THE IMPACT OF CEO-CHARACTERISTICS ON FIRM PERFORMANCE
EVIDENCE FROM DUTCH LISTED FIRMS

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ABSTRACT

This study uses a longitudinal data set of firm-year observations to test several hypotheses that CEO characteristics have an effect on firm performance. The independent variables in this study are CEO gender, age, tenure, compensation, and experience. The dependent variable, firm performance, is measured by two accounting-based measurements (ROA and ROE) and one market-based measurement (Tobin's Q). The study describes a literature review of previous studies for formulating hypotheses about the predicted effect of CEO characteristics on firm performance. This study uses a sample of Dutch-listed firms for a sample period of 2016 to 2019. Panel regression analysis is conducted to test the hypotheses. The panel regression included firm-fixed and time-fixed effects to control for specific factors related to each firm or period that do not change randomly. The results show that CEO characteristics do not have a significant effect on the performance of Dutch-listed firms. When a significant effect was found in the study, this statistically significant effect usually did not persist when another metric measured firm performance. Furthermore, robustness tests were conducted to test the results of the main model. The robustness tests were conducted from a sample of manufacturing and non-manufacturing firms. The results of the robustness test showed similar results than the main model. Future research has to be done to assess the validity of these results. Additionally, addressing the limitations of this study and making recommendations for future research can further advance this research subject in organisational studies.

Keywords: CEO gender, CEO age, CEO Tenure, CEO compensation, CEO experience, firm performance, panel regression analysis, Dutch-listed firms.

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1. INTRODUCTION

1.1   BACKGROUND

In today's dynamic and ever-evolving business landscape, the Chief Executive Officer (CEO) role is of essential significance. A company's success is often partially attributed to the CEO's leadership and decision-making abilities. As Jeff Bezos, the CEO of Amazon, stated: 'A brand for a company is like a reputation for a person. You earn a reputation by trying to do hard things well.' Under his leadership, Amazon has grown from a small bookstore to a global online retailer and content provider. Similarly, Steve Jobs, the founder of Apple, has succeeded in turning the company into a global empire with billions of dollars in revenue. Also, research has shown that the characteristics of top-level management teams, including the CEO, significantly impact a company's financial and operating performance (Westerberg et al., 1997).

As the visible face of an organisation, the CEO brings a unique set of skills, experiences, and personal attributes to the table. One theory that supports this idea is the Upper Echelons Theory (UET), developed by Donald C. Hambrick and P. Mason in 1984. The theory suggests that a firm's performance is partially determined by the characteristics of its top-level management team. Other theories, such as the human capital theory, suggest that the education and experience of a CEO can benefit a company (Altuwaijri & Kalyanaraman, 2020). Further research showed that CEO characteristics reflect the corporate decisions of the firm (Papadakis & Barwise, 2002). To examine the relationship between CEO characteristics and a company's performance, different researchers have focused on demographic characteristics (such as age, gender, and education level) and job-related characteristics (such as tenure, compensation, and experience). This study will also examine the relationship between CEO characteristics and firm performance. Therefore, data from annual reports and the ORBIS database of Bureau van Dijk are collected. The data were imported into a statistic program, and a panel regression was run to get the results for this study.

This study focuses on firms listed on Euronext Amsterdam from 2016 to 2019, which offers a unique perspective on the relationship between CEO characteristics and firm performance within the context of the Netherlands. In addition, to the relationship between CEO characteristics and firm performance, this study also delves into the relationship between corporate governance and firm performance. Corporate governance is the control or supervision of the organisation to uphold the interests of stakeholders, including shareholders, managers, and board members. By reducing agency costs, which arise when the interests of owners and managers are not aligned, corporate governance mechanisms can help ensure that a CEO's decisions are in line with the interests of shareholders (Schäuble, 2019; Wang et al., 2019; Beiner et al., 2004; Singh et al.,2017). The influence of corporate governance and firm performance is interesting, because mechanisms of corporate governance could be used to control the strategic decisions of the CEO. Previous studies examined the relationship between corporate governance mechanisms and firm performance. Therefore, in this study, previous studies will be used to describe the relationship between the mechanisms and a firm's performance.

1.2   CONTRIBUTION OF THIS STUDY

The relationship between CEO characteristics and firm performance is often researched in previous studies. The previous research on this subject will be discussed in the literature

review. This study has some academic contributions. Firstly, this study builds on existing literature as it will examine the relationship for firms listed on Euronext Amsterdam, which previous researchers did not often do. Secondly, this study takes the different measures of firm performance (accounting-based as well market-based) into account. Lastly, unfortunately, several limitations were noted during the conduct of this study. These limitations offer the opportunity to generate suggestions for future research.

Understanding the relationship between these CEO characteristics and firm performance is academically interesting and holds practical implications for corporate governance and executive selection. Effective corporate governance is essential for aligning the interests of stakeholders of a specific firm. As this study includes a literature review on corporate governance and firm performance, it could give insights into the use of effective corporate governance mechanisms in firms with influential CEOs to achieve higher firm performance. Next, this study could contribute to attracting and retaining CEO's. This study will show whether specific characteristics significantly influence firm performance. These significant CEO characteristics can be considered by an executive selection.

1.3   OUTLINE

In the following chapters, this study will dive deeper into the relationship between CEO characteristics and conducting this study.

First, the literature review examines previous research on the relationship between CEO characteristics and firm performance. Common theories associated with this relationship will first be discussed. Next, the effects of different CEO characteristics on firm performance are described, leading to the formulation of hypotheses. The third chapter will discuss and compare various research methods of prior research and will describe the research method used in this study. The third chapter is expanded by explaining the variables and the research model. The fourth chapter will describe the data collection and the resulting sample. The descriptive statistics are also discussed to gain insight into the obtained data, variables, and sample size. Subsequently, to give further insights into variables a bivariate analysis is done by analysing Pearson's correlation matrix and checking the variance inflation factors. The fifth chapter will focus on the results of the panel regression. Based on these results, the considerations of rejecting hypotheses are discussed. In addition, similarities, and differences of the outcomes of the models and previous studies will be discussed. The sixth and last chapter gives a conclusion regarding this study, as well as a discussion of its limitations and recommendations for further research.

2. LITERATURE REVIEW

This chapter describes a literature review of the relationship between CEO characteristics and firm performance. In addition, as corporate governance could also affect firm performance and effective corporate governance mechanisms could be used to minimise the impact of the CEO, this literature review will also describe some previous studies of this relationship. First, the theories that explain the relationship will be discussed. Next, the CEO characteristics and their effect on firm performance will be described which will result in hypotheses. Lastly, the influence of corporate governance mechanisms on firm performance will shortly be discussed.

2.1 THEORIES ASSOCIATED WITH CEO CHARACTERISTICS, CORPORATE GOVERNANCE AND FIRM PERFORMANCE

In many studies, researchers examined the relationship between CEO characteristics, corporate governance and firm performance based on theories. Below, the theories that most occur in the studies of other researchers will be discussed.

2.1.1 Upper Echelons Theory

The Upper Echelons Theory (UET) is a management theory that states that organisation's outcomes, including strategic decisions and performance levels, are partly predicted by managerial characteristics (Hambrick & Mason, 1984). The interpretations or organizational situations and subsequent choices are influenced by the managers' prior experiences, values and personalities. (Hambrick, 2007). In addition, Hambrick and Mason (1984) argue that managers' demographic (observable) characteristics, rather than psychological characteristics, affect decision-making and organisational performance. The variables age, CEO tenure, education and former career experience are most used in UET as indicators for CEO experience (Wang et al., 2016). Older CEOs are less aggressive and more risk-averse compared to their younger counterparts (Hambrick & Mason, 1984). This risk-averse behaviour could lead to bad firm performance (Wang et al., 2016). However, Wang et al. (2016) also argued that older and long-tenured CEOs have more organisational commitment which improves firm performance. According to the research on UET, education is positively related to future firm performance (Wang et al., 2014). Highly educated CEOS have more knowledge and can handle complex information and difficult situations (Hambrick & Mason, 1984; Wang et al., 2016; Shen et al. 2021). In addition, in the context of UET, CEO's prior career experience is also positively associated with firm performance (Hambrick & Mason, 1984; Wang et al., 2016; Shen et al., 2021). Prior career experiences ensure that the CEO has already acquired perspectives and orientations from his previous position, which could affect the decision-making and strategic decisions and, consequently, the firm performance.

2.1.2 Agency Theory

The agency theory deals with the ownership structure of the firm and the resulting agency costs. According to the agency theory, an agency relationship exists within a firm where ownership and management are dispersed. This agency relationship can be defined as a contractual agreement between the agents (managers) and the principal (shareholders), wherein the agents have the decision-making authority (Jensen & Meckling, 1976). The separation between the ownership of the principals and the decision-making authority of the agents creates conflicts due to information asymmetry and the divergence of interests (Di Vito & Trottier, 2021). This conflict creates agency costs because the manager will not

always make optimal decisions from the shareholder's viewpoint (Jensen & Meckling, 1976). The conflicts arising from the agency relationship could be controlled by a supervisory board (Fama & Jensen, 1983).

CEO tenure is most combined with the agency theory. the context of the agency theory, a long-tenured CEO has a strong connection with the board, which causes less independence of the board. This board dependence could be the reason that that a CEO is not being punished for bad performance (Kaur & Singh, 2019). In addition, authors such as Bebchuk and Fried (2003) argued that CEO compensation is part of the agency problem. Therefore, the compensation a CEO receives should be partially based on performance-dependent components as this will align the CEO's interest with those of shareholders.

Additionally, in studies of corporate governance mechanisms and their effect on firm performance, the agency theory is often used. The board's independence protects the stakeholders and will secure the transparency towards stakeholders, which reduces the agency problem (Pucheta-Martínez & Gallego-Álvarez, 2019). In addition, CEO non-duality is preferred to enhance transparency and accountability for a firm's decisions, increasing shareholders' trust and reducing agency costs. (Wijethilake & Ekanayake, 2019). CEO duality increases CEO power, which allows the CEO to develop strategies in his/her interest (Pucheta-Martínez & Gallego-Álvarez, 2019). Another essential part of the agency theory is the ownership of the firm. When the CEO or other members of the management (the principal) of the firm take part of the ownership, agency problems could be reduced, because the managers have the agent's but also the principal's interests. Lastly, agency theory argues about the size of the board. The theory argues that for larger boards it is more difficult to communicate; larger boards increase the problems of coordination and have higher agency problems (Cheng, 2008; Merendino & Melville, 2019).

2.1.3 Stewardship theory

In contrast to the agency theory, the stewardship theory assumes that managers are stewards who consider their interests in line with the entire organisation. According to the stewardship theory, a steward will stay within the organisational interests and their shareholders (Davis et al., 1997; Khan et al., 2018; Di Vito & Trottier, 2021). The stewardship theory sees managers as collectivists, pro-organisational and trustworthy persons (Davis et al., 1997). The view of the stewardship theory leads to decreased agency costs because managers identify themselves with the organisation and act in the interests of the organisation (Khan et al., 2018). Stewardship theory is widely used in studies related to corporate governance (Khan et al., 2018; Di Vito & Trottier, 2021; Rashid, 2020; Wijethilake & Ekanayake, 2019; Singh et al., 2017). Corresponding with the stewardship theory, Rashid (2020) found that board independence does not significantly affect the firm's performance. In contrast, the stewardship theory believes that CEO duality should benefit the firm because the board can improve decision-making and reduce information asymmetry which consequently leads to better performance (Singh et al., 2017; Wijethilake & Ekanayake, 2019; Donaldson & Davis, 1991).

2.1.4 Human capital theory

The theory of human capital suggests that a manager's skills, experiences, and education can benefit the firm (Altuwaijri & Kalyanaraman, 2020). Studies which use the theory of human capital relate CEO education and experience to firm performance (Altuwaijri & Kalyanaraman, 2020; Saleh et al., 2020; Hamori & Koyuncu, 2014). Altuwaijri and Kalyanaramn (2020) researched the CEO Education-Performance relationship of listed firms

in Saudi Arabia. They found that CEOs with a higher education level are related to higher earnings and thus benefit firms. Saleh et al. (2020) concluded that CEO's financial experience is positively related to firm performance suggesting that CEOs with excellent financial experience could bring significant value to the organisation. However, the study of Hamori and Koyuncu (2014) showed that experience in the CEO position is negatively related to firm performance. They concluded that CEOs with prior job-specific experience or experience in a related industry are related to lower performance compared to CEOs without prior CEO experience. These results do not support the theory of human capital.

2.1.5   Resource dependence theory

The resource dependence theory is used in studies to understand boards and their effect on firm performance (Hillman et al., 2009). The resource dependence theory assumes that board members improve the firm by giving the firm access to external resources. The board of directors can help firms reduce their dependence on the external environment (Pfeffer and Salancik, as cited in Pucheta-Martínez & Gallego-Álvarez, 2019). This perspective focuses on the resources as the board's primary function rather than monitoring and controlling according to the agency theory (Wijethilake & Ekanayake, 2019). Furthermore, the board of directors can benefit the organisation by providing information through advice (Hillman et al., 2009). In the context of resource dependence theory, the directors of the board should be independent as the external networks and valuable resources of independent directors contribute positively to the firm's performance (Rashid, 2020; Pucheta-Martínez & Gallego-Álvarez, 2019). Additionally, the board size is positively related to a firm's performance because larger boards have more access to external resources, which could improve the performance (Pucheta-Martínez & Gallego-Álvarez, 2019).

2.2   THE EFFECT OF CEO CHARACTERISTICS ON FIRM PERFORMANCE

The effect of CEO characteristics on firm performance is a relationship that other researchers often studied. Therefore, previous studies will be used to understand the relationship between CEO characteristics and firm performance. In this section, the findings of previous studies and theories are used to formulate hypotheses.

2.2.1   CEO gender

The effect of CEO gender diversity on firm performance has been researched in multiple studies. The literature on gender-based differences shows that females are more risk-averse (Palvia et al., 2014), are better at communicating (Schubert, 2006), and perform better in decision-making and problem-solving (Huse & Grehte Solberg, 2006) than their male counterparts. These gender differences recognised in studies can also influence a firm's financial performance. Prior literature shows different outcomes of the relationship of CEO gender on firm performance. The articles of Peni (2012) and Assenga et al. (2018) show a significant positive effect between female CEOs and firm performance. Also, Campbell and Mínguez-Vera (2007) and Chen et al. (2019) argue that a female board member has a positively impacts the firm value. In contrast, Kaur & Singh (2019) found a negative effect of female CEO's and firm performance in Indian firms. Also, the study by Shen et al. (2021) shows no relationship between CEO gender and firm performance.

A theory that explains the influence of gender diversity is the resource dependence theory. According to the resource dependence theory, the firm's boards, the board of directors and the supervisory board can link the organisation to essential external resources such as human capital, relevant information or other sources that can value the

organisation. As mentioned, the gender differences of females can bring unique qualities to the organisation. Women exhibit more remarkable social aptitude compared to men, enabling them to effortlessly establish connections with external stakeholders such as suppliers and customers. They also feature unique skills and experiences that distinguish them from their counterparts, which add significant value (Pidani et al., 2020). Overall, the literature and resource dependence theory show a positive relationship between female CEOs and firm performance. Based on these findings, the first null hypothesis is stated as follows:

Null hypothesis 1. Female CEO's have a positive effect on firm performance

2.2.2   CEO age

The second characteristic researchers often study is the time a CEO lives. A study by Serfling (2014) assumed that older CEOs show more risk-averse behaviour than younger CEOs. However, they have more experience that can help the organisation in strategic decision-making. Additionally, Wang et al. (2016) stated that risk-averse behaviour, which increases with the age of a CEO, leads to poor firm performance. This can be explained by the fact that older CEOs have experienced a lot of well-being due to their past success. As they approach retirement age, they want to protect this well-being and will exhibit risk-averse behaviour. This risk-averse behaviour leads to less investment in R&D, business developments or acquisitions, which will negatively affect the results of the firm (Wang et al., 2016). In contrast, the study of Belenzon et al. (2019) assumes that younger CEOs have less experience in strategic decision-making and in weighing the various strategic risky choices, older CEOs would be better able to make the choices with the greatest chance of success due to their experience and their past success. However, the explanation of Belenzon et al. is influenced by the effect of the experience of the CEO, which is another CEO characteristic in this study. Thus, according to the literature, the age of an CEO, as older CEOs show more risk-averse behaviour, impacts the firm performance negatively. Therefore, the second null hypothesis is stated as follows:

Null hypothesis 2. The age of a CEO has a negative effect on firm performance.

2.2.3   CEO tenure

CEO tenure refers to the number of years the CEO has been in the CEO position within the firm. The stewardship theory states that CEOs will not deviate from the organisational interests of their shareholders (Davis et al., 1997; Khan et al., 2018; Di Vito & Trottier, 2021). From this point of view, longer-tenured CEOs better understand the organisation's goals and values (Kaur & Singh, 2019). Their experience, knowledge, and commitment to the firm can help it make strategic decisions. This theory is also supported in a study of Chinese Listed firms by Hu and Alon (2014) which showed that CEO tenure and firm performance are positively related. In addition, Henderson et al. (2006) showed that CEO tenure has a positive effect on firm performance when the firm operates in a stable environment. However, tenure shows a negative relationship with firm performance in a dynamic environment. Based on the stewardship theory and prior literature, the tenure of a CEO has a positive effect on firm performance. Therefore, the third hypothesis is formulated as follows:

Null hypothesis 3. The tenure of a CEO has a positive effect on firm performance

2.2.4   CEO compensation

The compensation of the CEO consists of different components such as base salary, cash bonus, long-term incentive plans and stock options (Ozkan, 2009). Bonuses, long-term incentive plans, and stock options are a consequence of the firm performance. However, this study focuses on how the CEO characteristics affect the firm's performance. Therefore, this study will focus on the base salary of the CEO as it is not directly related to the outcome of the firm performance.

The pay-performance relationship has been widely studied with different outcomes of studies. A study by Duffhues and Kabir (2009) of Dutch-listed firms found a significant negative relationship between CEO compensation and corporate performance. However, they studied the relationship reversed than this study. So, this study could not be used to formulate the hypothesis of this study. A study by Smirnova and Naidenova (2017) of large European firms showed that CEO compensation positively influences corporate performance. However, they also included bonuses as a component of compensation which had a positive significant effect on firm performance. However, the base salary of the CEO had a positive effect on firm performance but was not significant. Therefore, the following null hypothesis is formulated:

Null hypothesis 4. The compensation of a CEO does not have an effect on firm performance.

2.2.5   CEO experience

The experience of a CEO and its effect on firm performance has been widely studied. In this study, CEO experience refers to the experience of the CEO in a similar function before taking up his current position as CEO. The study of Hamori and Koyuncu (2014) found a negative relationship between CEO experience and firm performance. One possible reason for this is that previous experience can impede the learning process in a new setting, as the CEO must first unlearn old habits before acquiring new knowledge within the new organisation (Rerup, 2005; Morrison & Brantner, 1992). However, Peni (2012) showed a positive significant relationship between CEO experience and firm performance. Also, the study of McDonald et al. (2008) showed a positive relationship between CEO experience and acquisition performance.

According to the upper echelons theory, the experience of the CEO influences the interpretations in different situations the CEO will be facing which affects their organisational choices (Hambrick, 2007). The CEO's past career experiences guarantee that they have already gained insights and approaches from their previous positions, which can influence their decision-making and strategic choices, thereby impacting the firm's performance (Shen et al., 2021). Additionally, CEO experience can also be linked to the resource dependence theory. Saleh et al. (2020) argued that employee's experience, including the CEO, is one of the firm's main resources and is essential for achieving objectives. Therefore, resource dependence theory can also explain the role of CEO experience on firm performance.

Thus, based on previous literature, the upper echelons theory and the resource dependence theory, the following null hypothesis can be formulated:

Null hypothesis 5. The experience of a CEO has a positive effect on firm performance.

2.3   CORPORATE GOVERNANCE

Effective corporate governance mechanisms could be used to minimise the impact of the CEO. In addition, Stanwick and Stanwick (2002) found evidence that companies that improve corporate governance mechanisms can increase the firm's financial performance by 10-12%. In this section, corporate governance, its mechanisms, and the regulation of corporate governance in the Netherlands will be briefly described.

2.3.1   Definition of corporate governance

Corporate governance is about the mechanisms which aim to protect investors and shareholders. It focuses on controlling the management of the firm. Corporate governance is linked to the agency theory because it narrows the gap between the interests of managers, shareholders, and board members (Schäuble, 2019). Corporate governance is researched a lot in relation to firm performance. Larcker et al. (2007) showed that corporate governance dimensions are strongly associated with future operating performance and stock returns. Pucheta-Martínez and Gallego-Álvarez (2019) showed that the mechanisms board size, board independence and CEO duality were positively related to firm performance. Also, the study of Khan et al. (2018) showed evidence of the positive relationship between five corporate governance variables and firm performance.

In the literature, corporate governance mechanisms are subdivided into internal and external mechanisms (Schäuble, 2019; Filatotchev & Nakajima, 2010; Weir et al., 2002; Walsh & Seward, 1990). Internal mechanisms refer to the mechanisms that the firm's shareholders establish to oversee and regulate the management's actions. By these internal mechanisms, the divergence between the interests of managers and shareholders should be reduced (Di Vito & Trottier, 2021). According to the study of Weir et al. (2002), the internal mechanisms are the variables of the broad structure. The role of the board is to ensure that managers make decisions that align with the interests of shareholders (Di Vito & Trottier, 2021). On the other hand, external mechanisms refer to the mechanisms that protect shareholders but are outside the firm's control. These mechanisms, for example, legalisation, can offer protection when internal mechanisms fail (Aguilera et al., 2015; Di Vito & Trottier, 2021). Additionally, Weir et al. (2002) and Daily et al. (2003) stated that the key to external mechanisms is the market of corporate control that is activated when internal mechanisms have failed.

2.3.2   Corporate governance in the Netherlands

This study will focus on firms listed on Euronext Amsterdam. Many firms in the data sample must comply with Dutch laws and regulations. Therefore, it is interesting how corporate governance in the Netherlands is regulated. The Dutch Governance Code (DGC) is in force in the Netherlands for Dutch-listed firms that have their registered office in the Netherlands. The Dutch governance code recommends internal mechanisms for firms. The DGC conforms to the approach of the UK, Belgium, and Germany. Another approach is the system of the US, which gives individual firms greater freedom to choose the mechanisms that suit their specific circumstances (Weir et al., 2002). DGC is subject to annual monitoring and sometimes revision by the Monitoring Committee Corporate Governance. The Dutch listed firms with a registered office in the Netherlands must follow the comply or explain principle, which means that firms either have established the requirements of the DGC or explain where they do not comply, why and to what extent they deviate from the DGC (Bogtstra et al., 2020; MCCG, 2016). The DGC contains rules for the relationship between the board, the supervisory board, and the shareholders. Also, the DGC discusses how the board

is accountable, how the supervision of the board is organised, that the company and directors may not represent conflicting interests, that the supervisory board determines the compensation of the members of the management board, what position the shareholders have, and which requirements apply to an internal audit function and an external auditor. [1] Where companies are obliged to follow one type of board structure in most countries, the DGC distinguishes two types: unitary boards and dual boards. Dutch listed firms are not obliged to have one specific board structure. They are able to choose between the unitary or dual structure. In the unitary (one-tier) board the non-executive members, CEO, and executive directors are all present in one board. In a dual (two-tier) board structure, there is a separation between the function of supervision and that of management. The supervisory board consists of non-executive members and the executive board consists of the CEO and other executive directors. This study will, unfortunately, not generate statistical results of the effect of corporate governance mechanisms on firm performance.

2.3.3 Mechanisms of corporate governance and their effect on firm performance

In most literature about corporate governance a distinction is made between internal and external mechanisms. The studies of Aguilera et al. (2015) and Di Vito and Trottier (2021) argue that the external mechanisms are outside the firm's control. Therefore, this literature review focuses on the internal mechanisms of corporate governance of the firm as it could directly affect the performance of a firm. In this part of the literature review, corporate governance mechanisms, which are often used in studies and their effect on firm performance are discussed.

Board independence

The first mechanism of corporate governance is the independence of the board, which refers to the members of the board without any relation to the management of the company. In many studies, the importance of independence of the board is argued. In an early study, Fama and Jensen (1983) argued that outside directors could monitor the behaviour of the management and could reduce the agency problem. In addition, Fama and Jensen (1983) argued that outside directors have complementary knowledge and expertise for the firm. Independent directors are more objective in their decision-making than managers and, can provide management with different perspectives. Besides, independent directors protect the stakeholders and will be transparent towards stakeholders, which reduces the agency problem (Pucheta-Martínez & Gallego-Álvarez, 2019). The importance of independent directors is also supported in the study of Gupta and Fields (2009). They argue that investors react more negatively to the absence of outside directors, which leads to a decrease in the independence of the board of directors. Also, the Dutch Corporate Governance Code argues that the composition of board members should consist of independent directors and that these directors have specific expertise (MCCG, 2016). The view of the agency theory is also supported by the resource dependence theory and upper echelons theory (Terjesen et al., 2016; Rashid, 2020). According to the resource dependence theory, the expanded knowledge, expertise, and network of independent directors can contribute positively to the firm's performance. Upper echelons theory also assumes the value of independent directors because the board member must have specific expertise (Terjesen et al., 2016; Hambrick & Mason, 1984). The study of Pucheta-Martínez and Gallego-Álvarez (2019) supported these approaches. Their study with data from 34 countries

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[1] https://www.rijksoverheid.nl/onderwerpen/corporate-governance/corporate-governance-code

found a positive significant effect of board independence and firm performance. However, the study by Terjesen et al. (2016) found that independent directors do not significantly affect a firm's performance.

CEO duality

CEO duality refers to serving as board chair member and CEO. Authors such as Weir et al. (2002), Pucheta-Martínez and Gallego-Álvarez (2019), Merendino and Melville (2019), Di Vito and Trottier (2021) state that CEO duality is negatively related to firm performance which supports the agency theory. The agency theory argues that firms should divide the roles of CEO and chairperson to enhance transparency and accountability for a firm's decisions, which increases shareholders' trust, reduces agency costs and consequently increases firm performance (Wijethilake & Ekanayake, 2019). CEO duality could increase the power of the CEO, and simultaneously, the risk of developing strategies that flavour the personal interests of the CEO increases, which could harm the performance of the firm (Pucheta-Martínez & Gallego-Álvarez, 2019). The results of these studies, which support the agency theory, align with the DCG, which considers that members of the supervisory board should be independent of the firm (MCCG, 2016). Contrary to the agency theory, a potential advantage of CEO duality is that the CEO, as member of the board, has more knowledge and understanding of the operating performance of the firm (Weit et al., 2002). This advantage is in line with the stewardship approach, which states that CEO organisation interests have higher utility than the personal interests of the CEO (Davis et al., 1997). A CEO wants to behave as a steward in advancing the benefits of the entire organisation. The stewardship approach sees CEO duality as a positive instrument which helps in effectively delivering firm information, as the CEO holds multiple positions in the organisation (Wijethilake & Ekanayake, 2019).

Ownership structure

The third mechanism of corporate governance refers to the participation of ownership of the firm's executives. An essential part of the agency theory is the ownership of the firm. When the CEO or other members of the management (the principal) take part in the ownership, agency problems could be reduced. The CEO can pursue their interests, which are in line with the interests of other shareholders. The ownership of the CEO will force him to better management, which leads to higher firm value. Many researchers have investigated the relationship between the ownership of the CEO and the firm performance; many studies showed a positive relationship (Kaur & Singh, 2019; Bhagat & Bolton, 2019; Kao et al., 2019; Rashid, 2020). Kaur and Singh (2019) examined the effect of CEO characteristics on the value of Indian firms, which showed that CEO-shared ownership had a significant effect on ROA. The study of Bhagat and Bolton (2019) also showed a positive relationship between director ownership and corporate performance. On the contrary, Kaur and Singh (2019) stated that the ownership of a CEO can also lead to an increase in agency costs because the CEO as an owner of the firm has more power to make statements which do not maximise firm value. A CEO who holds a significant portion of the shares could act in a personally beneficial manner without considering outside shareholders. This could lead to increased agency costs because managers limit the flow of information to shareholders outside the organisation (Schäuble, 2019).

Board size

    The size of the board refers to the number of members who can influence the corporate governance practices of the firm. Prior literature differs in supporting the efficiency of both large and small board composition on firm performance. A thought could be that larger boards are inefficient because they deal with more people who all have personal interests, making it more difficult to reach agreements (Guest, 2009; Kao et al., 2019). On the other hand, it is possible that larger boards are efficient because more knowledge, experiences and external connections are available, which can assist a firm in obtaining resources and reducing environmental uncertainties (Kao et al., 2019). Merendino and Melville (2019) stated that the board size positively affects firm performance for lower levels of board size and negatively affects performance for higher levels of board size, which indicates that a board should have an adequate number of members. According to the agency theory, smaller boards are more effective. The theory argues that for larger boards, it is more difficult to communicate, which increases coordination and agency problems (Cheng, 2008; Merendino & Melville, 2019). However, a firm should have a large board regarding the resource dependence and human capital theory. The resource dependence theory states that if the board has more members, who have all their expertise and connections, the access to external resources is higher (Bhatt & Bhattacharya, 2015). The human capital theory argues that a larger board is preferred because a larger board exist of a larger set of skills and expertise (Ahmadi et al., 2018).

3. RESEARCH METHOD

Many researchers have studied the effect of different CEO characteristics on firm performance. Therefore, in this chapter, the research methods used by these researchers will be shortly discussed. Besides, a choice will be made on the research method used in this study.

3.1   METHODOLOGY

The CEO characteristics-firm performance relationship is studied by many researchers. The plurality of these studies used regression as a research method. There are different regression methods which can be used. For example, Belenzon et al. (2019) used ordinary least square (OLS) regression to study the relationship between the CEO's age and the firm's performance for owner-managed private firms. Also, Nguyen et al. (2017) used OLS regression to test the relationship of CEO characteristics on the firm valuation of Australian firms. However, Nguhen et al. (2017) used quantile regression analysis to test the conditional effects of high and low-growth firms. Kaur and Singh (2019), Peni (2012) and Shen et al. (2021) used panel regression to test the relationship between different CEO characteristics and firm performance. The studies of Kaur and Singh (2019), Peni (2012) and Shen et al. (2021) all used firm-year observations. Additionally, in previous studies that examined the effect of several corporate governance mechanisms on firm performance panel data and OLS regression were often used. For example, Pucheta-Martínez and Gallego-Álvarez (2019) examined how different corporate governance mechanisms, such as board size and board independence, affect firm performance in a sample of international firms by panel regression. Merendino and Melville (2019) tested the board structure-firm performance relationship by panel data regression and Generalized Method of Moments (GMM) regression. In a study about the effect of the dual role of the CEO, CEO tenure, board structures and gender diversity on firm performance OLS regression is used to get the results of the study (Ahmadi et al., 2018).

3.1.1   OLS regression

The regression method is often used in studies where the researchers use dependent and independent variables. Also in previous studies, that study the effect of CEO characteristics on firm performance, regression methods are often used. There are several types of regression analysis, such as, simple linear regression, multiple linear regression, and logistic regression. Logistic regression could be used when the dependent variable is qualitative, which means the dependent variable can only have two values. Simple linear regression could be used when there is one independent and one, quantitative, dependent variable. In a multiple linear regression model, more than one independent variable could be included to find the effect on a quantitative dependent variable (Chatterjee & Hadi, 2006). As this study makes use of several metric dependent variables (ROA, ROE and Tobin's Q) multiple linear regression is applicable to the data used in this study. A method that could be used as a simple or multiple regression model is an ordinary least squares regression. Also, prior studies often used the ordinary least squares (OLS) regression (Belonzon et al., 2019; Nguyen et al., 2017). An ordinary least square regression is a method where the value of the predictor variable is a linear combination of the independent variables plus the error term (Pohlman & Leitner, 2003).

However, some assumptions should be tested to determine if the data is suitable for a linear regression method. The first assumption is linearity, which means that the dependent

variable is a linear function of the independent variable. A graphical method, such as a scatterplot, can be used to check this assumption. The second assumption is the constant variance assumption or homoscedasticity. Homoscedasticity is about the constant variance of the residuals, which means that the variability of residuals remains constant irrespective of the values of the independent variables. A scatterplot with predicted scores on the X-axis and the residual values on the Y-axis can be used to check if the data deals with homoscedasticity. The third assumption that should be tested is that the independent variables should not be correlated. The data should not contain multicollinearity. Variance inflation factors could be extracted to test multicollinearity. A VIF value of 5 or above indicates multicollinearity (Daoud, 2017). The fourth assumption is that the residuals are normally distributed. To check the normality assumption, a histogram of the residual values should look like a normal distribution. The last and fifth assumption is that the observations of the data are independent.

3.1.2 Panel regression

Panel regression is a different type of regression analysis. As the data of this study contains observations of individuals (CEOs) at several points in time (2016-2019), called panel data, panel regression could be used. Since this study used firm-year observations to collect the data, panel regression is the most suitable method to get the results. In panel regression, a distinction is made between fixed and random effects. In the case of fixed effects, variables are assumed to have a constant effect on the predictor variable, whereas in random effects models, the variables' effects vary across groups or individuals. Previous studies by Kaur and Singh (2019), Peni (2012) and Shen et al. (2021) all used panel regression to test the relationship between different CEO characteristics on firm performance as they had firm-year-observations.

Because this study also deals with firm-year observations, panel regression seems the proper analysis. This study collected data from the same firms at multiple time points, so firm-fixed effects are included in the model. Additionally, time-fixed effects are included in the analysis. In a fixed effect model, we assume that the error term does not change randomly across the different firms or periods. It means that the model accounts for specific factors related to each firm or period that do not change randomly (Wooldridge, 2001). The fixed effects induce unobserved heterogeneity of the model. Therefore, it controls for all observed and unobserved time-constant characteristics of the firms (Berrington et al., 2006). Different models in panel regression will be used in this study to gather the results. Those different models will be described in the next chapter.

Additionally, to test the robustness of the main results, a robustness test will be done. The robustness test will test whether the results will still be valid when the sample size only contains firms of the manufacturing industry and when the sample size contains all other industries except the manufacturing industry.

3.1.3 Endogeneity problem

In the results of the study, we must be aware of endogeneity. This endogeneity problem could limit the interpretation of the results in this study. Endogeneity occurs when a predictor variable is correlated with the error term in the regression model. The endogeneity problem is also known as reversed causality, which means that the dependent variable, firm performance, could also affect the independent variables of CEO characteristics. For example, firm performance could affect the financial compensation of the CEO. However, studies by Kaur and Singh (2018) and Peni (2012) mentioned that it is hard to find the right

measurements to tackle the endogeneity problem for a study with several CEO characteristics. Because this study also uses several CEO characteristics, the endogeneity tests could not be conducted. For this reason, the possible endogeneity problem is ignored in this study, and the results of the study will be interpreted as somewhat exploratory (Peni, 2012).

3.2   VARIABLES

3.2.1   Independent variables

The independent variables in this study are the CEO characteristics. In the literature review, the effect of each CEO characteristic on firm performance and the expected relationship in this study is already discussed. In this section, the measurement of each CEO characteristic variable will be briefly described.

CEO gender

The CEO's gender (GEN) is measured as a binary variable. There are two categories: males and females. The CEO gender was given a value of '1' if the CEO is a female and '0' if the CEO is a male because the first null hypothesis expects that female CEOs have a positive effect on firm performance.

CEO age

The age of a CEO (AGE) is included as a continuous variable. The age of a CEO is calculated as the difference between the year of the data and the birth year of the CEO.

CEO tenure

The tenure of a CEO (TEN) is measured as a continuous variable. The tenure of the CEO represents the number of years that the CEO has been in the current position (as CEO) of the firm. The variable is calculated as the difference between the year of the data and the year of employment.

CEO compensation

The compensation a CEO receives for being in the position of CEO is measured as a continuous variable. In this study, the compensation of the CEO (log_COM) is the base salary a CEO received in the year of the data. The base salary is the fixed amount of money that the CEO receives for their work and responsibilities. This variable does not include bonuses, stock options, or deferred compensations. The natural logarithm of CEO compensation is taken, which mitigates the impact of heteroskedasticity on the research model.

CEO experience

The experience of the CEO (EXP) is included as a dummy variable in this study. The CEO experience variable takes the value of '1' if the CEO has prior executive experience and '0' if the CEO does not have prior experience because the fifth null hypothesis assumes a positive effect of experience on firm performance.

3.2.2   Dependent variables

As this study focuses on the effect of CEO characteristics on firm performance, the dependent variable is firm performance. The firm performance is measured differently in studies. These measurements of firm performance could be divided into market-based and

accounting-based measurements (Peni, 2012). The market-based measurements are metrics that use stock market data and other market indicators to evaluate a company's financial health and competitiveness. Tobin's Q and Price-to-earnings-ratio (P/E-ratio) are market-based metrics that are often used in studies. Tobin's Q is used in studies that study the CEO characteristics-performance relationship (Peni, 2012; Nguyen et al., 2017; Saidu, 2019; Rashid, 2020) and is calculated by the book value of total assets plus the market value of equity minus the book value of equity divided by total assets (Rashid, 2020).

Accounting-based metrics of firm performance, such as ROA, ROE, and net income, are based on accounting information to evaluate a company's financial health and profitability. These metrics are based on the financial statements published by the firm. Return on assets (ROA) and return on equity (ROE) are accounting-based measurements that are often used in studies focusing on firm performance (Belenzon et al., 2019; Kaur & Singh, 2019; Shen et al., 2021). ROA is measured as the net income after tax divided by the book value of total assets (Rashid, 2020). ROE is measured by net income after tax divided by the book value of equity (Rashid, 2020).

In this study two accounting-based measurements, ROE and ROA, and one market-based measurement, Tobin's Q, were used to provide more comprehensive results on the effect on firm performance.

3.2.3   Control variables

Year

To include time-fixed effects, the year of the data (2016-2019) is included in the dataset. Therefore, when including time-fixed effects in the panel regression the model accounts for specific factors related to each period that do not change randomly (Wooldridge, 2001).

Firm size

As studied by Peni (2012) firm size significantly affects the firm performance. Therefore, firm size is included as a control variable (SIZ). Firm size is measured as the natural logarithm of the firm's total assets (Peni, 2012; Nguyen et al., 2017; Kaur & Singh., 2019; Saidu, 2019).

3.3   RESEARCH MODEL

This study uses three different measures of firm performance, ROA, ROE and Tobin's Q, to investigate the effects of CEO characteristics on firm performance. This study investigates five hypotheses on different CEO characteristics. In this study, multiple models are used in the results chapter to be aware of the differences between including firm-fixed effects or including both firm-fixed and time-fixed effects. The model where both firm-fixed and time-fixed effects are included is considered as the main model of this study. Hence, the equation for the main model is included in this study. This study assumes that the following equation can describe the performance of a firm:

$$FIRMP_{it} = \beta 0 + \beta 1(GEN)_{it} + \beta 2(AGE)_{it} + \beta 3(TEN)_{it} + \beta 4(EXP)_{it} \\ + \beta 5(COMP)_{it} + \beta 6(SIZ)_{it} + \beta 7(IND)_{it} + \varepsilon_{it}$$

Where:

$FIRMP_{it}$
$= Firm\ performance\ measured\ by\ ROA, ROE\ and\ Tobin's\ Q\ for\ time\ fixed\ effects\ t\ and\ firm\ fixed\ effects\ i$
$GEN_{it} = Gender\ of\ CEO\ of\ firm\ i\ in\ year\ t$
$AGE_{it} = Age\ of\ CEO\ of\ firm\ i\ in\ year\ t$
$TEN_{it} = Tenure\ of\ CEO\ of\ firm\ i\ in\ year\ t$
$EXP_{it} = Prior\ career\ experience\ of\ CEO\ of\ firm\ i\ in\ year\ t$
$COMP_{it} = Base\ salary\ of\ CEO\ of\ firm\ i\ in\ year\ t$
$SIZ_{it} = firm\ size\ of\ firm\ i\ in\ year\ t\ included\ as\ a\ control\ variable$
$IND_{it} = industry\ of\ firm\ i\ in\ year\ t\ included\ as\ a\ control\ variable$
$\varepsilon_{it} = idiosyncratic\ error\ term\ of\ firm\ i\ in\ year\ t$

4. SAMPLE AND DATA

This chapter describes the data used in this study. Frist, this chapter discusses the sample size and data collection. Next, this chapter describes the descriptive statistics and bivariate analysis of the data.

4.1   SAMPLE

The study examines the effect of different CEO characteristics on the performance of Dutch publicly listed firms. Therefore, firms listed on the Euronext Amsterdam are used as the sample for this study. Euronext is a stock exchange that operates in eight cities/countries: Brussels/Belgium Dublin/Ireland, Lisbon/Portugal, Milan/Italy, Oslo/Norway, Paris /France, and Amsterdam/The Netherlands.[2]

The firms listed at Euronext Amsterdam operate in different industries: technology, telecommunication, health care, finance, real estate, consumer discretionary, consumer staples, industrials, basic materials, energy, and utilities. However, this study excludes firms that operate in the finance or utility industry because the high leverage ratio and business model of these firms differ significantly from firms that operate in other industries. Therefore, it is likely that including financial and utility firms leads to biased results.

4.1.1   Sample selection

The period of the obtained data is from 2016 to 2019. Because COVID-19 came up at the beginning of the year 2020, it was decided to leave this year out of the sample period as it could lead to biased results. Therefore, the sample period from 2016 to 2019 is chosen. The ISIN codes of the listed firms on Euronext Amsterdam have been imported year by year into the ORBIS database to collect the data of the variables. A filter has been set which excluded all firms active in the financial and utility industry. Table 1 shows the total number of listed firms on Euronext Amsterdam, the number of listed firms excluding firms active in the financial and utility industry and the actual sample size. Appendix A, Table 8, presents a table of which firms are included in the sample.

Unfortunately, only a few values could be found in ORBIS for the independent variables. Therefore, most of the independent variables have been collected by hand through annual reports. In Table 3, the manner of collecting the data per variable has been displayed.

Year	Number of listed firms	Excluding financial and utility firms	Actual sample size (missing values are excluded)
2016	148	122	57
2017	125	104	59
2018	126	106	58
2019	124	106	55

Table 1. Number of listed firms and actual sample size

4.1.2   Overfitting

As this study involves a small sample size and comparatively has many predictor variables, the problem of overfitting could arise. Overfitting occurs when the research model is too complex for the number of observations. When this is the case, the output of the analysis could show some effects regardless of whether these effects exist in the actual population

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from which the sample is drawn (Babyak, 2004). The study of Babyak (2004) assumes that a minimum of 10 to 15 observations per predictor variable will show reliable estimates. As the main model of this study uses seven predictor variables, the sample size should at least contain 105 observations. This rule of thumb is validated for this study as the sample contains 229 firm-year observations. Therefore, the problem of overfitting does not seem to affect this study's results.

4.2   DATA COLLECTION

Initially, the data would have been obtained from ORBIS (Bureau van Dijk) and BoardEx. In studies, ORBIS and BoardEx are frequently used data sources to collect firm-based data. However, during the time the data was collected many variables were given missing values. For this reason, the data is mainly hand-collected through the firm's annual reports. These annual reports were available on the websites of the firms. However, the firm performance and control variables were obtained from ORBIS. Table 2 gives insight into how each variable is collected.

Variable	Collection method
Dependent variables	
CEO-gender	Information of CEO in the annual report of a given year
CEO age	Information of CEO in the annual report of a given year
CEO tenure	Information of CEO in the annual report of a given year
CEO compensation	The base salary of the CEO in the annual report of a given year
CEO experience	News article of announcement of CEO or LinkedIn page.
Independent variables	
Return on Assets (ROA)	Inserted the ISIN code of the firm on the ORBIS data source and selected the given year
Return on Equity (ROE)	Inserted the ISIN code of the firm on the ORBIS data source and selected the given year
Tobins Q	Inserted the ISIN code of the firm on the ORBIS data source and selected the given year
Control variables	
Firm size	Inserted the ISIN code of the firm on the ORBIS data source and selected the given year
Year	Given year
Data obtained for the robustness test	
Industry	Inserted the ISIN code of the firm on the ORBIS data source and selected the given year

Table 2. Collection method per variable

To control for industry effects on firm performance, the firms are categorized in the NAICS industry classification. In the table below, the actual sample size per industry is displayed.

Year	Manufacturing industry	Information, communication, and other services industry	Construction and real estate	Wholesale and retail trade industry	Technical industry	Other industries*	Total
2016	29	8	7	3	5	5	*57*
2017	31	8	6	3	5	6	*59*
2018	31	6	6	4	5	6	*58*
2019	30	7	6	4	3	5	*55*
Total	*121*	*29*	*25*	*14*	*18*	*22*	**229**
Notes	*: The category ' Other industries' consists of the agriculture, forestry and fishing industry, the mining and quarrying industry, the transportation and storage industry, and the arts, entertainment and recreation industry.						

Table 3. Sample size divided into industry and year

4.3 DESCRIPTIVE STATISTICS

Table 4 presents the descriptive statistics of the variables that are used in the regression analyses. In this section, some variables with exceptional statistics are described.

4.3.1 Independent variables

Table 4 shows that the number of observations is equal for all variables. As can be seen in the table, the variables gender and experience are included as dummy variables in the dataset (minimum of 0, maximum of 1). The mean of the variable gender reveals that more males than females are present in the dataset. However, this is in line with the expectation and the traditional view that males are represented more often than females in higher positions in the firm.

The mean age of a CEO for firms listed on Euronext Amsterdam is 55. Besides, the deviation between minimum (36 years) and maximum (75 years) is large. The descriptive of Belenzon et al. (2019) showed a smaller mean of 50 years. However, they had a larger sample size of 157,996 private firms of three Western European firms. A logical explanation for this 5-year difference could be that CEOs in privately held firms sell their majority of shares in the company earlier as they do not want to be at risk as they head toward retirement age.

The reported descriptive statistics of CEO tenure show a mean of 7.2 years and a standard deviation of 5.93 years. The study of Hu and Alon (2014) of Chinese listed firms reported different statistics with a mean of 3.3 years and a standard deviation of 1.4 years. This indicates that in China CEOs are more likely to switch to another position than in the Netherlands. However, the study of Kaur and Singh (2016) of Indian-listed firms showed that Indian CEOs are 8 years in the position of CEO on average, which is more in line with the firms listed on Euronext Amsterdam. Unfortunately, no previous study for the Dutch context could be found.

The table also shows a large deviation between the minimum (€44,000) and maximum (€2,000,000) base salaries of CEOs. Also, the descriptive statistics show that the variable is skewed to the right. Therefore, the data of this variable will be transformed to the logarithm of these values, which will get a more symmetric distribution.

4.3.2   Dependent variables

The mean ROA for the firms in the sample is 2.17%, while the median is 4.24%. Besides, the minimum (-72.36%) and the maximum (48.34%) show some extreme values of ROA. The value of ROE shows some relatively comparable values. These descriptive statistics reveal that the dependent variable is skewed to the right, as the median is larger than the mean.

Z-scores were calculated for ROA and ROE to detect the outliers in the dataset. Because the data contains a small number of observations, outliers are not removed from the dataset but are changed to less extreme values. Therefore, we used a winsorizing technique to replace the outliers with less extreme values. As for Z-scores, values lower than -3 and higher than 3 are seen as outliers; these values are replaced with -3 and 3. For Tobin's Q, the descriptive statistics show that the data are right-skewed, as the median (0.95) is larger than the mean (1.22). Therefore, the logarithm will be extracted for the values of the variables Tobin's Q. This is also the case for the variables ROA and ROE; however, the data of those variables contains some negative values, wherefore the logarithm could not be extracted. Therefore, the values of the ROA were increased by 73 and the values of ROE were increased by 474, resulting in positive values. Next, logarithms were extracted from these values. However, the histogram of logged transformed data still showed some skewed data. Therefore, the z-scores of ROA and ROE will be used for the analysis.

	N	Minimum	Maximum	Mean	Median	Std. Deviation
Independent variables						
Gender	229	0	1.00	0.03	0	0.18
Age	229	36.00	75.00	55.30	56.00	5.92
Tenure	229	0	24.00	7.20	6.00	5.93
Compensation	229	44,000.00	2,000,000.00	578.844,98	500,000.00	343,604.54
Experience	229	0	1.00	0.63	1.00	0.48
Dependent variables						
ROA (%)	229	(72.36)	48.34	2.17	4.24	12.67
ROE (%)	229	(473.29)	400.00	3.88	9.57	51.69
Tobin's Q	229	0.03	7.30	1.22	0.95	1.03
Control variables						
Firm size	229	12.68	24.56	20.33	20.58	2.40

Table 4. Descriptive statistics

4.4 BIVARIATE ANALYSIS

The bivariate analysis is done by using Pearson's correlation matrix. In Table 5, the Pearson's correlation matrix is displayed. The most notable correlations are explained in this section.

4.4.1 Independent variables

As can be seen in Table 5, the logarithm of CEO compensation (log_COM) holds a positive and significant correlation with all other independent variables, expect for CEO experience. This indicates that female CEOs, older CEOs, and long-tenured CEOs, will get a higher base salary than their male counterparts, younger counterparts, and CEOs who are new in their positions. The correlations between the logarithm of compensation and age and tenure are economically logical to approximate. However, the traditional gender diversity approach assumes that women earn less than men. The correlation matrix shows that this is not the case for CEOs of Dutch-listed firms in this sample, as CEO gender and compensation are positively significantly correlated.

A significant correlation that is more difficult to explain, is the correlation between tenure and gender. This correlation indicates that female CEOs are staying in the position longer than male CEOs. However, an economic explanation could not be found for this correlation. Additionally, CEO tenure significantly correlates with experience (negative correlation) and the logarithm of compensation (positive correlation). This indicates that CEOs who do not have prior experience in a CEO position have a longer tenured period than those with prior experience. This is logically explainable since CEOs who are new in the CEO position have had their prior career experience at another company for several years. The positively significant correlation between CEO tenure and the logarithm of compensation could also be logically explained by the fact that generally, with a longer tenure, the salary has increased over the years.

In addition to these correlations, no significant and notable correlations were found between the independent variables that require additional explanation.

4.4.2 Dependent variables

As shown in Table 5, ROA correlates significantly with ROE at the 0.01 level (r=.826). This is in line with the prediction because ROA and ROE are accounting-based firm performance measurements. ROA and ROE are not correlated with the logarithm of Tobin's Q. This indicates that as a market-based ratio, Tobin's Q, measures firm performance differently than the accounting-based measurement ROA and ROE.

Besides, ROA, ROE and the logarithm of Tobin's Q are all significantly correlated at the 0.01 level with firm size. The correlation matrix, Table 5, shows a positively significant correlation between ROA (r=.415) and ROE (r=.384), which indicates that larger firms also show higher rates of ROA and ROE. However, Tobin's Q correlates negatively significantly with firm size (r=-.187). As aforementioned, Tobin's Q is a market-based ratio while ROA and ROE are accounting-based ratios which could explain the differences in direction.

Additionally, some significant correlations exist between the dependent variables that measure firm performance and the independent CEO characteristics. ROA and ROE are positively significantly correlated at the 0.01 level with age (r=.276; r=.208) and compensation (r=.420; r=.357). This indicates that older CEOs succeed more with better and higher ROA and ROE rates. The correlation between CEO compensation and ROA and ROE can be explained in both ways. On the one hand, the correlation could be explained by the general development that well-performed firms compensate their employees, which results

in receiving a better base salary. On the other hand, the amount of base salary can also be a motivating factor for a CEO to achieve a higher firm performance. This correlation could lead to biased results. However, to check for multicollinearity, the variance inflation factors are extracted.

4.4.3   Variance Inflation Factors

The Variance Inflation Factors (VIF) of the variables are extracted to check for multicollinearity in the dataset. Variance inflation factors with a value equal to or higher than 10 suggest that there is significant multicollinearity in the dataset (Saidu, 2019). Additionally, Daoud (2017) states that a VIF value of 5 or above indicates that the predictor variable highly correlate with other predictors. As shown in Table 5, the values of VIF are all below three indicating no multicollinearity problem in our dataset. Therefore, no variables are removed from the dataset.

	GEN	AGE	TEN	Log_COM	EXP	ROA	ROE	Log_TOQ	SIZ
GEN	1								
AGE	-0.018	1							
TEN	0.187*	0.492**	1						
Log_COM	0.163*	0.375**	0.198**	1					
EXP	-0.051	0.058	-0.248**	-0.050	1				
ROA	0.056	0.276**	0.118	0.420**	-0.088	1			
ROE	0.241**	0.208**	0.106	0.357**	-0.030	0.826**	1		
Log_TOQ	0.035	0.039	0.065	-0.124	0.079	0.057	0.083	1	
SIZ	0.143*	0.208**	0.098	0.894**	-0.061	0.415**	0.384**	-0.187*	1
VIF	1,1	1,6	1,6	2,9	1,1				2,6
Notes	This table reports the Pearson's correlation coefficients with their statistical significance. ** Significant correlation at the 0.01 level, * Significant correlation at the 0.05 level.								

Table 5. Pearson's correlation matrix and Variance Inflation Factors (after taking the logarithm of compensation and Tobin's Q and winsorizing for ROA and ROE)

5. RESULTS

This chapter describes the results of this study. First, the different models that have been used as panel regression, with their associated pseudo r-squared, will be explained. Additionally, the hypotheses of the effects of the different CEO characteristics on firm performance are associated with the results of the main model and the theory. In the last part of this chapter, the results of the robustness test will be described.

5.1   DIFFERENCES OF MODELS USED IN THIS STUDY

A panel regression is obtained to control for firm-level observations. The data is collected for different firms over four years. When conducting a panel regression, the statistical software SPSS controls for all observed and unobserved time-constant firms' characteristics (Berrington et al., 2006). The analysis accounts for specific factors related to each firm or period that do not change randomly (Wooldridge, 2001).

To understand the effect of including fixed effects in the analysis for the results, we will look at what inserting a fixed effect or multiple fixed effects does to the results and the pseudo r-squared. For this reason, different models are designed for the panel regression.

The first model contains the control variable firm size to check if this variable has a significant effect on firm performance as measured by ROA, ROE and Tobin's Q. As shown in Table 6, firm size has a positive and significant effect at the 0.05 level for the accounting-based measurements of firm performance, ROA and ROE. However, firm size shows a statistically significant and negative effect on Tobin's Q. The finding of this negative effect does not meet the expectation that investors will value larger firms higher as they often experience more growth and therefore have a higher opportunity to increase future profitability (Lumapow & Tumiwa, 2017). Because the control variable firm size is statistically significant for all variables that measure firm performance, firm size will be included as a control variable in the research models of this study.

As the data contains multiple observations of the same firms, the second model will include firm-fixed effects. Additionally, this model includes all the CEO characteristics and the control variable firm size. By including firm-fixed effects, the model helps capture and control the unique characteristics and attributes associated with each firm in the dataset while examining the impact of the independent variables on firm performance. Because the data contains multiple observations of the same firms over a four-year period, it is also interesting to include time-fixed effects. The third model contains all independent CEO characteristics, controls for firm size, and includes time-fixed effects.

Nevertheless, in the fourth model, 'year' and 'firms' fixed effects are included in the panel regression. Therefore, the fourth model controls for both the individual characteristics and attributes of each firm in the dataset and for temporal or time-related effects. Hence, this model will give a more comprehensive analysis of the data considering both cross-sectional and time-related influences.

As presented in Table 6, the results of the third and fourth models are more or less similar. This indicates that including firm-fixed effects does not significantly affect the overall model resulting in roughly the same results.

When looking at the pseudo r-squared, the panel regression gives two values: marginal and conditional. The marginal pseudo r-squared gives the explanatory value of the independent variables on the dependent variable without considering the structure of firm-year observations in the data. The conditional pseudo r-squared incorporates the fixed effects into the determination of the value of the explanatory power of the independent

variables in the model (Nakagawa & Schielzeth, 2012). As the analysis considers specific characteristics of firms and time-fixed effects, the value of the conditional pseudo r-squared is important to assess how well the independent variables explain the dependent variable. The differences in the values of conditional pseudo r-squared show some differences across the models. For all dependent variables that measure firm performance, the value of the conditional pseudo r-squared is higher in the fourth model than in the third model. Therefore, adding time-fixed effects improves the fit of the model, making the fourth model seen as the main model in this study. For this reason, this model serves as the starting point regarding the results of this study and will be used to check the robustness of the results.

5.2 EFFECT OF CEO CHARACTERISTICS ON FIRM PERFORMANCE

As in this study, hypotheses which assume a specific direction are formulated, the one-sided test is used. As we use a one-sided test, the estimate of the t-score has to be larger than the critical t-statistic. This means the t-statistic has to be larger than 1.65 standard deviations above 0 to reject the null hypothesis at the 5% level for a positive direction. However, in the case of a negative direction, the t-statistic has to be smaller than the negative t-statistic, so the t-statistic should be lower than -1.65 standard deviations below 0 to reject the null hypothesis at the 5% level. The t-statistic should be (lower) higher than the critical value of (-1.28) 1.28 to reject the null hypothesis at the 10% level. Additionally, because the hypotheses are based on a one-sided test the outcome of the p-value should be dived by to check the significance.

5.2.1 Null hypothesis 1: Effect of CEO gender on firm performance

The first null hypothesis assumes that female CEOs have a positive effect on firm performance, as measured by ROA, ROE and Tobin's Q. The results presented in Table 6 show that CEO gender (GEN) has a positive and statistically significant effect on ROE. The CEO variable gender is significantly and positively related to ROE at the 0.05 level. Therefore, the null hypothesis can be supported. These findings are consistent with the research of Peni (2012), who found that female executives are statistically significantly positively related to firm performance. However, in the study of Peni (2012), ROA and Tobin's Q have been used as dependent variables to measure firm performance. Similarly, in the study conducted by Assenga et al. (2018) which examined the effect of female board members on the performance of Tanzanian firms, the researchers also found a positive and significant effect on ROE. These results confirm that female executives can bring unique skills to the organisation that value the firm's performance.

In addition, CEO gender is positively related to ROA and Tobin's Q. However, ROA and Tobin's Q outcomes are not statistically significant. In line with these results, the study by Shen et al. (2021) also found no significant relationship between gender and firm performance for Australian firms. Hence, while CEO gender exhibits a positive association with firm performance, this relationship is only statistically significant when firm performance is measured by ROE.

So, the findings of this study suggest that CEO gender has a positive relationship with firm performance, particularly when measuring firm performance through ROE. These findings align with prior research and suggest that female executives can bring added value to the organisation.

5.2.2 Null hypothesis 2: Effect of CEO age on firm performance

The second null hypothesis predicts that the age of a CEO has a negative effect on firm performance as measured by ROA, ROE and Tobin's Q. As displayed in Table 6, CEO age (AGE) is statistically significant and positively related to ROA and ROE at the 0.05 level. For this reason, the null hypothesis could be rejected. However, when measuring firm performance with a market-based measurement (Tobin's Q), the effect is not significant.

Previous studies stated that older CEOs tend to show more risk-averse behaviour, which leads to fewer investments affecting firm growth and performance. The outcomes of this study could not support these prior studies. The findings of this study show that the older the CEO is, the better he/she will succeed in firm performance. The study by Belenzon et al. (2019) stated that older CEOs tend to have the greatest chance of success due to their previous experiences and success. The results of our study contribute to this prediction. In addition, older CEOs could have a more extensive network and, therefore, more access to external resources which could value the firm performance.

5.2.3 Null hypothesis 3: Effect of CEO tenure on firm performance

The third null hypothesis assumes that the tenure of a CEO has a positive effect on firm performance. As Table 6 presents, this study does not support the null hypothesis for all measurements of firm performance. The findings show that CEO tenure (TEN) and firm performance are insignificantly related. Therefore, in this study, there is no evidence to assume that a long-tenured CEO will significantly value a firm's performance.

This study does not support the studies mentioned in the literature review. The study of Hu and Alon (2014) of Chinese listed firms showed a positive relationship between CEO tenure and firm performance as a long-tenured CEO got a better understanding of organisational goals and values. However, the finding of Hu and Alon (2014) does not hold for this study in the Dutch context. In the Dutch context, more years in the CEO position does not necessarily imply that the firm's performance will increase. The results of the effect of CEO tenure on the accounting-based metrics, ROA, and ROE, show a negative insignificant effect. A possible explanation for this negative effect is that a long-tenured CEO may prefer to uphold the initially established strategy, potentially risking losing the evolving external environment and market dynamics. As a long-tenured CEO feels bound to the company as an owner, the CEO may become overly focused on internal affairs, whereby they may lose sight of the firm performance (Kaur & Singh, 2019). However, this effect is not significant in the sample used in this study.

5.2.4 Null hypothesis 4: Effect of CEO compensation on firm performance

The fourth hypothesis predicts that the compensation of a CEO does not have an effect on firm performance. The fourth hypothesis does not predict a specific direction of the relationship between the CEO characteristic and firm performance. Hence, the values of statistics of the two-sided test should be considered in rejecting or not rejecting the fourth null hypothesis. Therefore, the values of the statistics, as displayed in Table 6, should be multiplied by two. However, the significance of the results will remain the same, as displayed in Table 6.

As shown in Table 6, the CEO variable compensation (COM) measured as the base year salary of the CEO is not significantly related to firm performance for all measures of firm performance. Therefore, the null hypothesis could be supported as the results show no significant effect. The results can be supported by the study of Smirnova and Naidenova (2017), who held a sample of European firms. In the study of Smirnova and Naidenova

(2017), the effect on firm performance was also insignificant for base salary. Therefore, a higher base salary for a CEO does not necessarily mean that the motivation of the CEO will increase to improve firm performance. This explanation is consistent with the actual practice of compensation committees. Compensation committees often determine the CEO's compensation as a corporate governance mechanism, based on several components. Non-performance-based components, such as base salary, are not directly related to the firm performance. However, variable components such as bonuses are strongly related to firm performance (Ozkan, 2009; Smirnova & Naidenova, 2017)

5.2.5 Null hypothesis 5: Effect of prior career experience of CEO on firm performance

The fifth and last null hypothesis of this study states that the experience of a CEO has a positive effect on firm performance. The results in Table 6 show that CEO experience (EXP) has a negative and statistically significant effect on ROA. The null hypothesis can be rejected because the results show a negative and statistical significantly relationship between CEO experience and firm performance. This result is supported by the study of Hamori and Koyuncu (2014), who also found a negative relationship between prior CEO experience and firm performance. One possible reason is that previous experience can impede the learning process in a new setting, as the CEO must first unlearn old habits before acquiring new knowledge within the new organisation (Rerup, 2005; Morrison & Brantner, 1992). However, the effect of CEO experience and firm performance remains negative when measuring firm performance by ROE and Tobin's Q. However, the effect is not significant. Therefore, the resource dependence theory and UET could not be supported in this study. According to the resource dependence theory, an experienced CEO has access to more external resources to help achieve the firm's objectives. Besides, upper echelons theory assumes that prior experiences in functions affect decision-making, organisational choices, and firm performance. This study fails to support both the resource dependence and upper echelons theory.

Variable	ROA						ROE						Tobin's Q					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	<.001*** (-5.386)	0.012** (-2.312)	0.001*** (-3.193)	0.001*** (-3.193)	0.001*** (-3.193)	0.335 (-0.429)	<.001*** (-5.009)	0.125 (-1.161)	0.058* (-1.579)	0.051* (-1.554)	0.083* (-1.397)	0.151 (-1.037)	0.079* (-1.589)	0.255 (0.556)	0.368 (-0.337)	0.365 (-0.345)	0.145 (1.060)	0.05** (-1.712)
GEN		0.454 (0.117)	0.429 (0.181)	0.429 (0.181)	0.482 (-0.046)	0.202 (0.841)		0.004*** (2.723)	<0.001*** (3.460)	<0.001*** (3.406)	0.192 (0.874)	<0.001*** (4.651)		0.290 (0.556)	0.239 (0.712)	0.239 (0.712)	0.247 (0.685)	0.394 (-0.270)
AGE		0.009*** (2.413)	0.003*** (2.856)	0.003*** (2.856)	0.008*** (2.388)	0.064* (1.541)		0.042** (1.755)	0.006*** (2.563)	0.006*** (2.524)	0.022** (2.049)	0.232 (0.736)		0.479 (0.054)	0.448 (0.132)	0.450 (0.126)	0.247 (0.684)	0.071* (-1.444)
TEN		0.346 (-.401)	0.214 (-0.796)	0.214 (-0.796)	0.066* (-1.522)	0.282 (0.581)		0.436 (-0.161)	0.233 (-0.730)	0.237 (-0.719)	0.264 (-1.123)	0.122 (1.171)		0.142 (0.788)	0.184 (0.902)	0.180 (0.917)	0.463 (0.093)	0.031** (-1.888)
log_COM		0.473 (-0.068)	0.330 (0.442)	0.330 (0.442)	0.243 (0.699)	0.215 (-0.795)		0.191 (-0.880)	0.197 (-0.856)	0.200 (-0.843)	0.203 (-0.836)	0.491 (0.024)		0.432 (-0.171)	0.176 (0.932)	0.174 (0.942)	0.141 (-1.080)	0.008*** (2.438)
EXP		0.225 (-.669)	0.073* (-1.464)	0.073* (-1.464)	0.057* (-1.597)	0.083* (-1.399)		0.386 (0.290)	0.351 (-0.385)	0.353 (-0.379)	0.276 (-0.596)	0.171 (-0.957)		0.210 (0.808)	0.105 (1.257)	0.106 (1.251)	0.346 (-0.397)	0.002*** (3.094)
SIZ	<.001*** (5.408)	0.010*** (2.364)	0.014** (2.216)	0.014** (2.216)	0.169 (0.960)	0.005*** (2.667)	<.001*** (5.021)	0.003*** (2.882)	0.001*** (3.093)	0.002*** (3.046)	0.014** (2.239)	0.051* (1.654)	0.058* (-1.589)	0.108 (-1.244)	0.015** (-2.178)	0.015** (-2.185)	0.243 (0.700)	<0.001*** (-3.846)
Firm-fixed effects	YES	YES	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES
Time-fixed effects	YES	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES
Marginal Pseudo R^2	.207	.241	.214	0.214	0.209	0.251	.180	.224	0.208	0.203	0.163	0.317	0.031	0.055	0.055	0.056	0.020	0.253
Conditional Pseudo R^2	.543	.556	.214	0.607	0.604	0.625	.511	.498	0.208	0.601	0.581	0.658	0.891	0.898	0.063	0.528	0.510	0.626

Notes: This table reports the unstandardized coefficients. The figures in parentheses represent the t-statistic.
***Correlation is significant at the 0.01 level. **Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Table 6. Panel regression results

5.3   ROBUSTNESS TESTS

A robustness test is conducted to assess the resilience of the results obtained from the panel regression models. The robustness test involved extracting two distinct samples to investigate whether the industry in which firms operate affects the results. The first sample was extracted, focusing on firms in the manufacturing industry, which is the most strongly represented category in the dataset (N=121). The results from this analysis are presented in Model 5 of Table 6. However, to explore the effects on the results of non-manufacturing firms, a dataset excluding firms in the manufacturing industry was extracted from the original dataset. The results of this analysis are presented in model 6 of Table 6.

Model 5 showed some differences with the main model for the effect on the dependent variable ROA. For instance, firm size is significant in the main model. However it is not significant when the sample contains only firms active in the manufacturing industry, model 5. Conversely, CEO tenure exhibited a significant negative relationship with firm performance when measured by ROA. In the main model, the relationship was also negative but not significant. This suggests that a long-tenured CEO negatively influences the ROA among firms active in the manufacturing industry. As ROA measures the firm performance as net income after tax divided by the book value of total assets, this could explain the differences in the results for the manufacturing industry. The effective use of assets in manufacturing firms, such as inventory and equipment, is a determinant in producing revenue. Therefore, the total assets in manufacturing industries are generally higher than in other industries. As displayed in Appendix B, manufacturing firms show a higher mean value of ROA compared to non-manufacturing firms. This can explain the differences in the results.

Notably, Model 6 yielded results consistent in direction for the significant effects presented in the main model, showing the robustness of the results. Therefore, it could be concluded that the manufacturing industry, as the most prominently represented industry, does not substantially affect the results when measuring firm performance as ROA.

When measuring firm performance as ROE, CEO gender showed a positive but insignificant effect on ROE in Model 5, indicating that female CEOs do not significantly affect firm performance in manufacturing firms. In Model 6 the effect remains significant at the 0.05 level, similar to the main model. Nevertheless, the significance of CEO age on ROE changed when the sample exclusively consisted of non-manufacturing firms. In Model 6, a positive but insignificant relationship is found between CEO age and ROE, suggesting that the age of a CEO does not significantly affect the firm performance for non-manufacturing firms. This is consistent with the prediction that older CEOs tend to show more risk-averse behaviour, which leads to less spending on R&D which negatively affects firm performance (Wang et al., 2016).

The robustness test of the effects on Tobin's Q showed some notable results in Model 6. CEO age, tenure, compensation, and experience all became significant and changed in direction when the sample excluded manufacturing firms. For these independent variables, the manufacturing industry appeared to affect the entire sample as the main model results show insignificant relationships. As seen in Appendix B, the mean value of Tobin's Q is higher for manufacturing firms compared to non-manufacturing industries which could lead to a difference in results across the industries. A possible explanation for this could be that the market (investors) value manufacturing industries higher due to their position in the market or expenses in R&D. This is also consistent with the study of Ho et al. (2005), who found that R&D investments positively contribute to the stock performance of manufacturing firms but not for non-manufacturing firms in the U.S.

In Model 5, the effects remained consistent with the main model's results. However, firm size is not significant on Tobin's Q when the sample contains only firms active in the manufacturing industry. This result has also been found when measuring firm performance by ROA.

The robustness test results showed different outcomes across the three measurements of firm performance. For ROA and ROE, the manufacturing industry appeared to have no substantial effect on the overall results of the main model. However, for Tobin's Q, the manufacturing industry has a notable influence on the results of the main model. As Model 6 yielded significant results of the CEO characteristics on firm performance, this indicates that the absence of manufacturing firms can affect the robustness of the main model of Tobin's Q. These variations in results can be due to the different characteristics across the industries, such as total assets, investments in R&D and market position.

5.4   ASSUMPTIONS

In the previously described chapter, the results of the panel regression analysis are discussed. However, a side note must be made about meeting the assumptions for regression analysis. As chapter 3 of this study mentions, five assumptions must be met to determine if the data is suitable for a linear regression model. These assumptions have also been tested for the data used in this study. In Appendices C, D and E, the outcomes of these tests of the assumptions have been added. These outcomes will be discussed in this chapter.

The first assumption is (log)linearity, which means that the dependent variable is a linear function of the independent variable. The scatterplots in Appendix B show graphics where the independent variables are plotted against the dependent variables. Because CEO gender and experience are binary variables, these variables could not be plotted against the dependent variable. Based on these scatterplots, the data is not linear.

The second assumption is the constant variance assumption of homoskedasticity. Homoskedasticity is about the residuals' constant variance, which means that the residual variances are constant regardless of the values of the independent variables. Therefore, scatterplots with predicted scores on the X-axis and the residual values on the Y-axis are used. These scatterplots are displayed in Appendix C. As can be seen, these scatterplots show some heteroskedasticity. Unfortunately, taking the logarithm of the original variable CEO compensation hardly mitigated the impact of heteroskedasticity on the research model.

The third assumption that should be tested is that variables do not contain multicollinearity. The variance inflation factor is extracted and displayed in Table 5 to test the assumption of multicollinearity. As the values of VIF are all below three, this indicates no multicollinearity problem in our dataset. Therefore, the third assumption is met.

The fourth assumption is that the residuals are normally distributed. A normal p-plot is extracted from the data to check the assumption of normality. These P-plots can be found in Appendix E. However, the p-plots show no normality of the data as the data.

The last and fifth assumption is the independence of observations of the data. Firm-year observations are used for this study. Because this study uses panel data, it is assumed that these firm-year observations are independent. Additionally, in the research model firm-fixed effects and time-fixed effects are added to account for the variations across firms and time.

As can be concluded, most of the assumptions could not be met. However, in this study, we assumed that the assumptions were supported to analyse the results and complete this study. In the next and final chapter of this study, which will discuss some limitations of this study, the limitation of not meeting the assumption will be discussed further.

6. CONCLUSION

In this chapter, the conclusion of this study is described. The first part of this chapter presents the conclusion of the results and answers the research question through the formulated hypotheses. Next, the limitations of this study and recommendations of future research are discussed.

6.1   CONCLUSION AND DISCUSSION

The effect of CEO characteristics on firm performance is a subject that is often researched in studies. However, the results of these studies exhibit variability. Multiple theories support the idea that the CEO, as the visible face of an organisation, brings a unique set of skills, experiences, and personal attributes to the table. The upper echelons theory, for instance, suggest that a firm's performance is partially determined by the attributes of its top-level management team. Moreover, theories like the human capital theory argue that the education and experience of a CEO can benefit a company (Altuwaijri & Kalyanaraman, 2020). Also, in practice, a company's success is often related to the CEO. For example, Steve Jobs, the founder and former CEO of Apple, has succeeded in turning the company into a global empire with billions of dollars in revenue.

Given the variability in research findings regarding the relationship between CEO characteristics and firm performance, studying the effects in the Dutch context was interesting. Therefore, this study extends the existing literature by investigating this relationship within firms listed on Euronext Amsterdam. This study formulated five hypotheses of different demographic and job-related CEO characteristics: gender, age, tenure, compensation, and experience. The effect of these CEO characteristics has been investigated on different measurements of firm performance: ROA, ROE and Tobin's Q.

A dataset comprising 229 firm-year observations in the period from 2016 to 2019 has been collected by approaching the annual reports and utilising the database Orbis. This dataset served as the foundational input for the comprehensive panel regression analysis.

The first null hypothesis assumed that female CEOs have a positive effect on firm performance. The study supported this null hypothesis when firm performance is measured as ROE. For ROA and Tobin's Q, the effect was positive but not significant. The second null hypothesis predicted that the age of a CEO can positively contribute to firm performance. This null hypothesis can be supported when firm performance is based on the accounting-based measurements (ROA and ROE). However, the effect was not significant on Tobin's Q. The third null hypothesis suggested that the tenure of the CEO has a positive effect on firm performance. For all measurements of firm performance, no evidence was found to reject the third null hypothesis. A similar outcome was observed for the fourth null hypothesis, which assumed that CEO compensation has no effect on firm performance. Since the base salary showed no significant effect on ROA, ROE and Tobin's Q, the null hypothesis could not be rejected. The fifth and final null hypothesis stated that the prior career experience of a CEO positively influences firm performance. However, the CEO characteristic experience had a statistically negative effect on ROA. Therefore, the hypothesis could not be supported for ROA. The effect on ROE and Tobin's Q showed no significant effect.

Robustness tests are conducted to validate the results of the panel regression. The results of the robustness tests revealed differing outcomes for the various measurements of firm performance. The robustness test was conducted on a sample of manufacturing firms and a sample of non-manufacturing firms. While ROA and ROE remained relatively unaffected by the presence or absence of manufacturing firms, Tobin's Q appeared sensitive to the

industry composition. These insights shed light on the robustness of the main model, particularly when assessing Tobin's Q under varying industry conditions.

The research question "What is the effect of CEO characteristics on firm performance for Dutch listed firms?" can be answered. The effect of the CEO characteristics on firm performance depends on which metric for firm performance is used. When a significant effect was found in the study, this statistically significant effect usually did not persist when another metric measured firm performance. Additionally, the robustness tests also showed that no CEO characteristic had a significant effect on all measurements of firm performance. Therefore, the overall answer to the research question is that CEO characteristics do not affect firm performance in the Dutch context. As previous studies found some effects of CEO characteristics on firm performance, the results of this study could be influenced by the limited number of observations in this dataset.

6.2   LIMITATIONS AND RECOMENDATIONS OF FUTURE RESEARCH

While conducting a study, researchers encounter challenges and opportunities for improvement. This study was no exception. Therefore, describing the limitations and recommendations for future research is essential.

Firstly, one notable limitation pertains to the dataset utilised in this study. The dataset could not meet the required assumptions for standard multivariate regression analysis, particularly regarding normality and heteroskedasticity. In this study, we assumed that the assumptions were supported to analyse the results and complete this study. Therefore, the results of this study should be interpreted as exploratory and are not general results for the Dutch context. Secondly, previous research used more control variables in the dataset to test the effect of CEO characteristics on firm performance. However, this study did not collect data that could be used as a control variable. Besides, adding more variables to the model should have increased the chance of overfitting the research model. The third limitation pertains to the sample size of this study. The sample was primarily manually collected from annual reports. Hence, many values of variables could not be found, which resulted in many missing values. This limitation inherently impacted the statistical power and generalizability of the study's findings.

Considering these limitations, several recommendations for future research can be made. If future research also cannot meet the assumption for multivariate regression analysis, researchers should consider methods to address non-normality. This may involve robust standard errors or exploring other techniques for handling non-normal data. Additionally, a more comprehensive dataset could help to meet these assumptions. Besides, a larger sample size enhances the generalizability of findings and decreases the chance of overfitting the model. Another interesting recommendation for future research is to study the effects of differences in industries on firm performance measurements, especially Tobin's Q. As the result of the robustness test of non-manufacturing firms showed some different outcomes between the main model and Model 6 for Tobin's Q, it is interesting to study which factors influence these variations in results. Therefore, future research could include more control variables in the model, such as leverage, total assets, and expenses on R&D. These factors differ across industries and could also influence the relationship between CEO characteristics and firm performance. Another recommendation for future research could be to study the effect of CEO characteristics on firm performance in a different context, such as other countries or non-listed firms. It is interesting to examine whether the results of this study also are valid in other contexts. Besides, the extended research in other contexts could

contribute to a more comprehensive understanding of the relationship between CEO characteristics and firm performance.

In conclusion, while this study has limitations, it provided valuable insights for future research. Addressing the limitations of this study and making recommendations for future research can further advance this interesting and often-used research subject in organisational studies.

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APPENDICES

APPENDIX A

Firm name	2016	2017	2018	2019
AALBERTS INDUSTR				
AHOLD DEL	■			
AJAX				
AKZO NOBEL				
ALFEN	■	■		
AMG				
AND INTERNATIONAL				
ARCADIS				
ASM INTERNATIONAL				
ASML HOLDING				
AVANTIUM	■			■
BAM GROEP KON				
BASIC-FIT				
BATENBURG TECHNIEK				■
BE SEMICONDUCTOR				
BETER BED				■
BOSKALIS WESTMIN				
BRILL KON				
BRUNEL INTERNAT				
CORBION				
CTAC				
DOC DATA	■			
DSM KON				
ENVIPCO	■	■		
ESPERITE		■	■	■
FORFARMERS				
GEMALTO				
HEIJMANS				
HEINEKEN				
HOLLAND COLOURS				
HYDRATEC				
IMCD				
INTERTRUST				■
KARDAN		■	■	■
KENDRION				
KPN KON				

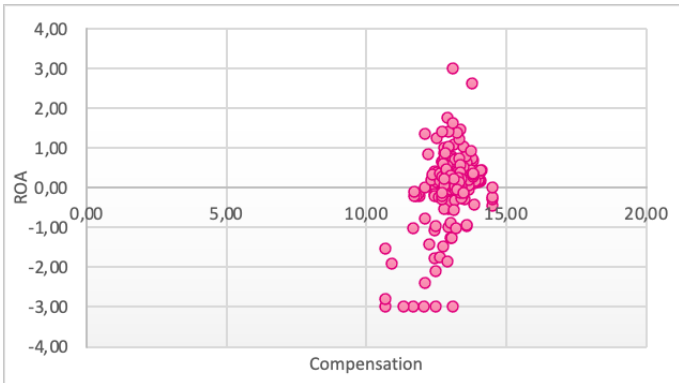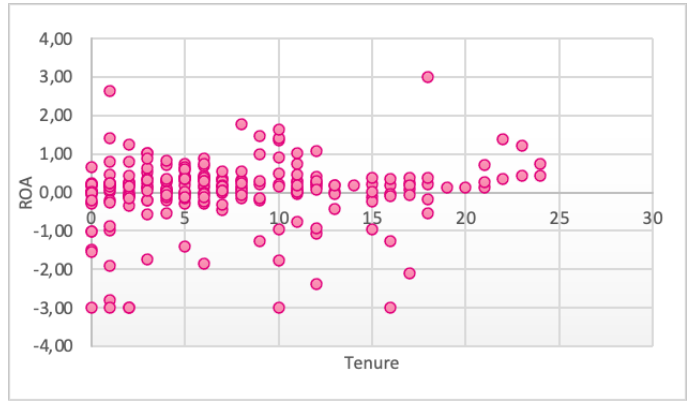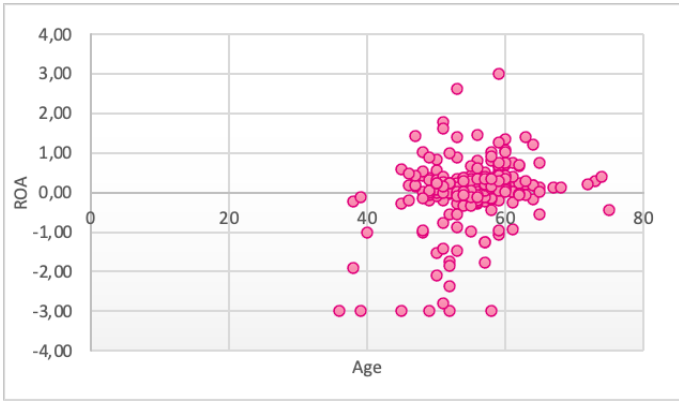| Firm name	2016	2017	2018	2019
LAVIDE HOLDING			■	
LUCASBOLS				
MTY HOLDINGS NV			■	■
NEDAP				
NSI N.V.				
OCI				
ORDINA				
PHARMING GROUP				
PHILIPS KON				
PHILIPS LIGHTING				
PORCELEYNE FLES				
POSTNL	■			■
RANDSTAD				
ROODMICROTEC				
SBM OFFSHORE				
SIF HOLDING				
SLIGRO FOOD GROUP				
SNOWWORLD				
STERN GROEP				
TAKEAWAY			■	■
TIE KINETIX				
TKH GROUP				
TOMTOM				
VASTNED				
VOPAK				
WERELDHAVE				
WOLTERS KLUWER				
Total of firms	**57**	**59**	**58**	**55**

APPENDIX B

Descriptive statistics of dependent variables in manufacturing and non-manufacturing industry

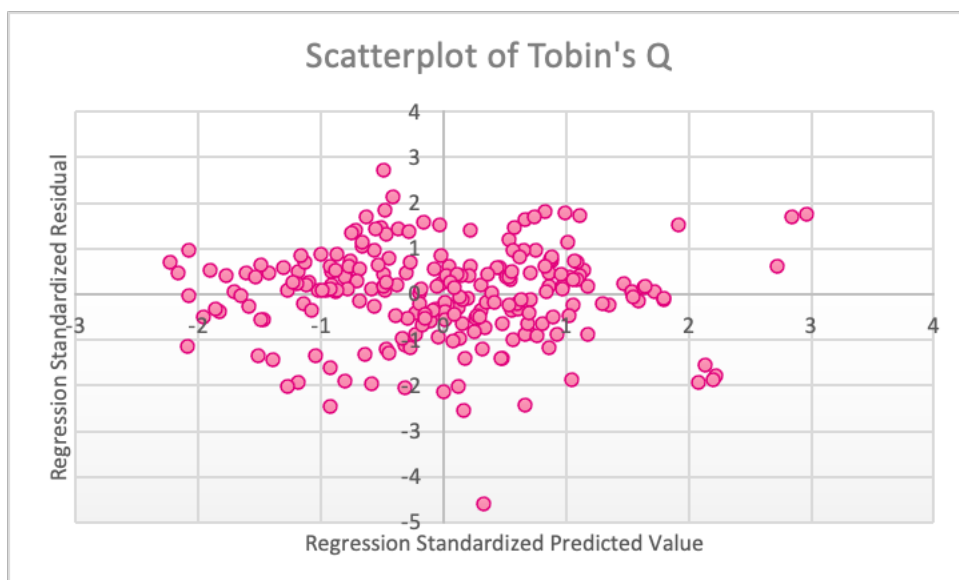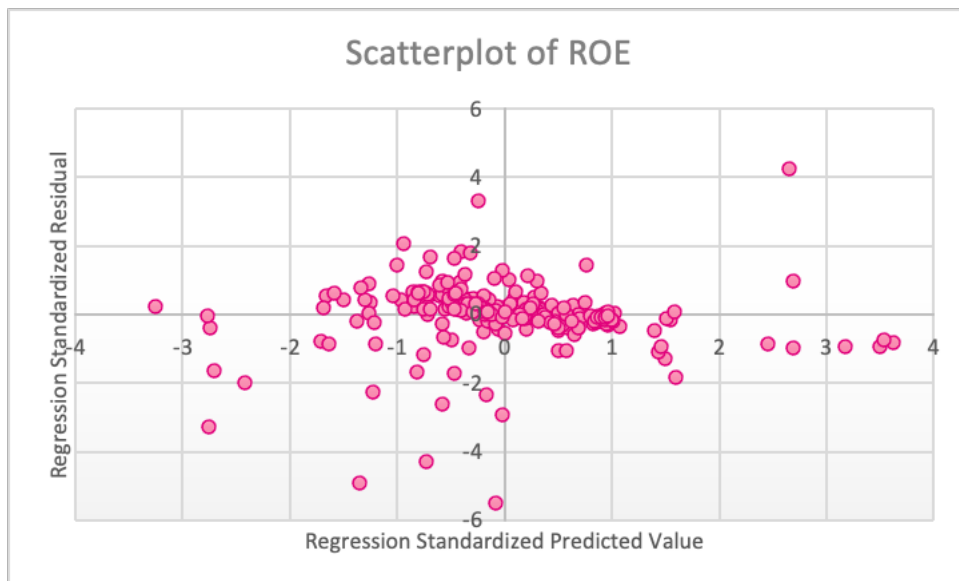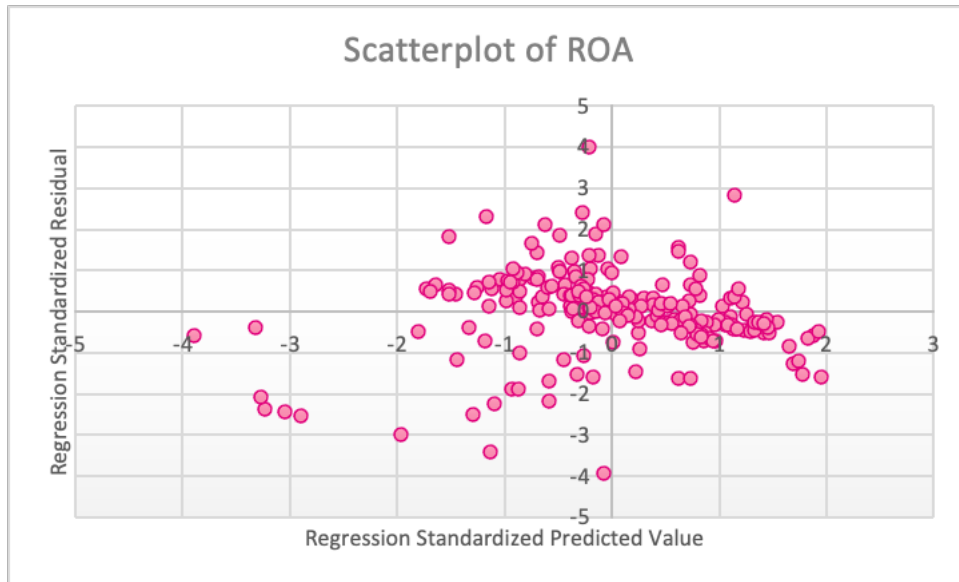|	**Descriptive statistics**					
	Manufacturing industry			*Non-manufacturing industry*		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
ROA	-3.00	3.00	.1234	-3.00	1.62	-.0741
ROE	-3.00	1.76	.0484	-2.51	3.00	-.0166
Tobin's Q	-1.41	1.99	.2078	-3.69	1.42	-.4242

APPENDIX C
Scatterplots with independent variables plotted against dependent variables

APPENDIX D

APPENDIX E

Normal P-P Plot of Regression Standardized Residual (ROA)

Normal P-P Plot of Regression Standardized Residual (ROE)

Normal P-P Plot of Regression Standardized Residual (Tobin's Q)