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# GRA 19703

Master Thesis

Thesis Master of Science

EFFECT OF GENERATIONAL CEO TURNOVERS ON FINANCIAL PERFORMANCE OF PRIVATE NORWEGIAN FAMILY FIRMS IN THE OIL INDUSTRY


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| Start: | 15.01.2020 09.00 |
| Finish: | 01.09.2020 12.00 |

# EFFECT OF GENERATIONAL CEO TURNOVERS ON FINANCIAL PERFORMANCE OF PRIVATE NORWEGIAN FAMILY FIRMS IN THE OIL INDUSTRY

## Master Thesis

**by**

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***MSc in Finance***

**Oslo, September 1, 2020**

## ABSTRACT

Using data of private Norwegian family firms in the oil industry, we study the effect of generational CEO turnovers –between 2000 and 2017– on companies' financial performance. We analyze firm performance by examining changes in operating return on assets in the years surrounding the CEO changes. We identify that, on average, family CEO successions: turn over the company to a younger generation, happen in smaller firms, and do not occur after a period of declining performance. More importantly, we find that family firms that undergo a family CEO succession experience no significant change in financial performance after the turnover compared to non-family CEO successions. Moreover, when controlling for firm age, CEO age, and year type, our findings suggest that family firms that undergo a family CEO succession experience a positive and significant change in profitability. Finally, given that the oil industry poses great importance to the Norwegian economy, we conclude that the effects in performance are attributed to CEOs acting as stewards of their firms and having a pressure to behave and maintain stable financial performance to contribute to the industry's wellbeing.

**Acknowledgements**

We would like to thank our wives, Sandra and Leslie, and our parents which have always been supportive throughout our two-year Master's degree journey that ended with the writing of our Master Thesis. We would also like to thank our supervisor, Bogdan Stacescu, who was of great help and was always available to guide us through every step of the way during our research. We have had very busy times in the past two years and especially in the past months, and we are very grateful that we were able to successfully combine our Master's studies and our Master Thesis writing with work, with our personal life at home with our families, and with a global pandemic taking place.

## Contents

## List of Abbreviations

CCGR – Center for Corporate Governance Research

CEO – Chief Executive Officer

DD – Difference-in-difference

DDD – Difference-in-difference-in-difference

NOK – Norwegian kroner

NPV – Net Present Value

OROA – Operating Return on Assets

SIC – Standard Industrial Classification

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β – Regression coefficients

ε – Error term of the regression

## 1 Introduction and Motivation

CEO succession is an important topic in corporate governance given that the chief executive officer is a critical element that makes important decisions and defines the strategy that can influence firm performance (Child, 1972; Wasserman, 2003). Moreover, it is the key figure in most firms which is supposed to maximize shareholder value, resulting on everyone –workers, consumers, suppliers and distributors– being better off (Lazonick & O'Sullivan, 2000). Particularly, family-related CEO successions are specific cases that are perceived as a controversial and unfair practice based on "birth rights" more than on merit given that management positions are limited to a restricted labor pool of candidates that could potentially lead to competitive disadvantages relative to non-family successions (Anderson & Reeb, 2003).

However, even though this topic has become more relevant throughout the years, there have been only a few studies that try to determine the impact of family CEO successions on firm performance[1]. Additionally, this existing evidence mostly focuses on the effect on public firms' performance, leaving an incognito on the way private firms are affected by CEO turnovers. Furthermore, considering the fact that most family firms in the world are private, hence they represent a larger part of the world's economy compared to public firms (Bøhren, Stacescu, Almli, & Søndergaard, 2019), conclusions on current empirical evidence might not be considering a representative data set. Therefore, with this master thesis we will aim to fill this gap and we will analyze how family related CEO turnovers could potentially affect or benefit the profitability of a private business.

In Norway, 99.7% of companies are private (Bøhren, 2011) and 71% of all firms in the economy are family firms (Bøhren, Stacescu, Almli, & Søndergaard, 2019). More importantly, family firms outperform non-family firms in terms of profitability across different firm size groups and across most industries (Berzins, Bøhren & Stacescu, 2018). So, it is clear that private family firms pose a significant

[1] Brian Smith and Ben Amoako-Adu (1999), Francisco Pérez-González (2006), and Morten Bennedsen et al. (2007).

contribution to the Norwegian economy. Furthermore, the country has had an oil-based economy ever since "black gold" was found in the North Sea.[2]. Rystad Energy (2019) estimates the size of the Norwegian oil service industry to be valued at 373 billion NOK in 2018, which represents approximately 20% of Norway's economy. Therefore, we focus our research on this industry and specifically on private family firms. Hence, we obtain from our data 3,542 private, family-owned companies in this important sector that are normally not on the "financial focus" because they don't trade on the Oslo Stock Exchange and it is difficult to track their behavior. Therefore, it is important to determine how the transition from the older oil pioneers to a younger generation might have an impact on their financial performance and consequently on the Norwegian oil industry as a whole.

Avoiding nepotism and appointing an outside-of-the-family CEO when there is a turnover, might bring good results to family firms. When there is a family CEO turnover, firms might be exposed to underperformance due to problems that could arise between family members and business objectives (Levinson, 1971; Barnes and Hershon, 1976; Lansberg, 1983). These issues could potentially be avoided by having an outsider CEO succession instead. Additionally, non-related CEOs have a higher drive to outperform given that they always face pressure from the labor market to deliver good results (Fama, 1980). Finally, these non-family executives are selected from a larger pool of managerial talent (Burkart, Panunzi & Shleifer, 2003) and, therefore, might be better prepared to manage the company and make decisions to improve its profitability.

On the other hand, keeping the CEO position within family members might not have a negative outcome, but could actually benefit the firm in terms of financial performance. First, family CEOs have a long-term focus that non-family CEOs lack (Cadbury, 2000). So, while the outsider chief executive officer is only worried about the results and performance during his tenure, the family CEO has a more look-ahead approach where he cares about what happens to the firm even after he

[2] In May 1963, the Norwegian Government proclaimed sovereignty over the Norwegian continental shelf and in the 1970's production and exploration officially started. (Norwegian Petroleum, 2020)

has left the position. Second, given the fact that they are "insiders in the firm", they are argued to have hard-to-obtain, firm-specific knowledge and higher levels of trust from stakeholders (Donnelley, 1964). Third, family CEOs are also argued to be stewards of their firms (Davis, Schoorman, & Donaldson, 1997). Finally, by reducing agency problems, they may enhance financial performance of their firms (Anderson & Reeb, 2003).

In this master thesis, we investigate the effects of generational CEO turnover on financial performance of private, family-owned Norwegian firms within the oil industry. We will also analyze the characteristics of these firms and its CEO turnovers. This research will be conducted on financial data results of these firms which were established in Norway as a result of the oil exploration and boom that started in the 1970's. Furthermore, we will analyze their performance post millennium time in the 2000-2010's, when the CEOs (usually also founders and owners) of those companies reached retirement age and left the firms to a new CEO.

We use company data from the database of the Center for Corporate Governance Research (CCGR) of BI Norwegian Business School. This database provides financial and ownership information of private firms according to their industry codes. In our research we will consider all the industry codes related to the oil service industry to filter the companies that belong to this business segment. With this information, first we will determine all the CEO turnovers in our sample. Afterwards, we will classify them as either (1) a family succession, where a family member related to the departing CEO stays as CEO or (0) an outsider succession, where the appointed CEO does not have family ties with the departing CEO.

After the classification of each turnover, we assess the effects that they have on financial performance. Given that we are not dealing with public companies, neither profitability nor financial performance can be determined by tracking stock prices and identifying abnormal returns because private companies don't trade on a stock exchange. So, instead of this approach, we focus on changes in accounting-based measures of performance around CEO successions. Hence, we evaluate firm

performance analyzing differences in operating return on assets following the CEO turnover literature[3].

Our results indicate that, on average, family CEO successions have certain characteristics. First, when a turnover occurs, the companies' leadership goes from the old CEO to a younger generation. Second, this family transitions happen in smaller firms with less institutional ownership. And, third, this type of successions does not occur after a period of declining performance. Moreover, our main results indicate that family firms in the Norwegian oil industry where a new CEO related to the actual CEO is appointed, experience no significant changes in OROA after compared to before the turnover compared to firms that appoint a non-family chief executive officer. Hence, financial performance of these private family firms is not significantly affected either positively nor negatively by a CEO turnover where the incoming CEO is related with the departing one. However, when we control for firm age, CEO age, and type of year of the succession, we find that family firms that undergo a family CEO succession experience a positive and significant change in profitability after compared to before the succession compared to non-family CEO successions.

In conclusion, our results could be attributed to the fact that the Norwegian oil industry has been quite regulated from the very beginning (St. meld. nr 76 (1970-1971), 1971) and its activities are meant to build a common welfare and financial security for Norway's future generations (St. meld. nr 25 (1973-1974), 1974; St. meld. nr 28 (2010-2011), 2011). Moreover, the oil industry is the largest and most important industry, in terms of value, to the Norwegian economy (Norwegian Petroleum, 2020). Therefore, these regulations and common interests make it a solid industry in which CEOs, whether they are inside or outside the family, act as stewards of their firms and have a pressure to behave and maintain stable financial performance, even during a succession, to contribute to the industry's and their welfare's wellbeing.

[3] David J. Denis and Diane K. Denis (1995) and Mark R. Huson et al. (2004)

# 2 Literature Review

## *2.1 Family and non-family CEO's: Benefits and downsides*

The CEO position in family firms can be a difficult subject when it comes to the succession to a new CEO. The choice of the new CEO will determine what kind of direction the company will take, as a family member and an outsider will most likely have different values and management style for the company (Lyman, 1991). Moreover, the choice is important as a family firm CEO's tenure is significantly longer than the one in non-family firms (Cromie, Stephenson & Monteith, 1995; Gallo, 1995). Hence, the firm wants to make the best possible decision, as it could be for the long run. Furthermore, the process turns especially difficult in private family firms where the family has a very strong ownership and control and where the founder has been the firm's only CEO since inception. In this case, the family wants to preserve personal and social control rather than have an outsider come in and potentially change these values (Daily & Dollinger, 1992).

On the one hand, having a family CEO could be beneficial for the firm. First, they are argued to be stewards of their firms and to obtain a lot of personal satisfaction if the firm has a healthy financial performance and, thus, if it is successful (Davis, Schoorman, & Donaldson, 1997). Therefore, this could potentially reduce the frictions –agency problems– between management and shareholders. And, in turn, by reducing agency problems, they may furtherly enhance financial performance of their firms (Anderson & Reeb, 2003). Moreover, a family CEO can also reduce agency costs by concentrating the decision making and cash flow rights (Fama & Jensen, 1983), as well as facilitating firm specific investments, easing cooperation and transfer of knowledge inside the firm (Barnes & Hershon, 1976). Second, they are focused on the long term (Cadbury, 2000), which gives them a more look-ahead approach where they care about what happens to the firm even after they have left the position. Besides, Barnes and Hershon (1976) argue that family firms rely on family and personal psychology rather than business logic, which could also lead to long-term success of an organization (Pérez-González, 2006). Third, they are considered to have firm-specific

knowledge and higher levels of trust from stakeholders (Donnelley, 1964). This particular set of characteristics along with different motivations –other than salary or bonuses– such as family peer pressure, shame or guilt will encourage them to perform (Kandel & Lazear, 1992; Davis, Schoorman, & Donaldson, 1997). Additionally, apart from personal and financial incentives, they have incentives to capture private benefits of control that an outsider CEO cannot obtain, and this can further help to increase the value of the firm (Burkart, Panunzi & Shleifer, 2003; Morck & Yeung, 2004; Adams, Almeida & Ferreira, 2005). Finally, in certain cases where founders of firms maintain a strong attachment to their business, they will continue to act as an owner even after they relinquish their ownership (Arthurs & Busenitz, 2003) which could potentially create a conflict with the new CEO. Hence, having a family CEO could prevent this issue given that it will be more likely that the successor follows the instructions or suggestions from the retired founder due to their family tie.

However, on the other hand, the close collaboration between family members could also backfire and hurt performance (Kepner, 1983). So, having a non-family CEO has also been proven by theory to be a good decision. First, an outside-of-the-family chief executive officer could help prevent problems that could arise between family and business decisions (Levinson, 1971). For instance, evading nepotism could avoid conflicts of interests when a family member needs to be hired, fired or needs to be assigned an executive pay. According to Lansberg (1983) founders of a company had a difficult time managing family relatives, such as hiring and firing incompetent relatives, which affected their relationship with part of the family. During a succession to a new CEO, Lansberg (1988) found that these tensions are particularly acute. Second, these “outsiders” have a higher drive to outperform given that they are constantly pressured by the labor market to deliver good results (Fama, 1980). Finally, non-related CEOs might be better prepared to manage the firm given that they have been selected from a larger pool of managerial talent (Burkart, Panunzi & Shleifer, 2003).

*2.2 CEO successions in family firms: Existing empirical evidence*

There are three studies that analyze CEO successions in family firms: Brian Smith and Ben Amoako-Adu (1999), Francisco Pérez-González (2006), and Morten Bennedsen et al. (2007). Hence, these are the ones that we mainly analyze, compare and contrast. However, there are two additional studies that complement the topic in hand and present additional findings. Therefore, we also mention them at the end of this section, by stressing points in which they are relevant and useful.

Brian Smith and Ben Amoako-Adu (1999) examine 124 senior management successions in family-controlled firms in Canada. They analyze the impact of senior management turnover on stock prices and performance. 49 out of the 124 senior management successions were CEO succession, out of which 18 were family CEOs and the remaining 31 were outsiders. The paper indicates that performance pre-succession does not predict whether a family member or an outsider will become the new CEO. In fact, they find a negative return when a family CEO is announced for succession, while the long run returns are actually superior compared to the outsider CEOs. Moreover, they find a correlation between family management and lower median return on assets (ROA). Finally, they find that stock prices decline when family successors are appointed. On the other hand, when a non-family successor gets the position, there is no significant decrease.

This paper, even if it has similarities to our study, has several differences and short-comings. First, the authors use only public companies and, therefore, no conclusions can be drawn regarding the effect on private firms. Furthermore, they make a deeper analysis that indicates that the negative stock price reaction to the family CEO might be due to the young age of the new CEO, and not necessarily to the family tie. This could mean that age and experience, independent of the family connection, play a more important role. It could also mean that investors think that the family CEO does not have the talent for the job. There are several uncertain variables to arrive to a proper conclusion. So, in our research, we are filling this gap by using private firms which are not affected by the market's perception of the new CEO. Finally, the sample size in their study is small. Therefore, by using data on

private firms, which make up most of the universe of companies in the world, we can be considered to have a larger sample than this study.

Francisco Pérez-González (2006) studies the impact of inherited CEO positions on the performance of publicly traded U.S. corporations. In his case, the sample size is larger than the previous study. He uses 335 management transitions. He finds that firms where the new CEO is related to the departing CEO tend to underperform in terms of operating profitability compared to unrelated CEO successions. Alternatively, he finds that when an external CEO is hired, abnormal positive returns are observed both upon announcement and three years after. As mentioned previously, the paper highlights that nepotism hurts performance by limiting the access to talent pool in the labor market. Furthermore, this research, contrary to many others, focuses on accounting-based measures as opposed to stock prices which we agree is the more accurate measure of a CEO's impact. We are aware that there are far too many factors that come in to play that can affect the stock price before, during, and after a CEO succession, it is, therefore, very hard to determine the new CEO's success based on the stock price of the firm. Another interesting finding was that the average age of a family CEO in a succession is, on average, 8 years younger than unrelated CEOs. This raises the question if the lower age is a contributor or even the main reason that can explain why family CEOs perform worse. This point was discussed in Smith and Amoako-Adu (1999) as there is an analysis that indicates that it is the family CEO's young age that causes concern, and not necessarily its ability. Eight years is a considerable gap which means that family CEOs have on average much less experience than "outsiders", which could explain the poor performance better than the CEO's relationship to the owner of the firm itself. Pérez-González (2006) finds large and significant differences within the family CEO succession, where the successor has not attended a very competitive college will underperform compared to outsider CEO's. He does not find the same for a family CEO that has attended a competitive college. It's interesting to see that family successors that have a good education from a competitive college do not perform much differently to outsider CEOs picked from a large pool of talents.

Again, this paper only considers public companies and, therefore, fails to present a conclusion for private companies. Hence, we can complement the findings of this study with ours since we use a sample which will be on private companies. Furthermore, a good approach that the author uses is to use several indicators to measure performance. He uses abnormal returns and he also uses accounting-based measures of performance such as operating return on assets.

Morten Bennedsen et al. (2007) use a dataset from Denmark to determine the impact on firm performance of appointing either a family or an external CEO, which is the same objective we have for our thesis. The authors were among the first ones to show the isolated causal effect a family CEO has on firm performance, as others have included other top executive positions in their research. They find that family successions have a negative impact on firm performance. Moreover, they attributed this underperformance to be particularly large for large firms with a skilled labor force in fast growing industries. Non-family CEOs, on the other hand, provided superior performance, which might be explained by the change in the governance structure following a CEO succession, rather than the new CEO's ability and talent. These findings are interesting as controlling families with benefits of control might select a family CEO, despite knowing it might lead to lower performance, given that they prefer the private benefits over performance. However, Morten Bennedsen et al. (2007) showed that family CEO's still underperform unrelated CEO's even when the family remains on the board of directors, which should keep the corporate governance working as well as it did. This evidence supports the superiority of the non-family CEO, as the earlier research by Anderson & Reeb (2003) did, and Villalonga & Amit (2006) indicates that family firms outperform their counterparts due to superior corporate governance mechanisms.

The difference of Morten Bennedsen et al. (2007) from the other papers is that the authors use instrumental variables to solve the endogeneity and omitted variables issues. However, they also use OROA as their main variable of interest. Interestingly, this paper uses a Danish dataset which includes a larger number of successions compared to other studies and it also includes both, publicly and

privately held companies. Hence, we could say that this study's data could be closely similar to ours. Furthermore, it might also be similar in the sense that Danish firms might be more similar to Norwegian companies as they share culture, values, and geography.

### *2.3 Additional studies*

Molly, Laveren and Deloof (2010) study the impact that a family business transfer has on the financial structure and performance. They use a sample of 152 small- to medium-sized businesses in the period between 1991-2006 where the goal is to identify the effects of a succession. They find no evidence that profitability is affected by a succession and state that a succession should not be viewed as a negative event in the life cycle of a family business. Compared to the previous three papers, this is the only one that does not find a decrease in profitability after a succession. This study is focused on capturing several successions in one firm if they experienced such, as opposed to just a single succession. The authors refer to Davis and Harveston (1998), Davis and Harveston (1999), Schulze, Lubatkin, and Dino (2003), and Villalonga and Amit (2006) who have shown that a transfer from the founder to the second generation can be different from a transfer from the second generation to the third generation. The survival rate of a transfer according to U.S figures (Birley, 1986; Ward, 1997; de Vries, 1993) is that about one third of family businesses survive into the second generation and that 10% to 15% make it into the third generation. Hence, making family business successions one of the most difficult steps in the life cycle of a family firm (Miller, Steier & Le Breton-Miller, 2003). This study does not specify the geography of the firms in the sample other than that they are European. The sample seems fairly small if they are using all of Europe to draw companies from. However, the number of firms is reduced given that they use only private firms, just as we are doing, to differentiate themselves from the previous researches done on public firms.

Burkart, Panunzi, and Shleifer (2003) present a model on transfer from the founder to the successor, and what impacts the decision between choosing a professional manager or the heir. They are focusing on firms where the founder is

managing the company and the way in which the legal environment shapes the founders' decision for leaving the firm to the family heir or to an outsider. They point out differences across countries with separation of ownership and management. They state that in the United States, founders hire professionals early on, and by the time the founder retires the family will have very little ownership in the firm. On the other hand, in Western Europe, the families retain significant ownership after the retirement of the founder. The authors argue that there are three theories of the benefits to a family of preserving control: (1) "amenity potential" (Demsetz & Lehn, 1985) which refers to the private benefits of control that do not come at the expense of profits, (2) reputation by having the family name tied to the firm, and (3) avoiding the possibility that the outsider manager will expropriate investors. The authors' model agrees with the evidence of Morck, Stangeland, and Yeung (1998), and Pérez-González (2001) in that family management is generally inferior to professional management.

### *2.4 Norway's family business outlook and the oil industry*

Private family firms in Norway contribute considerably to the Norwegian economy. On the one hand, private companies represent 99.7% of all companies in the country (Bøhren, 2011). And, on the other hand, 71% of all firms in the economy are family firms (Bøhren, Stacescu, Almli, & Søndergaard, 2019). So, the amount of private family firms that make up the economy is quite considerable. Moreover, CEO transitions are events that sooner or later will take place in any of these companies. The old CEO will eventually come to a retiring age or would need to be replaced by any of several other reasons. Furthermore, given the nature of these private family firms, some might have family CEO successions. So, studying the impact of family CEO successions in performance of private, Norwegian family firms becomes really relevant in a country like Norway.

Furthermore, to make the research more relevant, it was imperative for us to focus on an important industry in Norway. Therefore, we focused on the oil business activities given that the revenues from the petroleum sector have been representative to the Norwegian economy in the past four decades and especially in

the last twenty years. Over more than 40 years, petroleum production on the shelf has added more than 9,000 billion NOK to the country's GDP (Ministry of Petroleum and Energy, 2012). Figure 1 shows the way in which the value of the industry has increased with the years ever since oil was found in the 1970's. Additionally, the figure not only suggests that there has been an improvement in value and size with a sustained growth, but it also shows that it has played a relevant role for the development of the country as a whole given that it now represents approximately 25% of the total annual income generated among all industries. This indicates that oil could have had set the foundations for what is now a strong, healthy, and wealthy Norwegian economy.

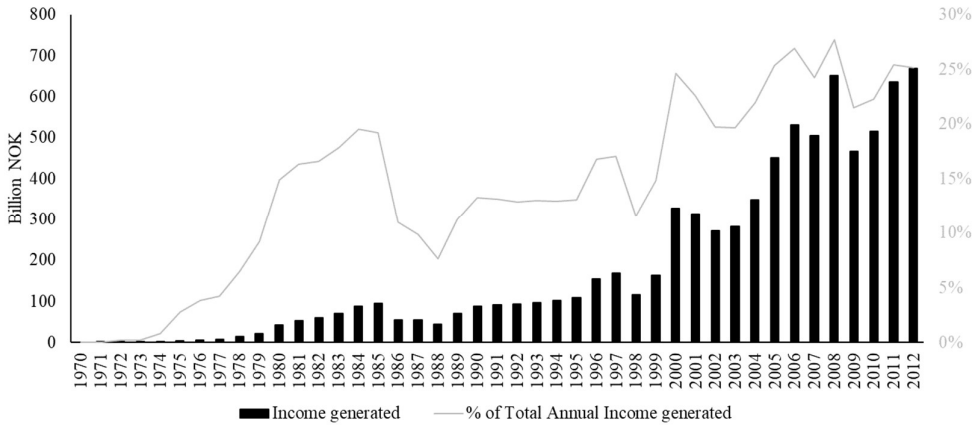


Figure 1.- Historic value of the Norwegian oil industry

Historic value creation, in billion NOK, of the oil industry in Norway since 1970 when oil was found. In the secondary axis, the oil industry value as a percentage of the total value of the Norwegian economy. Source: National Accounts, Statistics Norway

Furthermore, even though 25% of the economy might not sound as astonishing as it is, compared to all other industries, the petroleum sector is the largest one in Norway. Hence, it is important both, in size and value. Figure 2 shows that the oil service industry in 2012 created almost three times as much value as the second most important industry. Moreover, it is still the most important industry today. This reinforces the numbers presented in Figure 1 and definitely sets the industry as one of the pillars of the country's economy. As a matter of fact, today, the sector still plays a vital role in the Norwegian economy and the financing of the Norwegian welfare state (Norwegian Petroleum, 2020).

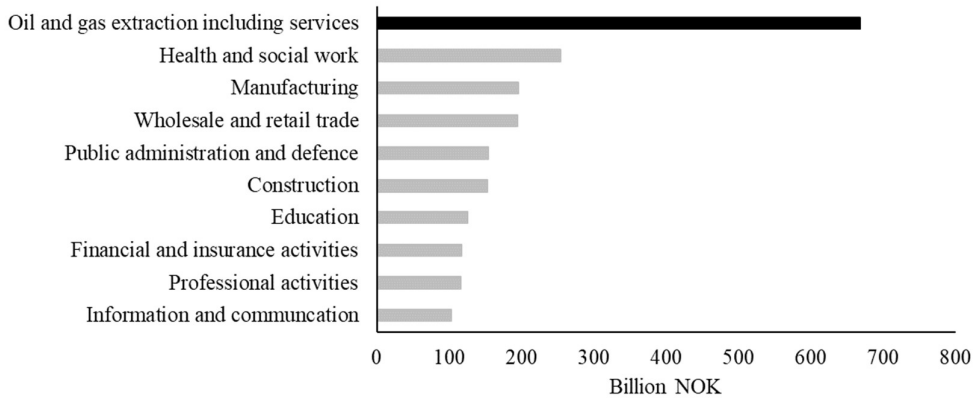


Figure 2.- Value of Norway's top industries

Value, in billion NOK, of top industries in Norway during 2012. Source: National Accounts, Statistics Norway

Besides, not only the resource and the industry themselves have given Norway a considerable amount of wealth, it is also due to a proper management of the profits produced. Long-term perspective in the management of the government's petroleum revenues ensures that they benefit Norwegian society as a whole, and that future generations will benefit from Norway's petroleum wealth (Norwegian Petroleum, 2020). Hence, to do so, Norway created the Government Pension Fund Global where they transfer all of the income from petroleum activities and whose main goal, according to Norges Bank Investment Management (2020), is to "safeguard and build financial wealth for future generations".

Finally, as mentioned previously, the industry has been heavily regulated since inception (St. meld. nr 76 (1970-1971), 1971). Thus, the government has managed to develop a financial and legal framework for the whole sector. Some of these regulations include exploration licenses, high taxes, area fees, investment guidelines, among others. Therefore, given that the industry is important for the whole economy, that its revenues are used to create a common welfare for Norwegians, and that there are quite some regulations in place, these suggest that it is a solid industry in which private family companies in it must have a pressure to deliver results and contribute to it. Moreover, CEO's understand this fact and must be aware that a lot of pressure is on them to behave and maintain stable financial

performance, even during a succession, to ensure the firm's and the industry's wellbeing. So, for all of these reasons it is interesting to explore what will be the effect of family CEO turnovers on performance in a country like Norway that has a high concentration of private family firms and in an industry that is really relevant to the country's economy.

## 3 Theory and Methodology

### *3.1 Impact of successions on performance: Norway's oil industry case*

The last section helped us identify that while there are more positive arguments in the CEO literature towards having a family CEO, most of the studies that analyze CEO successions in family firms find that family CEO turnovers tend to lead to an underperformance of the firm after the succession took place, compared to outsider CEO turnovers. Hence, given this mixed and opposed evidence, we want to investigate what is the case in the Norwegian oil industry given that, as mentioned before, is one of the most important industries in the country. Therefore, our research question being based on the effects of CEO turnover on financial performance of private, family firms within this sector in Norway:

*Will private Norwegian family firms in the oil industry that undergo a family CEO succession experience a significant change in financial performance after compared to before the turnover, compared to the change in financial performance after compared to before the turnover for those that undergo a non-family CEO succession?*

### *3.2 Corporate Governance theories*

Our research is built upon well-known management theories in corporate governance: the agency theory, the stewardship theory, and the stagnation perspective. Perhaps the best-known theory is the agency theory which has been used in many previous researches on the relationship between ownership structure

and firm value (Thomsen & Pedersen, 2000). This theory states that individuals who own less than 100% of a firm's equity will likely act as an agent rather than a steward to the firm and will, therefore, pursue their own interests at the expense of the shareholders and culture of the firm (Dawson, Paeglis & Basu, 2018). However, even if the founder's ownership is less than 100% but still high, the founder will perceive their stake to be higher due to the sweat equity they have put in to the firm (Dawson, Paeglis & Basu, 2018). Hence, according to Wasserman (2006), agency theory is more likely to describe executives who did not create an organization, which is one of the main concerns for family firms. Nevertheless, the agency conflict may be reduced or eliminated if the managers are significant owners themselves or if they are members of the controlling family; in which case, dealing with the conflict needs to be traded off with potential inferior quality compared to hired professionals (Villalonga et al., 2015). However, Maury (2006) found the opposite regarding this trade off: family owners' active control in the firm yields better performance compared to non-family owners. Besides, Fama and Jensen (1983) argue that agency conflict might be lower in family firms, and thus help family firms outperform its counterpart. Therefore, there are no clear results that can tell us if an outsider CEO will perform better than a family CEO, or if the agency conflict causes bigger drawbacks than lack of talent inside the family.

Conversely, while the agency theory addresses manager-principal interest divergence, the stewardship theory defines situations where managers are not motivated by individual goals, but rather are stewards whose motives are aligned with the objectives of their principals (Davis, Schoorman & Donaldson, 1997). This theory was introduced to help define relationships that were based upon certain behavioral premises other than the agency theory (Donaldson & Davis, 1991). Additionally, the stewardship theory is based on a psychological perspective, which states that individuals will invest greatly in their organization to the benefit of all (Le Breton-Miller & Miller, 2009). This particular philosophy is interesting when dealing with private family-owned firms, and it can be helpful explaining entrepreneurial and pro-organizational behaviors (Corbetta & Salvato, 2004). Moreover, Miller and Le Breton-Miller (2005) argue that leaders in family-owned businesses care deeply about the continuity or longevity of the enterprise, and this

leads to a community culture of motivated and loyal staff due to the nurturing of the staff (Arregle et al., 2007; Beehr, Drexler Jr & Faulkner, 1997). This focus on longevity also creates strong connections with outside stakeholders who can endure and stay with the firm when things get difficult (Das & Teng, 1998; Tsui-Auch, 2004).

On the other hand, the stagnation perspective is an alternative way of thinking for many family-owned businesses as the stewardship theory is not widely accepted (Miller, Le Breton-Miller & Scholnick, 2008). Despite the upside of having a family CEO, the stagnation theory argues that conservatism will prevail and this will hinder growth ambitions as well as opportunities (Allio, 2004). Furthermore, Morck and Yeung (2003) go as far as saying that family secrecy favors collusion over competition, while Schulze, Lubatkin & Dino (2003) argue that resource restrictions, family conflicts, succession difficulties, undertaking conservative strategies, and eschewing growth will compromise the longevity of the company. Hence, as we can see so far, the three theories have some shared and opposing views related to having family and non-family managers and CEO's.

### *3.3 Testable hypotheses*

Therefore, after all the empirical evidence and background related to the theories, there is still no clear answer as to who –a family CEO or an outsider– could perform better in a succession that occurs in private family firms. Although the studies and the theories are relevant, they likely apply differently based on the type of firm and certain specific scenarios. Hence, such as the pros and cons of the CEO literature and the empirical studies presented in our literature review, we argue that the theories could also neutralize and balance each other out depending on the firms themselves, the industry they are in, and the economic relevance and role they play in the country they are located in. Therefore, in our particular case, we expect that we will not find any significant difference in financial performance after compared to before the turnover, between family firms with a family CEO succession and the ones with a non-family CEO succession due to the nature of the industry and the country it is located in. Moreover, we expect this would be the case

even if the family succession involves a younger generation or even if there is a difference in firm characteristics. Hence, we formally arrive to our hypotheses:

(1) Family firms that undergo family CEO successions will tend to leave the company in hands of a younger generation, potentially the sons, daughters, nephews, or nieces of the current CEO, rather than leaving it to a contemporary generation to the CEO, say his/her brothers or sisters.

We state this first hypothesis based on the belief that family firm owners acting as CEO's would try to seek continuity for their firms. Therefore, they would be more likely to appoint their heirs, whom they have "trained", instead of choosing to leave the firm to a family member with similar age as them who will eventually end up transitioning the firm to someone else of his/her choice, who is perhaps not approved by the initial CEO. We believe that a younger generation is more suited to follow the stewardship principle, apply their firm-specific knowledge, and provide the company with a stable financial position. Finally, having this hypothesis also allows us to study and address age difference in successions and see its implications, just as other studies have done.

(2) Family firms that undergo family CEO successions are expected to be smaller firms where decisions are made internally by the controlling family and with less outsiders' opinion due to lower institutional ownership.

We believe that in smaller family firms, the CEO might most likely be the owner or founder of the firm and he would have high and concentrated ownership. Moreover, given the size of the firms, having institutional ownership might be seldom. Hence, these characteristics of family firms could lead them to incline towards appointing family CEO's as successors.

(3) Family CEO turnovers in family firms are not necessarily preceded by periods of declining performance in the three-year period before the succession, while it might be the case in non-family CEO turnovers.

As mentioned before, when appointing a new CEO, family firms might decide to appoint an "insider". Therefore, given our first hypothesis in which we believe that family firms having family CEO successions, on average, will turn over the company to a younger generation, by formulating our third hypothesis we expect for family CEO turnovers to happen due a family or other type of decision and not because there has been declining performance in the firm and, hence, a new CEO needs to be appointed to improve profitability. Finally, our last three hypotheses refer to our main research interest. Hypotheses 4 and 5 merely address the result of having single time-series comparisons for each type of succession, while hypothesis 6 directly addresses and aims to answer our research question by taking into account time-series and cross-sectional comparisons.

(4) Family firms that undergo a family CEO succession do not have a significant change in their financial performance (after the succession compared to before the succession).

(5) Family firms that undergo a non-family CEO succession do not have a significant change in financial performance (after the succession compared to before the succession).

(6) Family firms that undergo a family CEO succession experience no significant change in OROA (post-turnover compared to pre-turnover) compared to family firms that undergo a non-family CEO succession.

*3.4 Identifying CEO successions*

To answer our research question and test our hypotheses, it is crucial to analyze the effects of the CEO turnovers in our firm sample. Hence, the first step is to identify the CEO successions that took place in the Norwegian oil industry. To do so, we used our company data and ran it in STATA. We decided to use STATA because we believe it is a robust statistical software which is better than other programming languages, such as R, for a type of research such as ours. Additionally, it is more user-friendly and possesses really good data management

capabilities that allowed us to have better control over our data set. Besides, we declared our data as a panel given that we have different companies and a set of years for each of them. Hence, we wanted to have firm-year observations and STATA proved to also be a better option when handling this type of data sets.

Once our panel data was ready, we used the industry codes to filter the firms that are classified as having any economic activity related to oil. Therefore, we did not limit our sample to firms dedicated only to oil production itself, but, more exhaustively, we considered all the ones involved in the whole supply chain: the oil service industry. For instance, we considered firms dedicated to mapping and exploration of oil wells, drilling, building of platforms, extraction, piping, refining, and distribution of this non-renewable natural resource. By doing so, our results are able to provide us with insights for us to draw conclusions about the whole oil industry in the country and do not limit the outcomes to only one economic activity within the sector.

Once we had the data for the firms we were interested in, we continued to determine the successions. In our data, we obtained the CEO's year of birth. Therefore, we created a lag variable to determine, for every data point, the year of birth of the CEO during the previous year. We then used the original variable, indicating the year of birth of the current CEO, and the lag variable, indicating the year of birth of the previous CEO. We compared them and, if the years of birth were different, it meant that there was a turnover and, therefore, a new CEO was appointed. We categorized these turnovers as industry successions.

After identifying a succession, we needed to define whether the incoming CEO is related or not to the departing CEO. Hence, each turnover needed to be classified as family or non-family. The company data that we used contains a variable that indicates if the CEO is owned by the largest family. Therefore, we created a lag variable, to indicate if the previous CEO was owned by the largest family. Then, we compared the original variable, which indicated if the current CEO was owned by the largest family, with the lag variable, which indicated if the previous CEO was owned by the largest family. If both variables indicated that the

largest family owns the CEO, it meant that there was a family succession because the new CEO that was appointed was still a member of the largest family. Otherwise, the turnover resulted in a non-family succession when an outsider occupied the CEO position.

### *3.5 Measuring performance using OROA*

The next step was to follow the CEO turnover literature (Denis & Denis, 1995; Huson, Malatesta & Parrino, 2004) to determine the effect of these turnovers on financial performance of the firms. Hence, we analyzed firm performance by calculating and looking at the changes in operating income before depreciation in the years surrounding the CEO turnover. The operating income before depreciation can be calculated as revenue minus cost of goods sold minus selling, general, and administrative expenses and without subtracting depreciation. However, in our data, we already have information about the operating income and depreciation. So, we took the operating income and added the depreciation to get the operating income before depreciation. Subsequent, we scaled the calculated operating income before depreciation by the value of total assets to control for differences in size across firms and for changes in asset base within firms across years. To obtain the total asset value, we added total current assets plus total fixed assets. Finally, with this value calculated in our data, we divided the operating income before depreciation over the total assets to obtain the operating return on assets (OROA).

OROA is a measure of performance that indicates current profitability and, therefore, is the simplest measure of overall firm performance (Pérez-González, 2006). Moreover, one could argue that one additional alternative could be to use net income instead of operating income. However, using operating income in our calculations instead of net income reduces the impact on performance of CEOs' attempts to manipulate reported earnings through accounting accruals (Denis & Denis, 1995). Additionally, an advantage of using within-firm variation in performance is that it allows us to control for time-invariant characteristics that might influence performance (Pérez-González, 2006). On the other hand, our literature review pointed out that some of the other similar researches use other

alternatives to measure firm performance. One of them is the stock price to determine abnormal returns and therefore financial performance of the company. However, this indicator is only available for public firms that trade on the stock market. Hence, given our set of private firms, this is another reason that indicates that OROA is the most suitable performance indicator in our research.

So, once OROA is obtained, to analyze the changes of it, it is important to first look at the distribution of values. By doing so, we realized that the data had very high and very low values. This could create an issue and heavily influence the calculation and the distribution of the means. Therefore, one option to solve this problem was to get rid of these extreme values by dropping them from our sample by a procedure called trimming or truncation. However, this could introduce statistical bias and may undervalue the outlier (Ghosh & Vogt, 2012). Moreover, another option was to keep the outliers and simply emphasize the use of median values –instead of means– to reduce the influence of them, as done by Denis and Denis (1995). Nevertheless, we decided to use an alternative methodology instead of removing the outliers or keeping them as they are. Hence, we winsorized our OROA values in order to limit the effects of these abnormal extreme values and so that we could use the means (and not only the medians) of the OROA in our analysis. Winsorizing is a statistical transformation where outliers are limited to the rest of the data and are replaced by more plausible values to reduce the effect of possible spurious extreme values and where the danger of bias is alleviated by retaining an attenuated version of the datum (Ghosh & Vogt, 2012). Since winsorizing is not about discarding and excluding data, but about censoring data, our winsorized OROA had the extreme values replaced by certain percentiles. Therefore, we specified a 1% winsorization in each tail where all the data above the $99^{th}$ percentile would be replaced by the $99^{th}$ percentile value and all the data below the $1^{st}$ percentile would be set to the $1^{st}$ percentile value.

### *3.6 Addressing the issue: Econometric approach*

After winsorizing for outliers, we looked at the distribution of the means of the new OROA data and now it looked much better without the presence of extreme

values in the tails. So, then we continued to use the winsorized OROA and created the 1-year, 2-year, and 3-year lags which will comprise the period before the CEO turnover and the 1-year, 2-year, and 3-year leads which will define the period after the succession. It is important to look at the profitability of the firms some years before and some years after the succession and define a sample around this. Looking only at the year before and the year after the succession might not be representative given that one of those years could have had an extraordinary event –either negative or positive–, that might have impacted the financial performance and, therefore, our conclusions derived from the analysis will not be accurate. Hence, we look at seven years in total to analyze the changes in profitability, where the middle year is the one in which the turnover takes place. Therefore, we defined our sample as the seven years surrounding each succession just as the methodology used by Denis and Denis (1995) in their research.

It is also relevant to calculate industry-adjusted changes in performance to control differences on operating income that are not related to the management change. As defined by Denis and Denis (1995), industry-adjusted change in operating income is the change in the ratio of operating income to total assets for the sample firm minus the same change for the median firm in the same two-digit Standard Industrial Classification (SIC) industry. Moreover, having variables adjusted by industry-matched and performance-matched benchmarks also allows to control for potential mean reversion in accounting variables (Barber & Lyon, 1996). This are also used to prevent results from capturing time or differential industry trends. Hence, to control for the issues stated above, industry or firm fixed effects could be used. However, our study comprises companies in the oil industry in Norway, meaning that all of the firms belong to the same industry. And, as mentioned before, we chose to narrow our focus on this particular sector, rather than on all private family firms, given that this is one of the most important sectors in Norway. Moreover, by doing so, we have a certain degree of homogeneity among the firms in our sample, where most of them are exposed to the same exogenous shocks which could potentially reduce firm performance or, on the other hand, they are also exposed to the "good" peaks of the market where they can capitalize profitability. Therefore, the data would not be required to be controlled for

differences in operating income across industries that are not related to the CEO turnover.

After having identified each succession, along with its seven-year surrounding sample of winsorized OROA values, we could then use the data to address our research question and our hypotheses. Focusing on the levels and changes in the financial performance indicator allowed us to have two of our hypotheses tested which indicated that when everything else equal, we should expect to see no significant differences in profitability around the years where there was a CEO turnover. These hypotheses (4) and (5) apply to both types of succession: family and non-family, respectively. Therefore, first we graphed mean and median for each year of the seven years and for each type of succession: all turnovers, only family, and only non-family. Then we used the mean and median changes over various time periods and ran univariate tests on all changes to find the significance of them and, therefore, tested these two hypotheses. Significance of median changes was measured by using a two-tailed Wilcoxon signed rank test and significance of mean changes was measured by using a standard two-tailed t-test. We used these two tests based on the methodology by Denis and Denis (1995). Moreover, the two-tailed Wilcoxon signed rank test is mostly preferred among these types of studies because it is the non-parametric equivalent to the two-tailed t-test which assumes only that the distribution of differences within pairs be symmetric without requiring the normality assumption about an underlying population or distribution (Oyeka & Ebuh, 2012). Furthermore, this test is widely used to test the null hypothesis that the median difference between absolute values of positive and negative paired differences is zero (Harris & Hardin, 2013).

The mean and median changes in OROA indicate the way in which the profitability had changed in subsequent years compared to previous years, meaning that a positive sign indicates that the performance was better in the most recent year of the comparison and a negative sign indicates that profitability was better before. Moreover, we used the p-values to figure out the significance at 10%, 5%, and 1% levels. If the p-value was less than the significance level, then we rejected the null hypothesis (equality of means/medians), which meant that there was a statistically

significant difference in means/medians at that particular significance level. This implied, consequently, that the OROA values were statistically different after from those before. Hence, there was a significant change in financial performance in the respective time period comparison. Otherwise, if the p-value was greater than the significance level, then we failed to reject the null hypothesis, which meant that there was not a statistically significant difference in means/medians at that particular significance level. As a result, this implied that the OROA values were statistically the same after from those before. And, therefore, there was no significant change in financial performance in the respective time period comparison.

However, even though these univariate tests help address the fourth and fifth hypotheses, they are not enough to completely address our research question, nor to shed some light on our last hypothesis. Hence, to support these tests we required a regression that could indicate the relationship between the dependent variable, which in our case is firm performance measured by the operating return on assets, and the independent variables, which would be the succession characteristics such as type of succession (family or non-family) and moment in time (before or after the turnover). Moreover, a classical regression would not be appropriate given that it involves having to make several assumptions such as: random sample in both dependent and independent variables, the error term has zero mean, there is no perfect collinearity between explanatory variables, and the error term has zero mean conditional on the independent variables. Making these assumptions and, therefore, using a classical regression could be subject to an endogeneity problem. Endogeneity occurs when the error terms are correlated with the independent variables and it is a common problem that arises in corporate governance studies and that can be serious, given that it can lead to a bias on the parameter estimates obtained when performing a classical regression. Some sources of endogeneity could be simultaneity or reverse causality, measurement error, and/or omitted variables. Therefore, to address any endogeneity problem that might arise with the classical simple regression, instead of using a single cross-sectional difference estimator or a single time-series difference estimator, we decided to use a difference-in-difference estimator.

Using only a single cross-sectional difference estimator to measure the impact on performance of a family CEO succession compared to a non-family CEO succession in family firms has its shortcomings. If there are unobserved and permanent differences between the family successions (the "treatment") and the non-family successions (the "control group") before the treatment, then we could have had selection bias. On the other hand, using only a single time-series difference estimator to measure the effect of the family CEO succession by comparing firm performance before and after the turnover also has its limitations. If there is a trend in financial performance that is not related to the succession, then the parameter estimates would have been biased because we would be wrongly attributing the change in OROA to the turnover. Hence, it was really important for us to choose a difference-in-difference estimator to reduce the problems that arise with simple difference estimators. This double difference estimator allowed us to take into account both, the family and the non-family successions, and look at them both, before and after the succession. We compared the change in OROA after and before the succession for the family CEO turnover compared to the non-family CEO turnover. By doing so, the results of this methodology are less likely to be affected by time trends or by intrinsic differences across firms.

First, we started by defining that a family CEO succession would be our treatment. This type of succession occurred in some of the firms in our sample. Conversely, the other turnovers in our sample which involved a non-family CEO succession would act as our "control group". Hence, we created a dummy variable to identify the type of succession. This variable was equal to 1 for family CEO successions and equal to 0 for non-family CEO successions. Consequently, in a single cross-sectional difference estimator, a positive coefficient would indicate a positive effect of the family turnover and the significance of it would be obtained by looking at its p-value. However, since we are using the double difference estimator, this was the first variable that we needed for our regression.

Next, we needed to create another dummy variable which would indicate the performance at a certain point, before and after the turnover. Since we are using

seven years surrounding the turnover as our sample, the first three years were defined as before and the last three years were defined as after. Hence, the dummy variable was equal to 1 after the turnover and 0 before the turnover. This way, as how would happen with a single time-series difference estimator, a positive coefficient would indicate a positive effect of the turnover on performance and its significance would be defined by looking at its p-value.

Lastly, we used our two previous estimators to create our difference-in-difference estimator. This last dummy variable consisted of the multiplication of both, the cross-sectional difference estimator and the time-series difference estimator. Therefore, it would also take values of either 1 or 0. Once we had all of them, we estimated and ran our main regression:

$$oroa\_w = \_cons + \beta_1 * type\_dummy + \beta_2 * post\_dummy + \beta_3 * mult + \varepsilon$$

This regression indicates, as mentioned before, the relationship between our dependent variable, the winsorized OROA (named oroa_w in our STATA code) which measures the firms' financial performance, and the independent variables, which would be: the type of succession (named type_dummy in our STATA code), either family or non-family, with its coefficient $\beta_1$; the performance at a certain point in time (named post_dummy in our STATA code), either before or after the turnover, with its coefficient $\beta_2$; and the difference-in-difference estimator (named mult in our STATA code) taking into account both, the family and the non-family successions, and looking at them both, before and after the succession, with its coefficient $\beta_3$. Therefore, having a positive and significant $\beta_3$ coefficient would imply that there is a positive and significant change in performance in family CEO turnovers compared to non-family CEO turnovers, and after compared to before the turnover. Moreover, if $\beta_1$ is significantly different than 0, then the single difference cross-sectional estimator is biased; and if $\beta_2$ is significantly different than 0, then the single difference time-series estimator is biased. Hence, this regression allowed us to arrive to conclusions regarding our last hypothesis and helped us address and answer our research question.

*3.7 Applying control variables*

However, even though the difference-in-difference is a better alternative compared to simple difference estimators, it still has its limitations. For instance, it assumes that in the absence of family CEO successions, the operating return on assets would be the same for both, the firms in the treatment group that undergo a family CEO succession and the ones in the control group that undergo a non-family CEO succession. This is known as a "parallel trends" assumption. Therefore, we went one step further and checked internal validity by verifying that there were no significant differences between family CEO successions and the non-family CEO successions in terms of other control variables like firm size, firm age, CEO age, and type of year based in oil price conditions. Hence, we performed a more robust analysis by running difference-in-difference-in-difference regressions for each of these control variables.

To determine firm size, we used the logarithm of the revenues as a proxy. In cases where the revenues where not indicated in Norwegian kroner, we used the corresponding annual average exchange rate depending on the currency to change it. A large firm was labelled as 1 and corresponded to those in which the logarithm of revenues was higher than the firm size median. A small firm was labelled as 0 and corresponded to those in which the logarithm of the revenues was lower than the firm size median. The difference-in-difference-in-difference regression looked like this:

$$oroa\_w = \_cons + \beta_1 * type\_dummy + \beta_2 * post\_dummy + \beta_3 * firm\_size + \beta_4 * mult + \beta_5 * type\_firm\_size + \beta_6 * post\_firm\_size + \beta_7 * type\_post\_firm\_size + \varepsilon$$

To determine firm age, we had the company age in the initial data that we obtained from the CCGR. Therefore, old firms were labelled as 1 and were the ones older than the company age median. On the other hand, young firms were labelled as 0 and were the ones younger than the company age median. The difference-in-difference-in-difference regression looked like this:

$$oroa\_w = \_cons + \beta_1 * type\_dummy + \beta_2 * post\_dummy + \beta_3 * firm\_age + \beta_4 * mult + \beta_5 * type\_firm\_age + \beta_6 * post\_firm\_age + \beta_7 * type\_post\_firm\_age + \varepsilon$$

To determine CEO age, we subtracted the CEO year of birth, which we had in the data, from the year in which the succession took place. Old CEOs were labelled as 1 and were the ones older than the CEO age median. Young CEOs were labelled as 0 and were the ones younger than the CEO age median. The difference-in-difference-in-difference regression looked like this:

$$oroa\_w = \_cons + \beta_1 * type\_dummy + \beta_2 * post\_dummy + \beta_3 * ceo\_age + \beta_4 * mult + \beta_5 * type\_ceo\_age + \beta_6 * post\_ceo\_age + \beta_7 * type\_post\_ceo\_age + \varepsilon$$

Finally, to determine our last control variable, the oil market conditions, we used good years and bad years for the oil industry. This year indicators allowed us to control for macroeconomic factors. Good years were labelled as 1 and were the ones in which oil had a high price, the market was more stable, and demand was healthy. These years were 2004, 2005, 2006, 2007, 2010, 2011, 2012, 2013, and 2014. Conversely, bad years were labelled as 0 and were the ones where oil prices where low and volatile, the market was going through an economic turndown, and demand was stagnated. These years were 2000, 2001, 2002, 2003, 2008, 2009, 2015, 2016, and 2017. The difference-in-difference-in-difference regression looked like this:

$$oroa\_w = \_cons + \beta_1 * type\_dummy + \beta_2 * post\_dummy + \beta_3 * year\_type + \beta_4 * mult + \beta_5 * type\_year\_type + \beta_6 * post\_year\_type + \beta_7 * type\_post\_year\_type + \varepsilon$$

All the previous regressions indicate the relationship between our dependent variable, the winsorized OROA, and the same independent variables as the difference-in-difference regression, plus the effect of the new control variable

represented in the difference-in-difference-in-difference estimator taking into account both, the family and the non-family successions; looking at them both, before and after the succession; and controlling for the additional variable either firm size, firm age, CEO age, and year type, with its coefficient $\beta_7$. Therefore, having positive and significant $\beta_4$ along with $\beta_7$ coefficients would imply that there is a positive and significant change in performance in family CEO turnovers compared to non-family CEO turnovers; after the turnover compared to before it; and large firms compared to small firms or old firms compared to young firms or old CEOs compared to young CEOs or good years for oil compared to bad years for oil, depending on each corresponding regression. Hence, each of these regressions allowed us to make better and more detailed conclusions regarding our last hypothesis and our research question. In sections 4 and 5, we will talk more in depth about all the results derived from our univariate tests and from all the regressions mentioned previously.

## 4 Data and Preliminary Analysis

### *4.1 Data obtained and source*

For our analysis, we required data of private, Norwegian family firms within the oil industry which were established in Norway as a result of the oil exploration and boom that started in the 1970's. We also needed information about their performance post millennium time in the 2000-2010's where they underwent a CEO change. Hence, we needed company financial data (operating income, depreciation, and total assets) to calculate our measure to assess performance, CEO birth year to identify when there is a turnover, know if the CEO is owned by the largest family to identify the type of succession (family or non-family), industry codes to filter the companies in the oil industry, and revenues and company age to use as control variables. Therefore, to obtain this data for Norwegian companies, we relied on the database of the Center for Corporate Governance Research (CCGR) of BI Norwegian Business School. This database provided us with financial and ownership information of private family firms according to their industry codes.

We requested several variables in the database: CEO year of birth, revenue, depreciation, operating income, net income, total tangible fixed assets, total fixed assets, total current assets, total equity, industry code, full county number, company age, number of owners (ultimate ownership), aggregated fraction held by institutional owners (ultimate ownership), the Chair belongs to the largest family (ultimate ownership), sum of largest family (ultimate ownership), CEO belongs to the largest family, shares owned ultimately by the CEO's family, shares owned ultimately by the CEO, and number of employees. Some of these variables will be used directly in our analysis and other were required just to asses some firm characteristics. Furthermore, we required to have a filter added so that we could only obtain independent, not consolidated firms. Having consolidated firms created "noise" in our sample given that we focused our study in a single industry and conglomerates could potentially be difficult to differentiate among their several financial activities. Finally, since our interest was based on performance post-millennium, we got companies' information from the year 2000 to 2017.

*4.2 Constructing the sample and summary descriptive statistics*

The first step before we arrived to our sample was to declare all the data as a panel. The whole set was comprised of 284,855 different company ID identifiers and a total of 2,107,572 firm-year observations. Once we had this panel, we started narrowing it down. By applying the first filter, we would get our sample of firms within the oil industry. Hence, we used the provided industry codes[4] to do so. We then found 3,542 firms corresponding to the oil industry. This number of companies resulted in a total of 15,532 firm-year observations.

After obtaining our main data set, we applied the methodology explained in section 3 to find the successions. To briefly recapitulate it; first we used the variable that indicates if the CEO is part of the family or not, then we took a lag of that variable, and finally, we compared both. If in both cases, predecessor and successor

[4] Industry codes corresponding to the oil industry: 06.100, 06.200, 09.101, 09.109, 10.100, 10.200, 10.300, 11.100, 11.200, 19.200, 23.200, 30.113, 33.150, 35.114, 35.210, 35.220, 35.230, 36.110, 40.210, 40.220, 46.120, 46.630, 46.691, 46.693, 46.710, 51.120, 51.510, 51.871, 51.873, and 52.215

CEO were part of the family, it meant that there was a family CEO succession. Otherwise, it was classified as a non-family one. We therefore identified 688 industry successions which were categorized and divided into: 110 industry family successions and 578 industry non-family successions. Table 1 contains summary statistics for the sample of CEO successions occurring from 2000 to 2017. Instead of only taking the descriptive statistics for the total of the successions, we also include the summary figures of the breakdown of the family CEO turnovers and the non-family CEO turnovers.

Panel A in Table 1 shows summary statistics for the 688 industry successions in our sample. There we can see that the median outgoing CEO is 54 years old, while the median successor CEO is 47 years old. In Panel B we see the summary statistics for the 110 industry family successions. In this case, the median outgoing CEO is 62 years old compared to the median successor CEO which is 42.5 years old. Finally, Panel C displays the summary statistics for the 578 industry non-family successions. Here, the median outgoing CEO is 52 years old and the median successor CEO is 47 years old. Hence, the previous age data statistics reveal that, in the case of a family succession, the age gap is wider between the successor CEO and its predecessor compared to the cases of non-family CEO successions. There is almost a 20-year age difference when the succession involves two family members, while data in Panel C shows only a 5-year gap. This is the case for the age medians; however, there is a similar trend in the CEO age differences even when looking at the means. The means have some influence by the outliers and therefore the difference is not as large as the one in the medians. Nevertheless, it is still significantly different. In fact, our results in age difference are similar to those found by Francisco Pérez-González (2006). His findings suggested that the average age of a family CEO in a succession is, on average, 8 years younger than unrelated CEOs. Finally, our evidence supports our first hypothesis and the fact that, based on the median values of our family CEO succession cases, it occurs that the outgoing CEO leaves the leadership of their firm to a younger generation.

Moreover, by continue looking at the chief executive officer's ownership in Table 1, we see a higher concentration of it in Panel B than in Panel C. This trend

applies for both, the outgoing CEO and the successor CEO. In the case of family CEO successions in Panel B, the average is 53.83% and 34.53%, for the outgoing CEO and the successor CEO, respectively. Conversely, in the non-family CEO successions the mean is 14.87% for the outgoing CEO and 5.68% for the incoming one. Our results are aligned with the fact that in private family firms where the family has a very strong ownership and control, the family wants to preserve personal and social control by appointing a family CEO rather than have an outsider come in and potentially change these values (Daily & Dollinger, 1992). These findings support our second hypothesis, where we expected to see family CEO succession happen in family firms that have a controlling family which has large ownership and can perhaps make decisions without being questioned; hence, deciding to appoint an "insider".

Finally, we point out two last but very interesting evidences in Table 1 which also support our second hypothesis. The family firms in which family CEO successions took place, are on average smaller in terms of revenues and with less institutional ownership than family firms in which non-family CEO successions take place. We can see that while family CEO successions happen in firms with an average of 16.70 million Norwegian kroner in revenues, non-family CEO successions take place in larger firms averaging 260 million Norwegian kroner in terms of revenues. As per the institutional ownership, it is slightly higher in firms where we identified non-family successions taking place, being 2.16% on average compared to the 0% in institutional ownership of firms where family CEO successions occur.

Even though these differences may appear relevant, an assessment still needs to be done to confirm the validity of them. Therefore, we addressed the significance of these differences by applying univariate tests. In the following paragraphs we refer to the standard two-tailed t-tests that support the significance of the differences in CEO and firm characteristics that we mentioned previously.

Table 1.- Summary statistics

Statistics are for a sample of 688 CEO turnover events (110 family and 578 non-family) during the 2000-2017 period. Family successions correspond to those where there was a family CEO and turned the company over to another of its family members. Non-family successions also involve two CEO's, a predecessor and a successor, which in this case are not related. Revenues are restated in 2017 Norwegian kroner using the Consumer Price Index and using an average annual exchange rate when the currency was other than Norwegian kroner (i.e., U.S. dollars, Euro, and Swedish kroner), before the statistics for this variable were computed.

| | Median | Mean | Standard deviation | Minimum | Maximum | Observations |
|---|---|---|---|---|---|---|
| **Panel A: All successions** | | | | | | |
| *Outgoing CEO* | | | | | | |
| Age (years) | 54 | 53.34 | 10.78 | 25 | 86 | 688 |
| Share ownership | 0% | 21.10% | 33.58% | 0% | 100% | 688 |
| *Successor CEO* | | | | | | |
| Age (years) | 47 | 46.96 | 9.53 | 23 | 82 | 688 |
| Share ownership | 0% | 10.29% | 22.89% | 0% | 100% | 688 |
| *Firm* | | | | | | |
| Age (years) | 13 | 17.42 | 17.63 | 0 | 150 | 688 |
| Revenue (MNOK) | 12.70 | 221 | 1,270 | -12,000 | 21,000 | 688 |
| Institutional Ownership | 0% | 1.82% | 11.98% | 0% | 100% | 688 |
| **Panel B: Family successions** | | | | | | |
| *Outgoing CEO* | | | | | | |
| Age (years) | 62 | 58.65 | 13.43 | 25 | 86 | 110 |
| Share ownership | 50% | 53.83% | 38.48% | 0% | 100% | 110 |
| *Successor CEO* | | | | | | |
| Age (years) | 42.50 | 45.23 | 12.02 | 24 | 82 | 110 |
| Share ownership | 32.06% | 34.53% | 32.51% | 0% | 100% | 110 |
| *Firm* | | | | | | |
| Age (years) | 14.50 | 16.32 | 13.57 | 0 | 92 | 110 |
| Revenue (MNOK) | 5.29 | 16.70 | 36.50 | 0 | 324 | 110 |
| Institutional Ownership | 0% | 0% | 0% | 0% | 0% | 110 |
| **Panel C: Non-family successions** | | | | | | |
| *Outgoing CEO* | | | | | | |
| Age (years) | 52 | 52.33 | 9.90 | 26 | 79 | 578 |
| Share ownership | 0% | 14.87% | 28.64% | 0% | 100% | 578 |
| *Successor CEO* | | | | | | |
| Age (years) | 47 | 47.29 | 8.95 | 23 | 82 | 578 |
| Share ownership | 0% | 5.68% | 17.06% | 0% | 100% | 578 |
| *Firm* | | | | | | |
| Age (years) | 13 | 17.63 | 18.30 | 0 | 150 | 578 |
| Revenue (MNOK) | 16 | 260 | 1,380 | -12,000 | 21,000 | 578 |
| Institutional Ownership | 0% | 2.16% | 13.04% | 0% | 100% | 578 |

Table 2 shows the differences and univariate tests for the previously mentioned mean comparisons about the CEO and firm characteristics presented in the summary statistics in Table 1. In Table 2 we can see that means of age difference between outgoing and incoming CEO, and CEO ownership of family CEO turnovers are higher and statistically significant at the 10%, 5%, and 1% levels, than those of non-family CEO turnovers. Additionally, the means of revenues and institutional ownership of non-family CEO turnovers are higher and statistically different, at least at a 10% level, than those of family CEO turnovers.

Table 2.- Changes in CEO and firm characteristics

Mean changes in CEO and firm characteristics between the sample of 110 family CEO successions and the one of 578 non-family CEO turnover events during the 2000-2017 period. Mean differences are calculated by subtracting the non-family CEO succession mean from the family CEO succession mean. Hence, a positive value indicates that the family CEO succession mean is larger than the non-family CEO mean and vice versa. Age difference corresponds to the difference in years between the outgoing CEO and its successor. Revenues are restated in 2017 Norwegian kroner using the Consumer Price Index and using an average annual exchange rate when the currency was other than Norwegian kroner (i.e., U.S. dollars, Euro, and Swedish kroner). Significance of mean changes are measured using a standard two-tailed t-test.

| Successions Comparison | Age difference (years) | Outgoing CEO ownership | Successor CEO ownership | Revenues (MNOK) | Institutional Ownership |
|---|---|---|---|---|---|
| Family CEO minus Non-family CEO | 8.38*** | 38.96%*** | 28.85%*** | -243* | -2.16%* |

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

### *4.3 Levels of OROA around turnovers*

Next, after having identified the successions and computed their statistics, we turned to look at the OROA to start some preliminary analysis before examining the changes in this performance indicator. We calculated OROA as described in section 3 and looked at its values in the year in which the turnover took place. Then, as we described previously, we created OROAs' lag variables so that we could have our sample of three years before the turnover year and three years after it. Hence, our winsorized OROA sample, which comprised of the seven data points

surrounding a turnover, would allow us to look at the means and medians of all our 688 successions in the 7-year periods and then calculate the changes of them over various periods of time after and before the CEO succession.

Figures 3 and 4 plot the sample's winsorized OROA over the period from three years before to three years after the CEO turnover, including the year of the succession. Figure 3 plots the means, while Figure 4 plots the medians. Separate plots are shown for the family CEO successions, the non-family ones, and for the total sample. Figure 3 suggests that all CEO turnovers occur after a three-year period of decreasing firm performance and that performance tends to slightly recover in the years after the event. However, this applies only for the non-family successions and it is not clear in the family turnovers. The latter are characterized by the hyphened line in Figure 3 where the plot suggests that before the turnover, OROA increases, reaches a maximum point at year -1, and then decreases to similar levels as in year -3. After the turnover, performance keeps on decreasing for the first year and then starts increasing after that, reaching a new maximum at year +3.

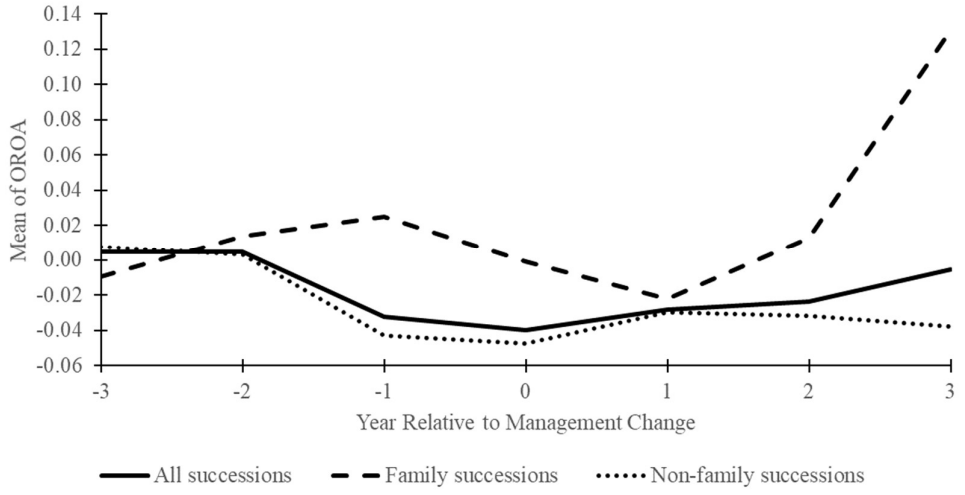


Figure 3.- Mean levels of operating return on assets

Mean ratio of winsorized OROA for a sample of CEO successions between 2000 and 2017. The sample includes 688 CEO turnover events, 110 family and 578 non-family. OROA is shown for each of the seven years centered on the year of the sample management changes (year 0). A CEO change is classified as family CEO change when a family CEO turns the firm over to a relative. Otherwise, if the succession involves a non-family CEO, then it is considered a non-family succession.

On the other hand, as initially mentioned, the non-family CEO turnovers represented by the dotted line in Figure 3 have a similar behavior than the plot representing all successions. However, there is a slight difference: from year +1 to year +3, performance is declining. Hence, OROA does not seem to improve after the turnover in this case, as it can be seen in the solid line.

In Figure 4, the medians of OROA are graphed. Here, the behavior of performance follows a similar pattern as the previous cases. For all the successions, OROA decreases from year -3 to year -1 and starts increasing afterwards until reaching year +3. The family CEO successions in Figure 4 also increase before the turnover until they reach a maximum at year -1 and then start decreasing. This declining pattern continues until year +2 –instead of year +1 like in Figure 3– and then it increases to reach a new maximum in year +3. Finally, as per the non-family successions, the pattern is quite the same as the solid line representing all the successions, except that it reflects an opposite behavior from year +2 to year +3.

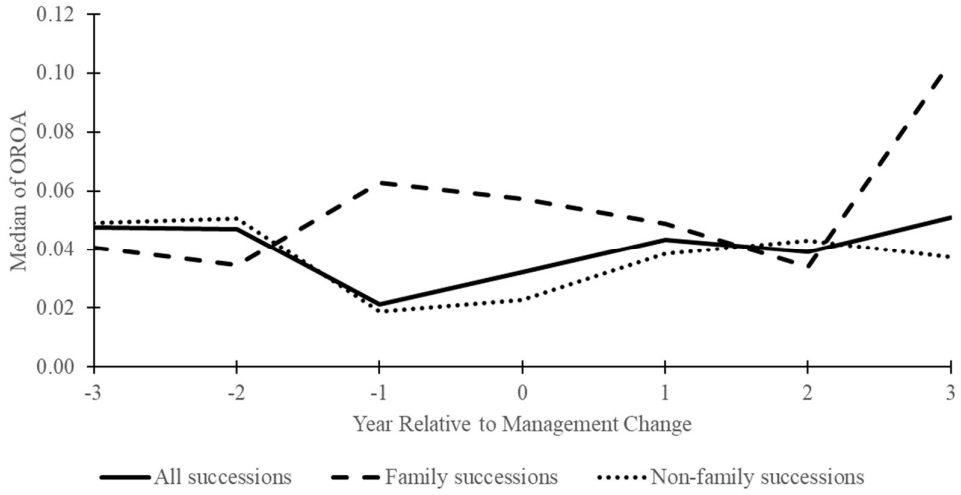


Figure 4.- Median levels of operating return on assets

Median ratio of OROA for a sample of CEO successions between 2000 and 2017. The sample includes 688 CEO turnover events, 110 family and 578 non-family. OROA is shown for each of the seven years centered on the year of the sample management changes (year 0). A CEO change is classified as family CEO change when a family CEO turns the firm over to a relative. Otherwise, if the succession involves a non-family CEO, then it is considered a non-family succession.

*4.4 Changes in OROA and univariate tests*

Table 3 reports mean and median changes in OROA over several time periods, measured as the difference between OROA at the end of the latter year and the OROA at the end of the earlier year. The comparison periods that we considered were the following: the three-year period preceding the turnover (-3 to -1), one year before to one year after the turnover (-1 to +1), one year before to two years after the turnover (-1 to +2), the three-year period succeeding CEO turnover (-1 to +3), and the comparison between before and after (before to after). The changes in the table display a similar pattern as the one seen in the figures and described previously. However, Table 3 shows that most –if not all– of the declines or improvements in performance are not statistically significant.

For example, when looking at the means, indeed Table 3 suggests that, for all CEO successions in our sample, turnovers are characterized by being preceded by declining performance. This behavior seen in our figures and in Table 3, is similar to the results of Huson, Malatesta, & Parrino (2004) which indicate that turnovers are preceded by declining performance. But, in our case, this difference of -0.037 in the -3 to -1 period is not statistically significant. Hence, even though performance has a negative change before the turnover, it is not an unusual change. Moreover, CEO successions are followed by monotonical increases in performance: 0.004, 0.009, and 0.026 when looking at the changes -1 to +1, -1 to +2, and -1 to +3, respectively. However, once again, even if this positive trend could indicate an improvement in performance, it does not represent a statistically significant change in the average OROA. Turning to the family CEO successions, Table 3 again suggests that even if turnovers happen after increasing performance, this value of 0.034 is not statistically significant. Nevertheless, it is interesting to point out that in this type of successions, we do have an increasing performance after the turnover when looking at the 0.106 value displayed in the change shown in period -1 to +3. This suggests a statistically significant, at the 5% level, increase in the OROA's mean, which is reinforced when looking at the before to after comparison whose 0.016 median value is also positive and statistically significant at the same level. Therefore, our fourth hypothesis is not supported because there

is a positive change. Finally, in contrast with family CEO successions, non-family CEO successions are indeed preceded by declines in operating performance, -0.051, which are significant at least at the 10% level. Moreover, Table 3 also suggests that, in contrast with all the successions, these non-family successions display a monotonic and positive change in performance that decreases throughout the years: 0.013, 0.011, and 0.005 when looking at the changes -1 to +1, -1 to +2, and -1 to +3, respectively. However, since it is not significant, it supports our hypothesis five.

The results in Table 3 and described in the previous paragraph support our third hypothesis. Family CEO turnovers are not preceded by declining performance. On the contrary, the three-year period before them indicates that performance is slightly increasing. But, its 0.034 value is not significant. Moreover, while it is not the case for family CEO successions, if we look at the non-family ones, the results indicate that those are indeed preceded by a significantly declining performance.

Table 3.- Changes in operating return on assets

Mean and median changes in OROA from three years before the succession, from one year before to one year after the succession, from one year before to two years after the succession, from three years after the succession, and from the three-year average before and after the succession, for a sample of 688 CEO successions (110 family and 578 non-family) of private family firms in the Norwegian oil industry between the 2000-2017 period. Family CEO successions correspond to those where a family CEO turns the firm over to a relative. Non-family successions also involve two CEO's, a predecessor and a successor, which are not related. Means are presented above medians. Significance of mean and median changes are measured using a standard two-tailed t-test and a two-tailed Wilcoxon signed rank test, respectively.

| Years | All CEO successions | Family CEO successions | Non-family CEO successions |
|---|---|---|---|
| -3 to -1 | -0.037 | 0.034 | -0.051* |
| | -0.026 | 0.022 | -0.030 |
| -1 to +1 | 0.004 | -0.047 | 0.013 |
| | 0.022 | -0.014 | 0.020 |
| -1 to +2 | 0.009 | -0.012 | 0.011 |
| | 0.018 | -0.029 | 0.024 |
| -1 to +3 | 0.026 | 0.106** | 0.005 |
| | 0.030 | 0.041 | 0.019 |
| Before to after | -0.012 | 0.031 | -0.022 |
| | 0.006 | 0.016** | 0.000 |

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Thus, overall, CEO successions in our sample do follow certain trends. However, these mean (and median) changes in operating return on assets are not statistically significant except for the three cases mentioned above. On the other hand, we do see evidence that refers back and supports our third hypothesis. The results show that family CEO successions are not preceded by unusual operating performance and that, conversely, non-family CEO successions do have an unusual and statistically significant (at the 10% level) decrease in OROA before the CEO turnover. The latter, together with the sample of all CEO successions, is also in accordance with the results obtained by Huson, Malatesta, & Parrino (2004) who mention that turnovers are preceded by declining performance.

## 5 Results and Analysis

The univariate tests performed in the previous section suggest that changes in OROA's mean and median in the seven-year period surrounding the turnovers did have certain pattern. Besides, results so far have provided light on some of our hypotheses. However, the t-tests and Wilcoxon tests have not shown enough significance throughout all the different periods before and after the successions, meaning that these changes in performance are not significantly unusual. Furthermore, using only single time-series comparisons, as done so far, is not enough to address our sixth hypothesis about not only the time-series comparison (after vs. before the turnover), but also the cross-sectional comparison (family CEO successions vs. non-family CEO successions). Therefore, we refer to our main regression.

### *5.1 Regression analyses*

In testing the last hypothesis which relates to firm performance and posing an answer to our research question, Table 4 presents our regressions' main results. The variable "mult" captures the time-series and cross-sectional comparisons. So, the results of our first regression suggest that family CEO successions' performance after compared to before the turnover and compared to non-family CEO succession have a slight increase of five percentage points (0.05). However, this result is not

statistically significant. Hence, there is no unusual impact in OROA's change and, therefore, no evidence supporting that there is a significant change in profitability after the turnover than before the turnover in family firms undergoing a family CEO succession compared to those undergoing a non-family CEO succession. So, these findings answer our research question, and support and confirm our last hypothesis, suggesting that private, Norwegian family firms that undergo a family CEO succession experience no significant change in OROA (post-turnover compared to pre-turnover) compared to family firms that undergo a non-family CEO succession.

Therefore, our study has differing results compared to most of our reviewed empirical evidence analyzed in Section 2. Anderson & Reeb (2003) argued that family-related CEO successions are based on "birth right" more than on merit and that this could potentially lead to competitive disadvantages reflected in profitability relative to non-family successions. However, in our study we do not see a negative implication in profitability even given that family CEO turnovers involve a younger generation which could potentially correspond to the heirs of former CEOs. So, this "birth right" and age difference did not reflect an adverse impact on performance compared to non-family CEO successions. Hence, we suggest that a possible explanation for this is that the former family CEOs try to seek continuity for their family firms given that they are in an important sector that contributes largely to the economy and, therefore, they train and prepare properly their successor.

Our research has also different findings to those of the three studies on impact of family CEO successions on firm performance. All of them found that family CEO successions bring negative results to the firm. Brian Smith and Ben Amoako-Adu (1999) used Canadian public firms and found that stock prices decline when a family CEO is appointed. Francisco Pérez-González (2006) used American public firms and found that when the new CEO is related to the departing CEO there's an underperformance in terms of operating profitability compared to unrelated CEO successions. And, Morten Bennedsen et al. (2007) used Danish public and private firms and found that family successions have a negative impact on firm performance. However, our results share some similar insights to those

found by Molly, Laveren and Deloof (2010). They also arrived to the conclusion that there was no statistically significant evidence that a family firm's profitability is affected by a succession. Additionally, they argued that a succession should not be viewed as a negative event in the life cycle of a family business. So, some possible explanations for our results differing from the first three studies could rely on the fact that, different from what they did, we considered only private firms and we focused our study in one industry in particular which is the most important in the country we are studying about.

Furthermore, to make our analysis more robust, we ran several other regressions where we included our control variables. Then, we further examined their impact on the results of our difference-in-difference estimator. First, the second regression in Table 4 indicates that firm size does not have a significant effect on performance, given that both coefficients, 0.056 for "mult" and 0.005 for the DDD estimator of the control variable, are not statistically significant. This further suggests that even if profitability might seem to slightly increase with size because both values are positive (yet, small), there is not enough statistical evidence that supports the claim.

Results from regression number three in Table 4 give some insights that no other result has given so far in our research. Due to the negative and significant value of the DDD estimator and the positive and significant value of the difference-in-difference estimator, the findings suggest that when appointing a family CEO, the firms' profitability after the turnover seems to increase by 21.2% as the firms' age decreases by 24.8%. Or, seen in another way, older firms have a negative effect on profitability. A possible explanation for this could lie in the fact that younger firms are still in a development stage where their earnings may be increasing exponentially by taking advantage of growth opportunities, while older firms might be in a more mature stage where earnings tend to be more stable and with less big, positive changes. Hence, younger firms might experience significant changes in OROA due to the fact that a new family CEO might come in and capture these business development opportunities that are beneficial for performance improvement. Therefore, referring back to corporate governance theories and CEO

literature, the positive results from this regression relate to the stewardship theory and to the positive aspects of having a family CEO. Stewards care about continuity and longevity of their businesses (Miller and Le Breton-Miller, 2005) and in the case of younger firms, family CEOs might be delivering good performance results because they are not motivated by individual goals, but rather have aligned motives to those of the firm (Davis, Schoorman & Donaldson, 1997). Moreover, family CEOs also have a long-term focus (Cadbury, 2000) that is also beneficial in this case because they could take advantage of the growth opportunities in the younger firms and provide a better improvement in profitability than the non-family CEOs would.

Moreover, a similar behavior as regression three is observed on the last column in Table 4. The fifth regression, which takes into account the market conditions and macroeconomic factors, indicates that the year type has also a significant effect on OROA. Firms' OROA looks to be increasing by 16.7% after the turnover of a family CEO and as the conditions of a year worsen by 20.3%. This outcome could also be explained by the fact that in a bad year there could be more chances of improving and being able to capture market opportunities (there is a wider growth gap), than in a good year where firms might be in their comfort zone just trying to keep earnings high but stable. Therefore, in the "good years", the change in financial performance is not affected that much if a turnover occurs. Whereas in a bad year, a family turnover could improve the companies' results considerably and perhaps that is why the turnover was appointed in the first place. This result again refers to the stewardship theory and the benefits of having a family CEO. Stewards of the firm obtain a lot of personal satisfaction if the firm has a healthy financial performance and, thus, if it is successful (Davis, Schoorman, & Donaldson, 1997). Hence, from here can come the family CEO's motivation to generate a positive change in performance during bad years. Another positive aspect of family CEOs in this case is that, even in during a downturn stage of the firm, they can enhance financial performance in several ways and one of them is by reducing agency problems in the firm (Anderson & Reeb, 2003). Finally, family CEOs have firm-specific knowledge built from experience and involvement in the firm (Donnelley, 1964), that gives them an advantage to overcome though times.

Table 4.- Regression analyses

OROA regression results from the seven-year data surrounding our sample of 688 CEO successions. In all regressions the dependent variable is OROA and the common independent variables are type of succession (type_dummy: 1 for family, 0 for non-family); time of succession (post_dummy: 1 for after, 0 for before); and the difference-in-difference estimator (mult). Regressions 2 to 5 have as control variables: firm size, firm age, CEO age, and year type, respectively. The DD and DDD estimators are shown in bold. Coefficient estimates are presented above standard errors.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Intercept | -0.016 | -0.232 *** | -0.091 *** | -0.034 ** | 0.004 |
| | *0.012* | *0.021* | *0.018* | *0.017* | *0.019* |
| type_dummy | 0.020 | 0.128 *** | 0.070 * | -0.057 | -0.029 |
| | *0.028* | *0.044* | *0.042* | *0.048* | *0.041* |
| post_dummy | -0.014 | -0.001 | -0.068 ** | 0.017 | -0.076 ** |
| | *0.020* | *0.036* | *0.031* | *0.026* | *0.031* |
| **mult** | 0.050 | 0.056 | 0.212 *** | 0.128 ** | 0.167 ** |
| | *0.044* | *0.069* | *0.069* | *0.062* | *0.069* |
| firm_size | | 0.311 *** | | | |
| | | *0.025* | | | |
| type_firm_size | | -0.133 ** | | | |
| | | *0.055* | | | |
| post_firm_size | | -0.029 | | | |
| | | *0.042* | | | |
| **type_post_firm_size** | | 0.005 | | | |
| | | *0.087* | | | |
| firm_age | | | 0.134 *** | | |
| | | | *0.024* | | |
| type_firm_age | | | -0.090 | | |
| | | | *0.056* | | |
| post_firm_age | | | 0.074 * | | |
| | | | *0.040* | | |
| **type_post_firm_age** | | | -0.248 *** | | |
| | | | *0.089* | | |
| ceo_age | | | | 0.044 * | |
| | | | | *0.024* | |
| type_ceo_age | | | | 0.090 | |
| | | | | *0.059* | |
| post_ceo_age | | | | -0.065 | |
| | | | | *0.041* | |
| **type_post_ceo_age** | | | | -0.138 | |
| | | | | *0.097* | |
| year_type | | | | | -0.033 |
| | | | | | *0.025* |
| type_year_type | | | | | 0.087 |
| | | | | | *0.056* |
| post_year_type | | | | | 0.109 *** |
| | | | | | *0.040* |
| **type_post_year_type** | | | | | -0.203 ** |
| | | | | | *0.090* |
| Number of observations | 2,610 | 2,610 | 2,610 | 2,561 | 2,610 |
| F Statistic | 1.57 | 35.13 | 11.73 | 2.12 | 1.96 |
| R2 | 0.18% | 8.63% | 3.06% | 0.58% | 0.52% |
| Adjusted R2 | 0.07% | 8.39% | 2.80% | 0.31% | 0.26% |

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Lastly, Table 4 also shows the results for regression four. These indicate similar conclusions as the two previous regressions. However, in this case, the DDD CEO age estimator (-0.138) is not statistically significant. It means that even if OROA seems to be significantly increasing by 12.8% this happens as the CEO age is reduced by 13.8% which is not statistically significant. This could be explained by the fact that younger family CEO's could be more risk takers than their older counterpart. Taking more risks could lead to larger changes in performance and perhaps these changes could be positive if the risky decisions taken are the appropriate ones. However, there is not enough statistical evidence supporting the result related to CEO age.

*5.2 Additional robustness tests*

To evaluate our results' validity, we performed some robustness tests. These mainly consisted on using alternative measures for firm profitability and addressing the fact of potential multicollinearity issues in our results. First, regarding other measures to measure performance, we considered gross return on assets, which differs from OROA by taking into account the effect of depreciation in the firm's profit. We followed the same methodology and steps as we did with OROA but now with the new indicator of profitability. However, in line with the current results of our first regression, we still found no evidence supporting that there is a significant change in profitability after the turnover than before the turnover in family firms undergoing a family CEO succession compared to those undergoing a non-family CEO succession. Moreover, it highlights the fact of OROA being a better and simpler measure of overall firm performance just as Pérez-González (2006) mentioned.

Second, as an additional robustness check, we explored the possibility of having presence of multicollinearity and of it having an effect on our results. To do so, we examined the correlations among the independent variables used in the regressions in Table 4. Table 5 shows that the correlation coefficients are relatively small and statistically significant. As a rule of thumb, multicollinearity could occur when some variables show a correlation greater than 0.7. Therefore, since that is

not the case, they do not have a substantial impact on our findings. Hence, we discarded the fact of multicollinearity affecting our results.

Table 5.- Correlations between explanatory variables

Pearson correlation coefficients matrix between the independent variables used in the sample selection regressions in Table 4. The sample used in these models consists of the seven years surrounding the turnover for the identified 688 CEO successions in private family firms in the Norwegian oil industry between the 2000-2017 period.

| | type_dummy | post_dummy | firm_size | firm_age | ceo_age | year_type |
|---|---|---|---|---|---|---|
| **type_dummy** | 1.000 | | | | | |
| **post_dummy** | 0.033 * | 1.000 | | | | |
| **firm_size** | -0.086 *** | 0.011 | 1.000 | | | |
| **firm_age** | 0.014 | 0.065 *** | 0.138 *** | 1.000 | | |
| **ceo_age** | 0.039 ** | -0.231 *** | -0.061 *** | 0.274 *** | 1.000 | |
| **year_type** | -0.007 | -0.009 | 0.014 *** | 0.017 *** | 0.003 *** | 1.000 |

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

*5.3 Results summary*

Finally, to summarize the results from our research outlined in sections 4 and 5, and based on our hypothesis and research question, we found that, on average, family CEO successions: (1) turn over the company to a younger generation, (2) happen in smaller firms with less institutional ownership and with a family CEO having high ownership, (3) do not occur after a period of declining performance, and (4) bring a positive and significant change in performance to family firms from year -1 to +3 when analyzing them using only time-series comparison. On the other hand, (5) family firms having a non-family CEO succession do not have a significant change in their profitability after the turnover when considering only time-series analysis. More importantly, our main results that address our sixth hypothesis and answer our research question reflect that family firms that undergo a family CEO succession experience no significant change in financial performance after compared to before the turnover compared to those that undergo a non-family CEO succession. Moreover, when controlling for firm age, CEO age, and type of year of the succession, our findings suggest, contrary to most empirical evidence that we analyzed, that family firms that undergo a family CEO succession experience a positive and significant change in profitability after the

turnover compared to non-family CEO turnovers. So, we argue that our results are driven by the stewardship theory, supported by all the positive outcomes of having a family CEO, and the fact that the results on family CEO successions might be dependent on the type of firm, the industry it is on, the country it operates in, and the importance that the industry represents to the country. In our study, having no significant changes in profitability after the turnover of family CEO compared to non-family CEO in the general case and having positive and significant changes when controlling for some variables, suggest that there are no negative impacts of family CEOs. Therefore, in this important industry for Norway, family CEOs could have different motivations –other than salary or bonuses– such as family peer pressure, industry peer pressure, shame or guilt that will encourage them to perform (Kandel & Lazear, 1992; Davis, Schoorman, & Donaldson, 1997).

## 6 Conclusion

The CEO is a key figure and an important position in every company. Hence, having a transition of chief executive officer has effects over different aspects and areas of the firm. More specifically, in private family firms, CEO turnovers become a more controversial topic given that appointing family members might be against what some argue are good corporate governance practices. Furthermore, in Norway's particular case, the country's economy heavily relies in private firms, whereas most of them tend to be family firms. In particular, the ones belonging to the oil sector pose a huge importance given that the petroleum industry is the largest one in terms of income. Thus, it becomes relevant to study family CEO turnovers in private, Norwegian family firms in the oil industry and their effect on the companies' financial performance.

Additionally, although CEO successions have become a more relevant topic in corporate governance throughout the years, only few studies exist which try to determine the impact of family CEO successions on firm performance. Besides, these studies mainly focus on large public firms instead of private family firms. Thus, our research sought to overcome these previous limitations by using data on private family firms and analyzing the effect of family CEO turnovers from both

perspectives, a cross-sectional and a time-series analysis, with the help of a panel data set. By using a difference-in-difference regression to address our research question, we contribute to previous empirical evidence related to CEO successions' impact on performance. Hence, we performed our study to answer if private, Norwegian family firms in the oil industry that undergo a family CEO succession experience a significant change in financial performance after compared to before the turnover, compared to those that undergo a non-family CEO succession.

Our research question was neutrally formulated given the contradicting positive and negative aspects of our theoretical framework. Mixed arguments about having family vs non-family CEO's, empirical evidence about negative performance after family CEO turnovers, and opposing corporate governance theories like stagnation and stewardship, led us to believe that family CEO successions effects on profitability may be dependent on the type of firm, the industry it is located in, and the country it is operating in. Hence, our belief is that due to this and to the fact that the oil industry is really important in the Norwegian economy, family CEO successions should not significantly affect performance in family firms compared to their non-family counterpart. We also hypothesized that it is a more natural pattern for family CEO successions to occur from an older generation to a younger generation and that therefore, this type of successions do not necessarily occur in periods of declining performance in the previous years before the succession, which could be the case in non-family CEO turnovers. Finally, having a family CEO succession might occur in firms where this is easier, i.e. in smaller firms where the controlling family and/or the current family CEO have higher ownership and where there is less outsider opinion due to lower institutional ownership.

As shown in our preliminary analyses and based on our first three hypotheses, family CEO successions in our sample have certain characteristics. First, they occur in smaller firms where there is less institutional ownership and a higher ownership by the current family CEO. This implies that the controlling family has a voice, more decision power, and an important vote to appoint an insider as CEO. Moreover, given these benefits of control, on average, family CEO

successions turn over the company from an older CEO, perhaps the founder or the owner, to its descendants or a younger generation within the family. This implies that the former family CEO wants to preserve personal and social control rather than have an outsider come in and potentially change these values (Daily & Dollinger, 1992). Furthermore, the benefits of having a family CEO as a successor will ease cooperation and transfer of knowledge inside the firm (Barnes & Hershon, 1976). Another decisive factor for inclining towards an insider is that the younger CEO has hard-to-obtain and firm-specific knowledge built from experience and involvement in the firm (Donnelley, 1964) that a non-family CEO will not have. Finally, the previous results from the first two hypothesis are also tied to the third hypothesis, which suggested that family CEO successions do not occur after a period of declining performance. This implies that firms do not need to be going through a bad financial situation to have a family succession.

Additionally, our fourth and fifth hypotheses were useful to examine the time-series comparison of each of the types of successions on their own. In the one hand, family CEO successions bring a positive and significant change in performance to family firms from year -1 to +3. Even though this result does not support our fourth hypothesis, it actually indicates a better result. We hypothesized that there was going to be no change and it resulted in a positive change. On the other hand, family firms having a non-family CEO succession do not have a significant change in their profitability after the turnover when considering this time-series analysis results from our univariate tests, which supported our fifth hypothesis. However, when looking at all the successions the change after the succession is positive even though it is not significant. So, this preliminary results before addressing the difference-in-difference study, indicate that there seems to be at least no statistically negative impact of either type of successions in family firms.

More importantly, our main results that support our sixth hypothesis and answer our research question reflect that family firms that undergo a family CEO succession experience no significant change in financial performance after compared to before the turnover compared to those that undergo a non-family CEO succession. These results are somehow similar to those found by Molly, Laveren

and Deloof (2010), which arrived to the conclusion that there was no statistically significant evidence that a family firm's profitability is affected by a succession and argued that a succession should not be viewed as a negative event in the life cycle of a family business. However, our main findings are different to those of the three studies on impact of family CEO successions on firm performance. All of them found that family CEO successions bring negative results to the firm. Brian Smith and Ben Amoako-Adu (1999) used Canadian public firms and found that stock prices decline when a family CEO is appointed. Francisco Pérez-González (2006) used American public firms and found that when the new CEO is related to the departing CEO there's an underperformance in terms of operating profitability compared to unrelated CEO successions. And, Morten Bennedsen et al. (2007) used Danish public and private firms and found that family successions have a negative impact on firm performance. Hence, one explanation for our results differing from the first three studies could rely on the fact that, different from what they did, we considered only private firms and we focused our study in one industry in particular. Another reason, which we think is the most important one that could explain our results being better (in terms of performance) compared to the previous empirical evidence is the fact that the oil industry is very important to Norway's economy because it is the main contributor to the oil fund which is the welfare system for future generations. Therefore, Norwegian family CEOs in the sector have the pressure to safeguard the economy and have a stable industry. Hence, family peer pressure, industry peer pressure, shame or guilt will encourage them to perform (Kandel & Lazear, 1992; Davis, Schoorman, & Donaldson, 1997).

When taking into account our control variables, our obtained results were different and even opposing as the ones of the three previously mentioned. When controlling for firm age, CEO age, and type of year of the succession, our findings suggest that family firms that undergo a family CEO succession experience a positive and significant change in profitability after the turnover compared to non-family CEO turnovers. These results proofed to be interesting to support the arguments of the stewardship theory, the benefits of family CEOs, and of the importance of the oil sector in Norway as reasons for positive results.

When controlling for firm age, there is a significant and positive change in performance of family CEO successions after than before the turnover compared to non-family CEO successions in younger firms. Therefore, older firms have a negative effect on profitability. A possible explanation for this is that younger firms might still be in a development stage. Hence, new family CEO's with a fresher approach of leading the company might be able to capitalize a larger upside by exploiting growth opportunities and hence lead to a larger change in profitability after successions. An example could be, taking on positive NPV investments that lead to an improvement in the firms' financial performance. These positive findings refer us back to the stewardship theory and the pros of having a family CEO. Stewards care about continuity and longevity of their businesses (Miller and Le Breton-Miller, 2005) and family CEOs have a long-term focus (Cadbury, 2000). Both characteristics support and are possible explanations for the behavior of family CEOs in younger firms performing better than non-family CEOs.

Moreover, a similar result was obtained when controlling for market conditions and macroeconomic factors. Our findings indicate that the year type has also a significant effect on OROA. Family firms that undergo a family CEO turnover experience a positive and significant change in performance after the turnover compared to non-family successions in downturns. This outcome could also be explained by the fact that in a bad year there is a wider growth gap and a family CEO could improve the companies' results considerably and perhaps that is why the turnover was appointed in the first place. This result again refers to the stewardship theory and the benefits of having a family CEO. Stewards of the firm obtain a lot of personal satisfaction if the firm has a healthy financial performance and, thus, if it is successful (Davis, Schoorman, & Donaldson, 1997). Hence, from here can come the family CEO's motivation to generate a positive change in performance during bad years. Another positive aspect of family CEOs in this case is that, even in during a downturn stage of the firm, they can enhance financial performance in several ways and one of them is by reducing agency problems in the firm (Anderson & Reeb, 2003).

Lastly, controlling for CEO age, the regression indicated similar results as the two previous ones. However, in this case the difference-in-difference-in-difference estimator was negative, which meant it inclined towards favoring younger CEOs. However, it was not statistically significant. If it would have been significant enough, this result could possibly be explained by the fact that younger family CEO's could be more risk takers than their older counterpart. Taking more risks could lead to larger changes in performance and perhaps these changes could be positive if the risky decisions taken are the appropriate ones.

In conclusion, we suggest that the main reason that family CEO successions do not have a significant implication in profitability changes compared to non-family successions and that our whole turnover sample did not show a significant change in performance in the three-year period after the succession in our univariate tests, could be attributed to the highly-regulated oil industry (St. meld. nr 76 (1970-1971), 1971) and the importance of it to build a common welfare and financial security for Norway's future generations (St. meld. nr 25 (1973-1974), 1974; St. meld. nr 28 (2010-2011), 2011). Furthermore, the oil service sector is the largest and most important industry, in terms of value, to the Norwegian economy (Norwegian Petroleum, 2020). Therefore, these regulations and common interests make it a solid industry in which CEOs, whether they are inside or outside the family, act as stewards of their firms and have a pressure to behave and maintain stable financial performance, even during a succession, to ensure the industry's and their welfare's wellbeing. These results are further supported with positive and significant changes in OROA particularly when taking into account firm age and year type as control variables.

Lastly, it is important to point out our study's shortcomings. Family firms' CEO transitions are more complicated and might involve more factors, other than the firm's characteristics obtained from our data, that could potentially define the degree of impact of the succession on company's performance. To mention some of these issues, we refer to: amount of planning of the successions, level of conflicts within the family, and the education level of family descendants, among others. Even though some or all of these could affect the relationship between the

succession and the firm's performance, we could not include them in our research due to a limited access to data related to these matters. Further studies could focus on these to have a better understanding of the way family CEO successions affect profitability compared to non-family CEO successions. Furthermore, family CEO successions might have other consequences in the non-financial part of the business. Therefore, future studies could further analyze the way in which family CEO successions affect other aspects of the company, other than the profitability, compared to non-family CEO successions. This will allow to identify a broader scope of implications of turnovers in private family firms. Additionally, an area of future research would be to explore the behavior of private family firms in another important sector like fishing, or perhaps even look at the big picture and investigate this studied behavior in all industries in Norway. This will help to see if there is a trend occurring in the private family firms in Norway, based on importance, size, or even firm age. To end, another suggestion for future research that would complement our findings is to study Norwegian public firms to be able to compare those results more directly with the three studies in our literature review which considered public firms in their data sets.

## Appendix

STATA code:

```
1 //Import Raw Data File>Import>TextData
2 import delimited "D:\Max\Documents\Maestría\BI\1.- MSc in Finance\5.- Master
Thesis\Chosen Topic\Data\Raw Data.txt", encoding(ISO-8859-2)
3
4 //Tell STATA that data is a panel
5 xtset pcid yr
6
7 //Rename variables
8 rename item_4 ceo_birth_year
9 label variable ceo_birth_year "item_4"
10
11 rename item_9 revenue
12 label variable revenue "item_9"
13
14 rename item_15 depreciation
15 label variable depreciation "item_15"
16
17 rename item_19 operating_income
18 label variable operating_income "item_19"
19
20 rename item_39 net_income
21 label variable net_income "item_39"
22
23 rename item_51 total_fixed_tangible_assets
24 label variable total_fixed_tangible_assets "item_51"
25
26 rename item_63 total_fixed_assets
27 label variable total_fixed_assets "item_63"
28
29 rename item_78 total_current_assets
30 label variable total_current_assets "item_78"
31
32 rename item_87 total_equity
33 label variable total_equity "item_87"
34
35 rename item_11102 industry_code
36 label variable industry_code "item_11102"
37
38 rename item_503 full_county_number
39 label variable full_county_number "item_503"
40
41 rename item_13420 company_age
42 label variable company_age "item_13420"
43
44 rename item_14002 number_of_owners
45 label variable number_of_owners "item_14002"
46
47 rename item_14018 aggregated_fraction_inst_own
48 label variable aggregated_fraction_inst_own "item_14018"
```

```
49
50 rename item_15305 largest_family_has_chair
51 label variable largest_family_has_chair "item_15305"
52
53 rename item_15302 largest_family_sum
54 label variable largest_family_sum "item_15302"
55
56 rename item_15304 largest_family_has_ceo
57 label variable largest_family_has_ceo "item_15304"
58
59 rename item_18010 shares_owned_by_ceo_family
60 label variable shares_owned_by_ceo_family "item_18010"
61
62 rename item_18011 shares_owned_by_ceo
63 label variable shares_owned_by_ceo "item_18011"
64
65 rename item_50109 number_of_employees
66 label variable number_of_employees "item_50109"
67
68 //Create dummy variable to filter industry codes
69 generate industry_dummy = 1 if ustrregexm(industry_code,"06100") |
ustrregexm(industry_code,"06200") | ustrregexm(industry_code,"09101") |
ustrregexm(industry_code,"09109") | ustrregexm(industry_code,"19200") |
ustrregexm(industry_code,"30113") | ustrregexm(industry_code,"33150") |
ustrregexm(industry_code,"35210") | ustrregexm(industry_code,"35220") |
ustrregexm(industry_code,"35230") | ustrregexm(industry_code,"46120") |
ustrregexm(industry_code,"46630") | ustrregexm(industry_code,"46691") |
ustrregexm(industry_code,"46693") | ustrregexm(industry_code,"46710") |
ustrregexm(industry_code,"52215") | ustrregexm(industry_code,"11100") |
ustrregexm(industry_code,"11200") | ustrregexm(industry_code,"10100") |
ustrregexm(industry_code,"10200") | ustrregexm(industry_code,"10300") |
ustrregexm(industry_code,"23200") | ustrregexm(industry_code,"35114") |
ustrregexm(industry_code,"36110") | ustrregexm(industry_code,"40210") |
ustrregexm(industry_code,"40220") | ustrregexm(industry_code,"51120") |
ustrregexm(industry_code,"51873") | ustrregexm(industry_code,"51871") |
ustrregexm(industry_code,"51510")
70
71 //Determine the successions
72
73 //Create lag variable of CEO year of birth
74 generate lag_ceo_birth_year=L.ceo_birth_year
75
76 //Create dummy variable for successions
77 generate succession_dummy = 1 if ceo_birth_year != lag_ceo_birth_year &
lag_ceo_birth_year != . & ceo_birth_year != .
78
79 //Create dummy variable for industry successions
80 generate industry_successions_dummy = 1 if industry_dummy == 1 & succession_dummy == 1
81 //We are getting 688 industry successions
82
83 //Determine if it is a family succession
84
85 //Create a lag variable of CEO owned by largest family
86 generate lag_largest_family_has_ceo = L.largest_family_has_ceo
87
88 //Create dummy variable for industry family successions
```

```
generate industry_family_successions = 1 if industry_successions_dummy == 1 &
lag_largest_family_has_ceo == 1 & largest_family_has_ceo == 1
//Out of the 688 successions in the industry, we are getting that 110 of them are family
successions

//Calculations of performance indicator: OROA

//Calculate Operating Income before Depreciation: Operating Income plus Depreciation
generate operating_income_before_dep = operating_income + depreciation

//Calculate Total Assets: Total Current Assets plus Total Fixed Assets
generate total_assets = total_current_assets + total_fixed_assets

//Calculate OROA: Operating Income before Depreciation over Total Assets
generate oroa = operating_income_before_dep / total_assets

//Summarize OROA to look at the distribution of the values and see if there are outliers
summarize oroa, detail
//We see that there are very high and low outliers. Therefore, we winsorize the data.

//Winsorize OROA
winsor2 oroa, cuts(1 99) by(yr)
//oroa_w variable is created

//Summarize winsorized OROA to look at the distribution values and see if they changed
summarize oroa_w, detail
//The distribution looks much more better without the presence of large outliers

//Generate lags for the new winsorized variable.

//OROA 1 year before turnover
generate lag1_before_oroa = L.oroa_w

//OROA 2 years before turnover
generate lag2_before_oroa = L2.oroa_w

//OROA 3 years before turnover
generate lag3_before_oroa = L3.oroa_w

//OROA 1 year after turnover
generate lead1_after_oroa = F.oroa_w

//OROA 2 years after turnover
generate lead2_after_oroa = F2.oroa_w

//OROA 3 years after turnover
generate lead3_after_oroa = F3.oroa_w


//Calculate means and medians for graphs

//Mean of OROA on the year of turnover of all 688 industry successions
mean oroa_w if industry_successions_dummy == 1

//Mean of OROA 1 year before turnover of all 688 industry successions
mean lag1_before_oroa if industry_successions_dummy == 1
```

```
143
144 //Mean of OROA 2 years before turnover of all 688 industry successions
145 mean lag2_before_oroa if industry_successions_dummy == 1
146
147 //Mean of OROA 3 years before turnover of all 688 industry successions
148 mean lag3_before_oroa if industry_successions_dummy == 1
149
150 //Mean of OROA 1 year after turnover of all 688 industry successions
151 mean lead1_after_oroa if industry_successions_dummy == 1
152
153 //Mean of OROA 2 years after turnover of all 688 industry successions
154 mean lead2_after_oroa if industry_successions_dummy == 1
155
156 //Mean of OROA 3 years after turnover of all 688 industry successions
157 mean lead3_after_oroa if industry_successions_dummy == 1
158
159
160 //Mean of OROA on the year of turnover of 110 industry family successions
161 mean oroa_w if industry_family_successions == 1
162
163 //Mean of OROA 1 year before turnover of 110 industry family successions
164 mean lag1_before_oroa if industry_family_successions == 1
165
166 //Mean of OROA 2 years before turnover of 110 industry family successions
167 mean lag2_before_oroa if industry_family_successions == 1
168
169 //Mean of OROA 3 years before turnover of 110 industry family successions
170 mean lag3_before_oroa if industry_family_successions == 1
171
172 //Mean of OROA 1 year after turnover of 110 industry family successions
173 mean lead1_after_oroa if industry_family_successions == 1
174
175 //Mean of OROA 2 years after turnover of 110 industry family successions
176 mean lead2_after_oroa if industry_family_successions == 1
177
178 //Mean of OROA 3 years after turnover of 110 industry family successions
179 mean lead3_after_oroa if industry_family_successions == 1
180
181
182 //Mean of OROA on the year of turnover of 578 industry non family successions
183 mean oroa_w if industry_successions_dummy == 1 & industry_family_successions != 1
184
185 //Mean of OROA 1 year before turnover of 578 industry non family successions
186 mean lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
187
188 //Mean of OROA 2 years before turnover of 578 industry non family successions
189 mean lag2_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
190
191 //Mean of OROA 3 years before turnover of 578 industry non family successions
192 mean lag3_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
193
194 //Mean of OROA 1 year after turnover of 578 industry non family successions
```

```
195 mean lead1_after_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
196
197 //Mean of OROA 2 years after turnover of 578 industry non family successions
198 mean lead2_after_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
199
200 //Mean of OROA 3 years after turnover of 578 industry non family successions
201 mean lead3_after_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
202
203
204 //Centile to get the medians of all 688 industry successions
205 centile oroa_w if industry_successions_dummy == 1
206
207 centile lag1_before_oroa if industry_successions_dummy == 1
208
209 centile lag2_before_oroa if industry_successions_dummy == 1
210
211 centile lag3_before_oroa if industry_successions_dummy == 1
212
213 centile lead1_after_oroa if industry_successions_dummy == 1
214
215 centile lead2_after_oroa if industry_successions_dummy == 1
216
217 centile lead3_after_oroa if industry_successions_dummy == 1
218
219
220 //Centile to get the medians of 110 industry family successions
221 centile oroa_w if industry_family_successions == 1
222
223 centile lag1_before_oroa if industry_family_successions == 1
224
225 centile lag2_before_oroa if industry_family_successions == 1
226
227 centile lag3_before_oroa if industry_family_successions == 1
228
229 centile lead1_after_oroa if industry_family_successions == 1
230
231 centile lead2_after_oroa if industry_family_successions == 1
232
233 centile lead3_after_oroa if industry_family_successions == 1
234
235
236 //Centile to get the medians of 578 industry non family successions
237 centile oroa_w if industry_successions_dummy == 1 & industry_family_successions != 1
238
239 centile lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
240
241 centile lag2_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
242
243 centile lag3_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
244
```

```
245 centile lead1_after_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
246
247 centile lead2_after_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
248
249 centile lead3_after_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1
250
251
252 //Create a dummy variable to see the data points that have data in all 7 years
253 generate complete_seven_years = 1 if oroa_w != . & lag1_before_oroa != . &
lag2_before_oroa != . & lag3_before_oroa != . & lead1_after_oroa != . & lead2_after_oroa != . &
lead3_after_oroa != .
254
255
256 //Define sample as the seven years surrounding the succession
257
258 generate year1_before_succession = F.industry_successions_dummy
259
260 generate year2_before_succession = F2.industry_successions_dummy
261
262 generate year3_before_succession = F3.industry_successions_dummy
263
264 generate year1_after_succession = L.industry_successions_dummy
265
266 generate year2_after_succession = L2.industry_successions_dummy
267
268 generate year3_after_succession = L3.industry_successions_dummy
269
270 generate sample_dummy = 1 if industry_successions_dummy == 1 |
year1_before_succession == 1 | year2_before_succession == 1 | year3_before_succession == 1 |
year1_after_succession == 1 | year2_after_succession == 1 | year3_after_succession == 1
271
272 //Create dummies for regression and univariate tests
273
274 //The post dummy equals 1 in the 3 years after the succession and it equals 0 in the 3 years
before
the succession
275 generate post_dummy = 1 if year1_after_succession == 1 | year2_after_succession == 1 |
year3_after_succession == 1
276
277 replace post_dummy = 0 if year1_before_succession == 1 | year2_before_succession == 1 |
year3_before_succession == 1
278
279
280 //Define family successions as the seven years surrounding the succession
281
282 generate year1_before_succession_family = F.industry_family_successions
283
284 generate year2_before_succession_family = F2.industry_family_successions
285
286 generate year3_before_succession_family = F3.industry_family_successions
287
288 generate year1_after_succession_family = L.industry_family_successions
289
```

```
290 generate year2_after_succession_family = L2.industry_family_successions
291
292 generate year3_after_succession_family = L3.industry_family_successions
293
294 generate family_dummy = 1 if industry_family_successions == 1 |
year1_before_succession_family == 1 | year2_before_succession_family == 1 |
year3_before_succession_family == 1 | year1_after_succession_family == 1 |
year2_after_succession_family == 1 | year3_after_succession_family == 1
295
296
297 //The type dummy equals 1 when there is a family succession and it equals 0 when there is a
non-family succession
298 generate type_dummy = 1 if family_dummy == 1
299
300 replace type_dummy = 0 if sample_dummy == 1 & family_dummy != 1
301
302
303 //Main regression. We are using difference-in-difference
304 generate mult = type_dummy*post_dummy
305 reg oroa_w type_dummy post_dummy mult if sample_dummy == 1
306
307
308 //Univariate tests to compare if the means are equal or not using a standard two-tailed t-test
309
310 //For all successions
311
312 //Comparing oroa_w 3 years before succession to 1 year before succession
313 ttest lag1_before_oroa == lag3_before_oroa if industry_successions_dummy == 1, unpaired
314
315 //Comparing oroa_w 1 year before succession to 1 year after succession
316 ttest lead1_after_oroa == lag1_before_oroa if industry_successions_dummy == 1, unpaired
317
318 //Comparing oroa_w 1 year before succession to 2 years after succession
319 ttest lead2_after_oroa == lag1_before_oroa if industry_successions_dummy == 1, unpaired
320
321 //Comparing oroa_w 1 year before succession to 3 years after succession
322 ttest lead3_after_oroa == lag1_before_oroa if industry_successions_dummy == 1, unpaired
323
324 //Comparing oroa_w before the succession (post=0) and after the succession (post=1)
325 ttest oroa_w, by(post_dummy)
326
327 //For family successions
328
329 //Comparing oroa_w 3 years before succession to 1 year before succession
330 ttest lag1_before_oroa == lag3_before_oroa if industry_family_successions == 1, unpaired
331
332 //Comparing oroa_w 1 year before succession to 1 year after succession
333 ttest lead1_after_oroa == lag1_before_oroa if industry_family_successions == 1, unpaired
334
335 //Comparing oroa_w 1 year before succession to 2 years after succession
336 ttest lead2_after_oroa == lag1_before_oroa if industry_family_successions == 1, unpaired
337
338 //Comparing oroa_w 1 year before succession to 3 years after succession
339 ttest lead3_after_oroa == lag1_before_oroa if industry_family_successions == 1, unpaired
340
341 //Comparing oroa_w before the succession (post=0) and after the succession (post=1)
```

```
342 ttest oroa_w if type_dummy == 1, by(post_dummy)
343
344 //For non-family successions
345
346 //Comparing oroa_w 3 years before succession to 1 year before succession
347 ttest lag1_before_oroa == lag3_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, unpaired
348
349 //Comparing oroa_w 1 year before succession to 1 year after succession
350 ttest lead1_after_oroa == lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, unpaired
351
352 //Comparing oroa_w 1 year before succession to 2 years after succession
353 ttest lead2_after_oroa == lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, unpaired
354
355 //Comparing oroa_w 1 year before succession to 3 years after succession
356 ttest lead3_after_oroa == lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, unpaired
357
358 //Comparing oroa_w before the succession (post=0) and after the succession (post=1)
359 ttest oroa_w if type_dummy == 0, by(post_dummy)
360
361
362 //Univariate tests to compare if the medians are equal or not using a two-tailed Wilcoxon
signed
rank test
363
364 //For all successions
365
366 //Comparing oroa_w 3 years before succession to 1 year before succession
367 signrank lag1_before_oroa = lag3_before_oroa if industry_successions_dummy == 1, exact
368
369 //Comparing oroa_w 1 year before succession to 1 year after succession
370 signrank lead1_after_oroa = lag1_before_oroa if industry_successions_dummy == 1, exact
371
372 //Comparing oroa_w 1 year before succession to 2 years after succession
373 signrank lead2_after_oroa = lag1_before_oroa if industry_successions_dummy == 1, exact
374
375 //Comparing oroa_w 1 year before succession to 3 years after succession
376 signrank lead3_after_oroa = lag1_before_oroa if industry_successions_dummy == 1, exact
377
378 //Comparing oroa_w before the succession (post=0) and after the succession (post=1)
379 ranksum oroa_w, by(post_dummy)
380
381 //For family successions
382
383 //Comparing oroa_w 3 years before succession to 1 year before succession
384 signrank lag1_before_oroa = lag3_before_oroa if industry_family_successions == 1, exact
385
386 //Comparing oroa_w 1 year before succession to 1 year after succession
387 signrank lead1_after_oroa = lag1_before_oroa if industry_family_successions == 1, exact
388
389 //Comparing oroa_w 1 year before succession to 2 years after succession
390 signrank lead2_after_oroa = lag1_before_oroa if industry_family_successions == 1, exact
391
```

```
392 //Comparing oroa_w 1 year before succession to 3 years after succession
393 signrank lead3_after_oroa = lag1_before_oroa if industry_family_successions == 1, exact
394
395 //Comparing oroa_w before the succession (post=0) and after the succession (post=1)
396 ranksum oroa_w if type_dummy == 1, by(post_dummy) exact
397
398 //For non-family successions
399
400 //Comparing oroa_w 3 years before succession to 1 year before succession
401 signrank lag1_before_oroa = lag3_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, exact
402
403 //Comparing oroa_w 1 year before succession to 1 year after succession
404 signrank lead1_after_oroa = lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, exact
405
406 //Comparing oroa_w 1 year before succession to 2 years after succession
407 signrank lead2_after_oroa = lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, exact
408
409 //Comparing oroa_w 1 year before succession to 3 years after succession
410 signrank lead3_after_oroa = lag1_before_oroa if industry_successions_dummy == 1 &
industry_family_successions != 1, exact
411
412 //Comparing oroa_w before the succession (post=0) and after the succession (post=1)
413 ranksum oroa_w if type_dummy == 0, by(post_dummy)
414
415
416 //CONTROL VARIABLES
417
418 //Firm size
419 generate revenue_nok = revenue
420 replace revenue_nok = revenue*5.6694 if ustrregexm(currency,"USD") & yr == 2008
421 replace revenue_nok = revenue*6.2502 if ustrregexm(currency,"USD") & yr == 2009
422 replace revenue_nok = revenue*6.0671 if ustrregexm(currency,"USD") & yr == 2010
423 replace revenue_nok = revenue*5.5737 if ustrregexm(currency,"USD") & yr == 2011
424 replace revenue_nok = revenue*5.7828 if ustrregexm(currency,"USD") & yr == 2012
425 replace revenue_nok = revenue*5.9014 if ustrregexm(currency,"USD") & yr == 2013
426 replace revenue_nok = revenue*6.3605 if ustrregexm(currency,"USD") & yr == 2014
427 replace revenue_nok = revenue*8.1208 if ustrregexm(currency,"USD") & yr == 2015
428 replace revenue_nok = revenue*8.3918 if ustrregexm(currency,"USD") & yr == 2016
429 replace revenue_nok = revenue*8.2410 if ustrregexm(currency,"USD") & yr == 2017
430 replace revenue_nok = revenue*8.2410 if ustrregexm(currency,"USN") & yr == 2017
431 replace revenue_nok = revenue*7.9936 if ustrregexm(currency,"EUR") & yr == 2010
432 replace revenue_nok = revenue*7.7841 if ustrregexm(currency,"EUR") & yr == 2011
433 replace revenue_nok = revenue*7.4662 if ustrregexm(currency,"EUR") & yr == 2012
434 replace revenue_nok = revenue*7.8622 if ustrregexm(currency,"EUR") & yr == 2013
435 replace revenue_nok = revenue*8.3936 if ustrregexm(currency,"EUR") & yr == 2014
436 replace revenue_nok = revenue*8.9712 if ustrregexm(currency,"EUR") & yr == 2015
437 replace revenue_nok = revenue*9.2607 if ustrregexm(currency,"EUR") & yr == 2016
438 replace revenue_nok = revenue*9.3568 if ustrregexm(currency,"EUR") & yr == 2017
439 replace revenue_nok = revenue*0.8204 if ustrregexm(currency,"SEK") & yr == 2009
440
441 generate proxy_firm_size = log(abs(revenue_nok))
442 replace proxy_firm_size = 0 if revenue_nok == 0
443 centile proxy_firm_size if industry_dummy == 1
```

```
444 //Large firms
445 generate firm_size = 1 if proxy_firm_size > `r(c_1)'
446 //Small firms
447 replace firm_size = 0 if proxy_firm_size < `r(c_1)'
448
449 generate type_firm_size = type_dummy*firm_size
450 generate post_firm_size = post_dummy*firm_size
451 generate type_post_firm_size = type_dummy*post_dummy*firm_size
452
453 reg oroa_w type_dummy post_dummy firm_size mult type_firm_size post_firm_size
type_post_firm_size if
sample_dummy == 1
454
455
456 //Firm age
457 generate proxy_firm_age = company_age
458 replace proxy_firm_age = 0 if company_age == .
459 centile proxy_firm_age if industry_dummy == 1
460 //Old firms
461 generate firm_age = 1 if proxy_firm_age > `r(c_1)'
462 //New firms
463 replace firm_age = 0 if proxy_firm_age <= `r(c_1)'
464
465 generate type_firm_age = type_dummy*firm_age
466 generate post_firm_age = post_dummy*firm_age
467 generate type_post_firm_age = type_dummy*post_dummy*firm_age
468
469 reg oroa_w type_dummy post_dummy firm_age mult type_firm_age post_firm_age
type_post_firm_age if
sample_dummy == 1
470
471
472 //CEO age
473 generate previous_ceo_age = yr - lag_ceo_birth_year
474 generate new_ceo_age = yr - ceo_birth_year
475
476 centile new_ceo_age if industry_dummy == 1
477 //Old replacement CEO's
478 generate ceo_age = 1 if new_ceo_age != . & new_ceo_age > `r(c_1)'
479 //Young replacement CEO's
480 replace ceo_age = 0 if new_ceo_age <= `r(c_1)'
481
482 generate type_ceo_age = type_dummy*ceo_age
483 generate post_ceo_age = post_dummy*ceo_age
484 generate type_post_ceo_age = type_dummy*post_dummy*ceo_age
485
486 reg oroa_w type_dummy post_dummy ceo_age mult type_ceo_age post_ceo_age
type_post_ceo_age if
sample_dummy == 1
487
488
489 //Good times and bad times for oil based on calendar years when the succession took place
490
491 //Good years
492 generate year_type = 1 if yr == 2004 | yr == 2005 | yr == 2006 | yr == 2007 | yr == 2010 | yr
== 2011 | yr == 2012 | yr == 2013 | yr == 2014
```

```
493
494 //Bad years
495 replace year_type = 0 if yr == 2000 | yr == 2001 | yr == 2002 | yr == 2003 | yr == 2008 | yr ==
2009 | yr == 2015 | yr == 2016 | yr == 2017
496
497 generate type_year_type = type_dummy*year_type
498 generate post_year_type = post_dummy*year_type
499 generate type_post_year_type = type_dummy*post_dummy*year_type
500
501 reg oroa_w type_dummy post_dummy year_type mult type_year_type post_year_type
type_post_year_type if
sample_dummy == 1
502
503
504 //SUMMARY STATISTICS
505
506 //Summary statistics for 688 turnovers in the industry
507
508 //Outgoing CEO age is defined in the variable previous_ceo_age
509 summarize previous_ceo_age if industry_successions_dummy == 1
510 centile previous_ceo_age if industry_successions_dummy == 1
511
512 //Outgoing CEO ownership
513 generate lag_ceo_ownership = L.shares_owned_by_ceo
514 summarize lag_ceo_ownership if industry_successions_dummy == 1
515 centile lag_ceo_ownership if industry_successions_dummy == 1
516
517 //Successor CEO age is defined in the veriable new_ceo_age
518 summarize new_ceo_age if industry_successions_dummy == 1
519 centile new_ceo_age if industry_successions_dummy == 1
520
521 //Successor CEO ownership
522 summarize shares_owned_by_ceo if industry_successions_dummy == 1
523 centile shares_owned_by_ceo if industry_successions_dummy == 1
524
525 //Firm age
526 summarize proxy_firm_age if industry_successions_dummy == 1
527 centile proxy_firm_age if industry_successions_dummy == 1
528
529 //Firm revenue
530 summarize revenue_nok if industry_successions_dummy == 1
531 centile revenue_nok if industry_successions_dummy == 1
532
533 //Firm institutional ownership
534 summarize aggregated_fraction_inst_own if industry_successions_dummy == 1
535 centile aggregated_fraction_inst_own if industry_successions_dummy == 1
536
537
538 //Summary statistics for 110 family turnovers in the industry
539
540 //Outgoing CEO age is defined in the variable previous_ceo_age
541 summarize previous_ceo_age if industry_family_successions == 1
542 centile previous_ceo_age if industry_family_successions == 1
543
544 //Outgoing CEO ownership
545 summarize lag_ceo_ownership if industry_family_successions == 1
```

```
546 centile lag_ceo_ownership if industry_family_successions == 1
547
548 //Successor CEO age is defined in the veriable new_ceo_age
549 summarize new_ceo_age if industry_family_successions == 1
550 centile new_ceo_age if industry_family_successions == 1
551
552 //Successor CEO ownership
553 summarize shares_owned_by_ceo if industry_family_successions == 1
554 centile shares_owned_by_ceo if industry_family_successions == 1
555
556 //Firm age
557 summarize proxy_firm_age if industry_family_successions == 1
558 centile proxy_firm_age if industry_family_successions == 1
559
560 //Firm revenue
561 summarize revenue_nok if industry_family_successions == 1
562 centile revenue_nok if industry_family_successions == 1
563
564 //Firm institutional ownership
565 summarize aggregated_fraction_inst_own if industry_family_successions == 1
566 centile aggregated_fraction_inst_own if industry_family_successions == 1
567
568
569 //Summary statistics for 578 non-family turnovers in the industry
570
571 //Outgoing CEO age is defined in the variable previous_ceo_age
572 summarize previous_ceo_age if industry_successions_dummy == 1 &
industry_family_successions != 1
573 centile previous_ceo_age if industry_successions_dummy == 1 &
industry_family_successions != 1
574
575 //Outgoing CEO ownership
576 summarize lag_ceo_ownership if industry_successions_dummy == 1 &
industry_family_successions != 1
577 centile lag_ceo_ownership if industry_successions_dummy == 1 &
industry_family_successions != 1
578
579 //Successor CEO age is defined in the veriable new_ceo_age
580 summarize new_ceo_age if industry_successions_dummy == 1 &
industry_family_successions != 1
581 centile new_ceo_age if industry_successions_dummy == 1 & industry_family_successions !=
1
582
583 //Successor CEO ownership
584 summarize shares_owned_by_ceo if industry_successions_dummy == 1 &
industry_family_successions != 1
585 centile shares_owned_by_ceo if industry_successions_dummy == 1 &
industry_family_successions != 1
586
587 //Firm age
588 summarize proxy_firm_age if industry_successions_dummy == 1 &
industry_family_successions != 1
589 centile proxy_firm_age if industry_successions_dummy == 1 &
industry_family_successions != 1
590
591 //Firm revenue
```

```
592 summarize revenue_nok if industry_successions_dummy == 1 &
industry_family_successions != 1
593 centile revenue_nok if industry_successions_dummy == 1 & industry_family_successions != 1
594
595 //Firm institutional ownership
596 summarize aggregated_fraction_inst_own if industry_successions_dummy == 1 &
industry_family_successions != 1
597 centile aggregated_fraction_inst_own if industry_successions_dummy == 1 &
industry_family_successions
!= 1
598
599
600 //T-tests to compare the means of revenues
601
602 generate revenues_family = revenue_nok if industry_family_successions == 1
603 generate revenues_nonfamily = revenue_nok if industry_successions_dummy == 1 &
industry_family_successions != 1
604
605 ttest revenues_nonfamily == revenues_family, unpaired
606
607 //T-tests to compare the means of institutional ownership
608
609 generate ownership_family = aggregated_fraction_inst_own if industry_family_successions
== 1
610 generate ownership_nonfamily = aggregated_fraction_inst_own if
industry_successions_dummy == 1 &
industry_family_successions != 1
611
612 ttest ownership_nonfamily == ownership_family, unpaired
613
614 //T-test to compare the means of age difference
615
616 generate outgoing_ceo_family = previous_ceo_age if industry_family_successions == 1
617 generate successor_ceo_family = new_ceo_age if industry_family_successions == 1
618 generate age_difference_family = outgoing_ceo_family - successor_ceo_family
619 centile age_difference_family
620 mean age_difference_family
621
622 generate outgoing_ceo_nonfamily = previous_ceo_age if industry_successions_dummy == 1
& industry_family_successions != 1
623 generate successor_ceo_nonfamily = new_ceo_age if industry_successions_dummy == 1 &
industry_family_successions != 1
624 generate age_difference_nonfamily = outgoing_ceo_nonfamily - successor_ceo_nonfamily
625 centile age_difference_nonfamily
626 mean age_difference_family
627
628 ttest age_difference_family = age_difference_nonfamily, unpaired
629
630 //T-test to compare the means of outgoing CEO ownership
631
632 generate out_CEO_ownership_family = lag_ceo_ownership if industry_family_successions ==
1
633 generate out_CEO_ownership_nonfamily = lag_ceo_ownership if
industry_successions_dummy == 1 &
industry_family_successions != 1
634
```

```
635 ttest out_CEO_ownership_family == out_CEO_ownership_nonfamily, unpaired
636
637 //T-test to compare the means of successor CEO ownership
638
639 generate succ_CEO_ownership_family = shares_owned_by_ceo if
industry_family_successions == 1
640 generate succ_CEO_ownership_nonfamily = shares_owned_by_ceo if
industry_successions_dummy == 1 &
industry_family_successions != 1
641
642 ttest succ_CEO_ownership_family == succ_CEO_ownership_nonfamily, unpaired
643
644
645 //CORRELATIONS
646 //Pearson correlation coefficient matrix to see if there is multicollinearity between
independent
variables
647 pwcorr type_dummy post_dummy firm_size firm_age ceo_age year_type, sig
```

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