Do the identities of managers matter for corporate performance?

Bernhard Trubrig

Dissertation written under the supervision of Prof. Burcin Yurtoglu and Prof. Ana Aranda

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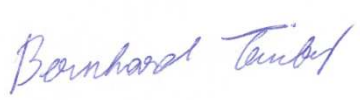
“I swear that I have written this thesis on my own and with no other help than the literature and other supportive material listed in the appendix. Citations of sentences and parts of sentences are declared as such, while other imitations are clearly marked and linked to original sources with regard to extent and intention of the statements made. This thesis has never been handed in to any examination authority before and it is also not yet published.”



Bernhard Trubrig

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Abstract

This master's thesis aims to examine whether corporate managers and specifically CEOs and their identities, influence performance in the companies they lead. The term identity hereby refers to a broad set of attributes of a manager, ranging from externally observable characteristics such as age or gender, over personal skills such as experience and education to generalized characteristics such as attitude towards leadership. Managers, as referred to in this thesis, are members of organizations, who are expected to be of sufficient importance to the company's success to be relevant to financial performance; these are CEOs and other managers in principal roles. It is found that the identities of managers matter for firm performance in a significant and a manifold way. This argumentation is founded on a comprehensive overview of existing literature. Further, an empirical study conducted by the author confirms literature findings.

Approach

In a first step, the present thesis provides an overview of existing literature on the topic and aims to connect the wide array of findings to a meaningful framework of general rules to explain how and when managers affect performance and other key aspects of companies such as strategic policies.

In a second step, an empirical study is conducted to validate theoretical and previous empirical findings.

In chapter one, existing management literature is reviewed to give a general idea why managers and CEOs in particular should be of relevance for firm success. Chapter two gives a profound overview of the key aspects of measuring leadership effects on firms. Relevant variables and their levels of observability as well as their usefulness are presented according to existing literature. Chapter three gives a technical overview of established approaches to measure the impact of variables defined in chapter two.

Chapter four investigates and categorizes research specific theoretical literature, which either supports or opposes the assumption of leadership effects on firm performance. Chapter five presents empirical results of existing research on various levels of research and interconnects them.

Chapter six investigates specific factors of both managers and firms, which are of particular interest in the field of research. Chapter seven explores difficulties and limitations in empirical research and presents possible solutions.

Chapter eight presents an empirical study conducted by the thesis' author, which in line with present literature finds and confirms the CEO performance effect. Chapter nine concludes.

1. The importance of leadership in organizations

The question, which should be asked right in the beginning is what role leadership plays in general for the success of firms. To a major part, management literature is concerned with finding approaches to practice leadership in ways most optimal for firm success. However, it seldom asks for the fundamental importance of leadership, which is naturally assumed to be major.

> *"We speak of "leadership" and of the "spirit" of an organization. But leadership is given by managers and effective primarily within management; and the spirit is made by the spirit within the management group. We talk of "objectives" for the company and of its performance. But the objectives are goals for management people; the performance is management performance. And if an enterprise fails to perform, we rightly hire not different workers but a new president."*
>
> **Peter Drucker, 1973, p. 29 (revised edition 2008)**

This quotation by Peter Drucker, born in 1909 in Vienna and one of the most regarded management theorists[1], summarizes the natural perception of the importance of leadership in respect to firm success in one paragraph. Drucker attributes leadership great importance for achieving organizational, or, in particular, firm success. He further elaborates in an earlier work that profitability in firms is not a goal to achieve, but rather a test for the legitimacy of behavior and decisions of businesses, driven by managers (Drucker, 1954). For sure, firm success is caused by other factors except leadership as well, such as economic developments and industry specific events. Surely as well, management philosophers would naturally assess management an important role in the interplay of factors driving firm performance.

It is a generally accepted fact that firms themselves have a significant effect on their performance, otherwise there would exist no detectable differences among firms within a homogenous industry, which, however, is undisputedly the case. If leadership, in turn, had no effect on firm success then, consequently, all characteristics such as corporate practices and strategic decisions would be a result of firm external factors.

[1] Steve Denning, a prominent organizational consultant describes Drucker as "the founder of modern management" (Denning, 2014).

However, this is not the case. Indeed, corporate practices remain largely unexplained by external factors such as the industry and macro firm characteristics such as size (Bertrand & Schoar, 2003).

To give an example, the capital structure, a strategic firm policy, cannot be fully explained by external factors such as those mentioned before. For one part it is true and easy to proof that companies in different industries, for instance in heaver machinery, tend to have a different capital structure than, for instance, companies in the recently evolving bio-tech sector.

However, within those sectors, also outlined by Bertrand & Schoar (2003), heterogeneity still is very large. This leads to the assumption, which is strongly emphasized by management philosophers, that internal factors have a significant impact on the strategic focus of firms, with management playing a key role.

General management literature describes leadership as crucial for firm success, as leaders shape the strategy, culture and structure of firms (Thomas, 1988). This, however, should not be confused with the research internal and topic related debate to which extend leadership matters for firm performance and which constraints it underlies. In this regard, chapter 4 analysis the two views, which have been forming since beginning of quantitative analysis on the leadership performance effect, the advocate and constraint view.

In the field of change management, John Kotter, professor of leadership at Harvard Business School, made significant contributions to the topic, primarily with his bestselling work “Leading Change”, (Kotter, 1996). In his view, leaders are an important factor to initiate change in organizations, adapting them to new environments. Hence, management has the power to shape the strategy of organizations at various levels.

In a narrower sense, management literature also repeatedly mentions employee commitment as prerequisite for sustainable firm success (Pettigrew, 1979). Commitment to an organization stems from a sensation of collective purpose of employees to strive for achieving the competitive goals of organizations. Without collective purpose as part of the culture of an organization, sustainable success is hard to achieve in a competitive environment.

Hence, one of the main duties of leadership is to form this feeling of collective purpose (Barnard, 1938), which in turn is of the key motivators for members of organizations (Shamir, House, & Arthur, 1993).

This is where the concepts of various behavioral styles of leadership come into play. As described before, literature certifies leadership, or the leader ("CEO") of a firm particular importance in persuading employees to execute organizational goals, also known as followership (Kelly, 1988).

Charismatic leadership is one of the most influential leadership theories, which has gained in attention over the past decades since the 1980s (Conger, Kanungo, & Menon, 2000). Charismatic leadership is a leadership style, which exerts vast impact on members of an organization. This impact stems from the leader – follower effect, which comes from organizational members achieving extraordinary personal satisfaction and gratification through working for the cause of the leader. Certainly, much work, which has been done in the field of charismatic leadership, is highly theoretical and examines specific cases of high impact CEOs as Steve Jobs was at Apple. Those leaders are very committed to their goals and able to exert a high level of referent power on followers (House, 1971). Charismatic leaders, due to their prominent presence, have often been the starting point of the discussion whether leaders ("CEOs") are a key differentiator in organizational management, that is whether they play a distinct role in the success of firms.

One could argue that Steve Jobs had a high impact on Apple through its leadership style. In fact, Apple continued to perform excellently in terms of financial performance after his sudden passing. In this sense, from a general standpoint it seems unclear whether Steve Job's period of leadership did matter, or if other factors resulted in Apple's organizational environment as of today.

In this regard, it is argued that leadership literature tends to overestimate the effect of leadership on organizational performance and neglects other important factors of influence (Bryman, 1986). The following chapters aim answer the question whether and when leadership and the CEO position in particular matter for corporate performance and how to quantify this and others factors of influence.

2. Outcomes and factors of interest

The first question, which arises when evaluating the effect of leadership on performance, is how to measure performance and which factors are expected to exert influence. The most part of reviewed literature, which to the author's best knowledge represents the major empirical studies on the subject, uses a set of individual parameters to quantify this effect.

Measures of performance commonly include accounting ratios such as the return on assets ("RoA"), market indicators such as absolute stock returns over a given period or individual assessments of firm performance by companies' managers. Factors, or independent variables, explaining those performance measures, dependent variables, are frequently, but not always (see section 3.1.3) classified in layers of impact, due to the mechanics of the estimation methods explained below. A first factor of performance could, hence, be the "time" a firm is situated in, followed by the industry it operates in and the specifics attributed to the company.

As all firms which are investigated share the property of time, events affecting all companies of a specific sample such as the rate of inflation are covered. This specific example of inflation is only valid if the sample was comprised of companies operating within a country, because different countries create different economic environments for firms. The factor "industry" would similarly account for all events companies are exposed to within their respective industry. An example for this are rising oil prices in the airline branch. Thirdly, the factor "company" covers all events specific to a single company. If now a fourth factor, "leadership", is introduced another layer is added, which is specific to characteristics within a company.

A major part of empirical research conducts analysis based on this logic, which underlies several assumptions and is prone to critique as further elaborated in chapter 7.

While it has always been an intuitive guess that top managers have a key impact on corporations, little comprehensive studies have been undertaken to verify this assumption (Bertrand & Schoar, 2003). One reason for this might be that it is indeed very complex to quantify effects of individual characters on whole organizations and even more so to control for endogeneity effects.

2.1. **Determinants of Leadership**

Going even one level deeper, one could asses which characteristics of leadership are important within the factor of leadership. Depending on the investigated type of manager characteristic, specific parameters such as capital structure, employee fluctuation, etc. are typically tested for explanatory power for firm performance.

In general, some authors in literature establish specific "manager styles", which are defined as recurring patterns in decision making and are related to so-called manager fixed effects in performance (Bertrand & Schoar, 2003).

In this respect, many obstacles are to overcome. Firstly, assumption have to be made on the influence of managers on corporate decision. It needs to be verified whether leading managers indeed decide on, for instance, the capital structure of a company. Secondly, a possible manager effect is surely based on a vast number of specific variables, and it is difficult to capture all of them. Thirdly, there may be numerous independencies among the variables, for instance between the age of a CEO and the strategy towards R&D expenditure.

As all those relationships described tend not to be linear, Blettner, Chaddad, & Bettis (2012) use aggregate literature on the topic of the CEO performance effect to establish a framework of interdependencies between various CEO specific and corporate variables of previous studies. The result is a complex network, showing the numerous interconnections between CEO characteristics, firm practices and outcomes.

The dependencies among factor variables and between factor variables and dependent variables as well as issues of causality are difficulties, which are addressed later in this thesis.

The next two sections present independent variables representing the identity, character or style of CEOs commonly used to measure firm performance. Other variables are used to identify the effect of leadership as a whole, the focus of this thesis, however, lies on the CEO position. Moreover, variables used to explain industry and company effects are not separately presented as this is not the focus of the thesis.

2.1.1. **Hard CEO Characteristics**

"Hard" or obvious CEO characteristics are easily observable as compared to "soft" characteristics.

CEO identification is a number in relevant databases, which is unique to each CEO working for a specific firm. While including this variable in statistical models would theoretically cover all effects attributable to CEOs there are limitations in that many firms employ a single CEO during an observation period. In this case, CEO effects would be undistinguishable from firm effects, as there is zero variation between firm and CEO identification. This limitation is often overseen in empirical studies (Mackey, 2008). Hence, no effect of persistent CEOs, which also includes many founder CEOs, can be estimated.

The following variables are characteristics of CEOs. Estimating the effect of those characteristics on firm performance gives an idea of what the overall CEO effect is comprised of and how specific characteristics affect firm performance.

Age is the most obvious CEO specific attribute. In fact, some studies find that age has at least an effect on firm policies and strategy (Bertrand & Schoar, 2003)

Gender is similar to age easily observable. Attempts to measure the effect of gender is significantly constrained by the low number of female executives (Dezsö & Ross, 2008). Section 6.1. deals with gender effects exclusively.

Education is usually defined whether a CEO holds an MBA degree. Findings on MBAs are mixed as presented in section 6.2. Also, the type of university education can be observed, for instance if the CEO holds a business or technical degree (Címerová, 2012).

Tenure describes how long a specific CEO already has served in his or her company. This can either be described as the total period of serving as CEO in the firm or being a member of the firm in general. This variable can be included to account for learning effects of the CEO (Mackey, 2008).

Experience accounts for learning effects not only due to the tenure in a single firm, but in general over available data on a specific CEO. Experience is usually a cluster variable, which subsumes various characteristics such as age, tenure, education, industry tenure, etc. As a proxy for experience Címerová (2012) defines experience as total number of years a CEO has been serving as CEO over various firms and industries.

Founder CEOs or CEOs with significant ownership stakes in the respective firms is a property that is often considered. Section 6.3. deals with the effect of founders on firm performance.

Concentration of titles measures how many functions a CEO simultaneously holds within a firm. This is an important measure to explain at least theoretically how independently a CEO can decide upon corporate actions (Adams, Almeida, & Ferreira, 2005).

2.1.2. **Soft CEO Characteristics**

"Soft" characteristics refer to CEO properties, which are not directly observable. This includes personal behavioral patterns on a general level or in specific situations.

Principal components are often used to group single similar characteristics into general strong patterns or "leadership styles". These characteristics such as attitude towards teamwork are mostly unobservable and often require extensive surveys, cp. Kaplan, Klebanov, & Sorensen (2007).

That is why, according to Bertrand & Schoar (2003) some studies inclusive their own, focus on properties on a firm level to explain certain behaviors and performance of corporations. They then try to infer from relationships between observable CEO characteristics and firm policies such as capital structure or R&D spending, personal properties of the CEOs.

However, due to obvious reasons this practice has limitations in examining the effect personal traits of CEOs and, hence, can only partly replace in-depth surveys.

2.2. **Performance variables**

Performance variables are the dependent variables in this field of research. While they are easier to define and to measure than the independent CEO specific variables, they should be interpreted with precaution. Among others, a major issue are time lags which arise due to the time gap between corporate actions taken and effect on accounting based variables. Time lags are separately addressed in chapter 7.1.

Return on Assets ("RoA") is the most commonly used performance variable. It is an accounting based variable and defined by dividing a profit figure by assets according to the balance sheet. The advantage of this variable is that it is easy to employ. Disadvantages are manifold. Firstly, only in the rarest cases the accounting return would reflect the economic return of a firm (Fisher & McGowan, 1983). Furthermore, accounting practices differ among firms and the capital structure of firms affect interest payments differently, so that RoA lacks in comparability.

Return on assets further fails to capture non-capitalized intangible assets, which are especially important nowadays. Among technological firms, this would extremely distort the explanatory power of RoA, as companies such as Google make significant investments in intangibles, which are not accounted for on the balance sheet and, hence, profit would yield a higher return on assets than what actual investments reflect.

Using either net profit or EBITDA as earnings figure distorts comparability as well. While net profit is influenced by capital structure and asset intensity, it also might be arbitrarily manipulated due to strategic and tax considerations. EBITDA, on the contrary neglects differences in financing as emphasized by McGahan & Porter (1997).

Despite the outlined drawbacks, most researchers continue to include RoA as at least one of their dependent variables for the simple reason of comparability to past research (Mackey, 2008).

Profit Margins are used by at least three authors in reviewed literature (Lieberson & O'Connor, 1972), (Weiner, 1978) and (Thomas, 1988). To the thesis author's view, profit margins are prone to endogeneity effects, as this variable is both a performance measure and a firm or industry specific characteristic, which would create reverse causality. This is in line with Blettner, Chaddad, & Bettis (2012), who argue that in aggerate literature dependent variables are sometimes used as explanatory factors and vice versa.

Stock returns are sparsely used in literature, as this limits observable firms to public companies. Studies, which focus on sector or country specific research, are reluctant on smaller companies, which do not trade on stock exchanges.

Tobin' Q is repeatedly cited as superior measure of performance (McGahan, 1998), (Wasserman, Nohria, & Anand, 2001). Tobin's Q is calculated by dividing the market value of a firm's assets by its replacement value. For simplification, this is frequently done by dividing market values of equity and liabilities by the book value of equity and liabilities. A value greater than 1 indicates that the assets within the company are expected to generate a greater return as if they were incorporated outside on a standalone basis, i.e. they add value beyond their costs.

Firm policies such as capital structure or R&D spending are indirectly related to firm performance. If significant effects of specific independent variables are found, it is often also of interest which firm policies they are associated with. This goes in the direction of determining specific leadership styles affecting firm performance.

2.3. **Endogeneity in estimating the CEO performance effect**

However, one of the main problems studying the effects of managers on firm performance are issues of endogeneity. It might very well be that manager effects are correlated with firm characteristics.

For instance, Bertrand & Schoar (2003) therefore build a framework in which it is possible to control for both observable and unobservable characteristics of firms. In order to do this, they track a set of individual managers over time which should allow to eliminate firm fixed effects. However, one point of critique to this reasoning is that they do not test whether those managers are always hired by the same type of firm, which would bias the result and open the door for endogenous effects. However, the lack of evidence of causality is acknowledged by the authors. Also, it is likely that general management effects are captured as well using this method, because when a CEO changes firm many other members of top management changes as well (Mackey, 2008).

2.4. **Prerequisites for the CEO performance effect**

It is suggested in literature that the effect of the CEO is dependent on the type of firm he or she works in as well as the industry and the economic success of the firm. Hence, CEOs with certain characteristics "fit" only at firms, which demand those characteristics. This leads CEOs to have a larger impact on firm performance in those firms, but also attracts CEOs, who expect to exert influence. Bandiera, Hansen, Prat, & Sadun (2016) conducted a very interesting study in this respect. They construct a binary model of CEO and firm types and presume that each CEO type fits one firm type, while one CEO type is more abundant than the other.

Through this macro level approach Bandiera, Hansen, Prat, & Sadun (2016) are able to provide evidence that indeed a fit in styles between CEO and firm is necessary in the first place, for the CEO being able to influence firm performance.

On a deeper level, a noteworthy contribution to the topic has been made by Wasserman, Nohria, & Anand (2001). The authors represent the view that it is not a question whether leadership matters, but in which situations it matters.

As having said before, general management literature assesses leadership crucial performance for firm success, as leaders shape the strategy, culture and structure of firms (Thomas, 1988). Authors like Peter Drucker also emphasize the importance of opportunities for leadership. This

reasoning is called contingent approach, meaning that the influence of leaders or CEOs particularly is determined by opportunities offered by the environment such as industry, but also by the amount of resources a CEO has access to.

Wasserman, Nohria, & Anand (2001) agree on that reasoning, but are able to prove that the larger the amount of opportunities, the smaller is CEO impact, given the firm offers enough resources. This is because a wide array of opportunities, in fact, makes harmful CEO decisions less relevant on a firm level and in relation to competitor's decisions, given the overall amount of opportunities available. If, however, opportunities are scarce, each single CEO decision matters much more within the firm, relative to other CEO's decisions.

This reasoning is actually very intuitive, as the more impact seizing an opportunity has on the firm, the more important each individual opportunity becomes. In this framework the question is not, which CEO characteristics matter for either good or bad performance. If opportunities are scarce, CEOs generally would account for much of the firm's performance variability through either seizing the right opportunities or not.

However, this view already implies that there are differences among CEO characteristics, otherwise their influence on performance variability would be extremely small. Wasserman, Nohria, & Anand (2001) are able to prove that the higher the constraints of a particular industry, the higher is the impact of CEOs. Given that most opportunities firms are facing, are within an industry and that the impact of CEOs gains in effect when opportunities are scarce, implies that CEOs must differ much in their actions.

3. Empirical Methodologies

This chapter describes which empirical methods are most commonly used by aggregate research on the topic. Table 1 gives an overview of the most important studies on the CEO performance effect and the estimation methods used. The main question is to which part CEO characteristics affect firm performance. The first key variable of interest, hence, is to which share CEOs account for variance in performance. The second key variable is in what way specific CEO characteristics affect firm performance, i.e. in a positive or negative way. The former is usually expressed as R-squared (R^2) in linear regression models, expressed as 1 minus the standard error of a specific variable divided by the total error of the model, as explained below.

3.1. Variance Component Analysis

Variance component analysis ("VCA") refers to the method of sequencing the effects of a general model through its individual factors. Basically, each increase in explanatory power is noted while adding the factors one after the other to the model. This increase is then taken as the relative explanatory power for the respective factor. Variance component analysis, or sequential variance decomposition is not to be confused with the underlying models used to estimate the effects, which, however, sound similar in terminology. In particular, sequential analysis of variance (ANOVA) refers to an estimation model accounting for each factor on a standalone basis, while simultaneous ANOVA accounts for interactions among these factors as well.

The types of models presented in this thesis do not change the importance of the order of the factors when conducting a sequential variance decomposition analysis.

For instance, Weiner & Mahoney (1981) employ a (sequential) ANOVA method to analyze the effects of environmental, organizational and CEO influences on corporate performance. They provide evidence that if the CEO variable is placed first in the ANOVA analysis, its effect can be increased up to 96%. From a logical standpoint of view, however, it makes sense to set variables in the order as outlined in Chapter 2, i.e. year, industry, firm and CEO level.

Placing CEO variables in the first order, parts of all other levels would be attributed to it, such as inflation, which is a year effect (Thomas, 1988).

3.1.1. **Linear Regression**

In short, linear regression draws a best fitting line through the values of independent variables. The squared distance to the line (error) of each variable value is added and compared to the sum of squared distances to the mean of the dependent variable, yielding R^2 which is the variance explained by particular independent variables. Linear regression models are used whenever predicting the effect of an independent variable on firm performance is of interest or the variable is of continuous form.

The size of a company would be an example of a continuous variable that could be used among others to estimate the effect of company effects on firm performance. Mostly, linear regression is used when independent variables represent regressors, which are part of an overall effect such as company, industry, leadership effect, and are of continuous form. Also, in former research

other methods were difficult to implement due to technical constraints, which limit the use of variables such as age as categorical variable as this results in a vast amount of factor levels such as in Weiner & Mahoney (1981).

Additionally to explaining the amount of variance explained by specific independent variables, linear regression is also used to determine the effect of these variables. For instance, does CEO tenure positively or negatively affect RoA, is represented by a positive or negative coefficient of the regression line.

3.1.2. **Sequential ANOVA**

The bulk of empirical research uses linear analysis of variance (ANOVA) techniques to calculate the variance explained by CEO characteristics (input factors) in a fashion as described in chapter 2, i.e. one factor accounted for after the other. The first researchers to use variance decomposition to measure CEO effects has been done already in 1972 (Lieberson & O'Connor, 1972).

In contrast to linear regression, which fits the independent variables on an optimal fitting line, ANOVA compares the means of the dependent variable for each value (level) of the independent variable (factor) and determines if these means are statistically different from each other. It is important to emphasize that both, linear regression and ANOVA rely on the same general linear least square model and result in the same level of R^2.

However, as basic determinants of firm performance such as current year for year effects or CEO ID for overall CEO effects are categorical variables with vast amounts of levels, especially for the CEO variable, ANOVA is a more suitable method. Including those variables as dummy variables in a linear regression model would result in a confusing output table with each level of a factor listed separately. Also, the aggregate explanatory power of the factors is usually of interest instead of the slope i.e. the relative impact of each level.

It is further important to keep in mind that in all models, factor levels without variation, i.e. a company which is the only one representing a whole industry or a CEO who works for the same firm over the whole observation period will be omitted due to collinearity. This is logical as those factors pairs are undistinguishable as pointed out by Mackey (2008).

3.1.3. **Simultaneous ANOVA**

A major point of criticism by some researchers is that sequential ANOVA estimation assumes zero covariance between factors (McGahan & Porter, 1997) (Fitza, 2014) (Mackey, 2008). However, in reality, reasonable covariance between factors such as company and CEO factors can be measured (McGahan & Porter, 1997). As a result, this covariance would be attributed to the former factor inserted in the sequential variance decomposition analysis, in this case CEO effects would be falsely attributed to company effects. This is why, the authors mentioned above usually extend the classical one-way ANOVA estimation with a model that accounts for covariance between factors.

It could be argued further that the issues of sequential ANOVA potentially decrease the CEO effect, but never increase, when placed at last order. Hence, findings of a significant CEO effect on performance through sequential ANOVA might be challenged in that they underestimate CEO effect, but not in that the effect is overestimated or does not exist.

3.1.4. **Fixed versus random effects**

Usually, analysis in variance decomposition assumes dependent variables to be driven by fixed effects. This means that there are no recurring patterns or chance factors influencing firm performance, which is expected only to be driven by fixed year, industry, company and leadership effects. Some authors, however, point out that exactly this is not the case. Fitza (2014) argues that by using variance decomposition techniques, a major part of explanatory power of the CEO effect is caused by random effects. The reason why CEO effects are especially prone to random effects as compared to industry and company effects lies in the low number of CEO changes within a firm year matched panel data set.

Year, industry, and firm effects, represent exponentially growing subsamples exactly in this order. This vastly reduces the possibility of random effects being attributed to those factors. For the CEO level, however, the number of CEOs does not increase relative to the number companies. This is because firms show relatively few CEO changes within a reasonable timespan. Hence, a change in firm performance of two periods represented by two distinct CEOs, would fully be attributed to the CEO effect after controlling for the other levels, although this may also include some random effects. To quantify these random effects, Fitza (2014) constructs a sample with random performance variables to measure the CEO effect. It shows,

that about two thirds of the overall measured CEO fixed effect is attributable to random events. This important model also serves as a robustness check in the empirical part of this thesis.

3.1.5. **Non-linear systems**

Going one step further Blettner, Chaddad, & Bettis (2012) advocate a view of "complex independencies" in respect to the CEO effect on firm performance. Instead of assuming fixed and sequential levels of impact, they establish a network of interrelated environmental, company and CEO specific variables. These dependencies are expected to variate over time, i.e. in a non-linear way. Such a methodology, commonly practiced in hard sciences, would present the CEO effect on firm performance in a "fit" perspective, according to Blettner, Chaddad, & Bettis (2012). Social sciences, in general, still lack in such empirical studies and are subject to further research.

3.2. **Micro versus Macro CEO Characteristics**

As outlined in section 2.1.1. aggregate research focuses on directly observable (macro) CEO characteristics and indirectly observable (micro) CEO characteristics. The latter revers to individual leadership styles.

Prior to Kaplan, Klebanov, & Sorensen (2007), only few researchers have investigated the CEO effect through examining individual leadership styles rather than clearly observable characteristics such as age or tenure in a specific company. In order to gather these data, they collect survey data from each specific CEO and the owner of the firm a CEO serves in. Such surveys, in the case of Kaplan, Klebanov, & Sorensen (2007) 40 pages long, of course impose restrictions. They can only be done for a limited number of managers and companies and within a limited time span, as they are usually very costly.

Bertrand & Schoar (2003) is another well cited example in this regard. As describes before, they define manager style as an array of accounting and organizational variables, while managers refer to the CEO position as well as to other top-level executives such as CFOs and COOs. Bertrand & Schoar (2003) then aim to find how much specific managers impact those variables, i.e. how large the manager fixed effects are. However, in contrast to Kaplan, Klebanov, & Sorensen (2007), they do not define which personal characteristics could be the

underlying cause for these corporate practices, but rather assess managers general characteristics such as aggressiveness for higher debt levels.

On the other hand, the study of Bertrand & Schoar (2003) is unique as it controls for firm fixed effects in a novel fashion. This is achieved through a panel data set they employ to track individual managers over time and firms and therefore enables them to better separate firm and manager fixed effects.

A point of criticism on conducting research on the effect of unobservable manager characteristics is that those are, as mentioned before, extremely hard to gather and also show a great level of noise within the data. Instead, some authors recommend to use observable characteristics as proxy for unobservable ones in line with Bertrand & Schoar (2003) and Hambrick & Mason (1984).

4. Should CEOs really matter?

This chapter outlines two distinct views on the performance effect of leadership, which are frequently referred to in existing literature. Advocates support the theory that leadership and especially the CEO have a significant impact for firm performance, opponents either oppose this view or refer to substantial constraints, which the leadership effect underlies.

4.1. **Advocates of the Leadership Effect**

According to management theory as presented in chapter 1, it is often argued that leadership in general plays a great role in firm success. Under the so-called leadership school, topic specific researchers are of the opinion that leadership and the choices managers make are crucial for firm success. Naturally, in management literature most authors support this view.

Child (1972), for instance, argues that CEOs influence firm performance by making distinct choices in order to change the organization to fit the environment. Moreover, CEOs even manipulate their environment to create opportunities for the firm.

In a similar way, according Rotemberg & Saloner (2000), CEOs make choices and implement strategies due to idiosyncratic believes of the likely evolution of the industry. This means that the opinions of CEOs regarding industry opportunities are different from those of other insider managers as well as from firm outsiders, and therefore, CEOs personally create variation in

firm performance. As firm owners or the board of directors appoint CEOs, Rotemberg & Saloner argue that CEOs become idiosyncratic or biased in favor to follow his or her own ambitions, after being appointed as CEO. Those idiosyncratic goals are different from other members of the organization and should therefore increase performance variability as well (Jensen & Meckling, 1976).

As a result, it should also not be surprising that outside CEOs have a greater impact on organizational changes than CEOs hired internally (Wiersema, 1992) or when a CEO is hired after a disruptive period (Khurana & Nohria, 1999). In the first case, outsider CEOs are expected to be less aligned to established organizational practices and in the second case, a company is expected to appoint a CEO, who acts radically different than its predecessor, as previous CEO behavior is not connected with firm success.

4.2. **Opponents of the Leadership Effect**

These findings stand in clear contrast to the neoclassical view in which individual managers play an insignificant role in organizations and can easily be substituted.

Very recently in 2014, Prof. Fitza from A&M University, Texas, USA, has postulated that the effect of CEOs on firm performance is to a major part attributable to pure chance as firm performance follows stochastic patterns, and accounting for these would result in a much smaller CEO effect. His conclusions challenge a major part of past literature on the topic and are presented in chapter 7 (Fitza, 2014).

This is in line with other authors who see leadership itself less important for firm success. A prominent example would be Hannan & Freeman (1989), who elaborate on the limited role of leadership due to various constraints due to internal and external forces. These are based on environmental, legitimacy or organizational factors and are called “the inertia” of CEOs.

Others further argue that in the end, CEOs mainly serve a representative purpose Pfeffer (1977). As contrast to this general reasoning is the research of Jay Conger, one of the premier researchers on charismatic leadership as mentioned in chapter 1. He attempts to directly measure the effect of CEO characteristics on other organizational members in several studies (Conger & Kanungo, 1998) and (Conger, Kanungo, & Menon, 2000). While they do confirm for instance that charismatic leadership has a strong influence on organization members and

that this influence increases when the leader (CEO) recognizes environmental opportunities, no direct effects on firm performance are reported.

A more differentiated view is that CEOs might initially after appointment have power to exert influence, but later loose that power due to the stiffening of relationships over time within the organization, which again causes inertia (Burkhardt, 1991). Other more general management and organizational culture researchers such as Martin (1992) assert organizations deep levels of sub- and counter cultures. This especially applies to large companies and greatly limits the influence a CEO can have on firm output.

One of the main proponents of a constrained view on CEO influence is Jeffrey Pfeffer, who is a prominent professor of organizational theory at the Stanford University, USA since 1979. Together with Gerald Salancik, they advocate the theory of resource dependency (Pfeffer & Salancik, 1978).

In general, resource dependency implies that a company's success and freedom to take action depends on outside resource availability. For instance, if production inputs are available in a very fragmented market with many competing suppliers, resource dependency in that regard would be low, as compared to a monopoly of a supplier. The second question is, to which degree the company can control a limited resource. Even if there was only one single supplier for a company's input, dependency would be low, if that company was the only customer of its supplier.

In turn, those resource or more general, environmental constraints affect the number of choices leading managers such as CEOs face. A CEO appointment is, according to Pfeffer & Salancik (1978), more a product of environmental opportunities and constraints. The CEO, however, does not exert much active influence on the firm (Pfeffer, 1977).

Company leadership tends to accredit itself with firm success, however, in turn, it often is exchanged due to bad performance even it stems from outside factors. Organizational power stems more from the interplay of different divisions within an organization.

As environmental developments and divisions within organizations define the hiring and exchange of leadership, CEOs should be very homogenous in their characteristics (Pfeffer, 1977). This would imply that CEO effects on firm performance would not be measurable, which stands in clear contrast to the findings in this thesis.

5. Existing Literature Findings

The present master's thesis covers empirical findings from the foundational work of Lieberson & O'Connor in 1972 to resent findings. Table 1 gives an overview of those studies, their main results and implications.

5.1. **Empirical results**

One of the first and probably most influential study was conducted by Lieberson & O'Connor (1972). The data used was collected from the years 1946 to 1965 on 167 major public companies. For many subsequent studies, the research of Lieberson & O'Connor (1972) serves as reference literature and represents a base case and benchmark for further investigation. The researchers find that the CEO position accounts for as much as 14.5% of variance in performance. However, there are several differences to more recent studies. Firstly, Lieberson & O'Connor (1972) use the variance of profit margins as dependent variable, instead the recently more commonly used variance of return on assets. Both variables have their drawbacks as described in section 2.1.1 and may lack in comparability.

Lieberson & O'Connor (1972) find similar to other researchers an increase of CEO effects when accounting for time lagged effects, with the CEO effect increasing to 32% of explained variance in profit margins.

The work of Lieberson & O'Connor (1972) has also been subject to substantial criticism. Specifically, Weiner (1978) argues that sequential variance decomposition analysis is not suitable to measure the CEO effect, as this effect can be greatly increased by reversing the order of entry. However, Thomas (1988) points out that this reasoning is not a valid counterargument. Surely, measuring CEO effects on performance before accounting for year, industry, and company effects would cause many factors such as inflation, which is a factor included in year effects, to be party attributed to the CEO. Thomas (1988) concludes that sequential variance decomposition proves an effective analysis, which is dependent on the correct order of factor estimation.

In a very interesting way, Thomas (1988) is able to show that companies, even within the same industry, show great heterogeneity. Is this achieved by his sample construction, which narrows the sample to an as homogeneous company group as possible. These are a small sample of UK retail firms that coexisted over the whole sample period. Year effects remain as usual small and

industry effects are due to sample selection not present. Company effects, however, explain 83.2% of performance variance and CEO effects 5.7%, leaving only 5.4% of variance unexplained.

Table 1. Major studies on the CEO effect on firm performance

Study	Estimation	Sample	Main Results	Comment	Limitations
Lieberson and O'Connor (1972)	Linear regression	167 companies in 13 industries (1946-1965)	Effect of CEO: 14.5%, with time lagged performance measure 31.7%.	Reference work for most subsequent studies.	Questionable performance variables, exclusion of many companies with M&A activity, nesting effects possible, effect on margins than on sales or profits (Aldrich 1979), flawed due to sequential analysis according to (Hambrick & Mason 1984).
Weiner (1978)	VCA*	193 manufacturing firms (randomly selected) (1956-1974)	Fixed-effect of CEO: 8.7%.	Reversed order of entry with CEO first: CEO explains 77.5%-96.1%. Author criticizes Lieberson&O'Conner's work as the results are only artifacts of entry order.	Replication of Lieberson & O'Conner. Reverse order not meaningful (Thomas 1988).
Weiner and Mahoney (1981)	Multiple Regression	193 manufacturing firms (randomly selected) (1956-1974)	"Stewardship" explains 12.8% of variance of profit, 43.9% of profitability, 47% of stock price.	Multiple regression should overcome sequential VCA issues. According to Thomas 1988 support Lieberson and O'Conner results.	Limitations in comparability due to different approach and use of stock returns.
Thomas (1988)	VCA*	12 UK retail firms (1965-1984)	Fixed-effect of Leadership: 5.7% with total R^2 of 94.6%.	Supports Lieberson & O'Conner and disproves Weiner's (1978) and Aldrich's (1979) critique.	Sample small and very biased, which is on purpose to explain as much of variance as possible.
McGahan and Porter (1997)	VCA model with random effects and factor covariance; sequential ANOVA	US firms 4-digit Sic code, 72742 observations for 5196 business segments (1981-1994)	Only industry and firm specific.	Serves as basis for Wasserman, Nohria and Anand (2001). They argue that sequential ANOVA does not account for covariance and attributes it to the first factor entered due to nesting and imprecision.	Random effect assumption of factors is questionable. E.g. industry might not be randomly attributed to firms.

Study	Estimation	Sample	Main Results	Comment	Limitations
Wasserman, Nohria and Anand (2001)	Hierarchical linear regressions (1979-1997)	531 companies in 42 industries	Effect of CEO: 14.7% (RoA) and 13.5% (Tobin's Q).	They claim RoA measure is flawed. Large differences are found within industries (in contrast to Thomas 1988). CEO effect is biggest when resource availability is high and opportunities scarce.	No causality between CEO effect and performance can be inferred.
Betrand and Schoar (2003)	Fixed effects regression model	600 firms, 500 managers matched panel data set 1969-1999 (Top 800 Forbes firms) 1992-1999 (S&P 1500 firms	CEOs with best effects on RoA (top 25%) increase RoA by 3%.	They argue that Wasserman, Nohria and Anand 2001 do not control for firm fixed effects, but indeed they do.	No causality between managers, firm performance and policies.
Adams, Almeida, Ferreira (2005)	Linear regression; Glejser tests	336 firms 1992-1999	When CEO is the founder, standard deviation stock returns increase by 22%.	Firm performance more variable the more decision power a CEO has. Use future and past time lagged returns to prove causality.	
Kaplan, Klebanov, Sorensen (2007)	Linear regression	313 CEO candidates for PE portfolio companies (VC and LBO) (2000-2006)	Hard skills are most correlated with success.	They go beyond observable characteristics and group 40 characteristics in three principal components.	
Crossland and Hambrick (2007)	Sequential and simultaneous ANOVA	100 US, 100 German, 100 Japanese firms (matched 15y sample)	CEO effect is 4.6% (Japan) and 13.4% (US).		

Study	Estimation	Sample	Main Results	Comment	Limitations
Mackey (2008)	Sequential and simultaneous ANOVA	520 firms (51 firms with strongest limitations) (1992-2002)	Without constraints and sequential ANOVA: CEO: 12.9%, With constraints and simultaneous ANOVA: CEO 29.21%, Fewer constraints and simultaneous ANOVA: CEO: 23.8%.	CEO effect is systemically underestimated due to nesting in industry and firm effect and use of sequential ANOVA method.	Artificial selection of CEOs who served in multiple firms within sample.
Deszö and Ross (2008)	Linear regression	S&P 1500 firms, 19,509 firm year observations (1992-2006)	Firms with at least one female executive have 3% increased Tobin's Q.	Female effect is only driven by firms which have R&D expense. Females in CEO position is neutral or negative for performance.	
Címerová (2012)	Linear regression	1,930 U.S. firms, 2,426 CEOs with at least 3-year tenure (1996-2006)	Experience matters more for firm performance than education, MBA CEOs smooth returns.	Powerful CEOs should be constrained to stabilize firm. Founder CEOs cause largest performance variability.	Selection bias might arise due to taking into account only experienced CEOs (3-year firm tenure).
Fitza (2014)	Simultaneous ANOVA	1,425 U.S. firms, 2,634 CEOS (1993-2012)	Base case reports CEO effect of 17.7%.	Using a random performance variable, Fitza reduces real CEO fixed effects to ca. 5%.	
Quigley and Hambrick (2014)	Sequential and simultaneous ANOVA	1,015 U.S. firms, 2,732 CEOs (1950-2009)	CEO effect increased from 7.8% (1950s-1960s) to 15.7% (1990s-2000s).	Increasing CEO effect is due to increased demand of shareholder value maximization, more complex markets and wide options for leaders.	
Bandiera, Hansen, Prat and Sadun (2016)	Linear regression	1,114 surveyed CEOs in Brazil, France, Germany, India, UK and US	Evidence of a matching frictions between firms and CEOs through binary characteristic model.	Authors employ novel machine learning algorithm to classify CEOs.	Matching frictions could be due to the fact that firms relying on scarce CEO type are forced to hire the inefficient abundant CEO type, if this is the only available CEO type.

* VCA stands for variance component analysis (interchangeable with "variance decomposition"), which is used in all mentioned studies and stated if the exact estimation method is not given by the study authors.

At first sight, this sample would be expected to cause large selection bias. Interestingly, however, it shows that companies even as similar as possible differ a lot. Secondly, the control levels year, industry, company and CEO are indeed able to explain most of performance variance (96% in the sample), supporting underlying theory. It could be argued that the reported CEO effect of 5.7% is underestimated, or conversely, overestimated by other studies. It shows, however, that when accounting for random effects as done by Fitza (2014) and in the empirical part in section 8.5.2, the fixed CEO effect shrinks to a range between 4% to 6% independent of sample selection, i.e. the relative difference between fixed and random CEO effects remains constant.

It can be further argued that the high company effects found by Thomas (1988) are due to random effects. Then, however, the CEO effect measured by Thomas (1988) should be much larger as explained in section 3.1.4, which is not the case. Hence, it can be concluded that Thomas (1988) work supports Lieberson & O'Connor's (1972) work, the underlying theory and the findings that, in realty, only about 5% of performance variance can be explained be the CEO as true fixed effects.

As cited before, one very foundational work has been done by Bertrand and Schoar in 2003. In their work, they track individual top-managers such as CEOs, CFOs and COOs over time in a panel data set and examine each manager's fixed effects on corporate behavior and firm performance. Bertrand and Schoar conclude that manager fixed effects matter for corporate decisions.

Manager effects have the biggest impact on acquisitions, diversification, dividend payout policies, interest coverage and cost cutting measures. Also, by correlating manager fixed effects with firm policies, it becomes evident that differences in "managing styles" are very pronounced. For instance, managers who engage more in acquisitions invest less in capex and R&D. Furthermore, only considering the distribution of managers in relation to their effect on return on assets, it shows that managers of in the 75^{th} percentile increase RoA by 3% and managers in the 25^{th} decrease RoA by the same amount.

In a final step, Bertrand and Schoa (2003) confirm general intuitions concerning hard attributes of managers. This is, for instance, that older CEOs are more conservative in their investment behavior, while MBA CEOs tend to be more aggressive. In summary, Bertrand and Schoa conclude that managers show systematic differences in CEO decision making.

Through examining the largest 1,500 US based firms (S&P 1500), Fitza (2014) finds that CEO tenure is too short to rule out luck factors affecting performance of a company. Unforeseen events such as a major scandal at a competitor can increase the performance of a specific firm. In the same way, other chance events would lower that firm's performance. On average, those events are being canceled out by the passing of time.

However, according to Fitza (2014) average CEO tenure is too short for this "regression to the mean" to have sufficient time to apply. With Average CEO tenure being only four years, chance has a big impact on performance during this timeframe. Prof. Fitza concludes that over 70% of a CEOs contribution to firm performance could the attributable to sheer randomness. These findings strongly support the theoretical conclusions of Blettner, Chaddad, & Bettis (2012) that firm performance follows a stochastic proccess of a frequency, which is longer than average CEO tenure. It is argued by Fitza (2014) that it is often difficult to distinguish between patterns in data such as strochastic processes and sheer random behavior. Either way, the outcome would be similar, namely that effects of random or stochastic nature, outside the scope of the controlled factors, are attributed to the CEO position.

While one valid conclusion of this work is that CEOs should not the rewarded based on a single year's performance, the study has limitations. By controlling for factors such as chance events or the short CEO tenures, present literature review provides evidence for substantial effects of CEOs on firm performance. The model employed by Bertrand and Schoar (2003), for instance, in which they track individual managers effect on firm performance over time and firms, is specifically designed to rule out exogenic effects such as chance events.

Mackey (2008) reports that CEOs account for about 30% of the variance in firm performance, whereas industry and corporate effects are much smaller. He investigates CEO effects also on a segment level and finds, similar to O'Reilly, Caldwell, & Chatman (2005) that the CEO effect is strongest at corporate level. However, one could argue that Mackey's sample restrictions cause selection bias by only accounting for CEOs who served in more than one firm and firms having employed more than one CEO. This could artificially select CEOs, which indeed are more influential than the average CEO and firms in which the CEO is especially important and in line with Hannan & Freeman (1989) has the ability to exert influence. So, the question that remains is, whether Mackey (2008) is right in arguing that most existing literature systemically underestimates the CEO effect, or Mackey systemically overestimates its effect.

However, Mackey (2008) argues that most empirical research underestimates the CEO effect on firm performance, though not employing the restrictions described before. Fitza (2014), criticizes Mackey's (2008) argumentation, that only CEOs should be regarded, who serve in multiple firms within the sample. This restriction is not necessary for variance decomposition. Similarly, individual companies also belong to a single industry. Following Mackey's (2008) reasoning it would, therefore, also be necessary to find companies changing industries to correctly estimate company effects; this, however, is probably not necessary and would cause strong selection bias.

Another important contribution to the topic has been done by Kaplan, Klebanov, & Sorensen (2007). In their paper, the authors aim to answer the question whether CEO characteristics predict firm performance in buyout and venture capital ("VC") firms. Also questions regarding which characteristics matter most in these two different types of companies are answered. Additionally, an important distinction is whether inside or outside knowledge is recruited by firm owners.

To investigate this question, Kaplan, Klebanov, & Sorensen (2007) take into account over 40 personal CEO characteristics in seven general areas. Special about their work is, that it is one of the few studies, which conducts an in-depth assessment of the CEOs. While most research relies on general statistical data available for large US companies, Kaplan, Klebanov, & Sorensen (2007) rely on personal CEO assessments through detailed questionnaires. However, the sample of CEOs is restricted to buyout and VC firms, which might cause a lack of comparability to papers which investigate large public companies.

Kaplan, Klebanov, & Sorensen (2007) find that inside CEOs are less strictly assessed by buyout firms than outside CEOs. This means that there is a tradeoff between the "general" outsider knowledge and inside knowledge, while inside knowledge is stronger weighted. However, this might be logical for, compared to S&P 1500 firms, smaller companies which also operate in specialized fields, as common in private equity. Hence, an outside CEO would have to offer a higher than equal level of general skills and experience than an inside CEO to compensate for this special situation of buyout targets. For VC firms, this might apply even more.

However, Kaplan, Klebanov, & Sorensen (2007) emphasize that controlling for general knowledge, inside CEOs are not more successful than outsiders. Therefore, they conclude that knowledge specific to a firm is overvalued by strategic investors.

Concerning performance, Kaplan, Klebanov, & Sorensen (2007) not surprisingly find that CEO characteristics matter for performance. This is expected as other authors such as Lieberson & O'Connor, (1972) and later research on this basis, already find relatively large CEO effects for public companies. Therefore, it could be expected that CEOs exert a greater influence in a buyout environment, where CEO power is much higher. As Adams, Almeida, & Ferreira (2005) already state, the ability for a CEO to theoretically have influence on firm decisions is a prerequisite for CEO characteristics to impact firm performance in the end.

A unique method of investigating the effect of CEOs on firm performance is established by Bandiera, Hansen, Prat, & Sadun (2016). Similar to Kaplan, Klebanov, & Sorensen (2007) they individually assess CEOs through a survey over the course of one week.

Special about this study is that not only US based firms are investigated, but also firms based in Brazil, France, Germany, India and the UK. This allows to identify variable effects of the CEO impact relative to, for instance, country wealth. Indeed, for less developed countries a lager effect of CEO impact is detected.

In detail, Bandiera, Hansen, Prat, & Sadun (2016) match the collected CEO observations with only two distinct types of behavior, the abundant “micromanager”, who pursues a more direct leadership style and the scarce “coordinator”, who is eager to include a larger number of managers and employees in the decision-making process.

Their assumption is that all firms investigated achieve an optimal “CEO fit” with either behavioral type one or two. As said, it is further assumed that one of the two types is abundant, the “micromanager”, whereas the other type is scarce, the “coordinator”. This leads to CEOs of the abundant type trying to be appointed as CEO in firms, which demand the scarce type. Due to matching frictions such as the inability of firms to correctly identify the optimal CEO type, some companies are led by inefficient CEOs. Bandiera, Hansen, Prat, & Sadun (2016) hence hypothesize that if the correlation of CEO behavior and performance is not zero there must be an effect of different CEO characteristics on firm performance.

This effect is positive and highly significant. Also, correlation on the scarce behavioral type is not generally positive with firm performance, which otherwise would imply that only this behavior increases firm performance.

An important conclusion of this paper is that it is the inefficiency of firms appointing optimal CEOs which leads on an impact of the CEO on firm performance and not the CEO's individual characteristics, which consequently cannot predict firm performance (Bandiera, Hansen, Prat, & Sadun, 2016)

A point of criticism, which the authors however acknowledge, is that the simplicity of the method setup does not allow to investigate more detailed CEO characteristics, the general difference between a coordinative and micromanager leadership style.

Also, the authors implicitly assume that in contrast to firms, CEOs are perfectly able to determine whether a firm would be a good fit to their abilities. However, this assumption might actually be the case as CEO candidates have much more information on, especially public, firms than vice versa.

Bandiera, Hansen, Prat, & Sadun (2016) also successfully test if the results hold for time lagged measures of performance, to reject criticism that the detected binary impact of CEOs merely is a result of other unobservable firm effects.

Table 4 gives an overview of selected CEO effects on firm performance, which are comparable regarding the underlying empirical methods. In summary, prevalent findings reviewed in this chapter provide significant evidence for a strong CEO effect on firm performance.

6. Leader specific effects

The following chapter examines specific attributes of CEOs, which play an important role in the effect on firm performance.

The experience and education of CEOs certainly are one of the most regarded variables when estimating CEO effects on firm performance. Firstly, it can be intuitively assumed that these factors play a significant role of overall CEO influence and secondly, they are relatively easy to obtain from various databases.

Címerová (2012) investigates those two CEO characteristics while adding the level of power individual CEOs maintain within an organization. Címerová measures power by determining four measures. These are whether specific CEOs are the founders of the company and the only insider on the board. Also, their concentration of titles and managerial discretion is measured. The number of insider board members is a crucial variable in determining CEO power, as a

larger board implies greater internal constraints, especially when comprised of firm outsiders (Adams, Almeida, & Ferreira, 2005).

The rationale behind this method is the theory that CEO characteristics should matter more if, in the first place, a CEO shows a level of power, which is sufficient to have an impact on corporate practices. This is also based on Adams, Almeida, & Ferreira (2005), who find that an increase in CEO power results in an increase of firm performance variability.

As a result, Címerová (2012) finds that, not surprisingly, the CEO being the founder of the company causes the largest level of power and matters most for corporate performance in conjunction with a higher level of experience. This finding is confirmed by Adams, Almeida, & Ferreira (2005), reporting a by 22% increased standard deviation of stock returns when a given CEO is also the founder of the firm.

In line with above reasoning Címerová (2012) further finds that CEOs with a technical background cause higher firm performance variability as well. This makes sense, as the personal connection of those CEOs to the success of the companies' output such as products should, similar to founder CEOs, be higher, which therefore may lead to greater risk-taking. Especially the lack of education in corporate finance could lead technical experienced CEOs to riskier corporate leadership styles, supported by the MBA effect described in section 6.2.

6.1. **The Female Effect**

Dezsö & Ross (2008) find that soft skills, which usually are attributed to a stronger extend to female CEOs, positively affect firm performance. This is according to the authors especially the case in innovation intensive companies, as collaboration and facilitation of team work is crucial in an R&D environment.

A very interesting question is, whether women as managers affect firm performance in a special way. It is common knowledge that female managers are underrepresented in corporate leadership positions. This is especially the case for the CEO position. According to COMPUSTAT data of the empirical part, among S&P 1500 firms, only 6.25% of all top-executives such as CEOs, CFOs and COOs have been female in 2016. However, of these only 65 have been registered as CEOs, which corresponds to 4.4% of all S&P 1500 CEOs in 2016.

This number is certainly very low. On the other side, it is slightly increasing year by year and also strongly depends on industry.

It might be that the CEO position represents a special public role, which is even more the case for large enterprises such as found in the S&P 1500. Indeed, there is evidence that the sole announcement of a female CEO negatively affects stock prices (Lee & James, 2007), which might also reflect a sociocultural response, additional to the fact that female CEOs seem to indeed lower firm performance in some circumstances as elaborated on below.

In their paper, Dezsö & Ross (2008) postulate that a female leadership style increases competitiveness through female's stronger teamwork orientation, especially in innovation intensive firms. In this in line with Finkelstein & Hambrick (1996), who also see in female management participation a distinct source of competitive advantage.

The main finding in the research paper of Dezsö & Ross (2008) is that female executives add value if positioned below the CEO, but do not affect or even decrease performance when appointed as CEOs.

The rationale behind this finding is that the female leadership style, which has similar attributes to the soft managerial skills established by Kaplan, Klebanov, & Sorensen (2007), makes management more efficient. Women foster stronger relationships and collaborate more intense, which boosts creativity. This, in turn, facilitates intrinsic motivation. As a result, female participation should matter the most in companies in which teamwork is most essential, i.e. innovation intensive firms (Ginsberg, 1994).

Dezsö & Ross (2008) indeed find that female management has the greatest impact in companies with high R&D expenditure, strictly speaking this seems to be a prerequisite for a female impact on firm performance.

However, on the CEO level females lack on average in aggressiveness and the necessary hard skills (Oakley, 2000). Also, as a matter of fact, the CEO is positioned on a single player level, where collaboration on an equal eye to eye level with other managers is limited. Hence, the relative advantage of female management styles diminishes on the CEO level.

Dezsö & Ross (2008) use various accounting measures as indicator of firm performance such as Tobins's Q. Their findings are confirmed by other authors, who find similar results on return on investments (RoI), (Shrader, Blackburn, & Iles, 1997) and gross margins (Smith, Smith, & Verner, 2006). When investigating effects on the stock market, Welbourne (1999) finds a positive effect on stock prices due to the presence of female managers at different organizational levels.

Another more intuitive view of the increasing performance effect of female participation is that females, as a response to sociocultural performance, need to outperform male peers in personal and educational skills in order to be offered equal professional opportunities (Eagly & Johannesen-Schmidt, 2007). However, as a result female participation should positively affect all types of firms instead of innovation intensive firms only. Also, Dezsö & Ross (2008) note that female CEOs then should increase performance as well.

It might very well be, however, that on average, the relative lack in hard skills of female CEOs more than offsets their higher general skills versus male CEOs. Another meaningful hypothesis would be that on the CEO level, the disparity of educational skills and experience between male and female managers is much lower than on corporate levels below the CEO.

In summary, the effect of the better educational background of female managers is hard to quantify, also due to the many independencies and reverse causalities between managers and corporate organizations.

Some authors also suggest opposite views of female management participation. In some situations, the variety of decisions and opinions, which is increased through females may represent a source of internal conflicts in organizations (Hambrick & Mason, 1984).

More research has to be conducted in assessing the unique value proposition of a higher presence of female managers in top level positions affecting firm performance. As a matter of fact, given the very low number of actual female leaders, this research question is difficult to investigate and results may be biased. Given that the percentage share of female managers continues to increase, more comprehensive research could be conducted in the future. However, when comparing future to past results, it is important to keep in mind that corporate culture might has changed as well. This means, for instance, that the way male managers within the organization or shareholders react to female participation today may be different in the future.

6.2. **The MBA Effect**

Representing a very important personal CEO variable used in many studies, there are different views on the relevance of an MBA title. Pfeffer (1981), for instance, states that the MBA title itself does not affect performance variability at all, but rather acts as a necessary prerequisite for candidates to be considered as CEOs. Empirical research, however, shows mixed results.

Címerová (2012) reports that MBA holders tend to smooth firm performance variability as those CEOs have a stronger strategic focus on firm stability. This finding is in line with Hambrick & Mason (1984), who argue that MBA degree holders exert a more moderate leadership style. This roots in the assumption that CEOs with MBA degrees are less risk-taking than, for instance, founders, as stated before. MBAs may be personally less connected to their companies than founders and may be appointed just because of their predictable managements skills. Graham & Harvey (2001), confirm for the CFO level that MBA degree holders use, regarding corporate finance skills, superior academic methods than CFOs without MBA degree. It can be assumed that this applies at the CEO level as well.

On the other hand, MBAs sacrifice innovations and a long-term strategy for achieving short-term goals instead (Hambrick & Mason, 1984). This is also coherent with the reasoning outlined before, namely that MBAs are more distant to corporate identity than founders or long-term insiders.

Contrary to those findings, Bertrand & Schoar (2003) find in their panel data set that CEOs with MBA degree foster more aggressive decisions than the average CEO. Although they are in line with Pfeffer (1981) in that MBA degree holders influence firms through having a starting advantage to be appointed, Bertrand & Schoar (2003) find that those CEOs show higher CAPEX spending and higher debt holdings than the average CEO. Moreover, there is consensus with Címerová (2012) with MBAs investing less in R&D activities and generally, MBAs follow a decision-making process which is more based on management education.

The differences in among diverse views on the MBA effect might be rooted in the definition of "aggressiveness". Bertrand & Schoar (2003) define aggressiveness as how CEOs approach capital structure. However, they find that CEOs with MBA degrees also pay less dividends than the average CEO, which reflects a more conservative approach. Hence, differences in corporate finance decisions may originate from better corporate finance skills of MBAs in establishing an optimal capital, rather than from an "aggressive" approach in respect to the leadership style.

While there is superficial dissent about the leadership style of MBA degree holders, it is repeatedly confirmed that MBAs invest less in innovation, tend to make decisions in accordance with management literature and are more short-term oriented (Bertrand & Schoar, 2003) (Címerová, 2012) (Hambrick & Mason, 1984).

6.3. **The effect of firm types**

Even to a greater extend than previous research finds on a mixed set of companies, hard leadership skills seem to matter for private equity portfolio companies. In fact, hard skills such as deciding over laying off employees, who do not meet the CEO's standards or measures to increase work efficiency, positively affect firm performance. In turn, soft skills such as pursuing collaboration and teamwork actually negatively affect firm performance (Kaplan, Klebanov, & Sorensen, 2007). This is strongly in line with Dezsö & Ross (2008), who find that similar soft skills contribute to firm performance below CEO level, but harm firm performance at the CEO level, as described in section 6.1.

As buyout companies usually show unique capabilities in research and development, which makes them attractive as takeover targets, this "female participation effect" and thereof deducted leadership style, should be even more significant in companies owned by private equity firms.

On the other side, it is not surprising that on the CEO level hard skills are crucial for buyout firms. Firstly, as stated before, CEO power is very high in buyout firms. This means that as the company is entirely taken over by a strategic investor, the newly appointed CEO usually should have full support of the owners and the also of newly appointed remaining top management. Additionally, target company size is usually small to mid-size, further increasing CEO power. This is because, the higher the number of managers the CEO has to interact with and the more complex the organizational structure, the less influence the CEO has (Adams, Almeida, & Ferreira, 2005).

It might also very well be that private equity firms preferably acquire companies, where performance increases are achievable through common "hard skills" measures. As a matter of fact, buyout firms are usually either rationalized through, for instance, employee cuts or optimized through more efficient processes, in order to achieve an instant increase in cash flow and hence valuation.

In interesting question would be, whether soft skills or female participation in particular below CEO level, adds long term value in buyout companies.

7. Selected methodical critique

Blettner, Chaddad, and Bettis (2012) challenge the most conclusions of past research in this field. Although many studies identify the CEO position in general and various other subordinated variables such as CEO experience to be significant performance fixed effects, three key aspects are not kept in mind. These are the stochastic nature of time series as previously mentioned, confounding of CEO, firm and time and interaction effects among sources of the CEO performance effect.

Concerning the first point, Blettner, Chaddad, and Bettis (2012) argue that since firm performance indicators such as return on assets follow a mean reverting process (Denrell, 2005), fixed effects models are biased as they are unable to measure the effect of stochastic processes. Mean reversion is a process in which a specific variable has an equilibrium value, not necessarily zero, to which the process tends to return over time. According to existing literature this is the case for most performance variables. This is easily observable for stock returns through the movement of stock prices to previous levels after major shocks or booms.

On the other hand, Fitza (2014) states that pure random effects often are accidentally mistaken for stochastic processes. For the validity of Prof. Fitza's argumentation concering random effects influencing firm performance, this reasoning does not matter as figured before. However, in the thesis author's view, both random effects and stochastic processes might exist and influence firm performance.

Another second point of criticism addresses the mixing up of CEO, firm and time. In many studies, only a static look is taken at the CEO performance effect. The before mentioned study conducted by Bertrand and Schoar (2003) tries to overcome this limitation by tracking CEOs over time and firms to capture year and firm fixed effects in a more sophisticated way compared to studies which only control through the respective fixed effects dummy variables. Blettner, Chaddad, & Bettis (2012), however, argue that this study omits the increase in experience of individual CEOs and the possibility that only specific types of firms hire external CEOs.

Moreover, although Bertrand and Schoar (2003) measure year fixed effects, these effects only represents a sample average. It might very well be that the impact of time is different for different firms. For instance, a fall of commodity prices in a certain time period might be positive for one type of firm, but negative for another. This interaction is not accounted for in most models using time fixed effects. According to Blettner, Chaddad, & Bettis (2012) this

would nearly be impossible as sucg interaction terms exponentially increase for each added CEO to the panel data set.

Finally, one of the biggest limitations which the CEO performance effect faces is the interaction between its sources. Many independent variables used in literature have causal relationships between each other. Also, independent variables are often used as dependent variables in other studies. Hence, due to this complex system of interactions, studying a simple relationship between a couple of variables and CEO performance will only partly capture the source of their impact.

Therefore, those complex interdependencies among explanatory variables might blur the origin of causality of the CEO performance effect. To take this reasoning one step further, one could add to this network of causalities and reverse causalities of explanatory variables a time dimension. Naturally, it would take a specific amount of time for one independent variable, e.g. CAPEX, to affect another variable, e.g. cash holdings. This means that the not only the systemic origin of the performance effect of a specific variable could be unclear, but also the time of origin.

As these three valid points of criticism come together in real world analysis, it becomes obvious that is it extremely difficult to reliably determine the exact impact of individual CEO characteristics or actions on firm performance. However, as elaborated on in this thesis, aggregate research provides a valuable framework of cause and effect between CEO and firm characteristics.

7.1. **Time lags**

As it was mentioned before, time lags between CEO action and effect on firm performance are a major issue in literature. Since the influential study of Lieberson & O'Connor (1972) they have been a major point of criticism and are frequently accounted for in relevant studies.

Fixed effects might be biased due to the lagging effect of measures taken by previous managers. It is hard to determine whether the level of current performance is due to actions taken before the tenure of the actual CEO. Hence, a currently high variability of returns might be the outcome of previous measures and not be attributable to current management. Therefore, the implied effect of CEO actions on future performance should be considered, which, however, is extremely complex. The time lag of effects of actions taken by CEOs and effects on the

company, usually is estimated to amount at least to three years (Bertrand & Schoar, 2003). Also, this lag effect may variate over firms and industries (Címerová, 2012). However, considering lagged performance measures still does not resolve this problem and continues to presume that a measured CEO effect is caused by a single CEO. On the contrary, aggregate CEO effect for a given observation of performance may be partially compromised of past and present CEOs' actions, while the present CEO partially influences future performance. Controlling for the current CEO would, hence, underestimate its effect.

Albeit taking into account these time dynamic properties, time lagged effects are certainly not a homogenous measure, they might differ among organizations, time period, type of management action taken, etc. Most researchers assume an about two to four-year time lag. However, none of the research studied for the purpose of this thesis, elaborates on the different type of time lags according to the various independent factors declared before, or how to account for them. For instance, some CEO decisions such as dividend policy have an immediate impact on specific firm performance variables, while others such as increased R&D spending might take up to 10 years to manifest in performance. This fragmented view of time lag would, hence, add another dimension to the cumulative view of time lags and would be a novel approach of investigation.

Nevertheless, this should not be seen as threat to the validity of existing findings as accounting for this issue would potentially only increase overall observed CEO effect.

7.2. **Nesting**

Another main obstacle in current research is that in many studies, industry and firm effects could be overestimated compared to the CEO effect (Mackey, 2008). This roots in the problematic methodology in research, which does not account for so-called "nesting" effects. Nesting basically means that one independent variable draws away explanatory power from another, i.e. some of the variable's effect in "nested" in the other one. In particular, many studies include companies in their sample, which have never changed the CEO, and CEOs, which have never changed the firm. As a result, CEO effects would often be mistakenly measured as firm or industry effects.

Bertrand & Schoar (2003), however, use a panel data set of CEOs and only track those who do switch firms at least one time and are observable in at least another firm to find CEO effects on an individual CEO level. This does exclude firms, which only employ one CEO in their

observation period. As Bertrand & Schoar (2003) impose such strict limitations on CEO characteristics such as position switching and having served at least three years as CEO, it is likely that further restrictions would facilitate selection bias, as also acknowledged by the authors themselves.

Nesting will also be an issue when there is large correlation between explanatory factors. This is certainly the case between companies and industries (McGahan & Porter, 1997). As described in section 3.1.3, simultaneous ANOVA is effective in accounting for this effect. However, if the sequence of entry is carefully minded in variance decomposition analysis, the choice of the model will not vastly change results Fitza (2014). To have a widespread dataset with as many CEO movements as possible is an effective measure to limit nesting effects.

This chapter concludes the theoretical part of the master's thesis.

8. Empirical part

The following sections represent the empirical part of this master's thesis. Following existing and previously presented literature on measuring the CEO impact on firm performance, the study is organized in a very straight forward way. The main question this study aims to answer is, to what level time, industry, firm and CEO specific fixed effects influence firm performance in the timespan 1992 to 2016. These specific sources affecting firm performance are found at levels consistent with existing literature through employing well-established empirical methodologies and are confirmed by several model extensions.

8.1. **Sample**

As a first step, annual data on company executives is drawn from Execucomp database for the years 1992 to 2016. As sample restriction, only companies which are members of the S&P 500, S&P 400 and S&P 600 are represented in the sample. This covers all major 1500 U.S. firms, from large to small market capitalizations. The rationale behind this is to include only firms, which are of sufficient size to fulfill reporting and going concern criteria, which is in line with other authors (Bertrand & Schoar, 2003), (Dezsö & Ross, 2008).

In total, information on 3,073 executives of 1,497 distinct firms is collected via Execucomp with a total of 24,238 observations. As a second step, a list of these distinct company is used as selection criterion for attaining a broad range of firm characteristics on those companies from Compustat, resulting in a total of 31,490 observations.

Naturally, yearly information on companies derived from the Execucomp and Compustat database does not exactly match, in most cases information available at Compustat covers a longer timeframe than data derived from Execucomp. Therefore, a VBA routine in Microsoft® Excel® is employed to create a firm-year matched panel data set of company and executive characteristics.

This results in information on all initially selected 1,497 firms with a total of 24,071 observations. As further steps, consistency checks are conducted on the data set, as well as a second routine, which marks years with "1" if a respective year represents a CEO change and with "0" otherwise. Years in which this information is unavailable, i.e. the first year of a specific firm observation period, are left blank.

Finally, the dataset is cleaned according to measures taken by previous literature. Firstly, all companies with SIC codes starting with 60 to 69 (financial industry) are removed, which tend to cause arbitrary results (Címerová, 2012). This leads to an exclusion of 4,406 observations. Moreover, 58 firm-year observations reporting no information on performance indicators are removed from the dataset. The final dataset is comprised of 1170 distinct companies represented by 19,607 observations.

Further cleaning or truncation measures are not conducted, as the data already represents a very well selected sample of S&P 1500 firms. Further exclusion of, for instance, companies below a certain size could bias the results in that among other issues, selection bias could be induced.

8.2. **Data Description**

This section describes in detail the final data set including all variables of interest. Table 2 shows descriptive statistics for the dataset.

Dependent variables are firm performance measures represented by return on assets. As previously outlined, this variable suffers from specific drawbacks, but nevertheless is used as main dependent variable by the majority of studies reviewed for the purpose of this thesis. In order to be of best comparability to other studies, return on assets is employed as dependent variable.

However, to mitigate some of the major weaknesses, the variable is measured in two ways. In the first case, EBITDA serves as numerator and total assets as denominator, in the second case pre-tax profit serves as numerator, the denominator remains unchanged. While the latter method represents the usual measure of return on assets, the former ignores differences in capital structure as EBITDA is commonly seen as proxy for operating cash flow disregarding interest payments, depreciation and amortization as well as taxes payable.

In the author's view, considering this measure of return on assets makes companies more comparable. Capital structure often is a strategic decision, which should not be accounted for when comparing firm performance. Also, as measures of capital structure such as leverage are frequently used as independent variables, endogeneity issues could arise, as capital structure would also be reflected in return on assets based on net profit or pretax income.

Table 2. Descriptive Statistics

Variable	Source	Total Observations	Total distinct Observations	Mean	Std. Dev.	Min	Max
Return on Assets	Compustat	19,607	19,603	14.89	10.20	-253.92	100.11
(EBITDA based)							
Return on Assets	Compustat	19,607	19,607	8.48	13.88	-577.60	115.33
(Profit based)							
Years	Compustat	19,607	25				
Industries	Compustat	19,607	286				
Companies	Compustat	19,607	1,170				
Assets	Compustat	19,607	19,449	9,933.28	33,145.14	4.83	797,769.00
CAPEX	Compustat	19,512	16,882	517.47	1,760.42	-330.00	37,985.00
as % of assets		19,481	19,477	5.70	5.64	-3.27	81.53
OPEX	Compustat	19,607	19,312	6,423.86	19,477.77	0.68	448,909.00
as % of assets		19,607	19,607	96.62	77.75	0.17	1,583.13
Employees	Compustat	19,439	8,091	27.05	79.23	0	2,300.00
as % of assets		19,439	19,434	0.71	2.56	0	117.01
Leverage		19,607	19,565	33.31	9.75	0	89.63
CEOs	ExecuComp	19,607	3,073				
Age	ExecuComp	19,073	70	56.22	7.38	27	96
Total Salary	ExecuComp	19,502	19,312	5,752.11	10,502.62	0	655,448.00
as % of assets		19,487	19,487	299.48	820.15	0	66,643.75
Ownership	ExecuComp	13,647	4,197	3.41	7.50	0	87.60
CEO Change		18,464	2	0.10	0.31	0	1

Assets is total asset value in USD millions. **CAPEX** and **OPEX** are in USD millions. **Employees** (total number) are in thousands. **Total salary** is in USD thousands. **Ratios** are in percentage points.

It is found that return on assets based on EBITDA shows superior results compared to return on assets based on pretax income, hence results on the latter variable are not reported.

Independent variables are year effects, represented by a year dummy for each year 1992 to 2016, industry effects, represented by an industry dummy for each four digits SIC code, company effects, represented by a company dummy for each individual company and CEO effects, represented by a CEO dummy for each company CEO combination.

Further, time variable independent variables are added on the firm and CEO level. Capital expenditures (CAPEX), operational expenditures (OPEX), the number of employees within a firm as well as total CEO salary are scaled on company size (total assets). Those variables are highly correlated with firm size; hence it is important to scale them, otherwise they would act as additional proxies for firm size.

CEO change is a binary variable indicating a CEO change ("1") in a given year within a given company. A correlation table for the variables is provided below in Table 3.

Table 3. Correlation matrix

Variable	RoA	Size	Capex /Assets	Opex /Assets	Staff /Assets	Leverage	Age	Salary	Ownership	CEO Change
RoA	1									
Size	-0.05	1								
Capex/Assets	0.156	-0.021	1							
Opex/Assets	0.125	-0.125	-0.05	1						
Staff/Assets	0.083	-0.061	0.049	0.29	1					
Leverage	-0.117	0.138	-0.019	0.057	-0.028	1				
CEO Age	-0.002	0.063	-0.013	-0.004	0.027	0.033	1			
Salary	0.024	-0.082	0.013	0.071	0.027	-0.137	-0.061	1		
Ownership	0.062	-0.025	0.053	0.076	0.133	-0.153	0.142	0.001	1	
CEO Change	0.036	0.023	-0.014	-0.003	-0.02	0.04	-0.114	0.0054	-0.084	1

8.3. **Method**

The empirical method used is similar to previous work in variance decomposition. It is presumed that total variance of return on asset can be explained broadly by four levels of effect. These are year, industry, firm and leadership effects as outlined in chapter 2. Leadership effect is narrowed to the CEO effect. The final equation denotes as follows:

$$RoA_{c,i,t} = \mu + \gamma_t + \alpha_i + \beta_c + \varphi_{c,t} + \varepsilon_{c,i,t} \quad (1)$$

The left-hand side represents return on assets for each company *c*, in industry *i*, in year *y*. On the right-hand side, μ is the average return on assets over the whole sample, while Υ, α, β, φ, represent respectively the difference of μ to each factors level's average of year-, industry-, company- or CEO-specific return on assets. The residual ε denotes the error term.

Four stages of ANOVA analysis are conducted, while the respective increase in in explanatory power as total R-squared is noted. To estimate year effects, an ANOVA is run on return on assets and the factor year. Similarly, to estimate industry effects, the factor industry consisting of the four digits SIC code is added to the model. This is done in an analogous manner for company and CEO effects.

The next section presents the main findings of this study and section 8.5. relates those to previous findings as well as expands the model.

8.4. **Empirical Findings**

Table 4 presents the relative increase as well as the absolute value of R^2 for each effect on return on assets based on EBITDA. Year effects are found to account for 1.6% of total return on asset variance, industry effects for 18.4%, company effects for 31.6 % and CEO effects of 15.7%. All effects are highly significant at the 1% level.

Table 4. Results from equation (1)

Effect in %	Increase in R^2	Total R^2	F-Stat
Year effect	1.6	1.6	14.29***
Industry effect	18.4	20.0	11.78***
Company effect	31.6	51.6	9.31***
CEO effect	15.7	67.3	4.17***

A total of 67.3% of variance in performance is explained by the model, which is a reasonable high number and consequently leaves 32.7% of variance unexplained.

To determine the importance of the unexplained variance, it is necessary to investigate whether there are omitted effects in the model. If, on the contrary, all remaining unexplained variance in performance is attributable to sheer random factors, then the model would cover all relevant explanatory variables. This, however, is highly unlikely and content for discussion in further research.

Existing literature draws a clear picture on validity on above results. Table 5 compares the thesis' results with previous literature. In doing so it becomes obvious that the results are in strong line with existing literature.

The second column of Table 5 presents averages for existing finings. These selected studies all use return of assets as dependent variable and sequential variance decomposition as empirical method. Some studies listed in Table 5 use different estimation methods or tightly restricted samples as an extension. Those results are covered in more detail in Table 1.

Year effects are commonly known to be highly significant, but to only explain a small share in performance variation, as deeper factors have much more impact on individual performance than effects common to all sample companies such as inflation. Industry effects differ between studies, as measurements differ. Fitza 2014, for instance used three-digit SIC codes as fixed factor levels, while other use major industry groups (first two digits). The present study employed all four classification levels of SIC codes and found that using this most detailed industry description, resulted in the largest industry effect. This indicates that even within narrowly defined industry groups, large heterogeneity exists.

Table 5. Comparison of results to previous research

Effect in %	Master's Thesis	Average[1]	Lieberson and O'Conner (1972)	Weiner (1978)	Thomas (1988)[2]	Wasserman, Nohria, Anand (2001)	Crossland and Hambrick (2007)	Mackey (2008)[3]	Fitza (2014)
Year	1.6	2.2	1.8	2.4	5.6	2.6	3.6	1.0	2.0
Industry	18.4	15.4	28.5	20.5	N/A	6.3	11.8	18.0	7.3
Company	31.6	29.3	22.6	45.8	83.2	25.5	19.1	29.5	33.4
CEO	15.7	13.7	14.5	8.7	5.7	14.7	13.4	12.9	17.7
Residual	*32.7*	*39.4*	*32.6*	*22.6*	*5.5*	*50.9*	*52.1*	*38.6*	*39.6*

[1] The average takes into account all previous studies listed in the table, except Thomas (1988), who uses an extremely restricted sample for the purpose of residual minimization.
[2] For Thomas (1988) no industry is reported as his sample is limited to a single industry.
[3] Mackey conducts both simultaneous and sequential ANOVA. In the table, the results for sequential ANOVA are shown for better comparability.

The company or firm level effect equals previous results average very much, as fixed effects often are estimated by considering firm identification as factor. CEO effect also strongly reflects research consensus. Similar to company effects, CEO IDs are used as factor variables. Most studies add to those fixed effects controls time variable terms as done in section 8.5. It shows, however, that doing so only results in slightly improved explanatory power. Greater deviation from the findings reported in Table 5 are achieved, when using different estimation methods or employing complex data gathering such as tracking individual CEOs.

Using other estimation methods, such as simultaneous ANOVA estimation (Mackey 2008), the result is an even increased CEO effect. Hence, it can be confirmed that the thesis' findings on the CEO effect are in line with similar previous research, which also represent an empirical base case level with CEOs effects explaining between about 9% and 18%.

8.5. **Discussion**

The previous section was based on time invariant factors. As other factors are expected to be hidden in the unexplained variance, this section expands the model by adding time varying variables. Those variables are unlike fixed company or CEO level controls not static and change over time. Naturally such variables are of continuous form and, hence, cannot be used in ANOVA estimation models, which deals with categorical variables exclusively. It is expected that time fixed effects are not able to explain all variation of firm performance, hence extending the model by time variable terms should increase total explanatory power.

For this purpose, a linear regression model is set up as some of the added variables are of continuous form. The final regression equation reads as follows:

$$RoA_{c,i,t} = \alpha + \beta_1 Size_{c,t} + \beta_2 \frac{Capex_{c,t}}{Size_{c,t}} + \beta_3 \frac{Opex_{c,t}}{Size_{c,t}} + \beta_4 \frac{Employees_{c,t}}{Size_{c,t}} + \beta_5 Leverage_{c,t} + \beta_6 \frac{Salary_{c,i,t}}{Size_{c,t}} + \delta_1 Year_t + \delta_2 Industry_i + \delta_3 Company_c + \delta_4 CEO_{c,t} + \varepsilon_{c,i,t} \quad (2)$$

Company characteristics are denoted by the terms β_1 to β_5, α is the intercept. CEO characteristics are specified by β_6 to β_6, while the remaining terms represent year, industry, company and CEO dummy variables and ε denotes the residual. The variables *Capex*, *Opex*, *Employees* and *Salary* are scaled on *Size* (total assets) for relative comparability. A dummy indicating CEO change within a firm over the observation period is excluded in the results, as it is insignificant and adds minor explanatory power, while reducing sample size. This is because no value can be assessed to the first firm-year observations as no previous observation exists to indicate a CEO change. The ownership variable is omitted as well, because many firms do not report on CEO ownership, resulting in a strongly reduced sample size.

Table 6 reports the regression results of Equation (2). Year and industry effects remain the same, as no continuous variables were added to those levels of variance. It should be noted as outlined in section 3.1.2 that ANOVA and linear regression rely on the same least square principle and produce the same level of R^2. Each model presented in Table 6 includes the variables of the previous models, hence follows the same variance decomposition method as described in section 8.3.

Company effects slightly increase from 31.6% to 33.13%, while the CEO effect slightly decreases from 15.7% to 15.33%. This outcome has several reasons. Concerning the increased company effect, it seems clear that additional time variable factors do play a role in overall explanatory power of the effects. Certainly, these are comprised of countless individual characteristics, and it might be challenging to find all variables of influence to either explain 100% of firm performance variation or to reliably determine which level or unexplained variance is a result of random factors to rule out hidden factors.

Table 6. Hierarchical linear regressions on return on assets

Model	Variable	Coefficient	T-Stat	Increase in R^2	Total R^2
1	Year Dummy			1.63	1.63
2	Industry Dummy			18.37	20
	Size	-0.00001***	-3.21		
	Capex/Size	0.17205***	10.63		
	Opex/Size	0.01738***	9.05		
	Employees/Size	0.20233***	2.58		
	Leverage	-0.20289***	-18.05		
3	Company Dummy			33.13	53.13
	Salary/Assets	0.00039***	4.51		
4	CEO Dummy			15.33	68.46
	Intercept	18.34***	2.92		

That the CEO effect slightly decreases could be due to nesting effects as strongly emphasized by Mackey (2008). Specifically, this means that the more detailed specification of company effects potentially draws away explanatory power of the CEO effect. Company characteristics such as capital expenditure are also strategic decisions made by the CEO, which now could partly be reattributed to the company level. Adding too many variables to explain effects on firm performance can lead to overspecification causing arbitrary results.

Looking at the regressor coefficients also gives a clear picture. All coefficients are significant at the 99% level. A 1% increase in a specific regressor leads, ceteris paribus, to a percentage change in return on assets of the regressors value. Capex and employee size are positively associated with return on assets. An increase in leverage, on the contrary, negatively affects performance due to higher default risk, a commonly known issue in corporate finance literature.

However, it is clear that the changes in company and CEO effects are extremely minor despite six new variables are introduced, which speaks for the robustness of the model.

8.5.1. **Causality**

As a measure of causality, a lagged performance variable is introduced. As described in section 7.1, it can be assumed that CEO measures take some time to have an impact on firm performance. Table 7 reports the results of both one-year and three-year lagged returns on assets.

Table 7. Results from equation (1)

	1-year lagged ROA			*3-year lagged ROA*		
Effect in %	Increase in R^2	Total R^2	F-Stat	Increase in R^2	Total R^2	F-Stat
Year effect	1.6	1.6	14.56***	1.7	1.7	14.97***
Industry effect	18.6	20.2	11.51***	19.9	21.6	12.16***
Company effect	32.5	52.7	9.26***	35.5	57.1	9.02***
CEO effect	14.8	67.5	3.87***	11.0	68.1	2.85***

As expected, year, industry and company effects are not much affected. When interpreting the results, it has to be noted that total observation decreases from 19,607 in the original sample to 18,437 in the sample for a one-year time lag and to 16,114 in the sample for a three-year time lag. This is because depending on the lag, either the first one year or three years must be omitted for each company observation. As a result, decreasing CEO effects might be due to that issue. It clearly shows, however, that a one-year lagged performance measure does not substantially impact the CEO effect.

Lagged performance measures are no perfect causality proofs, but give a strong indication. As stated before, it can be assumed that the CEO effect impacts firm performance in an individual

and continuous form, hence, it is difficult to define a single year representing the whole effect of CEOs within a sample.

8.5.2. **Robustness**

The previous two sections already indicate robustness through extending the model and through using a time lagged performance measure. The ultimate robustness test is modelled, however, according to the arguments of Fitza (2014). It is assumed that the distribution of return on assets in the sample is purely based on random factors. To implement this, the original model as represented by equation (1) is changed in that the dependent variable, return on assets, is replaced by a random distribution of this sample. This ensures that the mean and standard deviation of the variable remains equal. Repeating variance decomposition through ANOVA as in the base model should yield the effects of each factor attributable to pure chance. As in detail described in section 3.1.4. it is expected that year, industry and company effects are low as many observations exists for those factors. The CEO effect should not equal or exceed the level previously estimated, otherwise it cannot reliably be stated that the CEO effect is not based on random effects. Table 8 presents the results.

Table 8. Results from equation (1) based on a random sample

	Based on Random Sample			*Random Sample Fitza (2014)*	
Effect in %	Increase in R^2	Total R^2	F-Stat	Increase in R^2	Total R^2
Year effect	0.1	0.1	0.87	0.1	0.1
Industry effect	1.5	1.6	0.81	1.2	1.3
Company effect	4.9	6.5	1.36***	7.3	8.6
CEO effect	11.3	17.8	1.20***	13.8	22.4

The results behave has expected. Year and industry effects are low and highly insignificant. About 4.9% in random firm performance variation is explained by the company effect and 11.3% by CEO the effects. These numbers are coherent with Fitza (2014), who uses a similar sample with, however, tighter restrictions. What is more important than the absolute value of those results, is the relation to the fixed effects model estimated before. In this regard, the difference between fixed effects and random effects is 4.4% for the CEO performance effect, compared to 4% measured by Fitza (2014). This level is found to be high enough to reject the hypotheses that the CEO effect is purely based on random effects, captured by the model.

Noteworthy, the absolute CEO effect of a certain sample surely differs according to the variable and sample selection, average CEO tenure, etc. However, Fitza (2014) continuously finds that fixed CEO effects exceed random effects by about 4% to 5%, representing the real fixed effect level of CEO impact. Summarizing the empirical part of this thesis, the CEO effect could be estimated at a level consistent with past literature and is confirmed by well-established robustness checks.

9. Conclusion

The present master's thesis effectively answers the research question whether the identities of managers matter for corporate performance. Through extensive literature review a framework based on theoretical and empirical research could be built, which provides a foundation to explain the importance of leadership among varying settings and within diverse company types.

Furthermore, through conducting deep research on existing findings as well as conducting an own empirical study on a large and representative sample, it could be shown that the direct influence of the CEO position on firm performance is large and significant. Through extending the base model the validity of the findings is strongly supported. Moreover, based on literature, an in-depth analysis on individual leader characteristics draws a clear picture of personal key drivers, which affect firm performance.

This thesis is also intended to serve as guidance for further research on the topic, as common theories and empirical practices including their advantages and drawbacks are defined in detail as well as open questions remaining for discussion.

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