissals." *The Journal of Finance* 50 (4): 1029–57.
- Despa, Simona. n.d. "What Is Survival Analysis?" *Cornell Statistical Consulting Unit*. <https://www.cscu.cornell.edu/news/statnews/stnews78.pdf>.
- Díaz-Fernández, M. Carmen, M. Carmen Díaz-Fernández, M. Rosario González-Rodríguez, and Biagio Simonetti. 2015. "Top Management Team's Intellectual Capital and Firm Performance." *European Management Journal* 33 (5): 322–31.
- Economist, The. 2012. "Keeping It in the Family." *The Economist*. The Economist. <https://www.economist.com/news/asia/21567419-family-firms-adopt-unusual-approach-remain-competitive-keeping-it-family>.
- Eddleston, Kimberly A., and Franz W. Kellermanns. 2007/7. "Destructive and Productive Family Relationships: A Stewardship Theory Perspective." *Journal of Business Venturing* 22 (4): 545–65.
- "European Family Businesses – Facts and Figures." 2017. Accessed August 30. <http://www.europeanfamilybusinesses.eu/family-business/facts-figures>.
- Gabrielsson, Jonas. 2017. *Handbook of Research on Corporate Governance and Entrepreneurship*.
- Hambrick, Donald C., and Donald C. Hambrick. 2017. "Upper Echelons Theory." In *The Palgrave Encyclopedia of Strategic Management*, 4. Basingstoke: Palgrave Macmillan.
- Jenter, Dirk, and Fadi Kanaan. 2006. "CEO Turnover and Relative Performance Evaluation." doi:10.3386/w12068.
- Jenter, Dirk, and Katharina Lewellen. 2014. "Performance-Induced CEO Turnover." *SSRN Electronic Journal*, November. doi:10.2139/ssrn.1570635.
- Johnson, Beverly J. 2016. "The Biggest Life Event in Your Family Business | KPMG | GLOBAL," October. <https://home.kpmg.com/xx/en/home/insights/2016/09/the-biggest-life-event-in-your-family-business.html>.
- Kandel, Eugene, and Edward P. Lazear. 1992. "Peer Pressure and Partnerships." *The Journal of Political Economy* 100 (4). University of Chicago Press: 801–17.
- Kessler, Eric H. 2013. *Encyclopedia of Management Theory*. Sage Publications.
- Kraiczy, Nils. 2013. *Innovations in Small and Medium-Sized Family Firms: An Analysis of Innovation Related Top Management Team Behaviors and Family Firm-Specific Characteristics*. Springer Science & Business Media.
- Langberg, Øystein Kløvstad, and Frank Lynum. 2017. "Verdens Rikeste Mann Gir Bare «smuler» Til Barna. Nå Ber Han Flere Om å Gjøre Det Samme." *Aftenposten*.

- January 22. <https://www.aftenposten.no/article/ap-6JK58.html>.
- Lansberg, Ivan S. 1983. "Managing Human Resources in Family Firms: The Problem of Institutional Overlap." *Organizational Dynamics* 12 (1): 39–46.
- "Longevity Is in the Family - Not the Business." 2014, June. <https://home.kpmg.com/xx/en/home/insights/2014/05/longevity-is-in-the-family.html>.
- Mario, Cleves, William W. Gould, Roberto G. Gutierrez, and Yulia Marchenko. 2008. "An Introduction to Survival Analysis Using Stata." *StataCorp LP*.
- Michael-Tsabari, Nava, and Dan Weiss. 2013. "Communication Traps: Applying Game Theory to Succession in Family Firms." *Family Business Review*. SAGE Publications, 0894486513497506.
- Miller, Danny, Isabelle Le Breton-Miller, Richard H. Lester, and Albert A. Cannella. 2007. "Are Family Firms Really Superior Performers?" *Journal of Corporate Finance* 13 (5): 829–58.
- Morck, Randall K., David A. Stangeland, and Bernard Yeung. 1998. "Inherited Wealth, Corporate Control and Economic Growth: The Canadian Disease." Working Paper Series. National Bureau of Economic Research. doi:10.3386/w6814.
- Morris, Michael H., Roy W. Williams, and Deon Nel. 1996. "Factors Influencing Family Business Succession." *International Journal of Entrepreneurial Behavior & Research* 2 (3): 68–81.
- Perme, Maja Pohar, and Per Kragh Andersen. 2008. "Checking Hazard Regression Models Using Pseudo-Observations." *Statistics in Medicine* 27 (25): 5309–28.
- Ranganathan, Priya, and C. S. Pramesh. 2012. "Censoring in Survival Analysis: Potential for Bias." *Perspectives in Clinical Research* 3 (1): 40.
- regjeringen.no. 2007. "The Act Relating to Gender Equality," April. regjeringen.no. <https://www.regjeringen.no/en/dokumenter/the-act-relating-to-gender-equality-the-/id454568/>.
- Sedgwick, P. 2012. "Hazards and Hazard Ratios." *BMJ* 345 (sep07 1): e5980–e5980.
- Stern, Corey. 2015. "The 21 Biggest Family-Owned Businesses in the World." *Business Insider*. July 14. <http://www.businessinsider.com/the-worlds-21-biggest-family-owned-businesses-2015-7?r=US&IR=T&IR=T/>.
- Tagiuri, Renato, and John Davis. 1996a. "Bivalent Attributes of the Family Firm." *Family Business Review* 9 (2): 199–208.
- . 1996b. "Bivalent Attributes of the Family Firm." *Family Business Review* 9 (2): 199–208.
- Villalonga, Belen, and Raphael Amit. 2006/5. "How Do Family Ownership, Control and Management Affect Firm Value?" *Journal of Financial Economics* 80 (2): 385–417.

Appendix



Appendix A: Graphical assessment of the proportional hazard assumption



Appendix B: Smoothed Residual Plot – Martingale Residuals

	Haz. Ratio	Std. Err.	z	P> z
Direct Own Family	1.0077840	0.0015968	4.89	0.00
Family Related CEO	0.3623931	0.1127635	-3.26	0.00
CEO Salary	0.9999997	7.27E-08	-3.67	0.00
Share Owned by CEO	0.9687865	0.0013267	-23.16	0.00
Nr. of Employees	1.0059830	0.0009244	6.49	0.00
CEO Age	0.9636053	0.0016495	-21.66	0.00
Nr. of Boardmembers	1.0618760	0.0158640	4.02	0.00

Appendix C: CEOs own 50% or less of the shares

	Haz. Ratio	Std. Err.	z	P> z
Direct Own Family	1.015119	0.0034431	4.42	0.00
Family Related CEO	0.4335933	0.1901395	-1.91	0.06
CEO Salary	0.9999999	9.64E-08	-9.88	0.00
Share Owned by CEO	0.9864007	0.0009869	-13.69	0.00
Nr. of Employees	1.0116650	0.0013216	8.88	0.00
CEO Age	0.9743304	0.001988	-12.75	0.00
Nr. of Boardmembers	1.3592600	0.0282166	14.79	0.00

Appendix D: CEOs own more than 50% of the shares

	Haz. Ratio	Std. Err.	z	P> z
Direct Own Family	1.009178	0.0014693	6.78	0.00
Family Related CEO	0.8683915	0.0320078	-3.83	0.06
CEO Salary	0.9999996	6.56E-08	-5.55	0.00
Share Owned by CEO	0.9739697	0.0007105	-36.15	0.00
Nr. of Employees	1.0047730	0.0005782	8.27	0.00
CEO Age	0.9627698	0.0014271	-25.6	0.00
Nr. of Boardmembers	1.1323170	0.0154117	9.13	0.00
PSM-scores(ln)	1.04996	0.8858938	0.06	0.954

Appendix E: PSM-Scores included

	Haz. Ratio	Std. Err.	z	P> z
Direct Own Family	1.008348	0.0014317	5.86	0.00
Family Related CEO	0.8527097	0.0306953	-4.43	0.00
CEO Salary	0.9999996	6.30E-08	-6.07	0.00
Share Owned by CEO	0.9755191	0.0006876	-35.17	0.00
Nr. of Employees	1.0048460	0.0005783	8.40	0.00
CEO Age	0.9642858	0.0013994	-25.06	0.00
Nr. of Boardmembers	1.1492630	0.0152117	10.51	0.00
Performance	0.9917366	0.0390714	-0.21	0.833

Appendix F: Performance included

```
. teffects psmatch (SuccessionD) (LargefirmD Performance)
```

```
Treatment-effects estimation      Number of obs      =    591,595
Estimator      : propensity-score matching    Matches: requested =         1
Outcome model  : matching                      min =         1
Treatment model: logit                        max =    2163
```

SuccessionD	Coef.	AI Robust Std. Err.	z	P> z	[95% Conf. Interval]	
ATE						
LargefirmD (1 vs 0)	.0066356	.0056114	1.18	0.237	-.0043625	.0176337

Appendix G: Propensity Score Matching