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The impact of CEO characteristics on firm value

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Abstract

This paper examines if CEO characteristics have an impact on firm value. Does CEO's age, compensation, tenure, or gender influence Tobin's Q? The sample consists of 483 CEOs who are in charge of firms on the S&P 500 during the period 2000 till 2015. Through a linear regression and a fixed effects model, results show that CEOs do have significant impact on firm value. So, companies should consider the characteristics of their candidates before hiring a new CEO.

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1. Introduction

The literature of board structure and the position of the chief executive officer (CEO) within the firm is continuously growing. It is one of the most discussed topics in corporate finance today. This paper will start with the board of directors. This board is appointed by the shareholders of the firm and has to act on behalf of the shareholders to run the day to day tasks of the business. Each year the company will hold a general meeting (AGM) where the board of directors provide a report on the performance of the company and what its future plans and strategies are.

The board is accountable for all the actions taken by the firm. Several researchers tried to find correlations between characteristics of the board and firm performance. First of all, Bennedsen, Kongsted and Nielsen (2008) and Yermack (1996) looked what the influence of board size is. Their papers suggest that the increase in size of the board leads to more agency problems within the board. The results of their regressions confirmed the assumption that there is a negative effect of board size on firm performance. Furthermore, Campbell and Mínguez-Vera (2008) found empirical evidence for a correlation of female participation in the board and firm performance. Diversity in boards leads to competitive advantages in comparison to firms who only have males in the board of directors.

Nowadays, the competition increases, thus there is more need of understanding the complex demand of customers. Furthermore, shareholders and investors request for higher profit margins (Hong and Shum, 2002). Therefore, the importance of a well-structured board increases.

Linck, Netter, and Yang (2008) suggest that the CEO position and the chairman of the Board (COB) position are combined in large firms when the CEO is older and has a longer tenure. This means that the CEO has significant impact throughout his own position and the board of directors on the decisions and policies of the firm. The job description of a CEO is not as straightforward as most people expect. Its description includes everything that cannot be delegated to co-workers. The most important task is to set a strategy for the firm. Besides, he or she has to model and set the company's culture, build and lead the senior executive team, and allocate capital to the company's priorities.

Moreover, Papadakis and Barwise (2002) argue that the CEO has significant impact on the strategic decision making process in the broader context (external environment, firm, size, decision characteristics etc.).

The previous describes the influences that a board of directors and CEOs have on the firm. (Kaplan, Klebanov and Sorensen, 2012). Therefore, selecting the CEO is a key organizational decision, which has important implications for firm effectiveness (Kesner and Sebor, 1994). Interesting is to find a good 'fit' between the characteristics of the company and the individual who will fulfil the CEO position. Pfeffer and Salancik, (1978) concluded in their study that most firms in different context recruit and hire CEOs with backgrounds and skills fitting the company.

It is interesting whether the characteristics of a CEOs really have impact on different choices and outcomes for the firm (Adams, Almeida and Ferreira, 2005). This will be the area this thesis focusses on. The impact that a CEO might have on the firm value will be investigated. Therefore, the main question this paper will answer is the following:

Do CEO characteristics have a significant impact on the value of a firm?

Besides the main question, this paper will investigate what characteristics have a positive impact on firm value and what characteristics have a negative impact.

Several research has been done about why and how CEO characteristics matter for a company. To start with, Datta and Guthrie (1994) found that there is a strong connection between poor performance of a firm and selection of the CEO outside of the firm. Firms should search internally for a successor before going to external executives. Furthermore, CEOs that have a higher level of education and a technical functional background are more likely to have a more intensive research and development program. Thong and Yap (1995) agree on this view and found that small businesses are more likely to adopt information technology (IT) when the CEO has an innovative character, positive attitude towards adoption of IT, and possesses greater IT knowledge.

Besides the adoption of IT and the intensity of research and development, the characters of a CEO have influence on the choice of foreign market entry mode. Herrmann and Datta (2002) found which characteristics favour full-control entry strategies. Firstly, the longer the position tenure, the higher the probability for a full-control entry. Furthermore, legitimacy in their position along with higher levels of confidence and experience result in full-control entry. CEOs with throughput backgrounds normally have desire for greater control and efficiency, thus also prefer full-control entry. Lastly, international experience among successor are important factors for full-control entry.

Confidence of a CEO can also be seen as a characteristics that impacts firm performance. Heaton (2002) found that optimistic CEOs overvalue their own corporate projects and therefore invest in negative net present value projects even though their aim is to make

profit. Moreover, they believe that capital markets undervalue their firm's risky securities. Malmendier and Tate (2008) agree on this view and concluded from their study that overconfident CEOs overpay in mergers and acquisitions, especially if they have the access to internal financing. Reason for this is that they overestimate their ability to generate returns during mergers and acquisitions. Therefore, they make more mergers and acquisitions than they should.

This paper will rely heavier on firm value instead of implications such as R&D spending and other firm expenses. The most important contributions of this thesis is concerning the gender and tenure of the CEO and the implementation of the financial crisis. Previous studies investigated the impact of female participation in the board of directors on firm performance. However, neglected the impact of CEO's gender. Uniformity is missing concerning the impact of tenure. Studies vary in their conclusions on what the impact should be on firm value and this paper tries to find a uniform answer. Lastly, the financial crisis occurred in the sample period of this study. This had a major impact on the firm value. Therefore, the crisis is implemented as a control variable in the regression, which has not been done before.

To investigate the impact of CEO characteristics, this thesis will start with a comprehensive literature review. The results and arguments of current literature is used to figure out what most likely will be the effect of CEO characteristics on firm value. Hereafter, the data will be gathered to test the research questions. If the data is gathered we can start the calculations. This will be done through regression analyses and a fixed effects model. This helps explaining the effect of each independent variable on the dependent variable. Results will show if there is a significant effect and what the sign of the effect is. In this case, the independent variables are the CEO characteristics. It is hard to define the level of optimism or characteristics that are measure by questionnaires during the relatively small period we have for this master thesis. Therefore, the following quantitative CEO characteristics will be used: age, compensation, gender, and tenure. This will be regressed on the Tobin's Q of the company where the CEO is active. The result will show whether there is significant impact of age, compensation, gender or tenure on the firm value and what the sign of the impact is. Furthermore, the five different control variables that will be used are: capital expenditures, total liability, total assets, sales growth, and a dummy variable for the crisis. This helps for a more complete view on what the effects on firm value are.

This study will use data from all companies on the S&P500 index. This index consists of the 500 biggest listed firms in the United States measured by market capitalization. All the

data of the CEO characteristics can be found in WRDS: compustat executive compensation. The databases Orbis and WRDS will be used to gather the Tobin's Q, market capitalization, and book to market ratio. Data between 2000 and 2015 will be used. At the end of the paper the conclusions will be drawn and recommendations will be made.

Results showed that CEO characteristics have significant impact on firm performance. CEO's compensation and tenure is positively correlated with firm value and CEO's age and gender is negatively related.

However, this thesis does not test for reverse causality. This is too hard to detect in the rather small period for the thesis. Endogeneity is tested with the fixed effects model for industry and time impact on firm value. However, there is a possibility for more omitted variables, where further research can focus on. Lastly, due to the correlation between age and tenure, there is a possibility for multicollinearity.

2. Literature review

The current state of literature will be covered in this section. Firstly, the importance of a CEO will be shown. Furthermore, the relevance of Tobin's Q will be discussed. Followed by different CEO characteristics and the impact they could have on firm value. Finally, the hypotheses for each CEO characteristic is formulated.

2.1 Board of directors

It all started during the industrial revolution: the beginning of official firms. In that period, companies were owned by their founders. They had both ownership and control over the company. However, the company's size increased to a point where it was no longer possible for the owner/founder to lead the company on his or her own. This is the start of separation between ownership and control. New managers were appointed to lead the company. Beforehand, these managers did not have private equity invested in the company. They were compensated by their salary (Baysinger & Butler, 1985).

Companies made it possible for outsiders to invest in a small piece of the company to increase company's growth. The investors became shareholders of the firm and gained profits when the firm increased in value. Firstly, it was possible for the shareholders to oversee the day to day tasks in the company. However, this decreased once the size of the firm reached such a big size that it was no longer possible. The shareholders had to rely on the managers of

the firm that they were acting on behalf of the firm. Furthermore, the number of shareholders increased, which made it harder for each individual to influence the company. There were simply too many shareholders to give each shareholder power over the firm. Therefore, the board of directors was created. Every shareholder could influence the company through the shareholders meeting. The board of directors were present at these meetings and had to listen to the ideas of the shareholders. The board of directors was an important part of the organization because they appointed the new managers for the firm. Therefore, the managers should listen to the board.

The problem that arises from managers was that they did not always have the same incentives as the shareholders. Managers' focus was to get their salary. Therefore, goals were set and once the managers achieved those goals they would get their salary. However, the goals did not always mean higher firm value. Managers acted risk averse and in self-interests to meet the goals set by the board of directors (Jensen and Meckling 1976). Furthermore, some managers started to commit fraud to improve their values through accountants. The Enron scandal of 2001 is an example how big impact this has on the world. Enron was able to hide billions of dollars in debt from failed deals and project, by using accounting loopholes and poor financial reporting. Eventually, this led to the bankruptcy of Enron which made shareholders lose all their money that they invested in shares of the firm. This increased the interests for corporate governance from government, shareholders, and bankers. This started by a better supervision over the managers (Nelson, Price & Rountree, 2008).

2.2 CEO importance

It is believed that the management of a firm has power over the board of directors, despite the fact that managers are assigned by the board (Allen, 1974). Leonard (1969) agrees that the management team is in charge and have the power to indirectly appoint themselves. For instance, a CEO can be part of the board of directors and management at the same time. Therefore, he or she has the possibility to elect himself. Moreover, Vancil (1987) is sceptic about the ability of outside directors (the board of directors) to make independent judgement on the performance of the firm and CEO.

Mace adds on the relevance of CEO: "the powers of control usually rest with the president, not with the board. It is the president who, like the family owner-managers in the small corporation, determines in large part what the board of directors does or does not do"

(1971, p. 73). His paper claims that the board of directors is a creature of the CEO. The board just has to agree with the decisions of the CEO.

CEOs act in their own interests, risk averse, and possess goals that are not in line with those of the shareholders, according to agency theories from Jensen and Meckling (1976). Therefore, the CEO will engage in projects and actions that are beneficial for themselves without keeping in mind the results for shareholders. The board of directors is created to prevent this phenomenon. Their duty is to monitor the CEO in such a manner that he or she will act on behalf of the company. This would suggest that firms with greater dominance by independent directors should have higher firm performance. However Combs, Ketchen, Perryman, and Donahue (2007) did not find a significant relationship between dominance of directors and firm performance. This strengthens the fact that a CEO indeed has high power within the firm.

Furthermore, Adams et al. (2005) tested what impact CEO power has on the variance of firm performance. Results showed that the variance of firm performance is higher when CEO has higher power. Thus, CEO who experience higher power do effect the decision making process and strategic decisions. However, CEOs have to deal with regulations set by governments nowadays, which slightly reduce their power (Finkelstein & Boyd, 1998).

Further research has been done whether differences between CEOs matter. Norburn (1989), for example, has noted several differences between CEOs. Differences divided in three areas. Firstly, corporate influences such as tenure and functional background differentiate CEOs. Further differences are influenced domestically. Characteristics such as education and marital status. Lastly, management style is different.

Due to this last information the following hypotheses is stated:

H1 CEO characteristics have significant impact on firm value

2.3 Firm value

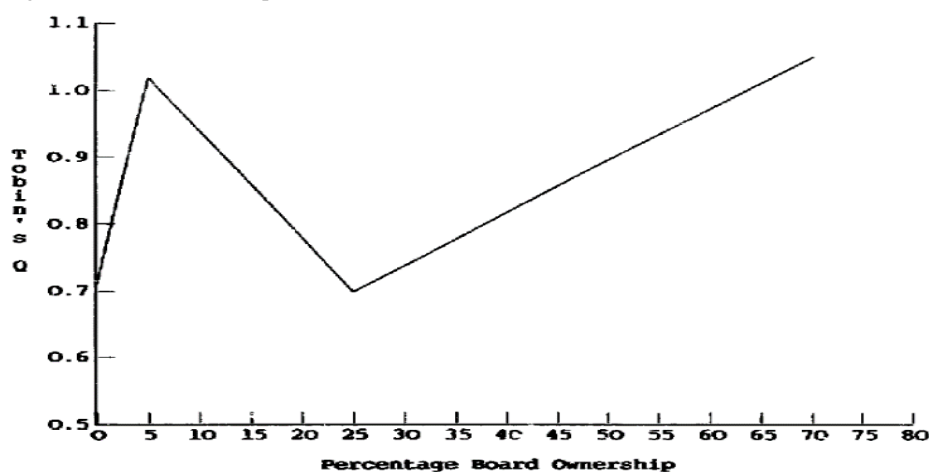
This section is supposed to give a better understanding on how firm value is specified in this paper. As already mentioned, it is assumed that the CEO influences the decisions in the firm. This can have further impact on firm value. Firm value, in this paper, will be described by the Tobin's Q of the company. This ratio plays an important role in many other financial interactions (Chung & Pruitt, 1994). Tobin's Q is defined as the ratio of market value to the replacement cost of the assets of a firm. How much more is a company worth on the stock market than the costs it will bear if it chooses to replace all assets? If the number is between 0

and 1 it means that the costs to replace all assets is higher than the market value. This means that the stock is undervalued. If it is greater than 1, it suggests that the stock is overvalued. However, it is hard to be precise in the replacement costs of the intangible assets, thus it does not mean the stock is overvalued per se. For example, technological companies would have relatively lower replacement costs for their assets to their market value than company that are more dependent of industrial machines. In this paper the Tobin's Q is calculated as the following:

$$\text{Tobin's Q} = (\text{Market capital} + \text{total liabilities}) / (\text{common stock} + \text{total liabilities})$$

The relationship between board ownership and Tobin's Q is investigated by Morck, Schleifer, and Vishny (1988). They argued that increasing board ownership is beneficial for the Tobin's Q if the board has no ownership yet. Previously, the incentives of the board and shareholders were not aligned. However, equity based ownership would give the board of directors incentives to increase the firm value. This positive relationship stops once they gained more than 5% of ownership. At this point an increase in ownership leads to a lower Tobin's Q. Reason is that at this point higher ownership leads to weaker governance structures. More and more different owners lead to more discussions during the board meetings, which increases managerial problems. However, when the board ownership passes 25%, the relationship is positive again. Eventually, the board gained an ownership level where they are able and willing to act on behalf of themselves. See figure 1 for the full graph.

Figure 1 – Board ownership and firm value



Source: *Management Ownership and Market Valuation* (Morck, R., A. Shleifer, and R. W. Vishny, 1988)

2.4 Overall CEO characteristics

Norburn (1989) already provided information regarding the different CEO characteristics and showed that they matter. Therefore, selecting the CEO is a key organizational decision, which has important implications for firm effectiveness (Kesner and Sebor, 1994). Interesting is to find a good 'fit' between the characteristics of the company and an individual who will fulfil the CEO position. Pfeffer and Salancik (1978) concluded in their study that most firms in different context recruit and hire CEOs with backgrounds and skills fitting the company's background. This paragraph will further explain the importance of CEO characteristics and what relationships are expected.

Firstly, the spending on research and development and adoption of IT will be discussed. CEOs with a higher education and a technical functional backgrounds are more likely to have an intensive research and development program. Firms with high research and development expenditures are more likely to select new CEOs that have technical experience. They would be more familiar and understanding towards the background of the company. Furthermore, individuals with advanced training and education are related with higher research and development expenditures (Datta and Guthrie, 1994). Thong and Yap (1995) agree with this view and found that small businesses are more likely to adopt new information technology (IT) when the CEO has an innovative character, is positive towards adoption of IT, and possesses greater IT knowledge. Younger CEOs tend to spend more on research and development when they have more wealth invested in firm stock and have significant career experience in marketing and engineering.

Besides IT adoption, CEO characteristics further effect the entry mode of firms. Herrmann and Datta (2002) found which characteristics affect entry mode. In general, entry modes can be divided in four categories: export, contractual agreement, joint venture, and wholly owned subsidiary. The first two (non-equity based entry) are less risky, because there is less equity involved than the last two options (equity based entry). There is a higher probability for full-control entry (equity based entry), when CEOs tenure is higher. Furthermore, legitimacy in their position along with higher level of confidence and experience result in full-control entry. In this case, The CEOs believes that he or she knows how their business works and does not mind taking higher risks for higher returns. CEOs with throughput backgrounds are more likely to have the desire for greater control and efficiency, thus also

prefer full-control entry. Lastly, international experience among successor are important factors for full-control entry.

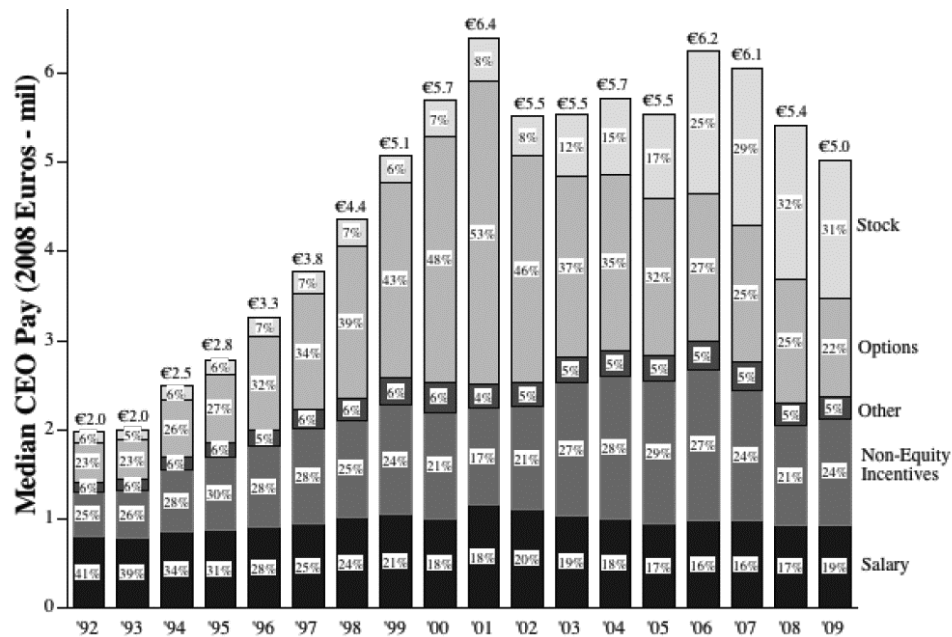
The last CEO characteristics which will be discussed in this paragraph is confidence. Overconfidence can have a negative impact on firm performance. Heaton (2002) found that optimistic CEOs overvalue their own corporate projects and therefore invest in negative net present value. Furthermore, they believe that capital markets undervalue their firm's risky securities. Malmendier and Tate (2008) agree with this view and conclude from their study that overconfident CEOs overpay for mergers and acquisitions, especially if they have access to internal capital. Reason for this is that they overestimate their ability to generate returns during mergers and acquisitions. Therefore, they make more mergers and acquisitions than they should. Their access to equity should be reduced to decrease this problem.

It will be beneficial to do further research on these topics, because there are loads of areas that are not investigated yet. However, it is not possible to investigate CEO characteristics such as confidence in this paper. Lack of time and access to information are the problems. Therefore, easier accessible CEO characteristics will be used. CEOs compensation, age, tenure and gender will be investigated. In the following sub-paragraph the current literature of these characteristics will be summarized and hypotheses will be formulated.

2.4.1 CEO's compensation

As already mentioned, the incentives of executives are not always in line with the incentives of the shareholders. There are two compensation based options to solve this problem. Firstly, the compensation can be based on firm performance. If the value of the firm increases, executive's compensation increases. Therefore, they will have the incentive to improve performance. Lately, there is growth in a new way of rewarding CEOs (the second option). In the past, CEOs got their salary fully paid in cash. This did not depend and variate with firm performance. However, equity based payment did its entrance in financial policies. Managers were paid equity based. For example, they will be rewarded by stocks of the company or call and put option. Figure 2 is an illustration how this trend evolved. Once CEOs gained stocks of the company they were working for, they would have the incentive to increase stock price (Conyon et. al., 2011). Morck, Schleifer and Vishny (1988) found an interval where increasing ownership does not increase firm value. At this interval an increase in ownership leads to weaker governance structures. More and more different owners lead to more discussions during the board meetings, which increases managerial problems as figure 1 previously showed.

Figure 2 – Executive compensation



Source: *The Executive Compensation Controversy* (Conyon et al., 2011)

In Mehran's (1995) paper the link between equity based compensation and firm performance is positive. Therefore, the following correlation is suggested:

H2a Executive's compensation is positive correlated with firm value

2.4.2 CEO's age

Next characteristic is the age of a CEO. Relatively, CEOs are older than the regular workforce. However, within the CEO segment there is a high variation. Several papers investigated the impact of age on financial implications of a firm. Firstly, Hambrick and Mason (1984) argued that older CEOs are less likely to bring up new ideas, because they are more conservative. They feel comfortable in the way they are currently leading the company. Chown (1960) further introduced the idea that the lack of change is due to the fact that they are less able to come up with new ideas. Child (1974) stated that executive youth is associated with economic growth. However, older executives have more experience in seeking and evaluating provided information. They take more time to make decisions with their obtained knowledge.

MacCrimmon and Wehrung (1986) argued that risk aversion increases with executives' age. Their young optimism will fade away and they prefer secured profits over risky more profitable projects.

The lack of innovative changes from older CEOs can be the factor which leads to competitive disadvantages compared to competitors. Therefore, it is more likely that the relationship of CEOs age and firm performance is negative:

H2b Executive's age is negatively correlated with firm value

2.4.3 CEO's tenure

The impact of executive's tenure on firm performance is more uncertain than other characteristics. Some paper suggests a positive relationship, despite the fact that other results are suggesting negative relationships.

First of all, Adams, Almeida, and Ferreira (2005) argued that CEOs with higher tenure normally gains higher power within the firm. More power on the one hand leads to better stock performance, but on the other hand also to higher volatility. This is the normal risk return payoff, which means that CEOs with a higher tenure prefer higher returns instead of more secured projects with lower returns. Furthermore, Alutto and Hrebiniak (1975) derived a positive relationship between longer-tenured CEOs and commitment towards their results. Higher commitment led to higher incentives to perform well.

Contradicting is the paper of Miller (1991). This paper argued that CEO's strategy are less likely to change if the tenure increases. They prefer stability and efficiency over inconsistency. This can either be the result of the fact that the CEO is convinced about their own strategy or the fact that interests in firm environment is lost and they stopped reinventing.

This thesis stronger believes the positive link between commitment towards the company and tenure, which can eventually lead to higher performance. Therefore, the following hypotheses will be tested:

H2c Executive's tenure is positively correlated with firm value

2.4.4 CEO's gender

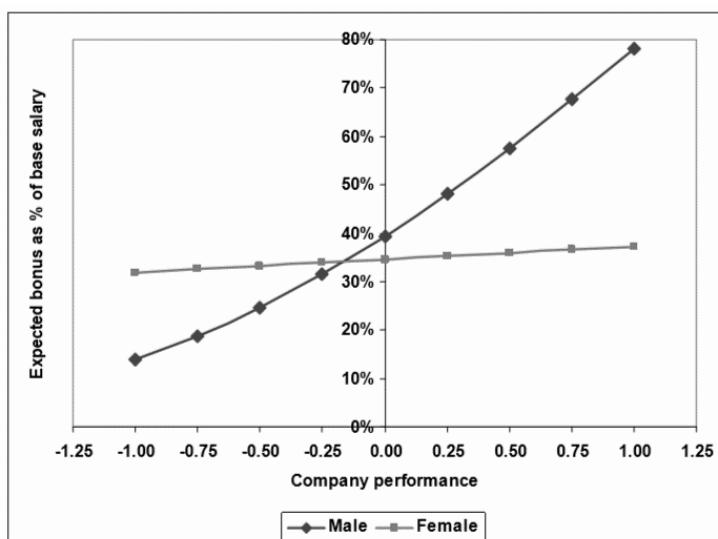
Recently, gender diversity is more discussed in literature and in political systems. First of all, Europe started to set a quota which requires a certain percentage of woman in the board of directors. They argue that females need to get the chance to fulfil managerial roles within the company and board. The United States lags behind Europe in this topic and has lower gender diversity in boards. Carter, D'Souza, Simkins, and Simpson (2010) argue that competent women and ethnic minorities should have the opportunity to participate in the board of directors and upper management. They possess external networks, information, and other characteristics

that can be useful for firms. The problem that arises is that firms do not want to recruit females just because they are female. They have to be sure that it will be beneficial for the company and performance. The image of the standard board in the United States, consisting of white, old, and bald directors, has to be changed. People should be more confident that a diverse board does not per se mean worse performance.

Furthermore, the papers of Smith, Smith, and Verner (2006) and Carter, Simkins, and Simpson (2003) both found a positive relationship between gender diversity and firm performance. Women tend to increase the oversight functions of the board. Moreover, women tend to differ in making investment decisions. Barber and Odean (2001) showed that men trade more excessively than woman. They are more confident that their investment will result in profit, regardless the level of knowledge they have on their investment opportunity. Moreover, men are more likely to pay out dividend than women. The risk aversion also differs. Women are more risk averse than men (Weber, Blais & Betz, 2002).

As figure 3 illustrates, the compensation structure for woman and men are different. According to Kulich et. al. (2011), men are more likely to be paid based on performance. Apparently, men have less incentive to perform well than women and therefore need performance related payments. Overall, men are paid more than women. In this thesis the dummy variable gender is 0 if the CEO is female and 1 if the CEO is male.

Figure 3 – Gender compensation



Source: *Who gets the carrot and who gets the stick?* (Kulich et. al., 2011)

This thesis relies on the fact that gender diversity within a board increases firm performance. Therefore, it could be reasonable that a female CEO would lead to higher firm value:

H2d Executive's gender is negatively correlated with firm value

3. Data and methodologies

3.1 Data

This thesis uses two different datasets. The first one is for CEO characteristics and the second one is for firm characteristics. All the data concerning CEO characteristics are provided by WRDS: compustat executive compensation. Information about the S&P500 companies are gathered from DataStream. The time period is set between 2000 and 2015. The next paragraphs describes what specific data is gathered followed by their descriptive statistics. Furthermore, the two different methodologies used in this study will be explained. These model both use the control variables, which are explained in the last sub-paragraph. This data will eventually be used to test the hypotheses.

3.1.1 Data gathering and description

The CEOs from the 505 biggest companies in the United States are used for this study (S&P 500). In the S&P 500 there are a few technological companies such as Facebook that did not exist in 1999. Therefore, some data is missing in the beginning of the time period. The Characteristics of the CEOs are provided by WRDS. CEO's age, compensation, tenure, and gender can all be found in the database of WRDS.

The database of WRDS is combined with the data from DataStream. DataStream contains the Tobin's, capital expenditures, total liabilities, sales growth, total assets and Global Industry Classification Standard (GICS) sectors of the firms used in this thesis. Tobin's Q will be calculated by the following formula: $(\text{Market cap} + \text{total liabilities}) / (\text{common stock} + \text{total liabilities})$. The market capital and common stock numbers are also gathered by DataStream. Sales growth is calculated by the percentage change of total sales. For this reason, this study uses data from 1999. To calculate the sales growth for 2000 you also need the total sales from 1999.

The GICS divides the companies into ten different industry groups. The industry groups used in this study are: materials, consumer discretionary, energy, health care, industrials, information technology, consumer staples, utilities, financials, and telecommunication servers. Most companies of this dataset are positioned in the consumer discretionary industry and financial sector. Only five companies are doing business in the telecommunication servers.

The two datasets contained different companies in the S&P 500. Therefore, the total samples decreased. After reconstructing and dropping missing values, a total of 480 firms were left.

Tables 1.1 and 1.2 give a brief overview of the descriptive statistics from the used dataset. As the table shows, 98% of all CEOs are male. On average, the age of the CEO is 56 and the average tenure is 6. With a maximum tenure of 51 and the oldest CEO is 89 years old. Furthermore, the total compensation has high variation within the dataset. Lastly, Tobin's Q varies between 0 and 34, with an average of 2.16. The data is tested for strange numbers such as negative number where it was not possible, but they did not occur.

Table 2 shows the correlation between the variables. As one would expect, the highest correlation is between tenure and age. Longer tenured CEOs are older in most cases. Furthermore, bigger firms tend to pay higher CEO's compensation in comparison to smaller firms. If the size increases, the CEO is responsible for more people working for the firm. They are compensated for the responsibilities they have.

Sales growth is significant correlated with capital expenditures. When the sales are going up, the company needs to increase their capacity. Capital expenditures are needed to buy new machines most of the times.

Leverage is negatively correlated with CEO's tenure. New CEOs are implementing new ideas, which can be costly for the firm. To finance these costs debt can be issued. Moreover, they are less risk averse and do not mind taking higher loans.

These relationships are not tested for omitted variables.

Table 1.1 Descriptive statistics CEO characteristics

Variable	N	Mean	Min.	Max.	Std. dev.
Age	6262	56.06	27	89	6.38
Compensation	6448	9846.47	0	245016.94	10556.97
Tenure	6228	6.36	0	51	6.16
Gender	6461	0.98	0	1	0.15

Table 1.2 Descriptive statistics dependent and control variables

Variable	N	Mean	Min.	Max.	Std. dev.
Tobin's Q	7190	2.16	0	34.05	1.58
Capex	6811	5.85%	0.02%	103.32%	6.75%
Firm size	7382	46459256.49	14377	2573126000	167912655.32
Leverage	7382	60.0%	0.0%	403.46%	22.74%
Sales growth	7346	13.67%	-86.58%	1423%	55.64%
Crisis	7479	0.13	0	1	.332

3.2 methodologies

This study mainly focussed on linear regressions. Linear regressions are used to explain a dependent variable by independent variables and control variables. Furthermore, the fixed effects of industry and time are added in the last calculations. Stata is used to process all the data and Stata is used to calculate the results that are in the tables.

3.2.1 Linear regression

As already mentioned, a linear regression is a helpful tool to explain a dependent variable by independent variables. In this study, firm value (Tobin's Q) is the dependent variable. The question is whether Tobin's Q is effected by CEO characteristics. Therefore, CEO's compensation, age, tenure, and gender are the independent variables.

Total compensation has to be multiplied by 1,000 to get the actual number. Total compensation for all CEOs together is almost \$5 billion. On average they earn \$10 million. Lastly, if gender is 0, the CEO is female and if the number is 1, the CEO is male. Most CEOs are male in the S&P 500.

3.2.2 Control variables

More variables than just the CEO characteristics have to be used to prevent incorrect results. Tobin's Q is not only affected by the characteristics of the CEO. As shown in the literature, it is likely that they have impact. However, firm value is also impacted by other variables. Therefore, control variables should be included in the regression for a more complete view on how Tobin's Q is affected.

This study uses five different control variables which explain variation in Tobin's Q. The same control variables are used in El-Faitouri (2014) study which tries to explain if the board of directors have impact on corporate performance. Only difference is that this study uses the financial crisis as a control variable. The crisis occurred in 2007 and went on for two years. These are the control variables that are used:

- Capital expenditures (Capex) as a percentage of total assets
- Leverage is total liabilities divided by total assets noted in percentages
- Sales growth is the percentage of growth in sales
- Firm size is the total assets of a firm and has to be multiplied by 1,000 to get the actual number
- Financial crisis is a dummy variable which is 1 if the data is in 2007 or 2008 and 0 otherwise

On average, firms listed on the S&P 500 spend 6% of their total assets in dollars on capital investments. Leverage ratios varies from 0 to 4 and firms consist of 60% debt on average. Sales growth varies from minus 86% to plus 403%, and is on average 13.7%. The total assets of the smallest company are worth \$14,377,000 and the biggest company has total assets worth \$2,573,126,000,000. On average this number is \$46,459,256,000.

With all those variables, the linear regressions can be formulated as the following:

$$\text{Firm value}_a = \alpha + k_{\text{CEO Characteristics}}x_a + k_{\text{Control}}x_a + \varepsilon_t$$

Table 2 Correlation matrix

Variable	Age	Compens.	Tenure	Gender	Capex	Leverage	Sales grow.	Firm size	Tobin's Q
Age	1								
Compens.	.086***	1							
Tenure	.362***	.049***	1						
Gender	.051***	-.032***	.064***	1					
Capex	.001	-.040***	.063***	.045***	1				
Leverage	.075***	.013	-.123***	-.034***	-.142***	1			
Sales grow.	-.008	.022*	.016	.012	.213***	-.061***	1		
Firm size	.027**	.173***	-.045***	.015	-.100***	.233***	-.034***	1	
Tobin's Q	-.073***	.012	.102***	-.008	.054	-.316***	.071***	-.146***	1

*** significant at the 1 percent level. ** significant at the 5 percent level. * significant at the 10 percent level

3.2.3 Fixed effects

The dataset used in this study is a panel data set. It contains a set of repeated observations for the same firms collected over a number of periods. This allows to specify and estimate more complicated and more realistic models. An important feature is identification of certain parameters. Furthermore, the fixed effects model of this data can be estimated (Frehen, 2014).

The linear regression estimates the impact of the independent variables on firm performance. However, time and industry effects are not included in this regression. Therefore, industry and time fixed effects are used to complement the regression. It is hard to argue that the different industries explain the variation between firms, but the fixed time effects model just captures the differences. The 480 firms are pooled in ten different industry groups. Varying from the material industry to financial institutions. The same goes for time fixed effects. This is pooled over sixteen different groups. The first group is 2000, ended by the year 2015. Both fixed effects variables will be dummy variables labelled with different numbers for different industries or years.

The fixed effects model created a groups which combined year and industry. This resulted in 159 different groups of different years and industries.

4. Findings

In this section the regression are run to test the different hypotheses. Firstly, the results of the linear regressions will be discussed, followed by the fixed effects model. This is ended by the limitations of this study. Interesting is whether the results are in line with existing literature.

4.1 Linear regressions

Table 3 shows results of the linear regression. Most important numbers are the betas. This number means in which proportion each CEO characteristic influence the firm value. Furthermore, the reliability of these numbers are tested with a t-test. The t-test is mainly to check whether the results are significant. The level of significance is divided in four groups. The first group is noted by one star *, which means significant on a 10-percent level. ** is significant on a 5-percent level (95% confidence interval) and *** means on a 1-percent level. The last groups has no sign which means that the result is insignificant.

H1 CEO characteristics have significant impact on firm value

Table 3 shows that, except gender, all the CEO characteristics have significant impact on Tobin's Q based on a 95% confidence interval. Total compensation, age, and tenure all have a beta that significantly differs from 0, which means that they either have a positive or a negative relationship with the firm's Tobin's Q. This is in line with Norburn's (1989) findings that CEO characteristics matter. It is important to find a good 'fit' between the characteristics of the company and individual who will fulfil the CEO position. This will have beneficial effects on firm performance. It is important to test for endogeneity and reverse causality in the results. This will be discussed later in the paper.

H2a Executive's compensation is positive correlated with firm value

In table 3, the beta of total compensation is 0.038, which means that total compensation is positively correlated with firm performance. Higher compensation for the CEO, on average, leads to higher firm performance. This number is in line with Mehran's (1995) paper. This study argues that equity based compensation increases the incentives for higher performance. This dataset does not divide total compensation in equity and cash based compensation. However, it is more likely that CEOs with higher total compensation also have higher equity based compensation.

H2b Executive's age is negatively correlated with firm value

Next is the impact of age on firm value. The results show that CEO's age is significantly and negatively correlated with Tobin's Q (Beta of -0.082). Young CEOs normally have higher performance. Older CEOs are less likely to bring up new ideas, because they are more conservative (Hambrick and Mason, 1984). Furthermore, managerial youth is associated with economic growth (Child, 1974). These two papers describe possible reasons that suggests the negatively relationship, which is consistent with the results in this study. When a firm is stuck in specific strategies and products, they should hire a younger CEO. This will have a positive effect on the creativity of the firm and eventually improves firm performance.

H2c Executive's tenure is positively correlated with firm value

Despite the fact that tenure and age are correlation to each other (table 3), the relationship with firm value is different. Tenure has a positive effect on corporate performance with a beta of 0.089. CEOs that stay longer in the same firm improve the performance significantly. Adams, Almeida, and Ferreira (2005) assumed that longer-tenured CEOs have more decisional power within their firm. Having more power resulted in higher stock performance. Furthermore, they have more experience in leadership and know the culture of the company better. Therefore, it is recommended to keep the same CEO over time. Do not make hasty decisions by firing the CEO immediately once the firm is experiencing bad results. Eventually, the firm performance will increase with longer tenured CEOs.

H2d Executive's gender is negatively correlated with firm value

In this sample, gender is negatively correlated with firm value with a Beta of -0.022. This means that if the CEO is female, the Tobin's Q will be 0.022 higher on average. Diversity in the board has positive impact on firm performance according to Carter, Simkins, and Simpson (2003). It promotes a better understanding of the marketplace, increases creativity and innovation, produces more effective problem-solving, and enhances the effectiveness of corporate leadership. Furthermore, most CEOs are male. So it could be logical that a diverse company with a female leading the firm has higher firm performance. This is in line with the results in the table. However, this impact is not significant.

Table 3 Regression model

Variable	Beta	t	Sig.
Age	-0.082	-5.974	.000
Compensation	0.038	2.970	.000
Tenure	0.089	6.436	.003
Gender	0.022	-1.773	.076
Capex	-0.023	-1.739	.082
Firm size	-0.81	-6.180	.000
Leverage	-0.229	-17.313	.000
Sales growth	0.145	11.121	.000
Crisis	-0.065	-5.141	.000
_Cons		19.470	.000

Adjusted R² = 0.12 (N = 7479) F = 84.09 p<0.0000

4.2 Fixed effects

Table 4 shows the results of the fixed effects model. Does the betas change if groups are created for the different industries and years? Within CEO characteristics, the only sign that changed is the one for gender. In the first linear regression without fixed effects, the correlation was negatively related. However, it is positive in this model. It was assumed that diversity in the board would have a positive effect on firm performance. This applies for the whole board. However, the CEO positions is fulfilled by only one person. So, this does not mean that having a female CEO lead to a more diverse board. It could be the case that firms with a female CEO already have a high number of female participation in the board. If so,

recruiting a female CEO will not increase the diversity. The table does not include the crisis. This would be an omitted variable, because the crisis and years are both dummy variables linked with time

Table 4 Fixed effects model (industry and years)

Variable	Beta	t	Sig.
Age	-0.01019	-3.23	.000
Compensation	0.00002	1.39	.166
Tenure	0.01688	5.20	.003
Gender	0.09762	0.80	.423
Capex	-0.0204	5.64	.000
Firm size	-0.0000	-4.11	.000
Leverage	-0.8109	-8.29	.000
Sales growth	0.8215	9.40	.000
_Cons	2.8567	13.12	.000

Adjusted R² = 0.09 (N = 5501) F = 44.44 p<0.0000

The fixed effects models is a tool to test for endogeneity. Endogeneity means that there is one or more omitted variable(s) that affect(s) the correlation of an independent variable on Tobin's Q. In this model it tests whether industry and year could further affect the correlations of the CEO characteristics on the Tobin's Q. This only affects a small portion of the CEO characteristics. CEO's compensation is now negligible and economical insignificant because the number is too small. This thesis will not further test for endogeneity in the models.

4.3 Limitations

The most important limitation in this study is the fact that not all CEO characteristics are measured. Age, tenure, compensation, and gender are basic statistical facts about a CEO. This does not describe what approach the CEO has to certain tasks, how he or she reacts in different situations, and what personality the CEO has. These characteristics are hard and time consuming to measure. Further research can be done about these characteristics and their impact on firm value.

This further implies that both methods do not have a high R^2 . A small portion of firm performance is explained by the independent variables. More independent and control variables can be added to better specify Tobin's Q.

Furthermore, the influences of CEOs decreased over the past years due to regulations and better corporate governance. The companies that are investigated are large firms on the S&P500. It is harder for an individual to have impact on such big companies.

As mentioned in the previous paragraph, a problem of the models arises from endogeneity. This is tested with the fixed effects model using industry and time fixed effects. However, there are more possible omitted variables that can be tested to be sure that the correlation have the right signs and numbers. The numbers are further effected by multicollinearity. This happens when there is correlation between two or more independent variables. In this regression, CEO's age and tenure are correlated.

The last problem arises from reverse causality. This thesis tests whether CEO characteristics influence firm performance. However, it is also possible that firm performance influences the CEO characteristics. It is possible that the reason for higher CEO's compensation is the high performance of the firm instead the other way around. Because they perform well, it has the ability to pay higher bonuses, instead of the idea that compensation is based on performance. It is hard to test what way the variables affect each other and therefore will not be further discussed and investigated in this paper. However, keep in mind that there is a possibility that the results are biased.

5. Conclusion

5.1 Conclusive remarks

The main purpose of this paper is to answer the question whether CEO characteristics have impact on firm value. This is followed by a set of hypotheses to test if there are correlations between CEO characteristics and firm value. Firm value is estimated by Tobin's Q. The dataset consists of firms that are part of the S&P 500. Linear regression and a fixed effects model are used to give statistical conformation.

The results are in line with most suggestion from previous research. Firstly, the results show that CEO characteristics indeed have impact on firm value. Several characteristics have significant impact on the Tobin's Q of firms.

Four characteristics are tested: compensation, age, tenure, and gender. As Mehran (1995) suggested, higher executive's compensation increases firm value. The executive is more likely to have the incentive to improve firm performance if their compensation is equity based.

Age, in this paper, is negatively related to firm value as suggested by previous literature. Older CEOs are less likely to bring up new ideas, because they are more conservative (Hambrick and Mason, 1984).

Despite the fact that tenure is highly correlated with age, its correlation with firm value is the other way around. Adams, Almeida, and Ferreira (2005) assumed that longer-tenured CEOs have more decisional power in firms. Having more power resulted in higher stock performance. Therefore, it is not a surprise that the results confirmed the positive relationship.

Lastly, the results show a negative relationship between gender and firm value. However this relationship is insignificant. This correlation implies that a female CEO improves firm value. Diversity in the board has positive impact on firm performance according to Carter, Simkins, and Simpson (2003). Having a more diverse management team promotes a better understanding of the marketplace, increases creativity and innovation, produces more effective problem-solving, and enhances the effectiveness of corporate leadership.

The fixed effects model show consistency with the linear regression. Industry and time fixed effects only resulted in a different sign for gender. However, in both regressions this number is insignificant. Therefore, you should not take into account the gender of the CEO too much.

5.2 Recommendations

The results of the paper can have a few implications for companies concerning their recruiting process for CEOs. When striving for higher firm value, companies should consider the age and gender at their human recourse management. Older CEOs tend to lead to lower firm value. Furthermore, female CEOs should be considered more often, because the results show that they have a positive effect on firm performance. In salary negotiations, do not be too restrained when it comes to the height of salary. Equity based payment improves the incentives for executives and eventually lead to higher returns. Lastly, if a CEO is not performing as preferred, do not hurry in firing the executive. As tenure increase, the firm value will do the same.

Further research can be done on others CEO characteristics to get a more complete view on what characteristics should be used in the recruitment process for a CEO to ‘fit’ in the company.

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