CEO – the explicit value

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Abstract: The purpose of this essay is to examine the value connected to a company's CEO. CEO remuneration is a topic that is often addressed in the media and a central topic in research. The value added by a CEO is often questioned and hard to test for. We approach this by looking at the impact of CEO death on OROA. Using an extensive Swedish data set, we find a significant negative effect on operating return on assets from a CEO death event. The event is not followed by any over performance, meaning that losses are permanent. Smaller firms based on number of employees are hit harder by the event. CEO characteristics do not show significant differences aside from CEO tenure, which shows some impact only for the event year. Overall, the results exhibit CEO importance to Swedish firms.

Keywords: CEO death event, CEO Turn over, CEO characteristics, Firm performance

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1 Introduction

What it is exactly that the CEO does and more importantly, what value is attached to the CEOs? What does this value consist of? To answer these questions some academics have studied CEOs' personality traits, corporate governance systems and how they relate to company performance, and produced masses of literature. There is a problem with endogeneity as firms to do not select their CEOs randomly, and there are certainly differences across industries. This paper seeks to numerically determine the contributions of a CEO, by looking at CEO deaths, which are assumed to be exogenous. Firms can be benchmarked against other firms over the same periods around the death of a company's CEO. Over a large sample any difference should be attributable to this isolated event. This can then be interpreted as some sort of measurement of the inherent value of the CEO. We believe that this would contribute to the ongoing debate over management remuneration and whether it is reasonable or not. This will not answer what leadership or management is or what it is they are doing to create value for a company, but looking at the disruptive event of the death of a CEO will give a new perspective of that value.

In our empirical tests we identify a negative impact of 1.94 percentage points on operational return on assets (OROA) for the event of a CEO death. The effect starts one year before the year of death, which implies some expectancy in the event. There is no indication of the event being succeeded by overperformance, which means that the losses are permanent. When firms are grouped in terms of size based on number of employees, the effect is considerably weaker for the largest quartile. There is a statistically significant differential in performance between the smallest and largest quartile. Under the assumption that the event of a CEO death does have an effect, dividing firms using size of sales does not render any new perspectives. Looking at difference in age of the deceased CEOs we did not find any statistically significant difference in firm performance. For CEO tenure a significant effect can be found only for the event year, suggesting that CEO successors quickly come to grips with their new job tasks. For 28 % of firms where the death of a CEO occurred, the firm was registered for bankruptcy in the years following. For these firms, the event had a significantly more negative impact on firm performance.

We also tested the effect on the logarithm of sales growth, which surprisingly yielded a significant positive impact. We have no probable explanation for this and we cannot think of any sources of error.

We were interested in examining the effect on the death of a family member of a CEO on firm performance. Unfortunately we could not find any data on family relationships, which forced us to use restrictive proxies. This method was too strict and did not yield enough observations to generate statistically significant results. Although insignificant, they lean toward indicating the possibility of a negative impact on OROA, which could be examined further.

1.2 outline of study

In Section 2, previous research will be presented. A brief part will cover relevant literature that touches upon the question of “What value is the CEO to the company?” It will focus on the empirical work as that relates more closely to this paper. The qualitative research offers suggestions as to where more quantitative analysis can be done.

In Section 3, the data used in this essay will be described.

In Section 4, the handling of the data and the statistical methods that have been used will be described. It will also discuss the encountered restrictions.

Section 5, presents the results

In Section 6, the results will be analyzed

In Section 7, the conclusion will be summarized and presented.

In Section 8, possible future research will be discussed and suggested

Section 9, contains all references that have been used to write this thesis.

In the Appendix, all tables referred to in the paper will be displayed.

2 Previous Research

2.1 Related fields

To determine how much value a CEO adds one can start by looking at the tasks and skills that are required of executives. In management literature you find that managers are dissected into their personal traits, what style of management they employ, the situations in which they conduct their management and much more. It is also discussed whether the relationships between management and the employees come closer to capturing the essence of management rather than looking at the individual manager - “leadership is a process whereby an individual influences a group of individuals to achieve a common goal”.[1] Another frequently discussed topic is how much room there is to practice management. Obviously, a CEO has more freedom to practice his work than middle management, but to some extent the CEO is also limited by the board and cultural and institutional constraints. [2] With the low level of agreement regarding what constitutes management within this area of research, and the many authors with their own definitions it will be hard to deduce a quantitative indication of CEO value using only management literature. We hope that our study can bring a new perspective to this discussion. One benefit from our approach is that it is relatively separated from the field of management.

Executive pay is often the subject of public debate, their salary being several million dollars without clear justification. This leads us to CEO hiring practices. From an economics perspective, the skill of a CEO for a specific position is unobservable at the signing of the contract. Several researchers argue that running a modern company now favors general skills that are relatively transferable, as opposed to company specific knowledge, which would favor internal hiring. They see the trend that more executives are hired externally as confirmation of the hypothesis. A manager who is performing well at another firm is a good indication of aptitude, but a general skill set leaves uncertainty at the signing of the contract for both sides. In the field of labor market economics, Harris and Holmström present a dynamic wage model of efficient wage contracts. This model is applicable under the conditions that are mentioned above. The model assumes that the firm is risk neutral and that the agent is risk averse. Once the CEO starts working for the firm, output that is freely observable is produced. Output is considered to be positively correlated with ability.

The CEO compensation can then span from being completely fixed to giving the agent 100% ability related risk. Given that the agent is risk neutral we will not see the latter kind. Also, giving fixed contracts is not feasible as an agent cannot commit to refuse future offers should his ability turn out higher than expected. The option left is partial insurance with downward rigidity. If the manager’s

[1] Jönsson, S., Strannegård, L., *Ledarskapsboken*, Författarna & Liber AB, edition 1.1 page 14

ability is lower than expected then the company is stuck with taking negative profits. It is hard to discern the real reason for a CEO's departure, but there is some evidence suggesting that it is fairyly uncommon for a CEO to be terminated due poor performance. [3] If the manager turns out to be better than expected the company has to raise compensation as other employers compete for the employee. This picture should not be unfamiliar as one view how compensation packages are structured for top management and CEOs in presently listed companies.

2.2 Turnover empirical research

Stewart D. Friedman and Harbir Singh tested empirically what affects the CEO succession. They found that stockholders reacted heterogeneously to news of succession. The performance context is a good predictor to board initiated succession events and market reactions to successions. When firm performance indicates ineffective management and the company board replaces the CEO, the market tends to react favorably. Their hypothesis was that poor pre succession performance allowed for considerable latitude for action, and that communicating change in strategic direction is a positive signal of adaption.

Their data partially supported that disruptive succession, cases of CEO death or disability, were met with negative reactions. Another result was a negative relationship between stockholder reaction and pre succession performance, suggesting that if performance is good then all successions will be seen as disruptive. However, their data is limited by the small scope of succession cases studied. Results were not consistent across different regression models. [4]

Brian F. Smith and Ben Amoako-Adu studied management successions in 124 family-owned Canadian firms. Management literature suggests that family interests interfere with the goal of shareholder wealth at the time of CEO successions. Some fundamental questions they try to answer are whether companies appoint family members, non-family insiders or outsiders, what factors will affect this decision and what the characteristics are of these three types when they are appointed.

A multinomial logit analysis indicates that the only significant factor that leads to the choice of a family member as CEO successor is high concentration of family members in senior management and the absence of another large shareholder. In firms with another large shareholder it might even be the case that there is dissension as to which family should assume the senior executive role. Non-family insiders and outsiders are more often appointed as successors in poorly performing firms. Analysis of the stock price reaction to announcement of inside family succession shows a significant loss of shareholder value. Over the days around the announcement (-1 1) the stock return was estimated to -3.20 %. This negative effect does not extend to non-family insiders or outsiders. A cross-sectional regression indicates that age of the successor and the company size are significantly related to stock price reaction. They argue that negative reaction from the succession of a family member is due to the greater uncertainty of management quality when family members are appointed. [5]

Corporate governance is a proponent of succession planning which is believed to help organizations prepare for internal resource needs when unforeseen events occur, such as CEO deaths. This would include training qualified candidates for senior management positions which reduces the attrition of the high performing work force who tend to “job-hop” and put effort into looking into other career alternatives. Despite the benefits, a survey the Financial Executives Institute made in 1999 showed that 82 % respondents answered no to the question: “Were you groomed for your current CFO position by a mentor in the firm?” One possible explanation is that it is difficult to implement and the results are uncertain and difficult to measure. In a study published in 2005, Bruce K. Behn, Richard A Riley Jr. and Ya-wen Yang, map out some succession plans in American companies. The data used was found in the Factiva database for years 1984-2002, using the search criteria: “Death, Dies, Died or Dying and CEO”. The study was limited to bigger companies that were listed on stock exchanges. Some descriptive statistics are interesting to note. The average tenure of the CEOs was 14.1 years. Successions were internal in 72.6 % of the cases and the average age of the deceased was approximately 62 years. Higher tenure of a CEO increases the probability that someone from within the firm will be named successor.

Firms were considered to have a succession plan if there was a person holding the title of either president or COO (or both) and who was at least five years younger than the incumbent CEO. In their empirical research part they found evidence of shareholders valuing the presence of a succession plan, or at least the impression of there being one in place. It actually did not matter if the perceived successor in the end did not get promoted. [6]

2.3 Similar research

Morten Bennedsen, Francisco Pérez-Gonzalez and Daniel Wolfenzon used an extensive Danish data set to first test the performance of firms whose CEO dies to comparable firms. This evaluates the negative effect of losing the contribution of the incumbent CEO combined with the shock of losing any CEO. They also assessed a wider array of executive and firm characteristics that could affect a manager’s influence on firm performance, e.g. how the death of a family member of a manager affects the company. Their model was built on previously made assumptions regarding allocation of time between productive work and other activities, mainly household activities. If a family member of a manager did not work for the same firm then the effect of this family member dying should only be through the person who does. The hypothesis is that the death of a family member will alter the allocation of time toward family activities and reduce the capacity at which the manager can perform on the job. This provides a high level of separation and is likely to be exogenous.

They were able to identify 6753 deaths occurring to CEOs and the nucleur family; of which 1015 deaths were CEOs, 733 deaths were spouses of CEOs, 282 deaths were children of CEOs, 3061 were parents and 1364 deaths were parents in law of CEOs. The study found that the death of the CEO and his or her nucleur family is likely to cause both statistically significant and economically large impacts on firm profitability. The industry adjusted operating return on assets, OROA, falls by 0.9 percentage points annually over a two year window around any death to either the CEO or the nucleus family. If the CEO dies the direct effect is estimated to 1.7 percentage points annually and if it is a family member the effect is estimated to 0.7 percentage points. In robustness tests they found that the results are significant for the event year and the two following years. After that the results are insignificant, meaning that the losses are permanent and that shocked firms do not experience any over performance reversals afterwards. The effects are not dependent on any single year. There are no indications of differential performance prior to the event, strengthening the case for a causal relationship in which death affects performance and not the other way around. The effect of deaths of board members cannot be shown at an acceptable significance level. A limitation in this kind of study is that expected deaths cannot be isolated. It could be that some cases, but too few to show up significantly, involve expected deaths with the event effect somewhat spread out. However, the logical implication would be that for unexpected deaths the actual event should be even more negative than the results found. [7]

Our current understanding is that the data in their study have two major weaknesses:

1. Danish firms can opt to not be included in their national registry of firm accounting information,
2. They have no data on the number of employees in each firm.

The first point raises the question: Do firms that are doing poorly to a different extent choose to opt out than firms that are doing well? This kind of bias could lead to results being distorted in either direction. The second point is a shortcoming when investigating the magnitudes of impacts between bigger and smaller firms. They made a proxy variable using the size of assets of the firm. We consider this a rough proxy as industries differ in both labor and capital intensity.

W. Bruce Johnson, Robert P. Magee, Nandu J. Nagarajan and Harry A. Newman published a paper ("An analysis of the stock price reaction to sudden executive deaths") in 1984 on shareholder wealth dependent on continued executive employment. They studied 53 selected companies and looked into the stock reaction the day the CEO was mentioned in the obituaries. The selection criteria were that the deceased executive was working for a listed company which stocks were traded daily and that the cause of death was not due to "prolonged illness".

They did not find a systematic abnormal return on the average common stock. However, a bigger dispersion of returns was observed indicating that stock price adjustments were being made following the news. There are many factors that affect the net benefit of shareholders, i.e. the difference between incumbent and replacement executives' net contribution to equity value. They found a positive correlation with excess return and the incumbent executive also being the founder, although founder-managers appeared to receive a larger share from their employment contracts. The excess return was negatively associated with the death event of more senior management than their subordinates. The authors hypothesized that the value is mostly connected to the higher levels of firm specific human capital that higher management has had more time to acquire, meaning that the common stock returns were more negative when a CEO died than his subordinates, not because of the level of importance of the role, but rather the loss of firm specific human capital which is more difficult to salvage when replacing a lost employee.

The relationship between excess return and recent firm performance appeared unclear. The authors could not find a direct relationship between poor recent performance and higher expected value of new management. The combination of poor performance and a large shareholding of the deceased CEO was particularly interesting, as it was associated with higher announcement period excess returns. The interpretation here was that larger shareholdings enabled the CEO to impose higher transaction costs on the other shareholders during re-contracting initiatives. The article mentioned some limitations in the end: "In the absence of a well-developed theory linking managerial abilities, employment contract characteristics and external labor market opportunities to shareholder cash flows, the selection of appropriate independent variables for cross-sectional tests remains problematic". [8]

3 Data

To pursue our study we have used the following data sources:

Extract from Sveriges Dödbok, *Sveriges släktforskarförbund* – A registry containing information on all the deaths in Sweden between the years 1901 and 2009. In this paper, an excerpt for the years 1996 to 2009 was used. The data includes dates of birth and death, name, addresses and social security number of the individual. The source of the data is a collection of civil registry data from the church of Sweden and the Swedish Tax Agency.

Accounting data, *PAR AB* – Accounting data for Swedish firms from the early eighties to the year of 2008. This data set contains information on organization number, dates of financial reports and most relevant accounting data from the balance sheet and the income statement. It also contains some miscellaneous data such as number of employees.

Legal data, *PAR AB* – This contains the legal data collected by Statistics Sweden at the end of each year from 1997 to 2008. The data set includes information on organizational number, legal form and the industry classification according to Statistics Sweden. The industry specification is based on the "Svensk Näringsgrensindelning (SNI), which in turn builds on the EU standard NACE (*Nomenclature statistique des activités économiques dans la Communauté européenne).* The SNI is a five digit number with increasing level of detail from the left to right.

Board members and managerial data, *PAR AB* – A data set of information of board members, managers and accountants for Swedish companies from 1988 to 2008. The information included is the individual's position, social security number, address, start date and end date of their position and the company's corresponding organization number.

Bankruptcy & merger data, *PAR AB* – A data set containing records on bankruptcies, liquidation, cancellations and mergers. This includes information on which stage of a bankruptcy or liquidation the company is in and which date the status changed.

4 Methodology

The manipulation of the data and all the statistical analysis has been performed using Stata, a general-purpose statistical software package. The analysis can be replicated using the scripts written by the authors. Interested parties may inquire for the programming code.

4.1 CEOs – merging the data

To begin with, the data from the Swedish death registry and the Board and managerial data was matched using the social security number to create a data sheet consisting of all the dead CEOs. This information was merged with the industry classifications from the legal data.

The yearly legal data only contains information on industry specification when such specification had changed from the previous year. As different industry specification for different years for the same firms makes firm specific analysis problematic, we decided to keep the oldest known specification for each firm to get an industry specification that is accurate for the longest amount of time. We then dropped the following industries: financials, real estate, government, healthcare, sewage, associations, culture, embassies and utilities. This is because accounting data is not always economically relevant in public companies or the industry might be too tightly regulated, e.g. utilities. The specification standard from 1992 was used as this was the one with the most complete coverage of the data set.

Using the accounting data, yearly and industry specific averages were calculated for the measures used in the regression, i.e. operational return on assets and sales growth. This was then merged with the data above and the data set on bankruptcies and mergers. Our definition of bankruptcy was any company being either declared bankrupt, having been liquidated or cancelled at the company's own request.

4.2 Family members – merging the data

The merging of the family data was essentially the same. However, there was no data on family relationships as in the Danish paper. The Swedish Tax Agency holds information on these relationships, but only gives out information on specific cases. We were therefore forced to match family relations as best we could. This resulted in a matching with CEOs from the Board member and managerial data with deaths from the Swedish death registry on family name, street name, street number and postal code. This multidimensional matching did reduce the observations significantly but we thought it best to err on the side of caution. No other method gave clear indication of the matches being from the same family. A small caveat of this matching is if there are people with the same family name living in the same house but not being part of the same family. This should however only understate the results from any analysis.

4.3 CEOs – the statistical methods

The main outline of the statistical analysis is an event study where the identified event is when a CEO or a family member of a CEO dies. If we have several deaths for the same firm, there will be several event firms corresponding to the same firm. The year when the event occurs is called the event year and all the other data points will be compared relative to this event year. Specifically, this means the data set is a panel data set where the time variable is amount of years before or after the event and the panel variable is every unique combination of social security number and organization number.

The goal of the study is to establish quantitative relationships between the event and different kinds of accounting information. The typical regression will be:

$$y_{i.t} = \beta_0 + \beta_1 td_t + fe_i + e_{i.t}$$

Where $y_{i.t}$ is the dependent variable for event firm i and time t, td_t are different kind of time dummies and fe_i are event firm specific fixed effects and $e_{i.t}$ is the error term.

For simpler regression, a post event dummy will be used. This regression will put the observations into two groups, before and after the event. This kind of regression is good to use if more observations are needed to get significant results. The general regression will then be:

$$y_{i.t} = \beta_0 + \beta_1 post_t + fe_i + e_{i.t}$$

Where $post_t$ is a dummy that takes the value one when the observation is after the event and zero otherwise.

As dependent variables we will use:

- OROA – Operating return on assets defined as $OROA_t = EBITDA_t / Assets_{t-1}$. Of the return to assets ratios, this is the ratio least susceptible to managerial discretion. It should thus be a clean measure of how the profitability of operational activities changes. The OROA variable has been Winsorized using the 1st and 99th percentile to correct for outliers. As a measure of abnormal OROA, we will subtract the event firm OROA from the year and industry specific average OROA calculated for the entire population of Swedish firms.
- GS – Growth in sales defined as $GS_t = \log(Sales_t / Sales_{t-1})$. In companies where CEOs are working with customer relations, GS will measure the capability of an event firm to attract and withhold customers. The logarithm of the growth is used to correct for outliers and also make the result easier to interpret.

When the data permits, in terms of number of observations, we will look for differences in various non-accounting variables such as size of the company, age and tenure of the deceased CEO. The groupings in these cases will use the median as a cutoff point except for the age of the deceased CEOs where the cutoff point is 65, the Swedish state pension age.

Especially for small companies, the death of a CEO could mean the end of the company. Using dummies for companies which go bankrupt will make it possible to determine if these firms perform statistically worse relative to the rest of the event firms.

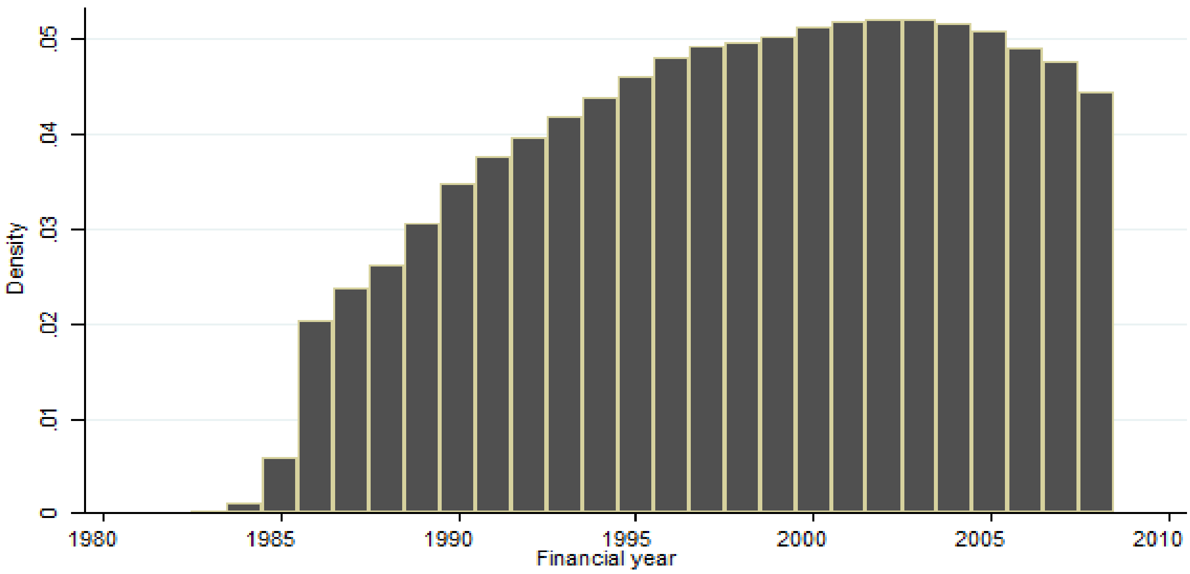
4.4 Family members - the statistical methods

For the case of deceased family members, the hypothesis is that the death of a close relative (i.e. spouse or child) will shift the time allocation of the CEO toward the family and from work. It can thus be seen as an instrumental variable for the managers' focus. In the case where the family member is not working at the same company as the CEO, it is not very likely that the death is endogenous to any firm variable. If the statistical analysis is restricted to only family members under the age of 18 or over the age of 65, the Swedish state pension age, it can be assumed with high probability that the instrument, i.e. the death of a family member, is not correlated with the error term in the explanatory equation. These will in the following sections be categorized as non-working family members. The small number of observations puts a restriction on what kind of statistical and statistical methods that can be performed. Significant results can unfortunately only be achieved using post event dummies.

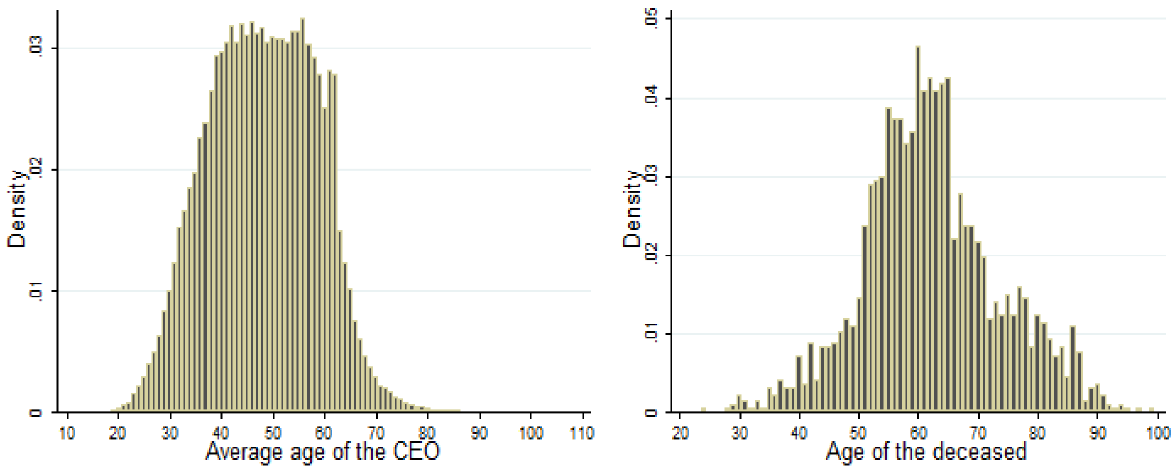
5 Results

5.1 Descriptive statistics

The data manipulation of deceased CEOs described in section 4 resulted in a dataset consisting of 1,935 identified events and 31,243 corresponding observations. This gives an average of about 16 years of data for every unique combination of deceased CEO and company.



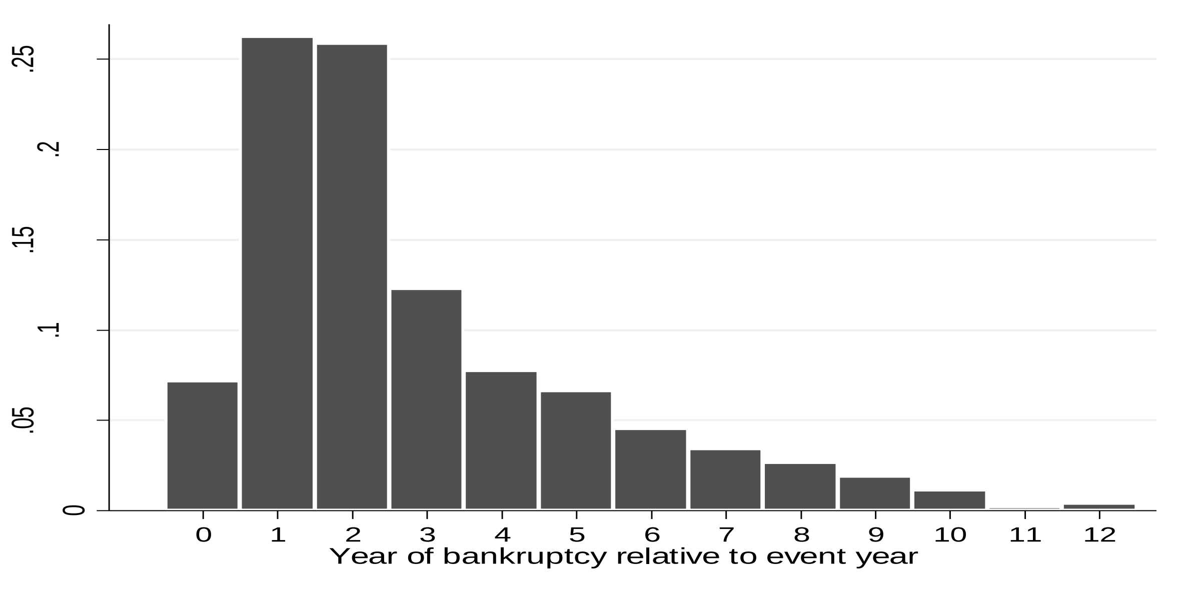
Summary statistic 1 *– this shows how the observations of yearly accounting information are spread out*



Summary statistic 2 *– the left graph shows the age distribution of CEOs in the full population. The right graph shows the age distribution of the deceased CEOs.*

The distribution of the financial year variable is slightly negatively skewed. This is probably because our records of deceased CEOs start from the year 1996. The data is however consistent during several business cycles which should correct for any bias in the accounting variables.

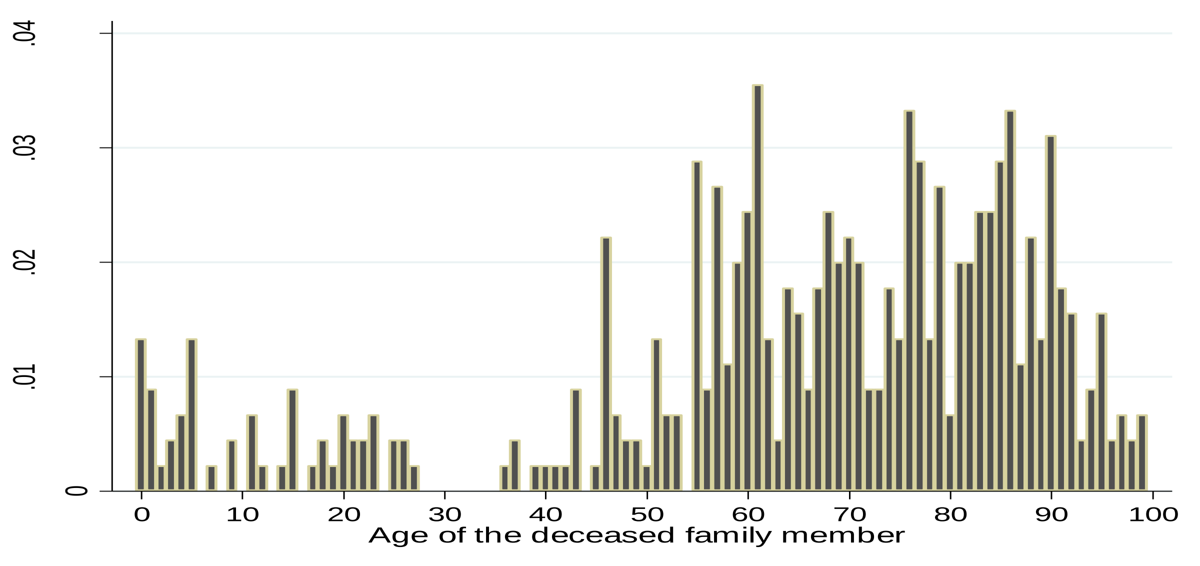
The graphs above show a comparison of the age of the deceased CEO compared to that of the average age of the CEO population which has been calculated using the social security number of every individual compared to the average date of their period as CEO. As can be seen in the graphs, the distribution of the age of deceased CEOs has a slightly higher kurtosis than the distribution of the average age of The CEOs. It is also quite naturally biased toward older individuals. This might create a problem if the performance of young and in particular old CEOs is consistently different compared to that of middle-aged CEOs.



Summary statistic 3 *– this shows the lag to a bankruptcy for firms that do go bankrupt after a CEO death event.*

In 537 firms or 28 % of the identified event firms the death of a CEO was succeeded by the company going bankrupt in the following years. The mean and median of time to bankruptcy is three and two years respectively relative to the event year. Of firms going bankrupt, 364 firms or 68 % of firms were defined as small relative to the median number of employees.

For deaths of family members, 451 individual cases with 5,447 corresponding observations were identified. The distribution of the age of deceased family members is centralized around the median of 70 years. 37 of the individuals are 18 or under and 270 are older than the Swedish state pension age. As expected, the method of matching described in section four yields a gap in the middle-ages where family members are less likely to live at the same address.



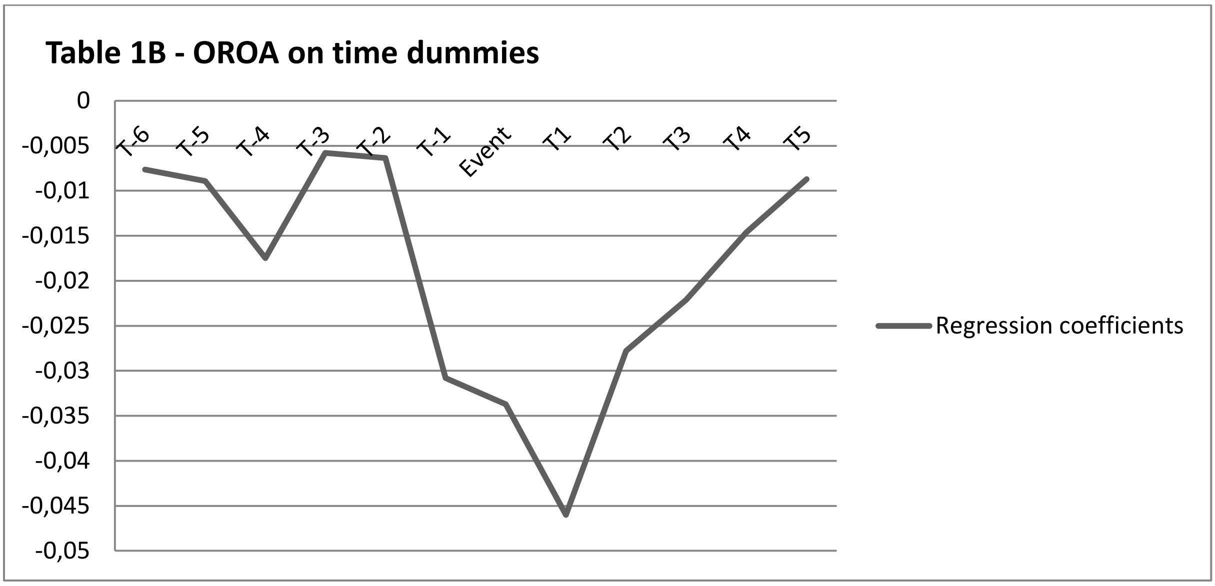
***Summary statistic 4** – this graph shows the age of the deceased family member in a CEO family death event.*

5.2 Main statistical tests

For the following test on OROA the measure has been demeaned using fiscal year and industry specifications based on the first four digits of the SNI. We also tested for SNI with only two levels of specificity and as the results were similar we chose four digits as it had lower variance.

Table 1A shows the results from regressing OROA on a variable post defined as one for every year at or after the event and zero else. The regression is restricted to three years before and after the event. The regression has 9723 observations. The constant and the independent variable are significant at the 1 % level. The Coefficient is -0.0238 and -0.0194 of the constant and the post variable respectively.

In **table 1B** are the results from regressing OROA on time dummies for six years before and five years after the event. For this regression we have 27251 observations. From t_{-1} to t_3 there is a highly significant (<1%) negative effect on OROA. The regression coefficient is -0.0308 for t_{-1}, -0.0337 for t_0, -0.0460 for t_1, -0.0278 for t_2, and -0.0221 for t_3,. The other time variables were economically close to zero and not significant except t_{-4}, which had a small coefficient of -0.0175 but still a t-statistics of -2.156. We have graphed the regression results below.



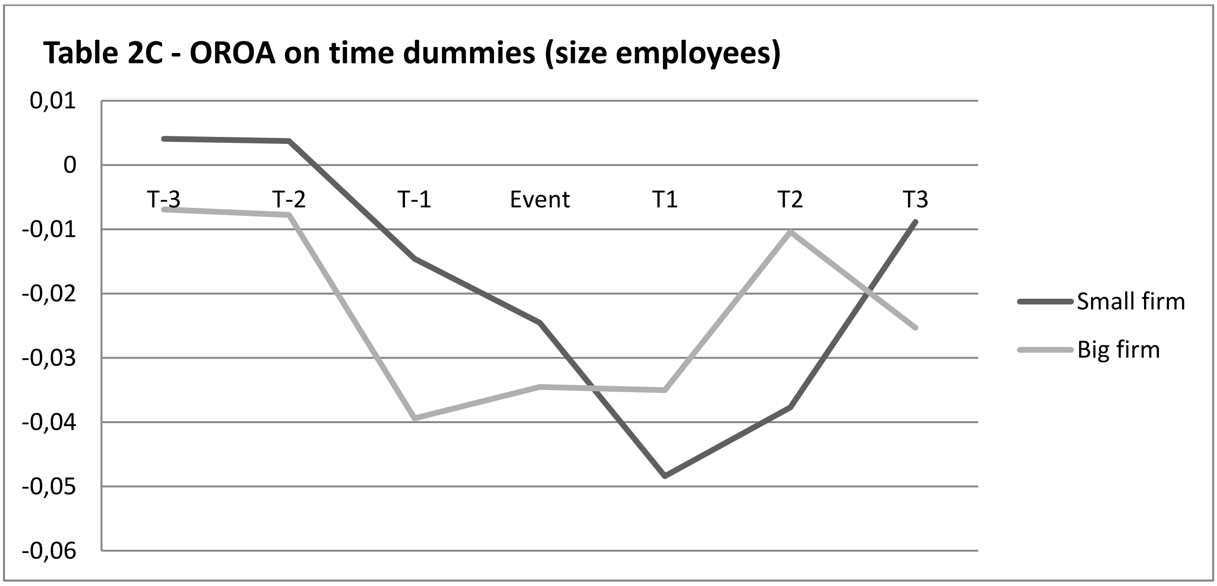
Results graph 1: *table 1B plotted. Industry demeaned OROA (operational return on assets) regressed on yearly time dummies. The regression constant has been excluded.*

The table also shows a regression for only events where observations are available all three years before and after. The only significant coefficient is -0.0261 for the year t_{-1}.

The two regressions in **table 2A** are the same kind as the one in table 1A, but they are divided into big and small companies with the cutoff for big companies being three or more employees. For small companies we have 4910 observations, the constant (-0.0275) and the independent variable post (-0.0337) are significant at the 1 % level. For big companies we have 4813 observations, the constant (-0.00925) is not significant at the 5 % level, the independent variable post (-0.0133) is significant at the 5 % level. The test was done on 27233 observations.

In **table 2B** we have tested all OROA on the post variable. The firms are divided into quartiles based on number of employees and all quartiles are measured <u>against</u> the first one with firms having the smallest amount of employees. The first quartile has a highly significant and negative effect, -0.0414. Compared to the first quartile the fourth one had a highly significant and positive effect. 0.0369.

Table 2C shows the results of regressing OROA on time variables that are separated into small and big (the cutoff for a big company is three or more employees). Tdminus3 is the coefficient for small firms at t_{-3} .If you add the coefficient for tdminus3_big_antanst you get the coefficient for big firms at the corresponding time. The same goes for all the other time variables. Due to the amount of variables please see the table in the appendix for further details. The resulting coefficients are graphed below.

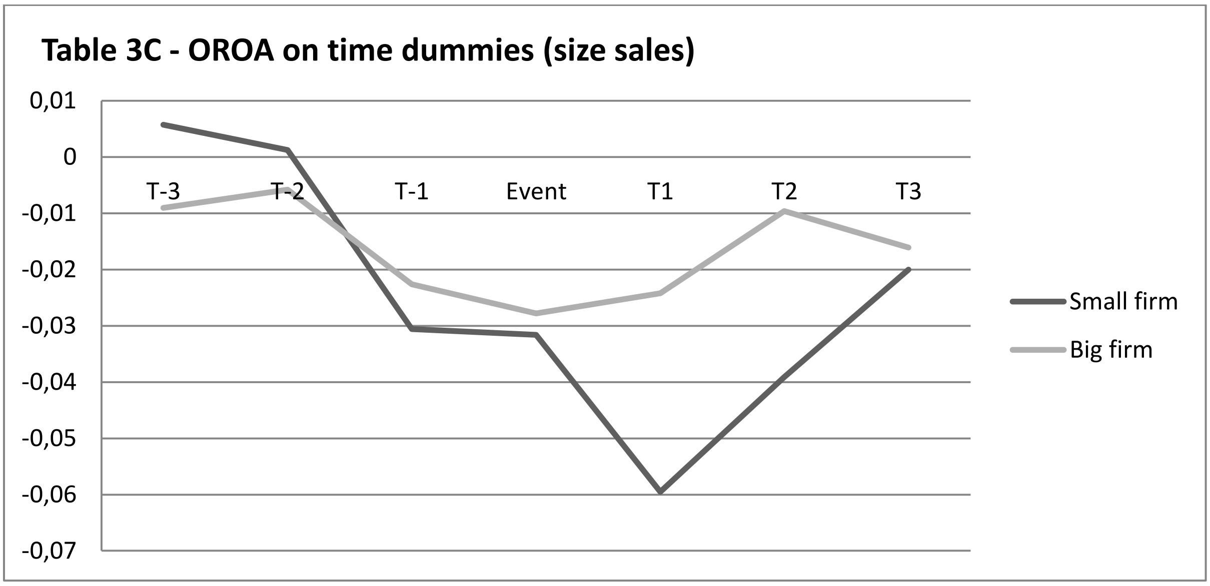


Results graph 2: *table 2C plotted. Industry demeaned OROA (operational return on assets) regressed on yearly time dummies. The regression constant has been excluded. Firms have been separated into big and small based on median number of employees.*

Table 3A shows OROA regressed on the post variable for three years before and after the event. The firms are divided into big and small firms based on the size of their sales with the cutoff for big firms being the median revenue, 2,583,055 Swedish Crowns. For small firms we have 4926 observations, the constant (-0.0354) and the "post" variable (-0.0386) are both significant at the 1 % level. For big firms we have 4797 observations, the constant (0.00526) and the post variable (-0.0114) are not significant at the 5% level.

Table 3B shows OROA regressed on the post variable. The firms are divided into quartiles based on size of sales. All quartiles are measured against the first one which contains the smallest firms. The first quartile is significant and negative, -0.0247. Relative to the first quartile, the fourth one is positive but lacks statistical significance. The test was done on 27235 observations.

Table 3C shows OROA regressed on time dummies and differentiated between big and small on size of sales. There are 27251 observations. We present the results in a graph below for readability. Please see the table in the appendix for details and numerical values.

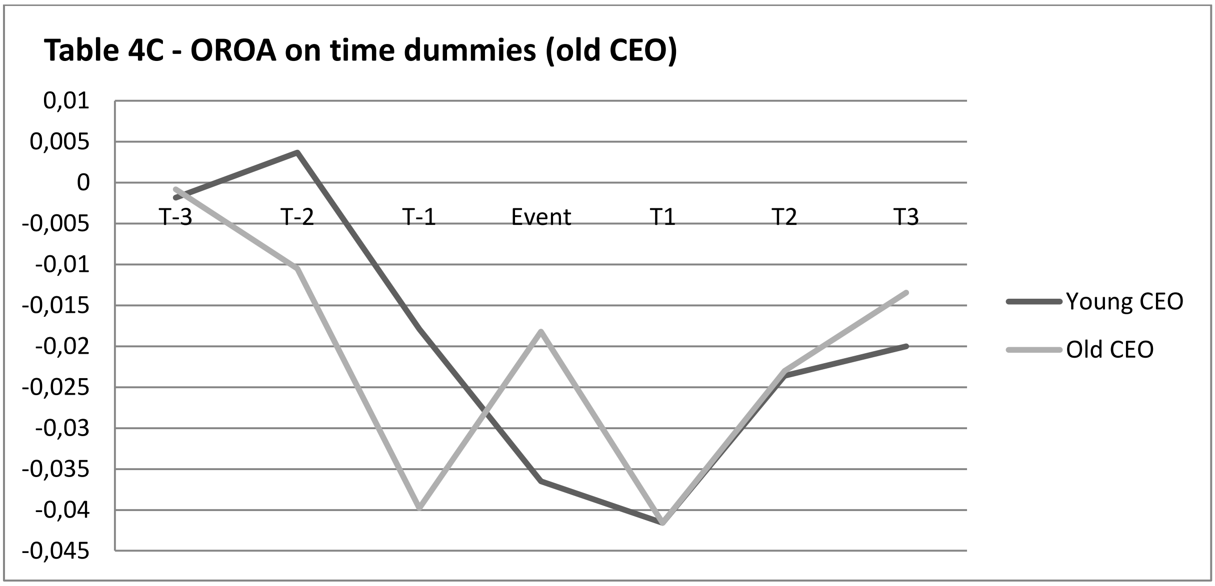


Results graph 3: *Coefficients from table 3C plotted. Industry demeaned OROA (operational return on assets) regressed on yearly time dummies. The regression constant has been excluded. Firms have been separated into big and small based on median size of sales.*

Table 4A shows OROA regressed on the post variable for the three years before and after and with deceased CEOs divided into young and old. The cutoff point for old CEOs is the Swedish state pension age, 65 years. For firms with young CEOs (5952 observations) the variable post (-0.03) is significant at the 1 % level, the constant is both economically and statistically insignificant. For firms with old CEOs (3771 observations) the variable post (-0.0131) is insignificant, the constant (-0.0413) is highly significant at a 1 % level .

Table 4B tests OROA on the post variable. The observations are divided into quartiles based on age of the deceeased CEO. The first quartile contains the youngest CEOS. The effect of the first quartile is significant and negative, -0.0229. Compared to the first quartile, the fourth was positive at 0.00842 but not significant. The test was done on 27235 observations.

Table 4C shows OROA regressed on time dummies with CEOs differentiated by an age dummy, young or old. The regression has 27251 observations. We present the results in a graph below for clarity. Please see the table in the appendix for details and numerical values.

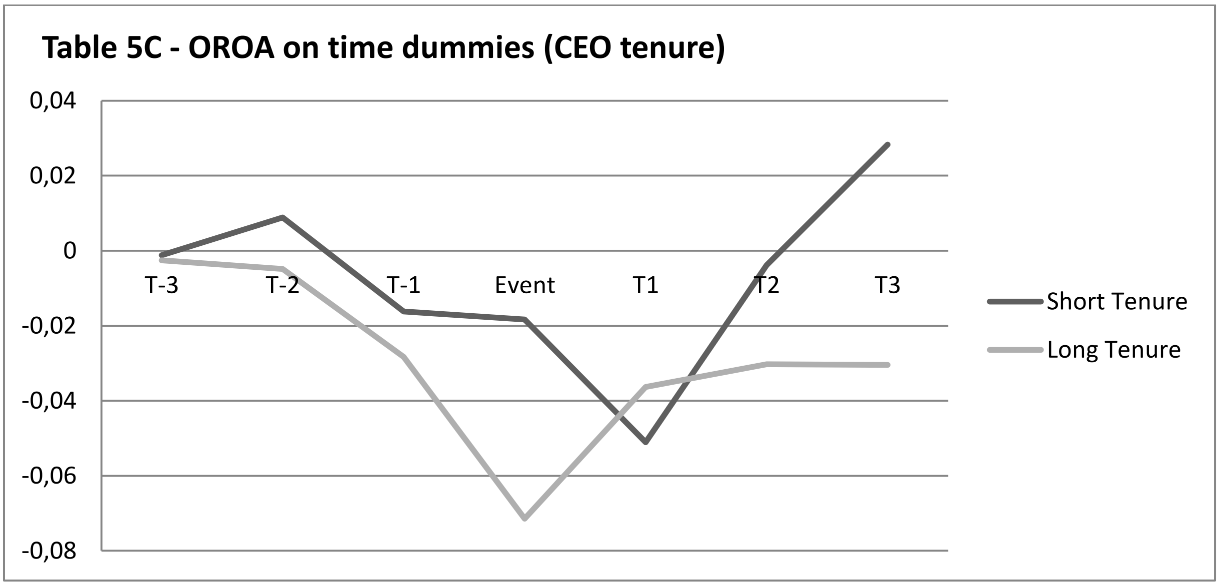


Results graph 4: *Coefficients from table 4C plotted. Industry demeaned OROA (operational return on assets) regressed on yearly time dummies. The regression constant has been excluded. Firms have been separated in terms of age of the deceased CEO where an old CEO is defined as being older than 64.*

Table 5A tests OROA on the post the variable that is differentiated on tenure. A CEO is considered to have tenure if the tenure on the CEO position is 5 years or above. For CEOs without tenure the coefficient of the constant is negative at -0.0196 but not significant at a 5 % level. The post variable coefficient is negative at -0.0182 but statistically insignificant. For CEOs with tenure the constant is negative at -0.0156 and highly significant (<1%) and the post variable is negative at -0-0252 and highly significant.

Table 5B tests OROA on the post variable where firms are divided into quartiles based on CEO tenure. The first quartiles contains CEOs with the shortest tenures. The first quartiles is negative at -0.0238 but not statistically significant. Compared to the first quartile, the fourth is positive at 0.0317 but not statistically significant. The test was done on 7105 observations.

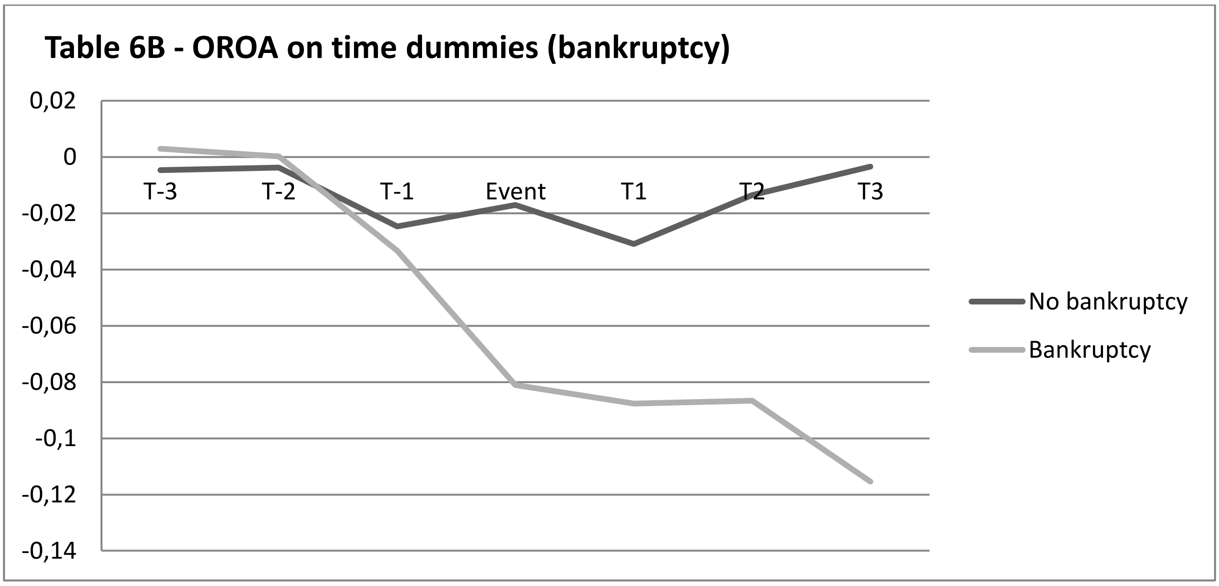
Table 5C shows OROA regressed on time dummies with CEOs differentiated on tenure (with a cutoff of 5 years). The regression has 27235 observations. We present the results in a graph below for readability. Please see the table in the appendix for details and numerical values.



Results graph 5: *table 5C plotted. Industry demeaned OROA (operational return on assets) regressed on yearly time dummies. The regression constant has been excluded. Firms have been separated based on the median level of CEO tenure.*

Table 6A tests OROA on the post variable where firms are separated into firms who do go bankrupt later some year following the event. For firms that do not go bankrupt the coefficient of the constant is -0.0137 and highly significant. The post variable is -0.00961 and statistically insignificant. For companies that do go bankrupt both the constant and the post variable are statistically significant and negative, -0.0283 and -0.0856 respectively.

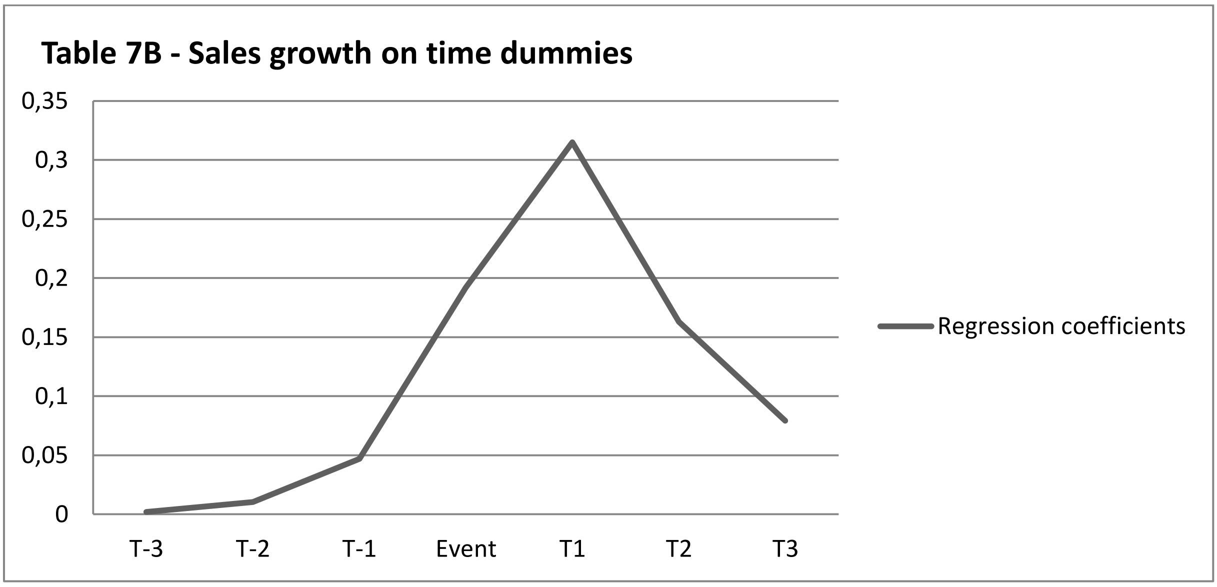
Table 6B shows OROA regressed on time dummies, but separates firms that also go bankrupt after the event. The regression has 27235 observations. We present the results in a graph below for readability. Please see the table in the appendix for details and numerical values.



Results graph 6: *table 6B plotted. Industry demeaned OROA (operational return on assets) regressed on yearly time dummies. The regression constant has been excluded. Firms have been separated based on whether or not they become bankrupt sometime after the event.*

Table 7A shows growth of sales regressed on the post variable with 7875 observations for the three years before and after the event. The constant (-0.0343) is significant at the 5 % level and the "post variable (0.236) is significant at the 1 % level.

Table 7B shows growth of sales regressed on time dummies. We have 23322 observations for this regression. We present the results in a graph below for readability. Please see the table in the appendix for details and numerical values.



Results graph 7: *table 7B plotted. Yearly sales growth regressed on yearly time dummies. The regression constant has been excluded.*

Table 8-11 are regressions of death events for family members. The number of observations that we have for these regression are between 1494 to 2554. OROA regressed on the post variable shows negative values for both all family deaths and those who were classified as "non-working family members", -0.014 and -0.0215. However, the values are not significant at the 5 % level. In **table 10** sales-growth regressed on "post" was positive, 0.0842, and significant at the 5 % level. For sales-growth regressed on non-working family members (**table 11**) the post variable was 0.0106 and significant at the 5 % level.

6 Analysis

In table 1A the coefficient for the post variable is as expected both significant and negative, -0.0194. Firms that experience a CEO death event will perform worse compared to firms that do not experience an event. The noteworthy part is that the coefficient of the constant is significant and negative, -0.0238. That means that firms that are going to experience an event perform worse already before the event.

In table 1B we see that there is a negative effect during the event year and the three following years. The effect was expected as a CEO death should be a loss of human capital for a firm as well as a disruption to business operations. The fact that the negative effect starts one year before the event is somewhat problematic and has several implications. First of all it made us question if the statistical analysis had been done correctly as the Danish study did not find any differential performance prior to the event. Second, it might be because of logical causes. Deaths can be preceded by sickness and inability to perform properly. Prolonged illness prior to death would spread the impact over several years. The effect on the actual event year would then be diminished. We are however skeptical of this pre-event effect and consider it to be a topic that can be picked up for further research.

The insignificant values for t_4 and t_5 could, unlikely but possibly, be the result of fewer observation points. Outside this time span the number of observations could have dropped. The more likely explanation is that the CEO death event does not significantly affect firms past three years. This is in line with the Danish study, which also found a significant effect for the three following years. Firms will have managed to replace the CEO, revised operations and the business plan. Insignificant difference between event firms and non-event firms past three years also means that firms that experience an event do not experience a recovery effect. The value lost during CEO death event is permanent.

The results in table 2A show that there is a more negative effect in smaller companies. In table 2B the biggest quartile is measured against the smallest and shows that the difference is significant and almost entirely attributed to the quartile with the largest firms. This supports the hypothesis that bigger firms have succession plans that minimizes the event effect. In smaller firms the CEO is more likely to be the founder, who possesses more firm specific knowledge. In economics there are theories positing that the skill set of a CEO is more important than firm specific knowledge based on the tendency of bigger firms to look externally for new CEOs. The general skills set of externally hired management will most likely be higher than internal management as you have a much deeper pool to choose from. This suggests a difference between bigger and smaller firms. Bigger firms have bigger boards that have a wider reach. Bigger firms look externally for management with higher general skill set. This leads to their CEOs having less firm specific knowledge. A death event would lead to smaller firms losing more firm specific knowledge. Bigger firms that have traded firm specific knowledge for a higher general skill set CEOs can much more easily replace what is lost when the CEO dies. Another explanation might be that firms defined as small on the basis of number of employees suddenly lose a higher fraction of their workforce and will be suffering a bigger shock to business operations.

Table 2C essentially describes the results in table 2A separated into a time dummy for each year. This perspective is somewhat perplexing. Smaller firms do cumulatively have a more negative effect, but the effects are postponed one to two years relative to bigger firms. We have not encountered any research regarding the time lag of CEO death events. Without any guidance of a theoretical framework we have created a hypothesis that smaller firms differ in their accounting procedure. It can be that changes are registered later or that their assets experience a much lower turn-over than assets in bigger firms. The event effect would then be dormant until that revaluation took place and cause our regression to show delayed event effects for smaller companies. Consistent with table 1B we find negative effects already in t_{-1}. We can also see that any differential performance between small and big firms is not significant to any specific year. In table 3A we see OROA regressed on the post variable but divided into big and small firms based on size of sales. We argue that it was dubious of the Danish study to divide firms into two size categories based solely on size of assets. We mentioned that different industries have different capital/labor intensity. However, the results show that this proxy yields the same kind of effect as a "size-proxy" based on number of employees: smaller firms take a bigger hit from the event than bigger firms. In table 3B we get some interesting results on the fourth quartile which is not significant. This might hint to some possible inferences that can be made on in management theory. A CEO death where small and big firm based on number of employees perform differently, but not small and big firms based on size of sales. The value created is tied to employees and the higher the number the better, whereas higher sales do not lead to a significant difference in CEO value.

Table 4A shows some interesting results for OROA regressed on the post variable where firms are differentiated on age of the deceased CEO. The event has a bigger effect on younger CEOs and not even a significant negative effect for older CEOs. Testing the youngest and oldest quartiles against each other did not yield a significant difference. The constant only shows a negative effect for old CEOs, -0.0413. This means that firms with an old CEO in general performs worse compared to an average firm. We do not have data on CEO ownership but this could be the effect described in the empirical finance study "An analysis of the stock price reaction to sudden executive deaths" [8] where a CEO may impose transaction costs and latch onto the position through higher bargaining power in re-contracting negotiations. Another reason could be that the older CEOs more often are also the founder of the firm and has more influence over board decisions on top management and CEO selections. Although we mentioned previous research that found a positive correlation when the CEO was also the founder and excess return, this might be contingent on age. We do not have data on firm founders. If it is possible to obtain such data then further empirical studies can shed light on whether age matters in the correlation between incumbent CEO also being the founder and excess return. Since we did not get a significant difference on a joint basis it was expected that table 4C would not yield a difference for any individual year.

For CEOs with tenure we can see in table 5A that there is a significant negative event effect. CEOs with tenure actually perform comparatively worse than the average with a pending death event as the coefficient of the constant is negative and significant as well. For CEOs without tenure we can neither conclude that the event effect is different from zero or that they are significantly different. It is understandable that the absence of CEOs with tenure would have a bigger impact on a firm, considering that the knowledge of that specific position cannot be replaced immediately even if a replacement were hired internally. We see in table 5B that no joint significance exists between the first and the fourth quartile. But table 5C actually does show a significance difference at the median level between those with or without tenure for one year, t_0. With the risk of reading too much into the result, it would suggest that the lost value (knowledge) is heavily located to the event year and that any replacement quickly acquires this knowledge. Significant differential performance is not seen past t_0.

Table 6A shows quite expected results. Companies that eventually file for bankruptcy have significant and economically very negative performance. In fact, the post variable for companies that do not go bankrupt is not even statistically significant. This difference between bankrupt and non-bankrupt companies is so strong that we can even see the differential performance in each year in table 6B. Considering that the data is of all Swedish firms of which many are very small with only a handful of employees we would imagine an extremely high correlation between CEO death and bankruptcy. We argue that it is causal for a firm with its CEO dying to experience higher risk of going bankrupt. Fortunately for us we do not need a specify causality in the other direction, crudely put, since it is financially uninteresting whether the CEO dies to a higher degree after firm bankruptcies.

In table 7A and 7B the regressions shows that the event has a positive impact on sales growth implying that the CEO dying is good for a firm. The accounting item sales is a straight forward measure and defining sales growth as $\log(sales_t/sales_{t-1})$ should not create any bias. We cannot find a theory that would predict this effect and can therefore not make anything of this result.

Regarding family regressions we see from the results that our way of filtering out family members is too strict. The event does have negative impact on OROA but no real analysis can be made as the t-statistics is too low, which is possibly due to the low amount of observations. The same positive event effect can be seen on sales growth, which has no real explanation here either.

7 Conclusions

In this study we have empirically tested the event “CEO death” under several circumstances. The death of a CEO is arguably exogenous. This allows us to isolate CEO impact and frame one perspective of the “value” a CEO is considered to contribute to its firm. To pursue these empirical tests, we used a proprietary Swedish data set over company information and accounting data combined with a Swedish civil register of deceased people. We find that the event has a negative impact on firm performance. We also find that firms that experience a CEO death event perform relatively worse prior to the event. The effect of the event seems to set in one year prior to the event. Much of this negative effect seems to be captured in firms that eventually go bankrupts a couple of year past the event. Smaller firms have a larger negative effect and appear to be more susceptible to the effect. As for the CEO characteristics, they did not seem to be that significant. Tenure could be differentiated against CEOs without tenure only for the event year with significance.

We did an ad-hoc solution to try to establish a family relationship to enable us regress the family death events. However, the filtering was too strict and we were not able to get enough observations to reach any significant conclusions.

8 Further Research

Our findings of event effects one year prior to the event are questionable and this would be interesting to investigate. It is not that the results are inconceivable; however, the inconsistency with what was found in the Danish paper raises some concerns.

We used relatively rough cut-off points to separate CEO characteristics and firm characteristics. It would be interesting to see other criteria for grouping firms based on theories from other academic fields. We avoided using any too carefully selected cut-off points as to how to separate our observations. We felt that it would be like retrofitting our analysis to produce results. This would not be a problem if the cut-off points were justified by theories based on corporate or managerial observation.

The Swedish tax agency holds data on family trees but as far as we know it can only be requested on individuals and not in the form of a major data base. This is of course due to privacy issues. However, it is not unheard of that Swedish authorities cooperate with SCB (Statistics Sweden) and anonymizes data so that it can be used for academic research without intruding on privacy rights.

9 References

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Appendix

Regressions on deceased CEOs

Table 1A

VARIABLES	OROA test with post event dummy Coefficient	Std. Error	t statistics	p-value
post	-0.0194***	(0.00590)	-3.289	0.00101
Constant	-0.0238***	(0.00583)	-4.084	4.43e-05
Observations	9,723			
Number of id	1,864			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for a regression on operational return on assets and a post dummy defined as 1 for the event year and every succeeding year and 0 else.

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Table 1B

	OROA test with time dummies				OROA test for event with observations available all three years before and after			
VARIABLES	Coefficient	Std. Error	t statistics	p-value	Coefficient	Std. Error	t statistics	p-value
tdminus6	-0.00765	(0.00833)	-0.918	0.358				
tdminus5	-0.00891	(0.00823)	-1.083	0.279				
tdminus4	-0.0175**	(0.00810)	-2.156	0.0311				
tdminus3	-0.00579	(0.00801)	-0.722	0.470	0.000871	(0.0105)	0.0832	0.934
tdminus2	-0.00636	(0.00795)	-0.800	0.424	0.00531	(0.0104)	0.512	0.609
tdminus1	-0.0308***	(0.00793)	-3.887	0.000102	-0.0261**	(0.0103)	-2.529	0.0114
td0	-0.0337***	(0.00800)	-4.210	2.56e-05	-0.00743	(0.0102)	-0.726	0.468
td1	-0.0460***	(0.00846)	-5.436	5.51e-08	-0.0121	(0.0101)	-1.205	0.228
td2	-0.0278***	(0.00921)	-3.017	0.00255	-0.0153	(0.00995)	-1.539	0.124
td3	-0.0221**	(0.00997)	-2.218	0.0266	-0.0177*	(0.0100)	-1.766	0.0774
td4	-0.0146	(0.0108)	-1.354	0.176				
td5	-0.00870	(0.0118)	-0.736	0.462				
Constant	-0.00882***	(0.00276)	-3.193	0.00141	-0.00727**	(0.00288)	-2.521	0.0117
Observations	27,251				14,792			
R-squared	0.002				0.001			
Number of id	1,910				865			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and time dummies where td0 is the event year and all other dummies relative to td0. The regression to the left is for +/- 5 years and the regression to the right is for when every observation is available all three years before and after for a specific event.

Table 2A

	OROA test with dummy for big companies based on number of employees				OROA test with dummy for small companies based on number of employees			
VARIABLES	Coefficient	Std. Error	t statistics	p-value	Coefficient	Std. Error	t statistics	p-value
post	-0.0133**	(0.00654)	-2.033	0.0421	-0.0337***	(0.0106)	-3.184	0.00146
Constant	-0.00625	(0.00466)	-1.341	0.180	-0.0275***	(0.00722)	-3.803	0.000145
Observations	4,813				4,910			
R-squared	0.001				0.003			
Number of id	863				1,001			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The left regression for is on firms with number of employees larger than the median of the population and the right regression is on firms with number of employees smaller than the median.

Table 2B

VARIABLES	Test on OROA on post dummy with regards to number of employees and comparing all quartiles to the first Coefficient	Std. Error	t statistics	p-value
_Ipost_1	-0.0414***	(0.00923)	-4.482	7.44e-06
_IposXqua_1_2	0.0176	(0.0129)	1.365	0.172
_IposXqua_1_3	0.00428	(0.0126)	0.341	0.733
_IposXqua_1_4	0.0369***	(0.0123)	3.005	0.00265
Constant	-0.0117***	(0.00221)	-5.301	1.16e-07
Observations	27,233			
R-squared	0.002			
Number of id	1,911			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The firms are divided into different quartiles with regards to the number of employees and every quartile is compared to the first.

Table 2C

VARIABLES	OROA test with combined dummy variables for companies based on number of employees Coefficient	Std. Error	t statistics	p-value
tdminus3	0.00409	(0.0110)	0.370	0.711
tdminus2	0.00373	(0.0109)	0.343	0.732
tdminus1	-0.0146	(0.0108)	-1.352	0.176
td0	-0.0245**	(0.0110)	-2.234	0.0255
td1	-0.0484***	(0.0118)	-4.088	4.36e-05
td2	-0.0377***	(0.0132)	-2.865	0.00417
td3	-0.00884	(0.0145)	-0.608	0.543
tdminus3_big_antanst	-0.0110	(0.0156)	-0.703	0.482
tdminus2_big_antanst	-0.0115	(0.0155)	-0.744	0.457
tdminus1_big_antanst	-0.0248	(0.0155)	-1.601	0.109
td0_big_antanst	-0.0100	(0.0156)	-0.641	0.522
td1_big_antanst	0.0134	(0.0165)	0.808	0.419
td2_big_antanst	0.0273	(0.0181)	1.507	0.132
td3_big_antanst	-0.0165	(0.0197)	-0.839	0.402
Constant	-0.0128***	(0.00223)	-5.767	8.16e-09
Observations	27,251			
R-squared	0.002			
Number of id	1,910			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets with time dummies as defined in table 2. The bottom variables are combined of $td_i * dummy$. The dummy is in this table 1 for companies with number of employees larger than the median and 0 else.

Table 3A

VARIABLES	OROA test with dummy for big companies based on size of sales Coefficient	Std. Error	t statistics	p-value	OROA test with dummy for small companies based on size of sales Coefficient	Std. Error	t statistics	p-value
post	-0.0114*	(0.00683)	-1.669	0.0952	-0.0354***	(0.0103)	-3.427	0.000617
Constant	0.00526	(0.00484)	1.087	0.277	-0.0386***	(0.00709)	-5.442	5.60e-08
Observations	4,797				4,926			
R-squared	0.001				0.003			
Number of id	865				999			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The left regression for is on firms with size of sales larger than the median of the population and the right regression is on firms with size of sales smaller than the median.

Table 3B

VARIABLES	Test on OROA on post dummy with regards to size of sales and comparing all quartiles to the first Coefficient	Std. Error	t statistics	p-value
_Ipost_1	-0.0247***	(0.00946)	-2.610	0.00906
_IposXqua_1_2	-0.0194	(0.0129)	-1.507	0.132
_IposXqua_1_3	0.00236	(0.0128)	0.185	0.853
_IposXqua_1_4	0.0114	(0.0124)	0.914	0.361
Constant	-0.0119***	(0.00221)	-5.399	6.75e-08
Observations	27,235			
R-squared	0.002			
Number of id	1,912			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The firms are divided into different quartiles with regards to the size of sales and every quartile is compared to the first.

Table 3C

VARIABLES	OROA test with combined dummy variables for companies based on size of sales Coefficient	Std. Error	t statistics	p-value
tdminus3	0.00573	(0.0110)	0.519	0.604
tdminus2	0.00123	(0.0109)	0.112	0.911
tdminus1	-0.0306***	(0.0108)	-2.831	0.00465
td0	-0.0316***	(0.0109)	-2.893	0.00382
td1	-0.0595***	(0.0117)	-5.073	3.95e-07
td2	-0.0391***	(0.0131)	-2.984	0.00285
td3	-0.0200	(0.0145)	-1.379	0.168
tdminus3_big_oms	-0.0148	(0.0156)	-0.947	0.344
tdminus2_big_oms	-0.00705	(0.0155)	-0.454	0.650
tdminus1_big_oms	0.00794	(0.0155)	0.513	0.608
td0_big_oms	0.00377	(0.0156)	0.241	0.809
td1_big_oms	0.0353**	(0.0165)	2.134	0.0329
td2_big_oms	0.0295	(0.0181)	1.634	0.102
td3_big_oms	0.00389	(0.0197)	0.198	0.843
Constant	-0.0127***	(0.00223)	-5.706	1.17e-08
Observations	27,251			
R-squared	0.002			
Number of id	1,910			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets with time dummies as defined in table 2. The bottom variables are combined of $td_i * dummy$. The dummy is in this table 1 for companies with size of sales larger than the median and 0 else.

Table 4A

	OROA test for deceased CEO:s of old age				OROA test for young age deceased CEO:s of young age			
VARIABLES	Coefficient	Std. Error	t statistics	p-value	Coefficient	Std. Error	t statistics	p-value
post	-0.0131	(0.00944)	-1.386	0.166	-0.0300***	(0.00813)	-3.693	0.000224
Constant	-0.0413***	(0.00656)	-6.292	3.58e-10	-0.00135	(0.00569)	-0.237	0.813
Observations	3,771				5,952			
R-squared	0.001				0.003			
Number of id	694				1,170			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The left regression is on firms with deceased CEOs of older age than the Swedish state pension age and the right regression is on firms with deceased CEOs of younger age than the pension age.

Table 4B

VARIABLES	Test on OROA on post dummy with regards to age of the deceased and comparing all quartiles to the first Coefficient	Std. Error	t statistics	p-value
_Ipost_1	-0.0229***	(0.00829)	-2.759	0.00580
_IposXqua_1_2	-0.0155	(0.0118)	-1.317	0.188
_IposXqua_1_3	-0.00249	(0.0125)	-0.200	0.842
_IposXqua_1_4	0.00842	(0.0122)	0.693	0.488
Constant	-0.0119***	(0.00222)	-5.373	7.81e-08
Observations	27,235			
R-squared	0.002			
Number of id	1,912			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The firms are divided into different quartiles with regards the age of the deceased CEO and every quartile is compared to the first.

Table 4C

VARIABLES	OROA test with combined dummy variables for difference in age of the deceased CEO Coefficient	Std. Error	t statistics	p-value
tdminus3	-0.00185	(0.0102)	-0.181	0.856
tdminus2	0.00367	(0.0101)	0.365	0.715
tdminus1	-0.0179*	(0.0100)	-1.784	0.0745
td0	-0.0365***	(0.0101)	-3.622	0.000293
td1	-0.0416***	(0.0107)	-3.904	9.48e-05
td2	-0.0236**	(0.0115)	-2.052	0.0402
td3	-0.0200	(0.0123)	-1.617	0.106
tdminus3_old	0.00100	(0.0159)	0.0632	0.950
tdminus2_old	-0.0142	(0.0158)	-0.900	0.368
tdminus1_old	-0.0219	(0.0158)	-1.388	0.165
td0_old	0.0183	(0.0160)	1.146	0.252
td1_old	1.74e-05	(0.0169)	0.00103	0.999
td2_old	0.000589	(0.0186)	0.0317	0.975
td3_old	0.00653	(0.0203)	0.322	0.748
Constant	-0.0128***	(0.00223)	-5.758	8.59e-09
Observations	27,251			
R-squared	0.002			
Number of id	1,910			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets with time dummies as defined in table 2. The bottom variables are combined of $td_i * dummy$. The dummy is in this table 1 for firms with deceased CEOs of older age than the Swedish state pension age and 0 else.

Table 5A

VARIABLES	OROA regressed on post (CEOs with tenure) Coefficient	Std. Error	t statistics	p-value	OROA regressed on post (CEOs without tenure) Coefficient	Std. Error	t statistics	p-value
post	-0.0252***	(0.00675)	-3.732	0.000192	-0.0182	(0.0150)	-1.216	0.224
Constant	-0.0156***	(0.00467)	-3.349	0.000817	-0.0196*	(0.0108)	-1.815	0.0698
Observations	7,535				2,194			
R-squared	0.002				0.001			
Number of id	1,396				483			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The left regression is on firms with CEOs having worked longer than the median and the right regression is on firms with CEOs having worked shorter than the median.

Table 5B

VARIABLES	Test on OROA on post dummy with regards to CEO tenure and comparing all quartiles to the first Coefficient	Std. Error	t statistics	p-value
_Ipost_1	-0.0238	(0.0164)	-1.457	0.145
_IposXqua_1_2	0.00657	(0.0299)	0.220	0.826
_IposXqua_1_3	0.00170	(0.0238)	0.0713	0.943
_IposXqua_1_4	0.0317	(0.0287)	1.106	0.269
Constant	-0.0120**	(0.00481)	-2.503	0.0123
Observations	7,105			
R-squared	0.001			
Number of id	648			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The firms are divided into different quartiles with regards to CEO tenure and every quartile is compared to the first.

Table 5C

VARIABLES	Test on OROA with dummies for CEO:s having had the positions for more than five years Coefficient	Std. Error	t statistics	p-value
tdminus3	-0.00121	(0.0186)	-0.0652	0.948
tdminus2	0.00885	(0.0176)	0.502	0.616
tdminus1	-0.0162	(0.0171)	-0.951	0.342
td0	-0.0183**	(0.00871)	-2.097	0.0360
td1	-0.0511***	(0.0171)	-2.996	0.00274
td2	-0.00386	(0.0185)	-0.209	0.835
td3	0.0283	(0.0203)	1.398	0.162
tdminus3_tenure	-0.00133	(0.0204)	-0.0653	0.948
tdminus2_tenure	-0.0137	(0.0196)	-0.698	0.485
tdminus1_tenure	-0.0121	(0.0191)	-0.636	0.525
td0_tenure	-0.0531***	(0.0190)	-2.787	0.00533
td1_tenure	0.0148	(0.0194)	0.763	0.445
td2_tenure	-0.0264	(0.0211)	-1.250	0.211
td3_tenure	-0.0587**	(0.0231)	-2.542	0.0110
Constant	-0.0129***	(0.00223)	-5.767	8.15e-09
Observations	27,235			
R-squared	0.002			
Number of id	1,912			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets with time dummies as defined in table 2. The bottom variables are combined of $td_i * dummy$. The dummy is in this table 1 for companie swith tenure larger than the median and 0 else.

Table 6A

VARIABLES	OROA regressed on post (firms that go bankrupt) Coefficient	Std. Error	t statistics	p-value	OROA regressed on post (firms that do not go bankrupt) Coefficient	Std. Error	t statistics	p-value
post	-0.0856***	(0.0168)	-5.097	3.87e-07	-0.00961	(0.00652)	-1.474	0.140
Constant	-0.0283***	(0.0103)	-2.731	0.00639	-0.0137***	(0.00469)	-2.928	0.00343
Observations	2,049				7,680			
R-squared	0.016				0.000			
Number of id	496				1,373			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets and a post dummy defined as in table 1. The left regression is on firms which go bankrupt sometime after the event year and the right regression is on firms which do not go bankrupt.

Table 6B

VARIABLES	Test on OROA for companies who go bankrupt after the event Coefficient	Std. Error	t statistics	p-value
tdminus3	-0.00470	(0.00899)	-0.523	0.601
tdminus2	-0.00375	(0.00888)	-0.423	0.673
tdminus1	-0.0247***	(0.00881)	-2.802	0.00508
td0	-0.0171**	(0.00872)	-1.966	0.0493
td1	-0.0309***	(0.00911)	-3.391	0.000696
td2	-0.0136	(0.00981)	-1.387	0.165
td3	-0.00345	(0.0104)	-0.331	0.741
tdminus3_bankruptcy_5	0.00768	(0.0182)	0.422	0.673
tdminus2_bankruptcy_5	0.00398	(0.0183)	0.218	0.828
tdminus1_bankruptcy_5	-0.00863	(0.0186)	-0.463	0.643
td0_bankruptcy_5	-0.0640***	(0.0195)	-3.279	0.00104
td1_bankruptcy_5	-0.0568***	(0.0214)	-2.648	0.00811
td2_bankruptcy_5	-0.0730***	(0.0251)	-2.915	0.00356
td3_bankruptcy_5	-0.112***	(0.0301)	-3.706	0.000211
Constant	-0.0125***	(0.00223)	-5.604	2.12e-08
Observations	27,235			
R-squared	0.003			
Number of id	1,912			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for regressions on operational return on assets with time dummies as defined in table 2. The bottom variables are combined of $td_i * dummy$. The dummy is in this table 1 for companies who go bankrupt some year after the event and 0 else.

Table 7A

VARIABLES	Test on sales growth with post event dummy Coefficient	Std. Error	t statistics	p-value
post	0.236***	(0.0250)	9.443	0
Constant	-0.0343**	(0.0168)	-2.035	0.0419
Observations	7,875			
R-squared	0.014			
Number of id	1,640			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for a regression on the logarithm of sales growth and a post dummy defined as in table 1.

Table 7B

VARIABLES	Test on growth of sales with time dummies Coefficient	Std. Error	t statistics	p-value
tdminus3	0.00198	(0.0264)	0.0753	0.940
tdminus2	0.0104	(0.0262)	0.397	0.691
tdminus1	0.0469*	(0.0265)	1.770	0.0768
td0	0.192***	(0.0272)	7.073	0
td1	0.315***	(0.0295)	10.66	0
td2	0.163***	(0.0324)	5.019	5.25e-07
td3	0.0791**	(0.0351)	2.255	0.0241
Constant	-0.0120	(0.00740)	-1.622	0.105
Observations	23,322			
R-squared	0.008			
Number of id	1,789			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for a regression on the logarithm of sales growth and time dummies as defined in table 2

Regressions on deceased family members

Table 8

	Test on OROA with post event variable for 5 years before and after			
VARIABLES	Coefficient	Std. Error	t statistics	p-value
post	-0.0140	(0.0118)	-1.191	0.234
Constant	0.00101	(0.00816)	0.124	0.901
Observations	2,554			
R-squared	0.001			
Number of id	384			

This table provides statistics with event specific fixed effects for a regression on the operational return on assets for all firms with deceased family member of a CEO and a post dummy defined as in table 1.

Table 9

	Test on OROA with post event variable for 5 years before and after for non-working family members			
VARIABLES	Coefficient	Std. Error	t statistics	p-value
post	-0.0215	(0.0146)	-1.471	0.141
Constant	0.00702	(0.0104)	0.678	0.498
Observations	1,683			
R-squared	0.002			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for a regression on the operational return on assets for all firms with deceased family member of a CEO of non-working age and a post dummy defined as in table 1.

Table 10

VARIABLES	Test on salesgrowth with post event variable for 5 years before and after Coefficient	Std. Error	t statistics	p-value
post	0.0842**	(0.0424)	1.985	0.0473
Constant	-0.104***	(0.0288)	-3.597	0.000331
Observations	2,247			
R-squared	0.002			
Number of id	361			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for a regression on the logarithm of sales growth for all firms with deceased family member of a CEO and a post dummy defined as in table 1.

Table 11

VARIABLES	Test on salesgrowth with post event variable for 5 years before and after for non-working family members Coefficient	Std. Error	t statistics	p-value
post	0.106**	(0.0536)	1.970	0.0490
Constant	-0.138***	(0.0374)	-3.681	0.000242
Observations	1,494			
R-squared	0.003			
Number of id	239			

*** p<0.01, ** p<0.05, * p<0.1

This table provides statistics with event specific fixed effects for a regression on the logarithm of sales growth for all firms with deceased family member of a CEO of non-working age and a post dummy defined as in table 1.