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The impact of CEO narcissism on M&A performance

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Examining on different narcissism variables

by

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Summary

Title:	The impact of CEO narcissism on M&A performance – Examining on different narcissism variables
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Authors:	Christian Dresen & Rolf Sprenger
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Key words:	CEO characteristics, narcissism, overconfidence, cumulative abnormal returns, M&A intensity
Purpose:	To investigate the effect of different narcissism variables on cumulative abnormal returns and M&A intensity of an acquiring company in an M&A context. Additionally, to compare different measures for narcissism.
Methodology:	This paper uses a quantitative research approach by doing an event study to explore cumulative abnormal returns and M&A intensity. Multivariate regression analyses are used to test for two different hypotheses that were derived deductively.
Theoretical perspectives:	The theoretical perspective incorporates theory from M&A value creation, managerial hubris, empire building, upper echelons and narcissism.
Empirical foundation:	To test for the hypotheses a sample of 214 acquisitions on the European market between 2010 and 2019 is used.
Conclusion:	The authors find evidence for different impacts on abnormal returns and M&A intensity depending on the respective narcissism measure that is analysed. In general, there is not one specific measure that can be recommended. The outcome is extremely dependent on the definition of narcissism and the way to measure it, as all variables used are showing different results. In order to obtain further sound and comparable research results, it is indispensable to develop a standardised and uniform measurement method for narcissism.

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Rolf Sprenger

Abstract

This research study uses an event study regressing cumulative abnormal returns on four different narcissism measures and additional control variables. Moreover, a regression of M&A intensity, measured by the deal size divided by the total market capitalisation of the acquirer, is regressed on the beforementioned narcissism measures and different control variables. Supplementary, the different measures for CEO narcissism are analysed in detail and compared with each other. The authors find evidence for different impacts on abnormal returns and M&A intensity depending on the narcissism measure that is analysed. There is not one specific measure that can be recommended to use in future research. The outcome is extremely dependent on the definition of narcissism and the way to measure it, as all variables used are showing different results. According to these results, previous research using just one variable trying to measure the phenomenon of narcissism should be critically scrutinised. Even though each of these methods are profound and scientifically recognised, their interchangeable application has to be challenged, since all methods measure the same phenomenon, narcissism, but make use of different characteristics of a narcissist. Since this research field is still quite young and little explored, there is still room for further research and extended measurement methods that measure narcissism in other ways and thus provide a supplementary and extended contribution to the literature. In order to obtain further sound and comparable research results in business and corporate finance research, it is therefore indispensable to develop a standardised and uniform measurement method for narcissism.

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1. Introduction

The first chapter gives an overview of the investigated topic. It starts giving some background information, before stating the problem and talking about the research gap that is filled. After that, the aim and purpose of this study are outlined, also mentioning the driving motivation for this research field. The last two sections raise the exact research questions and shortly explain the scope and delimitations of this paper.

1.1 Background

Rapid technological process, globalisation and the ever-growing, demand-dominated markets have significantly changed the business environment recently. Global M&A activity has boomed in the previous years. The question may be asked if we see the beginning of a seventh acquisition wave or if we are already in the middle of it (Gaughan, 2007). Industrial consolidations, cross border mergers and concentric mergers are just examples of aspects driving this increase in M&A transactions. Considering these market trends and M&A's in general, the question arises as to whether the transactions create value for the acquirer or not. While most previous research has focused primarily on "hard" economic, business- and finance related factors and drivers for M&A transactions (Faccio, et al., 2006; Servaes, 1991; Travlos, 1987), recent research shows a trend towards softer factors capturing behavioural aspects of central players and managing individuals in companies across industries and business areas, most often CEOs (Aktas, et al., 2016; Chatterjee & Hambrick, 2007; Ferris, et al., 2013; Capalbo, et al., 2018). Exemplary aspects lately investigated are narcissism and overconfidence of CEOs. Narcissistic individuals tend to have several specific characteristics influencing their psychological make-up and thereby their decision-making:

1. A narcissist tends to overestimate his/her abilities and achievements (Aktas, et al., 2016).
2. A narcissist forces his-/herself to reinforce the ideal ego and obtain endorsement of his/her self-view (Buss & Chiodo, 1991).
3. Social life and the psychological alignment of a narcissist are highly driven by goals that should help him/her to improve the own status and esteem (Campbell, et al., 2004).
4. A narcissist is itching to conduct highly visible and grandiose actions (APA, 1994).
5. A narcissist has great overconfidence and willingness to bet (Campbell, et al., 2004).
6. A narcissist has a high impulsivity which also influences the decisions he/she takes (Campbell, et al., 2004; Vazire & Funder, 2006).

All these characteristics of a narcissist can have a big effect on his/her behaviour and decision-making. Considering a company with a narcissistic CEO, the narcissistic characteristics could have a considerable impact on the CEO's M&A-related decisions and hence on the performance of the acquiring company.

1.2 Problem Statement

Shareholder value creation from M&A transactions is one of the most popular and most investigated topics in corporate finance research. Considering the fact that the field of mergers and acquisitions is experiencing a significant and continuous growth in the previous decades, this topic is still of highest relevance. Various researchers have examined different success factors, wealth effects and reasons that are causing mergers and acquisitions as a whole, in different sectors or industries, and in different geographical areas. Nevertheless, most research this topic has experienced so far has focused on conservative, classical and economic (most financial) issues. Under this focus we were able to experience an abundance of research, whereas other rather "soft" factors received little attention. A recent trend in corporate finance research is to investigate these softer and more behavioural factors like overconfidence or narcissism of managing individuals, central players, CFOs and especially CEOs. However, in empirical science there is just little research done approaching these behavioural factors.

A company's CEO is the major decision maker triggering essential merger or acquisitions, due to his/her strategic and leading nature. His/her psychological characteristics highly influence the realisation of M&A transactions, the number of conducted M&A transactions, and obviously the performance of M&A transactions (Aktas, et al., 2016). Taking also into account that a CEO with narcissistic characteristics tends to be driven by goals to improve his/her ego, self-esteem and status (Buss & Chiodo, 1991; Campbell, et al., 2004), it is very likely that his/her psychological make-up is influencing his/her decision-making as a whole and consequently also his/her M&A related decisions (APA, 1994; Campbell, et al., 2004; Vazire & Funder, 2006; Aktas, et al., 2016).

M&A transactions historically were a US-dominated phenomenon and most research that has been conducted by now has investigated US-American companies and samples (Gaughan, 2007, pp. 3-11; Aktas, et al., 2016). However, the occurrence and importance of M&A transactions has significantly increased in Europe and European companies already in 2007 (Gaughan, 2007, pp. 3-11). This trend has not stopped by now, reinforcing the need to use more

European companies and samples for the empirical investigation of softer factors influencing M&A transactions in corporate finance research.

The problem in examining the impact of a CEO's narcissistic characteristics is also to find a suitable and appropriate variable capturing narcissistic character traits and classifying the CEO as narcissistic or non-narcissistic in a profound manner. The recent corporate finance literature mainly measures narcissism by three different methods. One approach refers to indicators that are estimated by using the proportions of first-person singular (I, me, my, mine, myself) to total first-person pronouns (I, me, my, mine, myself, we, us, our, ours, ourselves) in CEO letters, speeches or interviews (Aktas, et al., 2016; Chatterjee & Hambrick, 2007). Another approach developed by Chatterjee and Hambrick (2007) sets up a scoring model which includes measures of the CEO's verbal behaviour, an analysis of the CEO's photograph in annual reports, an analysis of the CEO's prominence in the company's press releases and two measures analysing the CEO's compensation (ibid). Moreover, some research measures narcissism analysing the CEO's signature in annual reports according to various criteria like size, legibility etc. (Ham, et al., 2017; Ham, et al., 2018). It must be examined which method is most appropriate to measure narcissism or whether there are other alternatives by comparing different measures with each other.

1.3 Aim & Purpose

The research field of M&A transactions is very broad and comprises a variety of different studies, investigating different success factors, using different samples, analysing separate industries and geographical locations. Examining behavioural factors like overconfidence or narcissism is a recent trend in corporate finance research without a considerable evolution. Due to this fact, this research study will focus on the effect a CEO with narcissistic characteristics has on the performance of acquiring companies' M&A transactions and the M&A intensity of the deals. Although there is already some research and evidence investigating narcissism and its effect on a company's behaviour and performance (Campbell, et al., 2004; Capalbo, et al., 2018; Chatterjee & Hambrick, 2007; Ferris, et al., 2013), there is just little research and evidence, investigating whether a narcissistic CEO affects the success of an acquiring company in a M&A transaction (Aktas, et al., 2016) and almost no research on the effect on M&A intensity. This event study aims to detect if a narcissistic CEO of an acquiring company negatively impacts the success of an M&A transaction, measured by cumulative abnormal returns. Additionally, the paper aims to find if a narcissistic CEO positively impacts the M&A

intensity of the specific deal, measured by deal value divided by market capitalisation of the acquirer. This study contributes to literature in general by providing additional research on the very little investigated topic. This study is the first to investigate the impact of CEO narcissism on the respective company's M&A intensity. By using four different measures for narcissism this research study also contributes to previous literature in the way that it provides alternative measures for narcissism and thereby shows if there is a consistent result due to the formulated hypotheses. Their correlation is also of great interest, as comparing different measures for narcissism has not been investigated by now. On that account this study for the first time correlates four different measures for narcissism. Furthermore, this study captures the European market using the Euro Stoxx 50 index over a ten-year period and thereby contributes to literature with a sample hitherto not investigated in this research field. The European market is especially interesting since it comprises a variety of countries and is hence not influenced by country-specific characteristics. Moreover, Europe faces an enormous increase in M&A activity in the last decade.

1.4 Research Question

The previously presented research problem, the aim and purpose of this study are intended for deriving the following research questions:

Do narcissistic CEO characteristics have a negative effect on M&A performance?

Do narcissistic CEO characteristics have a positive effect on M&A intensity?

In order to answer these questions an event study is executed regressing cumulative abnormal returns on four different narcissism measures and additional control variables. Supplementary, a regression of M&A intensity is carried out on the beforementioned narcissism measures and different control variables.

1.5 Scope and Delimitations

The sample used in this research study bases on the Euro Stoxx 50 index which comprises the 50 biggest companies due to market capitalisation in the eurozone. It includes all acquisitions made between 2010 and 2019 by the Euro Stoxx 50 companies that meet the requirements set out in detail in chapter 4.2.2. An event study is performed as method which is commonly used in comparable research literature (Aktas, et al., 2016; Faccio, et al., 2006). Data is obtained from several databases, including Bloomberg, Thomson Reuters Datastream and Zephyr. The

event windows used to answer the first research question capture a five-day and three-day horizon around the announcement date of the respective acquisition. This research study is limited to the before mentioned scope due to limited availability of data for larger samples in Europe and its rather short time frame. Further, the measurement of narcissistic characteristics by the first narcissism variable is limited to CEO letters due to a lack of interviews and speeches. Moreover, interviews and speeches would be less consistent in terms of length, format and content than CEO letters. Furthermore, all narcissism measures were constructed manually, whereby a subjective influence cannot be completely eliminated and the variables potentially could suffer from individual bias.

2. Literature review

This chapter first presents findings of previous research on factors that are found to have an impact on M&A performance in general. It is then connected to the research gap that is identified concerning the measurement of soft factors and their impact on M&A performance. CEO narcissism is particularly investigated in this paper. There is little research on the topic of narcissism and especially the impact of CEO narcissism on M&A performance. However, findings of existing previous research on the impact of behavioural factors, focussing on narcissism, are outlined in this chapter.

2.1 Influencing factors on M&A performance

Impacts on M&A performance are frequently measured by changes in the cumulative abnormal return (CAR) around the announcement date of the specific transaction (Aktas, et al., 2016; Faccio, et al., 2006; Fuller, et al., 2002). The CAR is precisely outlined in chapter 4. Transactions are seen to create value because of synergies between the acquiring company and the target, but often they also destroy value. Bruner (2002) evaluated around 100 academic studies from 1971-2001 and stated that M&A's on average create value. Despite this overall finding he also mentioned that, especially for the acquiring firm's shareholders, half of the studies showed a negative CAR. A lot of research is already done on several factors influencing M&A performance. The most frequently researched factors and their impact are outlined in the following.

First of all, the acquirer's size is found to have a negative impact on M&A performance in several studies (DePamphilis, 2010; Loderer & Martin, 1990; Schwert, 2000; Moeller, et al., 2005). This phenomenon can be derived from corporate governance theory, such as empire building, stating that managers of large companies can be influenced by other factors than creating value for the company. They maybe want to enhance their influence and visibility through M&A's merely extending their empires rather than creating value. Additionally, smaller firms hardly acquire companies in industries they are not familiar with, which is something bigger firms tend to do more often and is seen to potentially destroy value due to lack of industry knowledge (DePamphilis, 2010).

Another factor that is also related to corporate governance, more specifically the hubris theory, is the payment of acquisition premiums. The payment of such premiums is associated with

overpaying for a company and is found having a negative impact on CAR and thus on M&A performance (Faccio, et al., 2006).

Moreover, several research studies focussed or at least incorporated the method of payment as a factor that can influence the CAR. Using a sample of 167 acquisitions, Travlos (1987) found that companies on average earn higher returns if the payment was done in stock and lower returns if it was done in cash. Datta et al. (1992) confirmed those findings, whereas Chang (1998) stated the exact opposite. Using a sample of 255 acquisitions, he found that the companies on average earn higher returns if the payment was done in cash rather than in stock. The results at least suggest that the payment method has any influence on CAR or may even point to a quadratic relationship.

There is a lot of research on the impact of acquiring a listed or unlisted target (Chang, 1998; Faccio, et al., 2006; Fuller, et al., 2002; Hansen & Lott, 1996; Moeller, et al., 2005). Faccio et al. (2006) found that acquirers of listed targets earn an insignificant average abnormal return of -0.38%, whereas acquirers of unlisted targets earn a significant average abnormal return of 1.48%, using a total sample of 4,429 acquisitions by Western European firms from 1996-2001. This phenomenon is called the listing effect and is in line with other research previously mentioned and is thus seen to have an impact on CAR.

Whether the M&A transaction is a cross border deal or not has found interest in several research papers (Morck & Yeung, 1992; Markides & Ittner, 1994; Datta & Puia, 1995). Deals that are cross border are seen to have a positive impact in some studies. Faccio (2006) found a significant positive impact on CAR, whereas Banal-Estanol and Seldeslachts (2011) argued that a cultural clash and different organisational cultures should have a negative impact when it comes to integration and overall M&A performance. In a research review of several years, Cartwright and Schoenberg (2006) showed that the impact of cross border deals appears to be mixed, but is seen to have at least any impact.

As mentioned earlier, value from M&A's is mostly created through synergies. Previous studies found that if M&A's are performed within the same industry, a transfer of core skills arises between the acquirer and the target. This is seen to have a positive impact on the acquirer's CAR (Salter & Weinhold, 1979). Other studies could not find significant evidence that transactions within the same industry impact the acquirer's CAR positively (Flanagan, 1996).

According to agency theory, which is outlined in more detail in chapter 3.2, the ownership structure is found to have an impact on M&A performance in different studies. Deng et al. (2013) argued that there is a huge difference between individuals and institutional owner structures in terms of individualities affecting a company's performance in transactions. Due to lack of personal interests and differences in percentage of stockholding, investors or owners are more or less interested in monitoring the specific company's actions and investments (Faccio, et al., 2011). Managers thus have more or less freedom in their decisions, which is seen to have an impact on M&A performance. High portfolio exposure of institutional investors is therefore found to create higher CAR in the event of M&A's (Thomsen & Pedersen, 2000; Shleifer & Vishny, 1986; Craninckx & Huyghebaert, 2015; Ben-Amar & Andre, 2006).

2.2 Behavioural factors in business research

After business and especially corporate finance research have long focused on "hard" financially oriented factors, a trend has recently emerged to examine "soft" behavioural factors with regard to corporate decisions, policies and performance. Already 35 years ago Hambrick and Mason (1984) developed their Upper Echelons Theory, stating that organisational outcomes, strategic choices and performance levels are highly predicted by managerial background characteristics. Considering this profound theory, there has been a variety of recent research investigating individual personality traits of managers, CFOs and especially CEOs.

Building on Upper Echelons Theory, Morck et al. (1990) found evidence that managerial objectives drive bad acquisitions by reducing the acquiring firm's value. This is in line with recent research that goes beyond managers' objectives and focuses more on the individual characteristics of CEOs and managers and analyses their effect on various important business decisions. With a specific concentration on overconfidence as character trait of interest, Malmendier and Tate (2005) examined the relationship between CEO overconfidence and corporate investments. In their study they investigated a US sample of 500 companies between 1980 and 1994 and claimed that overconfident CEOs overestimate returns on their investments and simultaneously regard external funds as unduly costly which results in corporate investment distortions (ibid.). Building on the critical deal characteristics investigated by Malmendier and Tate (2008), Ferris et. al (2013) examined the role a company's CEO plays for the company's international M&A activity. Unlike Malmendier and Tate they instead used a sample comprising the 500 largest companies in the world, measured by revenues, between the years 2000 and 2006. They found that overconfidence is related to a variety of M&A characteristics,

like the number of offers submitted by the respective CEO, the frequencies of non-diversifying and diversifying acquisitions and the use of cash as primary payment method. Furthermore, Ferris et al. could prove that the influence of an overconfident CEO is an international phenomenon and does not only apply to US companies and CEOs. A similar approach but with different objectives has been carried out by Hirshleifer et al. (2012). They tested whether overconfident CEOs are better innovators and found evidence for their hypothesis since overconfident CEOs invest more in risky projects and thus achieve greater innovative success by obtaining more patents. Another recent study published by Hribar and Yang (2016) focused on the relationship between overconfidence and future predictions and management forecasts. They found evidence for this relationship on the grounds that overconfidence leads to more optimism in a manager's forecasts of future earnings. Moreover, Hribar and Yang (ibid.) figured out that the predictions of an overconfident CEO are more precisely as they issue narrower range forecasts due to their optimism.

A great deal of research has focused on overconfidence of these strategic actors. Following the current trend, however, it becomes apparent that a certain part of research is no longer solely focused on individual character traits such as overconfidence, but rather on entire personality structures of leadership personalities such as narcissism. The personality structure of a narcissist is particularly interesting since it is not only attributed to historical "world leaders", but also a frequently occurring personality of company leaders, managers, CFOs and CEOs (Buss & Chiodo, 1991; Rosenthal & Pittinsky, 2006). One of the main research studies examining narcissism was conducted by Chatterjee and Hambrick (2007). In their prominent study, they investigated the influence of CEO narcissism on a company's strategy and performance in the computer and software industry with evidence that narcissistic CEOs positively affect the strategic dynamism and grandiosity (ibid.). Therefore, they examined the personality traits of 111 CEOs between 1992 and 2004. They also found that CEO narcissism is positively related to the number and size of acquisitions and resulting in partly extreme fluctuations in the company's performance. Nevertheless, the performance on average is not better or worse in companies with narcissistic CEOs. As a reason they claimed that narcissistic CEOs favor bold actions that attract attention. According to Zhu and Chen (2015) narcissistic CEOs also tend to overestimate their own prior board experience which leads them to rely more on their own experiences and less on the prior board experiences of other directors when making corporate strategy decisions. They concluded this tendency can also be seen as an expression of superiority and the overriding desire of self-realisation and improvement of the self-image

which are very similar for narcissistic persons. Similar to the findings of Ferris et al. (2013), but with a focus on narcissism instead of overconfidence and a more holistic view, not limited to mergers and acquisitions, Oesterle et al. (2016) investigated the role of CEO narcissism in internationalisation decisions. In an empirical study they captured German manufacturing firms over the period 2004 – 2013 and proved that CEOs with a high degree of narcissistic personality traits tend to intensify their company's business activities abroad. They traced their results back to the fact that greater foreign activities raise the CEO's sphere of control, opening multifaceted opportunities to fulfill narcissistic interests.

Another research has focused on the relationship between CEO narcissism and the company's tax policies (Olsen & Stekelberg, 2016). According to Olsen & Stekelberg (2016), CEO narcissism is also positively associated with tax sheltering, an aggressive form of corporate tax avoidance. They claimed that the narcissist, due to his or her sense of superiority, feels his- or herself above the law and is aggressive when acting from conviction. Moreover, being highly motivated to pursue rewards or desired outcomes, the narcissistic CEO shows just weak motivation to avoid negative outcomes (ibid.). This research by Olsen and Stekelberg is similar to the finding of Ham et al. (2017) who investigated the relationship between CFO narcissism and the company's financial reporting quality. In their empirical study they examined the signature of 512 CFOs and 513 CEOs of publicly traded companies with revenues above 1.2 billion USD. They could empirically prove that narcissism predicts misreporting behaviour and found that CFO narcissism is related to more earnings management, less timely loss recognition, weaker internal control quality, and a higher probability of restatements. This is in line with Capalbo et al. (2018) who found that narcissistic CEOs engage in accruals management to manage earnings positively. By making use of accounting choices, CEOs indulge their egos and enhance their perceived self-worth (ibid.). Analysing all NYSE listed securities between 2007 and 2013, they could support prior research conclusions of Amernic and Craig (2010) who claimed that narcissistic CEOs tend to use financial accounting language and measures to improve their sense of self-worth.

Recently, Aktas et al. (2016) investigated the takeover process under the question whether, and if so, how both target and acquirer CEO's narcissism influence the process from private initiation to deal completion and build on previous research of both Malmendier and Tate (2005) and Ferris et al. (2013). They used a US sample comprising mergers and acquisition from 2002 to 2006 and found that the length of the private takeover process is negatively

associated with acquirer CEO's narcissism and that the bid premium is unrelated to both acquirer and target CEO's narcissism. One further important and significant finding is that acquirer's cumulated abnormal returns are negatively related to target CEO's narcissism (Aktas, et al., 2016). Another research study investigating the relationship between CEO narcissism and the respective company's investment policy and performance was conducted by Ham et al. (2018). They found that CEO narcissism is associated with overinvestment in M&A and R&D expenditures and hence leads to lower financial productivity in form of profitability and operating cash flows. These results are in line with the findings of Malmendier and Tate (2005) with regard to the investment activity, but do not correspond to the findings of Chatterjee and Hambrick (2007) who found that the average performance of companies with narcissistic CEO's is neither better nor worse.

There is much consensus in existing literature about the relationship between narcissism and a CEO's willingness to take risks. Campbell et al. (2004) claimed that narcissists are focused on success and achievement combined with little conscious avoidance orientation or fear of failure. As a result, this narcissism can lead CEOs to place bets on promising outcomes with little worry about poor performance (ibid.). This conclusion is in line with findings of Malmendier and Tate (2005) as well as Olsen and Stekelberg (2016). One of the most recent research is carried out by Buyl et al. (2019) who analysed the US banking industry between 2006 and 2014 in the context of the systemic shock in September 2008. They found that before the shock, CEO narcissism has positively affected the risk-appetite of the bank's corporate policies. This result supports the findings of Campbell et al. (2004), seeing a company's willingness to take risks positively associated with CEO narcissism. Apart from the distinction between narcissism and overconfidence, there have already been other terminological and thematic distinctions in this emerging research field. While narcissism and hubris are terms that are often used very interchangeably in existing literature, there has also been research that distinguished CEO narcissism from hubris and examined the different effects on strategic business decisions (Tang, et al., 2018). In their research, Tang et al. found that narcissistic CEOs attach more importance to corporate social responsibility, while hubristic CEOs attach less importance to it (2018).

Apart from the thematic diversity within this research area, it has to be emphasised that in existing literature different variants are applied to measure the narcissistic character traits of CEOs. After the Narcissistic Personality Inventory (NPI) – it is the most widely used non-clinical measurement method for narcissism - was developed by Raskin & Hall (1979), Raskin

and Shaw (1988) discovered a significant relationship between the NPI and certain aspects of verbal behaviour. Specifically, they saw a positive interrelationship between narcissism and the use of first-person singular pronouns. In their study, they explored that the higher the NPI measure as an indicator for narcissism, the higher the use of first-person singular pronouns and the fewer the use of first-person plural pronouns in monologues of the investigated peer group.

Based on these results, a large number of researchers in corporate finance meanwhile measure narcissism using a ratio of first person singular pronouns to first person plural pronouns in CEO's speeches and interviews (Aktas, et al., 2016; Capalbo, et al., 2018; Chatterjee & Hambrick, 2007). An alternative approach was developed by Chatterjee and Hambrick (2007). Their method allows to measure a CEO's or manager's narcissism by using unobtrusive indicators of personality, namely (1) the prominence of the CEO's photograph in the company's annual report; (2) the CEO's prominence in the company's press releases; (4) the CEO's cash compensation divided by that of the second-highest paid executive in the firm; and (5) the CEO's non-cash compensation divided by that of the second-highest-paid executive in the firm (ibid.). There has been a variety of research replicating this approach, albeit in some cases with minimal variations (Zhu & Chen, 2015; Buyl, et al., 2019; Tang, et al., 2018; Oesterle, et al., 2016; Olsen & Stekelberg, 2016). Recently, however, another method has been applied in this research field, which evaluates narcissism on the grounds of graphological methods by analysing the signature of the respective CEOs in annual reports (Ham, et al., 2017; Ham, et al., 2018). Due to the complexity and lack of implementation possibilities, the NPI itself is rarely used to measure narcissism in empirical studies. However, a well-known exception are Nevicka et al. (2011) with their research study on narcissists' leader emergence and performance.

3. Theoretical Background & Hypotheses Development

The third chapter reflects the theory needed to understand this study. It starts talking about M&A fundamentals in general. Next, agency theory and in particular hubris and empire building theory are outlined. After this the theory on narcissism is highlighted. Finally, based on those theories and existing research outlined in the previous chapter, the hypotheses of this study are developed.

3.1 M&A Fundamentals

3.1.1 Definitions

Corporate finance theory contains a multitude of different ways to describe and define mergers and acquisitions. A merger can be simply seen as a legal and economical combination of two independent companies, in which one of these companies survives and the other so-called "merged company" defuncts (Gaughan, 2007, p. 12). In this transaction, often referred to as statutory merger, all assets and liabilities of the merged company are transferred to the acquiring company. However, if the target company acts as a subsidiary of the acquiring company, this transaction is referred to as a subsidiary merger (ibid.). Another form of M&A transactions is the consolidation. In a consolidation two or more companies join to form an entirely new legal entity (ibid.). Both in theory and in praxis the linguistic usage contains a variety of terms for M&A transaction forms, which are often used interchangeably (ibid.). Examples for this are takeovers, which can refer to both friendly and hostile transaction forms.

3.1.2 Reasons for M&A transactions

A company can be tempted to make M&A transactions for various reasons. The most common motive for a company to act on the buy-side (to acquire) is to expand its business as a whole or just in particular areas. Thereby, a distinction can be made between a vertical M&A transaction, a horizontal M&A transaction or a conglomerate. A horizontal transaction is a merger of two competing companies that act in the same or a similar business area (Gaughan, 2007, p. 13). In a vertical M&A transaction the acquiring and the target company have a buyer-seller relationship (ibid.). Completely detached from any directly obvious relationship are the acquiring and merged company in a conglomerate (ibid.). With a conglomerate merger the acquirer aims at a higher diversification in his company or portfolio (Porter, 1987). Choosing one of these types of M&A transactions a company can gain additional market shares or expand into other business or geographic areas (Gaughan, 2007, p. 14).

Another reason for acquiring a company is the financial aspect. If the target company is undervalued from the acquirer's point of view, but there is no strategic interest in acquiring this company, an acquisition may be justified for purely financial reasons (ibid.). Especially in a transaction for purely financial reasons, the premium plays a central role, since the market value of the target company plus excess premium should still lead to a profitable investment and the excess premium should not cancel out the expected gains resulting from the undervaluation (ibid.). Other reasons for M&A transactions can be tax motives, the admission of new investors, succession solutions, restructuring purposes, improvement of the competitive position, strengthening of core competencies, disposal of minority interests or the realisation of exit strategies (ibid.).

3.1.3 Wealth effects

Often M&A transactions are motivated by the generation of synergies (Koller, et al., 2015, p. 599). In the sense of the best-owner principle, an acquisition creates value for the acquirer, the investors and the whole economy if the acquired company is transferred to a better managing owner (ibid.). The value created by the new owner results from the difference of the value of improvements and the acquisition premium (Koller, et al., 2015, p. 601). Correspondingly, an acquisition can also be value-destroying, when the acquisition premium exceeds the value of improvements. The value of improvements, in turn, consists of the value of synergies and the value of control. The value of control refers to a better management resulting from changes in so far suboptimal corporate policies, whereas the value of synergies captures the gain in value obtained by the combination of the two or more separate firms (ibid.).

According to Koller et al. (2015, pp. 614-615), synergies can either lead to cost savings or increased revenues, whereby cost synergies are much easier to generate than revenue synergies. Additionally, companies can create financial synergies due to a better debt capacity or tax benefits (Koller, et al., 2015, pp. 637-638). The fundamental principles claim that creating and maximising shareholder value is a long-term endeavour and not limited to today's share price maximisation (Koller, et al., 2015, pp. 4-15). Considering company's success of acquisitions and being aware of the fundamental principles, it is obvious that the obtained value has to be measured in the long-term. Nevertheless, acquisitions can also have short term wealth effects, especially for listed companies, considering the share price increase/decrease after acquisition announcements.

3.1.4 Success factors

The economic history has shown that acquisitions tend to occur in waves, and that these waves are driven, among other factors, by the level of interest rates (Koller, et al., 2015, pp. 602-603). In general, low interest rates and high share prices lead to a high M&A activity (Koller, et al., 2015). The corporate finance literature and theory in general rely on coherent success factors that trigger and affect a M&A transaction. Koller et al. (2015, p. 606) list four major success factors which are established throughout leading research. The first factor is a strong corporate performance with regard to the operating business, either measured by growth rates of share price and earnings (Morck, et al., 1990) or by market-to-book ratio (Servaes, 1991). Acquiring companies with a better corporate performance relating to their respective industry tend to create value after announcement of the acquisition (Morck, et al., 1990; Servaes, 1991). A second success factor are low transaction premiums. According to Travlos (1987), high premiums lead to negative returns on announcement for the acquiring firm. Being a sole bidder is the third success factor identified by research, meaning that stock returns on announcement are negatively correlated with the total number of bidders with respect to one target (Morck, et al., 1990; Datta, et al., 1992). The last success factor listed by Koller et al. (2015, p. 606) is the target's corporate form. Research has found that an acquisition of private target companies leads to higher stock returns on announcement than an acquisition of public target companies (Draper & Paudyal, 2006). Naturally, different research comprises and investigates different influencing and success factors. A recent research trend in corporate finance concentrates on "soft" factors relating to the behaviour of managing individuals in companies and their impact on various business decisions, which are found to have an impact on M&A performance by several studies (Aktas, et al., 2016; Malmendier & Tate, 2008).

3.2 Agency theory

Factors that can influence corporate financial decisions according to agency theory are conflicts due to effects of ownership structure and various principal-agent conflicts within the firm (Odgen, et al., 2003, pp. 87-88). In large corporations the company is owned by one group, the shareholders, while the control of operations and management is done by another group, the management. Odgen et. al (2003) mention that the separation of ownership and control is necessary, as most of the shareholders only have little stake in companies and do not see it as their responsibility or in their financial interest to expend resources to either manage or monitor the company. The company's management is maybe tempted to take self-serving decisions that are costly to shareholders, which is called the agency cost of managerial discretion (ibid.).

Especially in firms with dispersed ownership structures, agency problems between the two groups can have excessive wealth effects. Firms with concentrated ownership, where there is a major shareholder with controlling ownership, are more likely to have on average lower agency costs due to their monitoring of management incentives. They restrict management in taking decisions that are of their own interest and in contrast to the company's wealth (Pound, 1988).

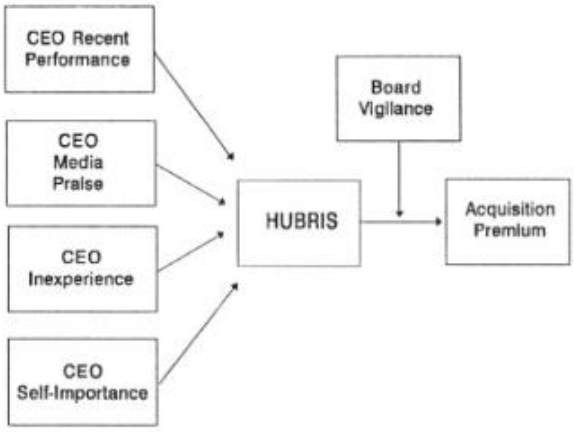
Odgen et al. (2003) raise the question which instructions should be given to the management by the company's shareholders in order to reduce agency costs. Large corporations are complex entities and also have a large group of extended stakeholders with different interests. It is thus also hard for the management to satisfy everyone. The message for the management should therefore be: "maximise the market value of the firm's equity, even if at time's management actions do not simultaneously maximise the value of the firm" (Odgen, et al., 2003, p. 87).

As already said, due to the separation of ownership and control, management has some space for action, also to achieve their own goals or to realise their interests, even when it is in contrast to the overall company wealth and the interest of shareholders. In a M&A context, agency problems or costs occur when managers take acquisition opportunities that maximise their own personal wealth but are not in line with the overall company or shareholder wealth. This can occur due to overpayments for the target by paying unworthy acquisition premiums (Morck, et al., 1990). This theory is described in more detail as the hubris theory in the next section. Another agency conflict in the M&A context arises when managers take on acquisitions that help building their own empire and thus take the chance of doing a large transaction in their career, without really increasing shareholder wealth (Lewellen, et al., 1985). This concept is known as the empire building theory and further outlined in section 3.2.2.

3.2.1 Hubris theory

The hubris theory in corporate finance literature was proposed by Roll (1986) and can be seen as part of the agency theory. It mainly describes the issue that CEO's of the acquiring firm in takeovers are biased by managerial hubris. This means that hubris, self-importance and pride of managers influence takeover decisions, which leads to overpayment in acquisitions due to higher premiums paid (Gaughan, 2007, pp. 157-168). It thus implies that managers or CEO's acquire companies not solely for economic gains or synergy effects, but also for their own personal motives, which may also be the primary reason or motivation for the takeover (ibid.). A visualisation of the hubris theory can be seen in the following.

Figure 1 - Model of CEO hubris and acquisition premiums (Gaughan, 2007, p. 159)



The theory is fundamentally based on the market efficiency theory of Fama (1970). It says that the market price of a security fully reflects its true and rational value. If this is the case, a company would not pay any premium when acquiring the target. Additionally, not every manager gets acquisition opportunities during his or her career and thus easily gets biased by hubris. When paying acquisition premiums, managers superimpose their own valuation over those of the market and thus show that their pride allows them to believe that their valuation is superior (Gaughan, 2007, pp. 157-168). The hubris hypothesis and the reason that managerial hubris influences takeover decision is in line with the best-owner principle. The principle in terms of M&A would state that the bidder company only acquires the target if they assume they can manage the assets of the target in a more efficient and profitable way. A manager who is biased by managerial hubris always thinks that he can manage the assets more efficiently than the target company does. The influence of personal motives of managers according to the hubris theory is thus seen as a reason for M&A activities (Koller, et al., 2015, pp. 613-614).

Roll (1986) posited that if acquisitions are explained by the hubris hypothesis, the stock price of the acquiring firm should decrease after the market becomes aware of the bid, as the takeover does not represent an efficient allocation of the company's shareholder wealth. However, he did not state that all takeovers are explained by his theory, but more wants to emphasise the importance of individual human elements, when negotiating acquisition prices of companies (Gaughan, 2007, pp. 157-168). Nevertheless, maybe most acquisitions are made truly to maximise shareholder value, create synergies or strengthen core competencies. Strengthen core competencies to become "the largest in the market" leads to the next chapter taking a look on the empire building theory.

3.2.2 Empire building theory

Empire building can also be seen as part of the traditional agency theory and is similar to the ideas of the hubris theory. The theory states that managers in companies with dispersed ownership acquire companies to enhance their empires, even if this reduces shareholder wealth (Lewellen, et al., 1985). They thus tend to strive reaching their own ambitions and goals rather than creating shareholder value. Ambitious CEO's who strive for a great career may have the goal to be head of a leading company and a huge empire, which they reach most quickly through inorganic growth by acquiring more companies. Additionally, they are becoming well known through news headlines of large transactions. CEO's with the ambition to create their own empire acquire companies without thoroughly investigating the potential downsides of the acquisitions (Gaughan, 2007, p. 160). Letting the firm grow beyond its optimal size to benefit from this by either financial compensation or prestige reasons is a comprehensively analysed agency problem (Chen, et al., 2012).

3.3 Narcissism

The *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, published by the American Psychiatric Association (APA) defines a narcissistic personality disorder as "a pervasive pattern of grandiosity (in fantasy or behaviour), need for admiration, and lack of empathy, beginning by early adulthood and present in a variety of contexts" (APA, 1994). Narcissistic personality traits and characteristics were already discovered and investigated by Sigmund Freud (1914). According to Aktas et al. (2016), "the diagnostic criteria describe individuals who are characterized by an exaggerated sense of their own importance that causes them to overestimate their abilities and achievements". A narcissistic individual is characterised by having a biased perception of reality and continuously forces his-/herself to reinforce the ideal ego and obtain endorsement of his/her self-view (Buss & Chiodo, 1991). The social life and the psychological alignment of a narcissist are highly driven by goals that should help him/her to improve the own status and esteem (Campbell, et al., 2004). Furthermore, narcissism is manifested by a grossly overdeveloped sense of entitlement and arrogance towards other people in their environment, which leads to the fact that a narcissist is itching to conduct highly visible and grandiose actions (APA, 1994). This in line with the research of Campbell et al. (2004) who detected that a narcissist has a great overconfidence and a great willingness to bet due to his willingness to take risks and his conceited behaviour. Another very important characteristic of a narcissist is his impulsivity which also influences the decisions he takes (Campbell, et al., 2004; Vazire & Funder, 2006).

Owen and Davidson (2009) found a relationship between the previously mentioned hubris syndrome (hubris theory) and an individual's narcissistic personality disorder. This relationship was essential to open the corporate finance research for these "soft" factors, describing behavioural effects and investigating their impact on managerial actions and decisions. This has motivated several business, economics and finance researchers to investigate the effect of narcissism on business-related topics. They thus contribute with this influencing factor to previous research and literature in different ways (Aktas, et al., 2016; Ferris, et al., 2013).

3.4 Development of Hypotheses

Two different hypotheses are formulated based on the previously discussed theory. Both hypotheses are rooted within the context of narcissism and the effect of narcissistic CEO's on M&A transactions. The first hypothesis is based on the influence of hubris on CEO's takeover decisions, which lead to overpayment in acquisitions due to higher premiums paid (Gaughan, 2007, pp. 157-168). It is also derived from empire building theory, claiming that some CEO's tend to strive reaching their own ambitions and goals rather than creating shareholder value (Lewellen, et al., 1985), which is in line with narcissistic characteristics (Campbell, et al., 2004). An ideal market would therefore recognise this overpayment and would react negatively to it. Previous research in corporate finance has already shown that acquiring CEO's overconfidence has a negative impact on market reactions to acquisition announcements (Malmendier & Tate, 2008). The impact of CEO narcissism on acquirer's CAR is thus tested by the help of different narcissism measures. The hypothesis is as follows.

Hypothesis 1:
Narcissistic CEO characteristics have a negative effect on M&A performance

According to the previously mentioned empire building theory, managers acquire companies to enhance their empires, even if this reduces shareholder wealth (Lewellen, et al., 1985). Narcissistic people are characterised by arrogance and the pursuit of attention and recognition (APA, 1994). They thus aim for huge and visible transactions (APA, 1994), which leads to the following hypothesis.

Hypothesis 2:
Narcissistic CEO characteristics have a positive effect on M&A intensity

4. Method & Data Description

This chapter outlines the overall research approach and method of the event study. Further, it describes both dependent and independent variables that are used, before presenting the regression models. Finally, important statistical tests are pointed out and the method is discussed.

4.1 Research approach & method

This paper is based on an event study, which aims to explain if and how narcissism of the acquiring CEO impacts cumulative abnormal returns of the acquiring company and M&A intensity of the specific deal. In order to get an overview of the topic and a general understanding, past literature was reviewed including different academic papers, reports and books found on LUBsearch and Google Scholar. A deductive approach is used, meaning that the hypotheses analysed in this paper are based on the dependency of economic theories, basically agency theory and narcissism. Using theory-based hypotheses is useful in quantitative studies, as it ensures objectivity and validity in interpreting results (Bryman & Bell, 2003). For the regression and analysis part of this study, data was collected using research databases like Datastream by Thomson Reuters, Bloomberg and Zephyr. Additionally, further data was collected manually from annual reports of the acquiring companies.

4.2 Event study

In order to analyse and evaluate the hypotheses developed in the previous chapter, an event study was carried out. This is mainly based on the fact that it is the common way to analyse the topic in previous research (Aktas, et al., 2016; Cable & Holland, 1999). Furthermore, event studies are among the predominant study techniques to investigate the impact of particular events (Cable & Holland, 1999), which can have an impact over a short period of time. Also, Mackinlay (1997) suggested event studies when investigating effects on abnormal returns deriving by easily identifiable events, like M&A's. Especially the effect of announcements of M&A's, which are analysed in this paper, should be reflected in the stock prices immediately if the theory of efficient markets holds (Odgen, et al., 2003).

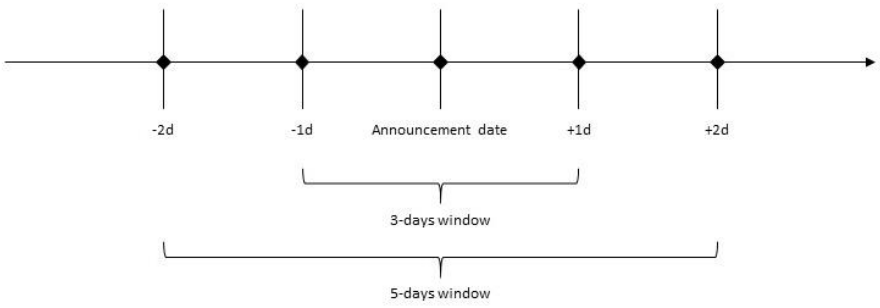
4.2.1 Event definition & window

As already stated, one purpose of this paper is to investigate whether narcissism of the acquiring firm's CEO in an M&A context has a negative effect on abnormal returns. First, the event is defined in the following. As it is common in previous research, the announcement date of the

specific M&A transaction is defined as the event (Aktas, et al., 2016; Faccio, et al., 2006). The event that an M&A transaction is announced is seen to be unexpected for the market. This is important because otherwise the market would have incorporated it already in the stock prices. Additionally, the majority of research in the field of M&A uses the announcement day as the event day as it is claimed to cause the greatest market reaction. This is especially found to be interesting in the context of narcissism research, as CEOs may show pride and self-confidence especially on the day of the transaction's announcement.

Second, the event window for measuring abnormal returns is defined. In line with Faccio et al. (2006) and other researchers in this field, this paper uses a five-day announcement period CAR as the event window. This means that the CAR is calculated by subtracting the daily return of the Euro Stoxx 50 index from the acquirer's daily stock return each day over the interval beginning two days prior to the announcement date and ending two days after the announcement date. Andrade et al. (2001) found that short-term windows are statistically the most reliable. The longer the event window, the more probable it is that something different than the defined event can influence stock prices, which is a problem that long event windows suffer from (Tuch & O'Sullivan, 2007). New information and thus transaction announcements are immediately incorporated into stock prices, when the theory of an efficient market holds (Odgen, et al., 2003). Therefore, an additional event window that is even shorter than the 5-day period is also used and analysed, beginning one day prior to the announcement and ending one day after the announcement date (3-day period). The following illustration shows the event windows used in this paper.

Figure 2 - Event-windows



4.2.2 Sample & Selection criteria

In the following the selection criteria for including a particular deal in the study are explained. Several criteria are used in the M&A database Zephyr to decide on which deal to include and which sample period to use:

- Transaction type: Mergers & Acquisitions
- Deal status: Announced
- Total deal value: > 500,000€
- Index: Acquirer listed in Euro Stoxx 50
- Announcement date: 01/01/2010 – 01/01/2019
- Percentage of final stake: min. 50%

The transaction type was set to Mergers & Acquisition with a minimum final stake of 50% hold by the acquiring company in the respective target company. The deal status has at least to be announced, as the announcement date is defined to be the event in this study. Additionally, the acquiring company must have a specific size and should be listed due to data availability. The minimum deal value is set to be at least 500,000€. This study focuses on acquirer companies listed in the Euro Stoxx 50. The criteria for the announcement date was set to 2010-2019 to include enough deals in the sample up to the actual year. These criteria are mainly chosen due to the fact that it was doable to find all the CEO letters in the annual reports, to analyse them and build the needed scores to measure narcissism in the given time frame of this thesis. The search results in 214 deals which is the total number of observations analysed and used in the regressions within this paper. Potential outliers or other reasons for excluding particular deals of the sample are described in in chapter 5.2.1.

4.2.3 Data collection

As already mentioned, the longest possible time frame without a financial crisis is used when collecting data, to mitigate the impact of economic up- or downturns. The general M&A data is collected from Zephyr. Data which was not available in the Zephyr database like stock prices and indices data were additionally collected from Thomson Reuters Datastream. Also, Bloomberg is used to collect any missing data. To build the different measures for CEO narcissism used in this paper, which are outlined in more detail in the next chapter, annual reports of the acquiring companies are used. Moreover, social media pages of the acquiring companies and the respective CEOs are utilised. Data and scores are manually collected and

build. The tables in appendix 1 show the different countries and industries that are present in the sample.

4.3 Description of variables

This paper aims to statistically test if acquirer CEO's narcissism has an impact on the cumulative abnormal return (CAR) and thus on the performance of the underlying acquisition and if acquirer CEO's narcissism has an impact on M&A intensity. To test these impacts, the paper uses a cross-sectional regression analysis regressing CAR and M&A intensity on the different measures for narcissistic CEO characteristics. To control for omitted variable bias in the regression results, various control variables are included, which are in accordance with M&A theory and in line with previous research (Aktas, et al., 2016; Faccio, et al., 2006). The dependent and independent variables used in this paper are described in the following to enable a better understanding of the regression and the analysis in the following chapters.

4.3.1 Dependent variables

To test hypothesis number one, the cumulative abnormal return (CAR) is used as dependent variable. The dependent variable to test for hypothesis number two is calculated by dividing the total deal value by the market capitalisation of the respective firm, in order to get the intensity of the transaction.

Cumulative Abnormal Return (CAR)

In general, there are two different common and scientifically recognised models that can be used for measuring M&A performance, namely price and return models. Kothari & Zimmerman (1995) stated that price models' earnings response coefficients are less biased, but however, return models have less serious econometric problems. Return models also avoid measurement errors when different accounting practices are used (Cable & Holland, 1999). As the sample includes different countries within Europe and potentially different accounting practices, the return model is used. This is also in line with most other researchers using cumulative abnormal returns as dependent variable to test for M&A performance (Aktas, et al., 2016; Faccio, et al., 2006; Fuller, et al., 2002). A 5-day and 3-day CAR each is used as dependent variable (event windows). More specifically, this paper works with the market adjusted return model as it claims to present similar results to the most commonly used market model (Brown & Warner, 1985) and is more appropriate to the scope of this thesis. The calculation and definition of the CAR based on this model are described in the following.

Calculation

The cumulative abnormal return is defined as the difference between the actual return of the specific company and the expected/normal return.

Firstly, the latest daily closing prices of the companies are extracted from Thomson Reuters Datastream. This is the base for calculating the actual return the company received within the investigated event window. According to Blume & Stambaugh (1983) price changes can be based solely on the bid-ask spread without changing the intrinsic value and can thus be biased, especially for smaller firms. As the sample contains the biggest companies in Europe, listed in the Euro Stoxx 50, this pitfall is expected to have little and thus negligible effect in this study.

Secondly, the normal return has to be determined. This is the return a specific company would have generated if the event would not have occurred. In line with other research (Faccio, et al., 2006; Aktas, et al., 2016), the performance of the stock market index serves as a proxy to get the normal returns. As all companies are listed in the Euro Stoxx 50, this index was taken to derive the normal returns.

$$R(E)_{i_t} = R_{M_t} \tag{1}$$

Where $R(E)_{i_t}$ is the expected return of the companies' stock price and R_{M_t} the return of the Euro Stoxx 50 index.

To calculate the actual and the expected returns on the basis of the companies' and index stock prices, the formula below is used:

$$R = \frac{P_1}{P_0} \tag{2}$$

Where P_1 is the closing stock price of the current day and P_0 the closing stock price of the prior day.

Next, the abnormal return for each day can be calculated by subtracting the daily return of the respective stock market index from the acquirer's daily stock return each day over the previous mentioned intervals.

$$AR_{i,t} = R_{i,t} - R_{M,t} \quad (3)$$

Where R_i is the return of the company's stock (actual return) and R_M the return of the respective index (normal return).

The last step is to cumulate the abnormal returns over the event window to generate the cumulative abnormal returns, showing the difference between the actual return and the return if the event would not have occurred.

$$CAR_i = \sum_{t-j}^{t+k} AR_{i,t+k} \quad (4)$$

Where CAR_i above is for the individual firm i, over the event window [t-j, t+k].

To test if the abnormal returns earned over the event window are statistically different from zero, the following hypothesis is tested with the traditional t-test.

$$H_0: CAR = 0 \quad (5)$$

Rejecting this hypothesis would mean that the market reacted significantly to the event and the announcement of the M&A transactions, which then enables to test CAR on the different variables. The t-test is performed in Stata and can be seen in appendix 2. The following formula is used to perform the t-test:

$$t_{CAR} = \frac{\overline{CAR_{i,t}}}{(\sigma(CAR_{i,t})/\sqrt{n}} \quad (6)$$

Where σ is the standard deviation of the abnormal return.

M&A intensity

To test for hypothesis number two, that narcissistic CEO characteristics have a positive effect on M&A intensity, the dependent variable (MA_INTENSITY) is measured by dividing the total

deal value by the market capitalisation of the acquirer. This shows how intense the particular transaction is and thus the relationship between the size of the deal and the size of the acquirer.

$$M\&A\ intensity = \frac{Deal\ value}{Market\ capitalisation} \quad (7)$$

4.3.2 Independent variables

The independent variables are distinguished between main explanatory variables and other control variables to control for omitted variable bias and to account for deal- and acquirer-specific characteristics.

Main explanatory variables

This study uses four different measures or scores for narcissism of acquiring CEOs, which are described in this section.

As already mentioned, a large proportion of the recent corporate finance literature measures narcissism with indicators that are estimated by using the proportions of first-person singular (I, me, my, mine, myself) to total first-person pronouns (I, me, my, mine, myself, we, us, our, ours, ourselves) in CEO letters, speeches or interviews (Chatterjee & Hambrick, 2007; Aktas, et al., 2016). This paper uses this measure as the first measure for narcissism as well (NARCISSISM1) and refers to CEO letters in the annual reports of acquiring companies in the respective year of transaction.

As a second measure for narcissism, graphology and the analysis of the CEO's signature in annual reports is used (NARCISSISM2). Although the measurement of narcissism in existing research literature is mostly carried out with other techniques, there are already approaches to measure narcissism using and analysing the CEO's signature in annual reports. In most cases, however, the analysis focuses solely on the size of the signature and ignores other graphological factors (Ham, et al., 2018; Ham, et al., 2017). Building on this approach, this study creates a score to evaluate the signature by analysing the overall size, left leaning, size of the first letter relative to the others and the legibility, which are seen as a sign of narcissism in graphology (Ploog, 2016; Nauer, 2013). All four individual components are therefore considered and evaluated separately. For every component 25 points are attainable, where zero is the minimum and 25 the maximum score. The higher the score, the higher the assumed narcissistic character traits. The overall size is assessed by comparing the signature's size with the size of the

preceding text. Both height and width of the signature have to be considered. If the proportions between the continuous text and the signature are identical, the overall size is rated "1" and receives none of the attainable points. If the signature is twice as large as the font in the continuous text, the size is rated "2" and receives 12.5 out of 25 points. A signature that has three times the size of the continuous text is rated "3" and receives the full score. The second component is the form of the signature. According to graphologists, a left-leaning signature with leftist loops indicates narcissistic traits (Ploog, 2016; Nauer, 2013). If the signature is left leaning, it must be evaluated with the full score of 25 points. If the signature is not left leaning, it does not receive any points for this criterion. The third criterion is the relationship between the first letter and the remaining letters of the signature. A very large initial letter in relation to the others also serves as an indicator of narcissistic traits (Ploog, 2016; Nauer, 2013). The following points are assigned to the different proportions:

1:1 $\rightarrow$ 0 points,
2:1 $\rightarrow$ 6.25 points,
3:1 $\rightarrow$ 12.5 points,
4:1 $\rightarrow$ 18.75 points,
$\geq$ 4:1 $\rightarrow$ 25 points.

As last component of this variable, the legibility of the signature is also evaluated with 25 points. A legible signature indicates that the signatory wants his or her name to be perceived and respected. According to graphologists, a legible signature is associated with narcissists (Ploog, 2016; Nauer, 2013). A signature is defined as legible if the full name of the signatory can be easily identified on the sole basis of the signature. If the signature is assessed as being legible, it receives the full score of 25 points, otherwise if it is assessed as illegible, it receives no points. The points from all four considered components are added and give a total score for each signature, which can take different values between zero and 100.

The third narcissism variable (NARCISSISM3) investigates the prominence of the CEO's photograph in the respective company's annual report in the transaction year and has already been used in corporate finance research by Chatterjee and Hambrick (2007) to measure narcissism. According to Chatterjee and Hambrick the CEO's photograph in an annual report is a great possibility to show him or her as the company's leader and as a representative for the company's success. They also claim that a highly narcissistic CEO will seek a great deal of

visibility in the annual report, both for vanity and also to show his or her superiority compared to others. If the annual report does not contain a picture of the CEO, no points are assigned to this variable. If the annual report contains only a photograph showing the CEO together with other persons, the variable receives 33.33 points. For a photograph that only shows the CEO occupying less than half a page, there is a score of 66.66 points. The full score of 100 points is assigned to the variable if the photograph only shows the CEO and simultaneously occupies more than half a page in size in the annual report.

The fourth narcissism variable aims to measure the self-portrayal and attention/recognition seeking personality of CEOs (NARCISSISM4). According to APA (1994) narcissistic persons are itching to conduct highly visible and grandiose actions. It is thus supposed that narcissistic people are bragging about big transactions through different media channels and present themselves to the public. As mentioned in the literature part, not many CEOs will have the chance to be a leading part of a big transaction and therefore eventually want to make sure that their name is associated with the deal. Previous research tried to measure the CEOs prominence in companies' press releases as a variable for narcissism (Chatterjee & Hambrick, 2007). This paper tries to do similar but will use todays very common social media channels Twitter and LinkedIn to build the score, as a lot of company news are published on social media channels and it is the fastest way to reach a lot of people. In the following, the scoring model for the variable is outlined in detail. First, it is counted how many times the name of the CEO was particularly named in tweets of the company's social media page in the year of the transaction. In order to control for the problem that social media became more popular in the last years and that there is a suspicious deviation between how often a company posted something in year 2010 and 2018, the mean value of the CEO mentions is calculated for every year. It is then checked if the CEO was mentioned above average in the company's postings of the transaction year or not. If so, 25 points were given and zero otherwise. Furthermore, to account for the social media presence of the CEOs themselves, 25 points were given if they have a social media account on Twitter or LinkedIn. It is seen that there are huge differences in how frequently CEOs use their social media pages for own postings, if they even have one. Thus, 25 points are also given if the CEO did more than 500 posts on his own and additional 25 points are given if he/she has more than 1,000 posts. To give an example, a CEO who, for instance is named above average in company posts, has a social media account for himself and has more than 1,000 posts will get the full score of 100. The score is seen to measure the social media presence of the

CEOs and how self-portrayed and attention-seeking they are as a measure for narcissism. It can take a value of zero, 25, 50, 75 or 100.

The correlation of the four measures are analysed precisely in chapter 6.1 as it is found to be interesting how the different measures for the same topic correlate and if all measures give the same results. Additionally, it is tried to give a recommendation based on the results on which measure to use in future research.

Control variables

The following control variables are found to be correlated with cumulative abnormal returns and in line with previous research. They are used in this paper to control for omitted variable bias.

The acquirer's size is found to influence the cumulative abnormal returns in previous research. Bigger bidders have lower CARs (Schwert, 2000; Loderer & Martin, 1990), whereas smaller bidders have significantly higher CARs regardless of the type of target (Moeller, et al., 2004). It is thus controlled for and *ACQSIZE* is measured as the natural logarithm of total sales and is a common measure for company size in corporate finance literature.

Additionally, Servaes (1991) stated that the acquirer's Tobin's Q positively affects acquirer's CAR. Using the acquirer's year-end Tobin's Q prior to the announcement date as a control variable (ACQTOBINSQ) controls for the market valuation of the respective company.

Chang (1998) stated a higher average CAR when the price for the target is paid in stock. Contradicting, Travlos (1987) reported a higher average CAR when the payment for the transaction is in cash. As the payment method seems to affect CARs, two dummy variables are used to control for it. PAYMENT1 takes a value of 1 if the payment is done in "all stock" and zero otherwise. PAYMENT2 takes a value of 1 if the payment is done in "all cash" and zero otherwise.

Geographical relatedness and thus, if a transaction is a domestic or a cross-border transaction influences CARs and was investigated or at least incorporated in several studies (Faccio, et al., 2006; Morck & Yeung, 1992; Markides & Ittner, 1994; Datta & Puia, 1995). CROSSBORDER

is thus measured as a dummy variable and takes the value of 1 if the transaction is cross-border and zero otherwise.

Furthermore, it is controlled for industry relatedness and diversification as it is seen to be a critical factor for M&A performance (King, et al., 2004; Mueller, 1969). In their paper Salter and Weinhold (1979) argued that a transfer of core skills can arise when both the acquirer and the target operate in the same industry. This is seen to create greater shareholder wealth than conglomerate M&As in finance literature. SAMEINDUSTRY is measured as a dummy variable taking on a value of 1 if acquirer and target have the same 4-digit SIC industry code and zero otherwise.

According to hubris theory, managers may be biased by managerial hubris and overpay for acquisitions by higher acquisition premiums. To control for this, the variable ACQPREMIUM takes on a value of 1 if an acquisition premium is paid and zero otherwise.

A control variable that is used by many researchers in this field and accounts for deal-specific characteristics is the deal size (Aktas, et al., 2016; Faccio, et al., 2006). DEALSIZE is measured by the natural logarithm of the total value paid for the target in million €.

One measure to control for acquirer-specific characteristics and a firm's financial situation that is widely used among researchers is leverage (Aktas, et al., 2016). It is used as a measure for investment capacity, since it is an indication of access to capital markets (Odgen, et al., 2003). ACQLEVERAGE is measured by the total debt to total equity ratio of the specific firm.

For a better overview, the control variables are briefly shown again in the following table with the label they have in the regressions and a description of the equation.

Table 1 - Control variables

Control variable	Label	Equation
Acquirer's Size	ACQSIZE	= natural logarithm of the acquirer's total sales
Acquirer's Tobin's Q	ACQTOBINSQ	= natural logarithm of the acquirer's Tobin's Q
Dummy payment method 1	PAYMENT1	= takes a value of 1 if the payment is done in "all stock" and 0 otherwise
Dummy payment method 2	PAYMENT2	= takes a value of 1 if the payment is done in "all cash" and 0 otherwise
Dummy cross-border transaction	CROSSBORDER	= takes a value of 1 if the transaction is cross-border and 0 otherwise
Dummy related industry	SAMEINDUSTRY	= takes a value of 1 if the firms have the same 4-digit SIC industry code and 0 otherwise
Dummy acquisition premium paid	ACQPREMIUM	= takes a value of 1 if an acquisition premium is paid and 0 otherwise
Natural logarithm of deal value	DEALSIZE	= natural logarithm of the total value paid for the target in million €
Acquirer's leverage	ACQLEVERAGE	= the acquirer's total debt to total equity ratio

4.4 Regression model

In this sub-chapter the regression models carried out in the econometrics software Stata are described. Different ordinary least square (OLS) regressions are run using White's (1980) robust standard errors to control for omitted variable bias and heteroskedasticity. The multivariate regression model to investigate on hypothesis one is set up as the following:

$$CAR = \propto + \beta_1\, NARCISSISM1 + \beta_2\, NARCISSISM2 + \beta_3\, NARCISSISM3 + \beta_4\, NARCISSISM4 + \mu x + u$$

Where CAR is the dependent variable, $\propto$ is the intercept, $\beta_1 - \beta_4$ the main explanatory variables, μx is a vector for all the control variables used and described in the previous chapter and u is the error term. Additionally, it is controlled for industry effects and different years with dummy variables.

The multivariate regression model to investigate on hypothesis two is set up as the following:

$$MA\_INTENSITY = \propto + \beta_1\, NARCISSISM1 + \beta_2\, NARCISSISM2 + \beta_3\, NARCISSISM3 + \beta_4\, NARCISSISM4 + \mu x + u$$

Where MA_INTENSITY is now the dependent variable, while everything else stays in line with regression model number one.

4.5 Statistical Tests

This section theoretically outlines statistical tests that are performed in Stata to ensure that the method leads to correct and valid estimations. The tests are executed in chapter 5.3. According to the Gauss-Markov theorem, the multiple linear regression model (MLR) estimators are the best linear unbiased estimators (BLUEs) when the following set of assumptions hold in the model (Woolridge, 2013, pp. 68-113). The subsequent explanations of the assumptions are based on Woolridge (ibid.).

The first assumption is *linearity in parameters* between the independent and the dependent variable. In order to test for linearity and thus get valid results Ramsey's RESET test is performed to discover misspecifications (Woolridge, 2013, p. 334). The test regresses the dependent variable on the explanatory variables from the original regression and additionally on powers of the fitted values of the dependent variable. It thus allows to capture non-linearity. If the f-statistic of the added variables is significant, it shows some sort of functional misspecification.

Random sampling and normality are bundled in this paper as the second MLR assumption. Random sampling means that the regression is based on a random sample of size n from the population. Since the used sample is large enough, it suggests that normality for the population can be assumed due to the central limit theorem (Woolridge, 2013, p. 120). The normality assumption can thus be dropped as a reasonably large sample size is used. Nevertheless, a frequency histogram is made to test for normality. Additionally, extreme outliers are removed from the sample as explained in chapter 5.2.1.

Assumption MLR 3 is *no perfect collinearity* between variables. For the assumption to hold there cannot be any constant variables or exact linear relationships among them. Some sort of imperfect collinearity is still allowed in the sample. If it would be assumed that all are pairwise uncorrelated, a bunch of simple regressions could also be performed and there would be no reason to use a multiple regression model. The Pearson correlation matrix is derived to see whether any variables correlate perfectly and thus have to be dropped.

The fourth assumption is *zero-conditional mean*, which means that the values of the independent variables are not allowed to contain information about the mean of the unobserved factors and thus have to be exogenous explanatory variables. The absence of endogeneity is the key assumption for unbiasedness of the estimators and a causal interpretation of the regressions. If the error term is correlated with any of the explanatory variables, the model suffers from endogeneity and potentially reverse causality, which is discussed in chapter 4.6 and 5.3.

The last and fifth MLR assumption is *homoskedasticity*, meaning that the variance of the error term is constant and does not change with any of the independent variables. To test for it, the Breusch-Pagan test for heteroskedasticity is performed.

When all five assumptions hold, it is assumed to get the BLUEs for the regression. Nevertheless, if the fifth assumption fails, which often happens, the estimators are no longer BLUE, meaning that there may be linear, unbiased estimators with smaller variance. To search for them is not easy and the use of a large sample is seen to solve for this problem. Testing for autocorrelation is also not necessary, as the sample does not contain a time series.

4.6 Method discussion

This section includes a discussion about three of the most prominent criteria of business and management research, namely reliability, replication and validity (Bryman & Bell, 2003, pp. 41-44).

Reliability is an issue particularly in connection with quantitative research like in this thesis. The main question is if the devised measures are consistent and stable (Bryman & Bell, 2003, p. 41). As this research incorporates control and dependent variables comparable to other research (Aktas, et al., 2016; Faccio, et al., 2006), and also uses the same kind of methodology, it implies a high degree of reliability. Even though it is tried to find different measures for narcissism that have little been investigated before, the measures are built using annual reports promising high reliability and social media channels that can also be checked. It has to be mentioned that building those scores can suffer from personal bias, which is hoped to be minimized as it is controlled and double checked by both authors. By incorporating a long-time horizon as explained earlier, the influence of economic up- and downturns is tried to be mitigated to make the method even more reliable. Furthermore, certified and reliable databases

such as DataStream, Bloomberg and Zephyr are used to collect data. The statistical analyses are performed using Stata, a common and reliable programme in quantitative research.

Another point is that research must be replicable for other researchers. It is thus of great importance that the researchers spell out their procedures in great detail (Bryman & Bell, 2003, p. 41). Replicability of this study is essentially given by outlining the selection criteria of the sample. Moreover, the self-developed scoring models for the main explanatory variables are explained in detail, enhancing replicability of building the investigated measures. As the overall method to regress CARs on variables in an M&A context was done by many researchers before, it can also be referred to previous research when trying to replicate this study.

The most important criterion for research is validity, which is concerned with the integrity of the conclusions drawn (Bryman & Bell, 2003, p. 42). One type of validity that needs to be discussed is measurement validity, questioning if the metric used in fact measures the concept that should be tested. It has to be questioned, if the narcissism variables do really measure narcissism and thus validate the conclusions that are drawn at the end of the paper. Measuring narcissism or psychological factors at all is very difficult. The first narcissism variable was already used in previous literature and is thus seen to be valid (Aktas, et al., 2016). The other variables used to measure narcissism are similarly used in research before (Chatterjee & Hambrick, 2007) or based on theories outlined earlier and seen to be at least logical approaches for measuring this phenomenon. It has to be said that especially these variables can suffer from bias when building the different scores. In order to deal with this, it is tried to describe the scoring models in very detail to make the measurement more valid and thus also reliable. The second type that needs to be mentioned is internal validity, mainly referring to a causal relationship between the dependent and independent variable. The question that comes up regarding this type is if the narcissism variables are really or at least in part responsible for the variation of the dependent variable and the conclusions that are drawn from this. A necessary first step in identifying causal effects is identifying the endogeneity problem and its implications for inference (Roberts & Whited, 2013). The particular question concerning endogeneity and causal relationships in this study is if the narcissism variables can be argued to cause the change in CAR and M&A intensity or also vice versa. This would then mean that a change in CAR or M&A intensity can also cause narcissism. Larger companies can for example offer a larger stage for narcissistic CEOs and therefore attract them. It can be argued that companies with a track record of high M&A intensity attract and preferably hire these kinds

of personalities. The endogeneity and reverse causality problem is further addressed in chapter 5.3. Furthermore, there is external validity that needs to be discussed. This type of validity questions if the results of the study can be generalised beyond the specific research context (Bryman & Bell, 2003, p. 43). As already said, the criteria for selecting the sample as well as the scoring models to build the variables are described in detail and can thus be used to examine the influence of narcissism of various people in different contexts.

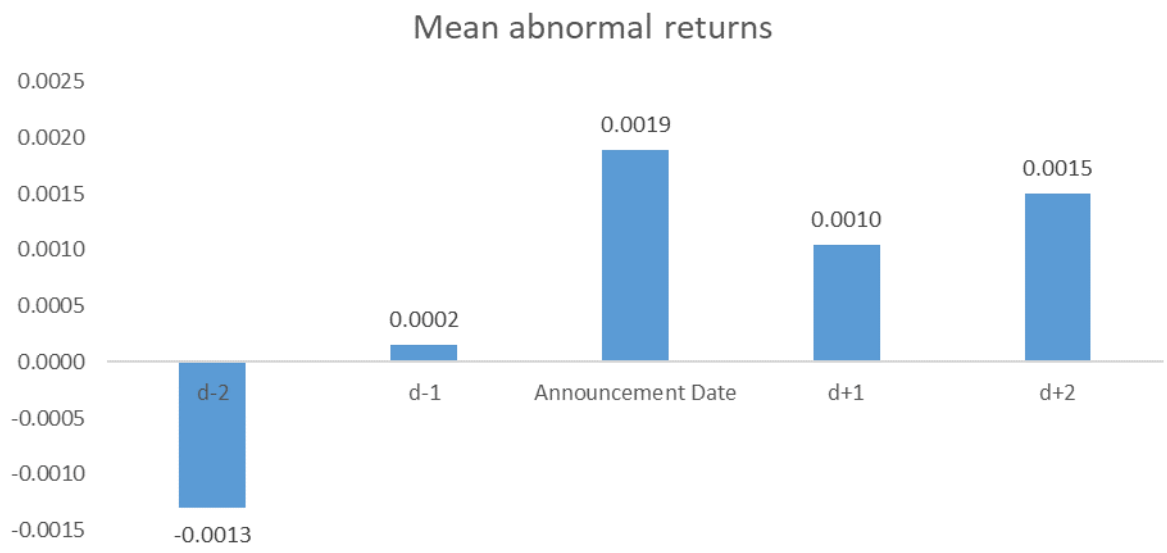
5. Empirical Results

This chapter outlines the empirical results of the study. First, cumulated abnormal returns are tested for significance to ensure validity of the results. Then, descriptive statistics of the raw data are presented. Lastly, several statistical tests are run before presenting the regression results.

5.1 Cumulated abnormal returns

First, it is tested if the abnormal returns earned over the event window are statistically different from zero to see if the market reacted significantly to the defined event. This would mean that the regression of the CARs on the variables leads to valid results. The following figure shows the average abnormal returns earned for the specific days around the announcement date (d-2 to d+2).

Figure 3 - Mean abnormal returns



Obviously, the market reacts negatively two days prior to the announcement date with an average abnormal return of -0.13%. One day prior to the event, it adjusts the reaction and turns slightly positive to 0.02% and stays positive for the investigated time period. The announcement date shows the highest positive market reaction with almost 0.2%. One day after the event, the market reacts less but still positive with 0.1% and then rises again on the second day after the announcement date to 0.15%. It has to be said that the market reactions for each day are not significant for all days. The following table summarises the average abnormal returns and their respective p-values.

Table 2 - Mean abnormal returns

	d-2	d-1	Ann. date	d+1	d+2
Average AR	-0.0013	0.0002	0.0019	0.0010	0.0015
p-value	0.0936	0.8486	0.1382	0.2795	0.0496

The negative reaction two days prior to the event is found to be significant on a ten percent level, whereas the reaction for the following three days is not. The last day of the period shows the lowest p-value and is found to be significant on a five percent level. Even if the day of the announcement is close to the ten percent significance level, the findings are not in line with for example Andrade et al. (2001), stating that the shorter the event window, the most reliable and significant the results. The findings would thus recommend incorporating the whole period and not just a 3-day event window. Nevertheless, cumulative abnormal returns are calculated for a 3- and 5-day event window and also tested with a t-test in Stata, which can be seen in appendix two. An overview is presented in the following table 3.

Table 3 - CAR t-test

CAR t-test	CAR3	CAR5
Observations	214	214
Mean	0.0031	0.0033
Min	-0.1047	-0.1198
Max	0.1275	0.0936
Standard Error	0.0017	0.0018
Standard Deviation	0.0244	0.0265
t-value	1.8452	1.8100
p-value	0.0664	0.0717

The table shows that both CARs are significant on a ten percent level. For this reason, both of them are used in the regressions and are seen to provide valid results. Beyond that, it allows to compare the regression results of two different event windows.

5.2 Descriptive statistics

This chapter summarises the raw data of the investigated sample in order to give a broader understanding of the respective variables. After certain outliers in the respective variables have been identified and removed from the sample, a further version of the descriptive statistics, adjusted for outliers, is depicted and analysed.

5.2.1 Descriptive statistics original sample

Table 4 shows the descriptive statistics of the analysed sample including all dependent variables (CAR3, CAR5 and MA_INTENSITY), the four explanatory variables of interest (NARCISSISM1–4) and all further control variables selected to examine the previously formulated hypotheses. The sample comprises a total of 214 observations and depicts the respective mean value, standard deviation, minimum and maximum value for each variable. As the sample contains certain outliers in the individual variables, a detailed description of the summary statistics is not given at this stage.

Table 4 - Descriptive statistics original sample

Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
CAR3	214	0.003	0.024	-0.105	0.128
CAR5	214	0.003	0.027	-0.120	0.09
MA_INTENSITY	214	0.047	0.130	0	1.070
NARCISSISM1	214	0.096	0.147	0	1
NARCISSISM2	214	22.61	25.34	0	87.5
NARCISSISM3	214	62.47	31.45	0	100
NARCISSISM4	214	30.96	28.29	0	100
CROSSBORDER	214	0.360	0.481	0	1
PAYMENT1	214	0.051	0.221	0	1
PAYMENT2	214	0.523	0.501	0	1
ACQPREMIUM	214	0.206	0.405	0	1
SAMEINDUSTRY	214	0.280	0.450	0	1
Deal Value	214	1,683.5	4,960.3	0.5	53,473.2
Tobin's Q	214	1.44	0.58	0.89	3.85
ACQLEVERAGE	214	1.29	1.73	0.0	9.57
Total Sales	214	45,590	33,425.0	3,103.7	156,390.3

5.2.2 Identifying and removing outliers

In the following paragraph all variables (except for dummy variables) are illustrated in scatter plots to identify and remove potential outliers in order to prevent undue impacts.

Figure 4 - CAR3 Outlier

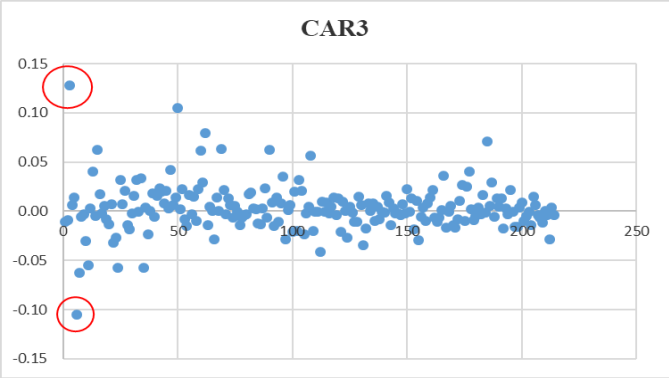


Figure 4 shows the percentage returns of the variable CAR3 for all 214 observations. The two observations circled in red are identified as outliers and removed from the sample.

Figure 5 - CAR5 Outlier

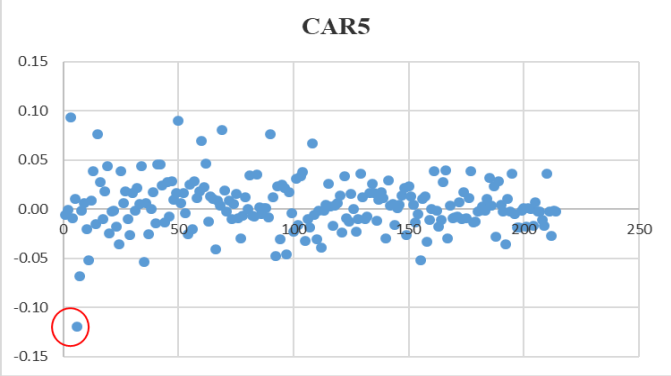


Figure 5 shows the percentage returns of the variable CAR5 for all 214 observations. The observation circled in red is identified as outlier and removed from the sample.

Figure 6 - MA_INTENSITY Outlier

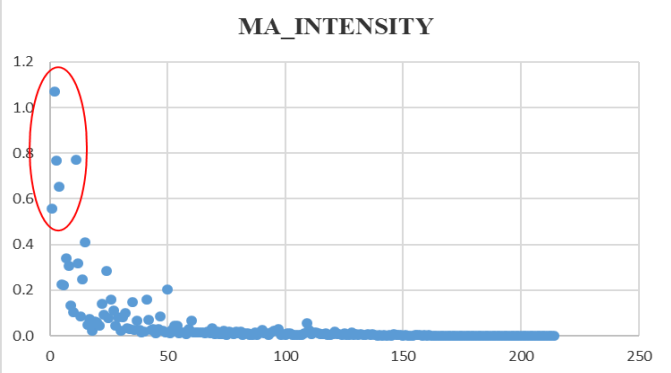


Figure 6 shows the ratios of the variable MA_INTENSITY for all 214 observations. The five observations circled in red are identified as outliers and removed from the sample.

Figure 7 - NARCISSISM1 Outlier

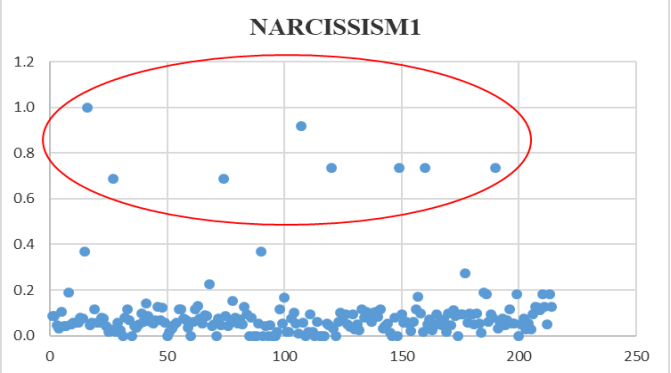


Figure 7 shows the scores of the variable NARCISSISM1 for all 214 observations. The eight observations circled in red are identified as outliers and removed from the sample.

Figure 8 - NARCISSISM2 Outlier

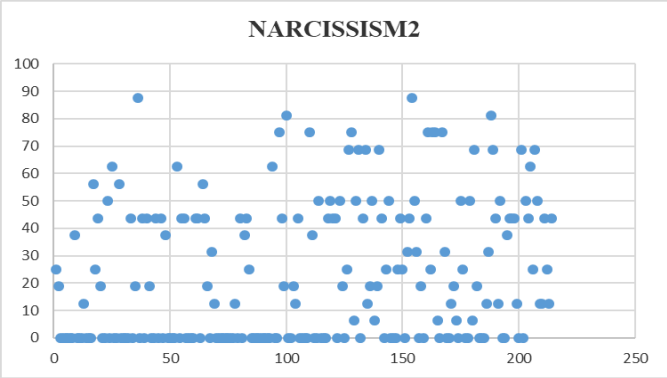


Figure 8 shows the scores of the variable NARCISSISM2 for all 214 observations. There are no significant outliers identified to be removed from the sample.

Figure 9 - NARCISSISM3 Outlier

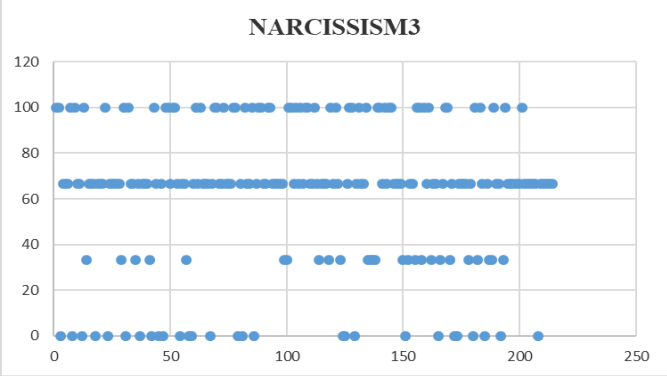


Figure 9 shows the scores of the variable NARCISSISM3 for all 214 observations. As for the previous variable, there are no significant outliers identified to be removed from the sample.

Figure 10 - NARCISSISM4 Outlier

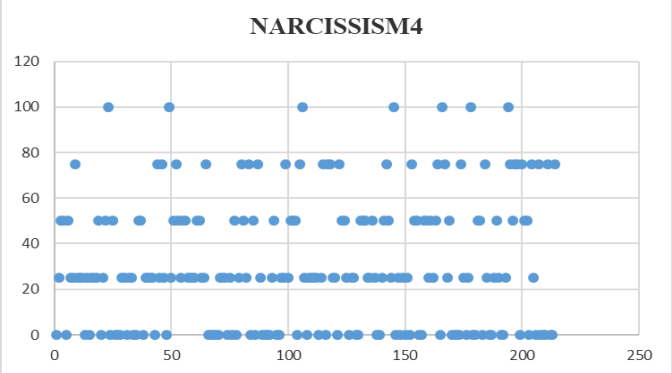


Figure 10 shows the scores of the variable NARCISSISM3 for all 214 observations. Again, there are no significant outliers identified to be removed from the sample.

Figure 11 - Deal Value Outlier

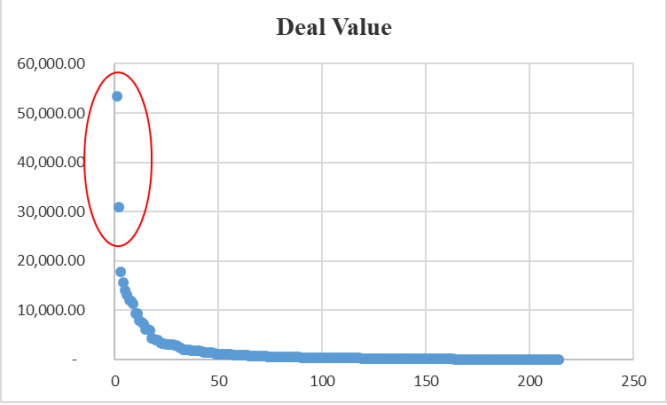


Figure 11 shows the absolute values of the variable Deal Value for all 214 observations. The two observations circled in red are identified as outliers and removed from the sample.

Figure 12 - Tobin's Q Outlier

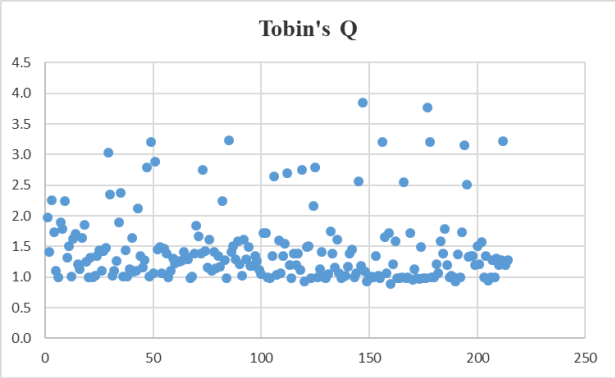


Figure 12 shows the ratios of the variable Tobin's Q for all 214 observations. There are no significant outliers identified to be removed from the sample.

Figure 13 - ACQLEVERAGE Outlier

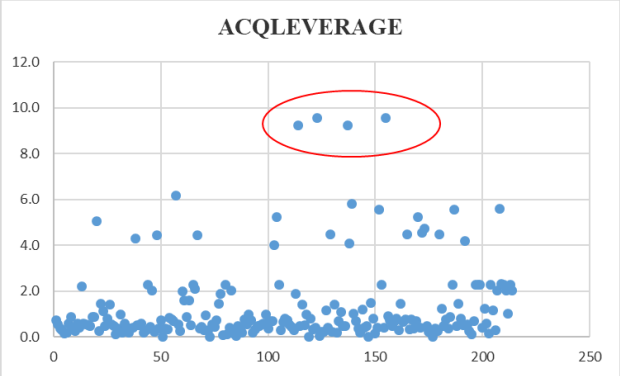


Figure 13 shows the ratios of the variable ACQLEVERAGE for all 214 observations. The four observations circled in red are identified as outliers and removed from the sample.

Figure 14 - Total Sales Outlier

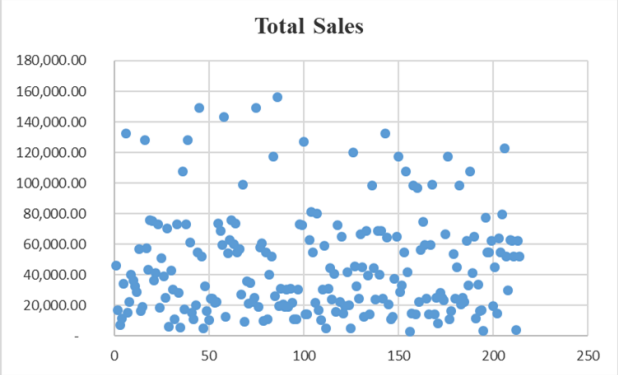


Figure 14 shows the absolute values of the variable Total Sales for all 214 observations. Finally, for this variable there are no significant outliers identified to be removed from the sample.

Since the outliers partly overlap between the individual variables, altogether not 22 but only 18 outliers are removed from the sample. The following table lists the transactions which are excluded.

Table 5 - Outlier acquisitions

	Announcement	Acquirer	Target	Outlier variable	Outlier value
1	14.09.2016	Bayer AG	Monsanto Company	Deal Value (m €)	53,473.17
2	01.06.2017	Linde PLC	Linde AG	Deal Value (m €)	30,992.79
3	16.01.2017	Essilor International SA	Luxottica Group Spa	CAR 3 days	13%
4	12.11.2015	Nokia OYJ	Alcatel-Lucent SA	M&A Intensity	65%
5	05.03.2018	Axa SA	XL Group Ltd.	CAR 5 days	-12%
6	24.06.2015	Koninklijke Ahold N.V.	DelHaize Group SA	M&A Intensity	77%
7	21.08.2017	Total SA	Maersk Olie og Gas A/S	Narcissism 1	1.0
8	20.09.2017	CRH PLC	Ash Grove Cement Company	Narcissism 1	0.69
9	07.08.2017	CRH PLC	Fels-Werke GmbH	Narcissism 1	0.69
10	12.05.2010	GDF Suez SA	Gaselys SAS	Narcissism 1	0.92
11	20.12.2013	Société Générale SA	Newedge Group SA	Acquirer's leverage	9.24
12	05.04.2017	Engie SA	La Compagnie du Vent SA	Narcissism 1	0.73
13	02.05.2014	Société Générale SA	Boursorama SA	Acquirer's leverage	9.57
14	07.10.2013	Société Générale SA	Aktsionernyi Kommercheskii Rosbank OAO	Acquirer's leverage	9.24
15	14.03.2017	Engie SA	EVBox BV	Narcissism 1	0.73
16	11.04.2014	Société Générale SA	Inmobiliaria Colonial, SA	Acquirer's leverage	9.57
17	18.01.2013	GDF Suez SA	Fluxys & Co	Narcissism 1	0.73
18	23.11.2017	Engie SA	mesdepanneurs.fr SAS	Narcissism 1	0.73

5.2.3 Descriptive statistics adjusted sample

After removing the 18 outliers, the adjusted and final sample is depicted by another descriptive statistics in the following table 6 with a total of 196 observations. Apart from the observations, the summary statistics show the respective mean value, standard deviation, minimum and maximum value for each variable.

Table 6 - Descriptive statistics adjusted sample

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
CAR3	196	0.003	0.022	-0.062	0.105
CAR5	196	0.004	0.025	-0.068	0.090
MA_INTENSITY	196	0.029	0.063	0	0.412
NARCISSISM1	196	0.070	0.056	0	0.37
NARCISSISM2	196	22.54	25.61	0	87.50
NARCISSISM3	196	62.77	32.06	0	100
NARCISSISM4	196	31.25	29.13	0	100
CROSSBORDER	196	0.367	0.483	0	1
PAYMENT1	196	0.036	0.186	0	1
PAYMENT2	196	0.551	0.499	0	1
ACQPREMIUM	196	0.194	0.396	0	1
SAMEINDUSTRY	196	0.281	0.450	0	1
Deal Value	196	1,065.5	2,193.0	0.5	14,055.1
Tobin's Q	196	1.46	0.59	0.95	3.85
ACQLEVERAGE	196	1.17	1.37	0	6.17
Total Sales	196	44,839	33,132.5	3,103.7	156,390.3

Considering these values, it becomes apparent that only some variables show considerable changes. The variables are now closer to their mean and show a smaller standard deviation. Logically, these are the variables that have been adjusted for their major outliers. As a consequence, the mean value of the variable MA_INTENSITY has decreased from 0.047 to 0.029 and the standard deviation 0.13 to 0.063. The explanatory variable of interest NARCISSISM1 shows a drop in its mean value from 0.096 to 0.070 and one in its standard deviation from 0.147 to 0.056. Another big change can be seen in the control variable Deal Value. After removing the four biggest acquisitions in terms of deal value, the mean value declined from 1,683.5 to 1,065.5 and the standard deviation from 4,960.3 to 2,193. Furthermore, there have been rather smaller changes for the dummy variable PAYMENT1, where the mean value has dropped from 0.051 to 0.036 and the standard deviation from 0.221 to 0.186 as well as for the control variable ACQLEVERAGE with a decrease in its mean value from 1.29 to 1.17 and in its standard deviation from 1.73 to 1.37. The variables CAR3, CAR5, NARCISSISM2 – 4, CROSSBORDER, PAYMENT2, ACQPREMIUM, SAMEINDUSTRY, Tobin's Q and Total Sales show only marginal changes.

5.3 Statistical tests

Before presenting the regression results, several statistical tests have been conducted on the three models using three different dependent variables (CAR5, CAR3, MA_INTENSITY). The tests are theoretically outlined in chapter 4.5 and done in order to get the best linear and unbiased estimations.

First, the models are tested for linearity using the Ramsey RESET test in Stata. The test shows if the models are suffering from any misspecifications by regressing the dependent variable on the explanatory variables from the original regression and additionally on powers of the fitted values of the dependent variable (Woolridge, 2013, p. 334). Ramsey's null hypothesis states that the model has no omitted variables and thus does not suffer from misspecifications. The test for the CAR5 regression model shows that the null hypothesis cannot be rejected with a p-value of 0.6819. For the CAR3 regression model, the p-value is 0.0629, which slightly indicates that the model may suffers from misspecification as the null can be rejected on a ten percent level. When adding the squared terms of the narcissism variables to the model, the p-value rises to 0.5230, saying that the model does not suffer from misspecification anymore when adding these variables. The MA_INTENSITY model shows a p-value of 0.0000, indicating that the model suffers from misspecification with high significance. As the Ramsey RESET test shows

some sign of misspecification in two models, the squared terms and additionally interaction terms of the main explanatory narcissism variables are included in the regressions. The results can be seen in detail in appendix 3.

The models are also tested for normality using frequency histograms and the Jarque-Bera test for normality. Both can be seen in appendix 4. The Jarque-Bera test states the null hypothesis that the regression residuals are normally distributed. All three models show high significance for rejecting the null, which means that they suffer from non-normality. Nevertheless, the frequency histograms reasonably show normally distributed residuals. In addition to this, normality can be assumed due to the central limit theorem, as the sample size is large enough (Woolridge, 2013, p. 120).

Furthermore, all explanatory variables included in the three regression models are tested for collinearity. Therefore, a Pearson product-moment correlation matrix is created in order to show the different correlations between the respective explanatory variables and thus measures their linear relationships (see appendix 5). Considering the different correlation coefficients, it becomes apparent that no perfect collinearity exists between the explanatory variables. Nevertheless, the correlation coefficients point to some sort of imperfect collinearity which, however, ranges for all variables to a permitted and tolerable extent.

Zero conditional mean and therefore the assumption of the absence of endogeneity is important for a causal interpretation of the regression results. The point is to discuss if the models suffer from endogeneity and reverse causality. The question is particularly raised, if just the narcissistic characteristics of CEOs cause changes in CAR and M&A intensity or if also the CAR performance and M&A intensity of companies attract narcissistic personalities. Maybe companies that aim for M&As with high intensity choose managers that fit this profile of the firm. Moreover, narcissists are seen to aim for a large stage and therefore may just work for companies who offer those stages and have a high intense acquisition track record. The problem of reverse causality is common among regressions using returns as dependent variable (Krüger, 2015). This problem needs to be in mind when interpreting the regression results. It has to be said that an instrumental variable or difference in difference approach could have been implemented to test for reverse causality but would have gone beyond the scope of this thesis. The previous discussion in this chapter as well as in chapter 4.6 and the consideration of the topic when interpreting the regression results are considered sufficient.

In order to test for heteroskedasticity a Breusch Pagan test is conducted for each of the three regression models (see appendix 6). Firstly, $\hat{u}_i$ is predicted and squared. Afterwards, $\hat{u}_i{}^2$ is regressed on the explanatory variables. For the first regression model using CAR5 as dependent variable the F-statistic for joint significance (with 13 and 182 df) is about 1.15 with p-value = 0.3218. Therefore, the null of homoskedasticity cannot be rejected and evidence for homoskedasticity is provided. Considering the second regression model using CAR3 as dependent variable, the F-statistic for joint significance (with 13 and 182 df) is about 0.90 with p-value = 0.5584. Again, the null of homoskedasticity cannot be rejected which gives evidence for homoskedasticity. The third regression model with MA_INTENSITY as dependent variable shows a F-statistic of 1.79 with p-value = 0.0473. For this regression model the null of homoskedasticity can be rejected on a five percent level which hints at heteroskedasticity. Since the third model (MA_INTENSITY) suffers from heteroskedasticity the following regressions are run using White's robust standard errors in order to control for heteroskedasticity (White, 1980). Even under the assumption that homoskedasticity is given in the CAR5 and CAR3 regression models, the use of White's robust standard errors would be equal to the use of OLS standard errors (Woolridge, 2013). It can be deduced that it is a safe and appropriate approach to use White's robust standard errors also for the regression models CAR5 and CAR3 (Woolridge, 2013). Considering this fact, robust standard errors are used for all three regression models.

The regression results outlined in the next chapter are seen as statistically robust and valid as the beforementioned statistical tests were performed.

5.4 Regression results

After collecting, testing and adjusting the data material, this sub-chapter presents the regression results and describes them before analysing and connecting them to the stated hypothesis in the next chapter. Regression results for the different regression models are outlined in the following.

CAR5 regression model

The base regression model is the following:

$$CAR5 = \propto + \beta_1\, NARCISSISM1 + \beta_2\, NARCISSISM2 + \beta_3\, NARCISSISM3 + \beta_4\, NARCISSISM4 + \beta_5\, CROSSBORDER + \beta_6\, PAYMENT1 + \beta_7\, PAYMENT2 + \beta_8\, ACQPREMIUM + \beta_9\, SAMEINDUSTRY + \beta_{10}\, DEALSIZE + \beta_{11}\, ACQTOBINSQ + \beta_{12}\, ACQLEVERAGE + \beta_{13}\, ACQSIZE + u$$

The model also controls for industry and year dummies. Table 7 shows the regression results for this model.

Table 7 - CAR5 regression model

DESCRIPTION	Base Model	Model including squared terms of the narcissism variables	Model including various interaction terms between the narcissism variables	Base Model without control variables	Base Model only including statistically significant narcissism variables (NARCISSISM1; NARCISSISM2)
REGRESSION	(1)	(2)	(3)	(4)	(5)
VARIABLES	CAR5	CAR5	CAR5	CAR5	CAR5
NARCISSISM1	0.139***	0.0384	0.0935	0.113***	0.122***
	(0.0293)	(0.0935)	(0.144)	(0.0344)	(0.0267)
NARCISSISM2	-0.000209***	-1.13e-05	-0.000825	-0.000243***	-0.000187**
	(7.98e-05)	(0.000255)	(0.000690)	(6.37e-05)	(8.10e-05)
NARCISSISM3	1.99e-05	-0.000128	-4.85e-05	3.87e-05	
	(6.35e-05)	(0.000224)	(0.000206)	(5.25e-05)	
NARCISSISM4	0.000122	0.000286	0.000192	-2.55e-06	
	(7.64e-05)	(0.000216)	(0.000411)	(5.31e-05)	
NARCISSISM1sq		0.362			
		(0.270)			
NARCISSISM2sq		-2.85e-06			
		(3.45e-06)			
NARCISSISM3sq		1.30e-06			
		(2.06e-06)			
NARCISSISM4sq		-2.02e-06			
		(2.49e-06)			
NARC1_2			0.00341		
			(0.00690)		
NARC1_3			0.000897		
			(0.00209)		
NARC1_4			0.00113		
			(0.00553)		
NARC2_3			7.60e-06		
			(9.58e-06)		
NARC2_4			1.83e-05		
			(2.04e-05)		
NARC3_4			-1.87e-07		
			(5.40e-06)		
NARC1_2_3			-5.17e-05		
			(0.000101)		
NARC2_3_4			-2.58e-07		
			(2.95e-07)		
NARC1_3_4			-4.31e-05		
			(7.72e-05)		
NARC1_2_4			-0.000311		
			(0.000270)		
NARC1_2_3_4			5.22e-06		
			(3.98e-06)		
CROSSBORDER	-0.00191	-0.00236	0.000190		-0.00314
	(0.00377)	(0.00389)	(0.00394)		(0.00368)
PAYMENT1	-0.000362	-0.000774	0.00448		0.000602
	(0.00749)	(0.00756)	(0.00631)		(0.00756)
PAYMENT2	-0.000183	0.000113	-0.00127		-0.000374
	(0.00402)	(0.00420)	(0.00437)		(0.00403)
ACQPREMIUM	-0.00693	-0.00693	-0.00667		-0.00715
	(0.00537)	(0.00565)	(0.00572)		(0.00528)
SAMEINDUSTRY	-0.00410	-0.00432	-0.00272		-0.00448
	(0.00413)	(0.00435)	(0.00449)		(0.00408)
DEALSIZE	0.000810	0.000625	0.000883		0.000563
	(0.000820)	(0.000855)	(0.000942)		(0.000819)
ACQTOBINSQ	-0.0159*	-0.0141	-0.0135		-0.0126
	(0.00910)	(0.00922)	(0.00935)		(0.00884)
ACQLEVERAGE	0.000644	0.000843	0.000597		0.000738
	(0.00156)	(0.00170)	(0.00167)		(0.00152)
ACQSIZE	0.000297	0.00111	0.00117		0.00146
	(0.00382)	(0.00430)	(0.00410)		(0.00369)
Constant	-0.0124	-0.0158	-0.0198	-0.000614	-0.0221
	(0.0456)	(0.0509)	(0.0466)	(0.00491)	(0.0444)
Observations	196	196	196	196	196
R-squared	0.263	0.273	0.303	0.122	0.252

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the first regression (1) the base model is run and CAR5 is tested on the four different narcissism variables and additional control variables to control for omitted variable bias. As can be seen, the first and second narcissism measures show high significance on a one percent level. They are however contradictory in their sign. NARCISSISM1 has a positive sign with a magnitude of 0.139, which is high compared to the other measures. NARCISSISM2 shows a negative sign with a very low value of -0.000209. The third and fourth measure for narcissism are not found to be significant but both show a positive sign. Coefficient estimates for the control variables are not significant except for ACQTOBINSQ, which is found to be significant on a ten percent level with a negative sign. This indicates that firm overvaluation has a negative impact on abnormal returns. Additionally, to check these results for robustness, supporting regressions are run changing the model specifics (2-5).

In regression (2) squared terms for the narcissism measures are added to the model to see if the measures may point to a quadratic relationship and to control for potential misspecifications the model could suffer from. When adding those variables, no coefficient is found to be statistically significant anymore. Focusing on the significant estimations for NARCISSISM1 and NARCISSISM2, they do not change their sign but do change their magnitude, pointing to a positive bias in the base model. Anyway, as the squared terms are not found to be significant there is no quadratic relationship that should be considered in the model.

Furthermore, regression (3) tests for any interaction of the narcissism variables by adding all potential interaction terms of the four measures to see if their effect is maybe mediated by one of the other narcissism variables. They all show very low coefficient estimates, and none is found to be significant, which is why they are not considered to include any important information for the impact of narcissism on the cumulative abnormal return for a 5-day period.

In regression (4) CAR5 is just regressed on the four narcissism measures without any control variables to see if the control variables mitigate the effect of the four main explanatory variables. Even without the control variables, just NARCISSISM1 and 2 are highly significant. They did not change their sign or magnitude conspicuous.

The last regression (5) regresses CAR5 just on those two narcissism measures and the control variables. Also, when dropping NARCISSISM3 and 4 the first two remain to be significant

with comparable estimation coefficients as in (1). They are thus seen to be robust to any model specific changes.

Moreover, the R-squared values are rather low with 0.263 in regression (1), indicating that the variables only explain a small part of the variance in the abnormal returns. They variate little due to adding or dropping variables, which has no importance for the analysis of the results.

CAR3 regression model

The base regression model is the following:

$$\begin{aligned} CAR3 = \propto & + \beta_1\, NARCISSISM1 + \beta_2\, NARCISSISM2 + \beta_3\, NARCISSISM3 \\ & + \beta_4\, NARCISSISM4 + \beta_5\, CROSSBORDER + \beta_6\, PAYMENT1 \\ & + \beta_7\, PAYMENT2 + \beta_8\, ACQPREMIUM + \beta_9\, SAMEINDUSTRY \\ & + \beta_{10}\, DEALSIZE + \beta_{11}\, ACQTOBINSQ + \beta_{12}\, ACQLEVERAGE \\ & + \beta_{13}\, ACQSIZE + u \end{aligned}$$

The model also controls for industry and year dummies. Table 8 shows the regression results for this model.

Table 8 - CAR3 regression model

DESCRIPTION	Base Model	Model including squared terms of the narcissism variables	Model including statistically significant squared terms of the narcissism variables	Model including various interaction terms between the narcissism variables	Base Model without control variables	Base Model only including statistically significant narcissism variables (NARCISSISM1; NARCISSISM2)
REGRESSION	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	CAR3	CAR3	CAR3	CAR3	CAR3	CAR3
NARCISSISM1	0.0956***	-0.0478	-0.0376	0.0591	0.0804**	0.0872***
	(0.0314)	(0.0834)	(0.0772)	(0.186)	(0.0351)	(0.0294)
NARCISSISM2	-0.000143**	-0.000125	-0.000118*	-0.000396	-0.000168***	-0.000131**
	(6.21e-05)	(0.000236)	(6.38e-05)	(0.000667)	(5.42e-05)	(6.11e-05)
NARCISSISM3	-6.65e-06	-0.000148	-2.94e-05	-1.64e-05	4.21e-05	
	(6.28e-05)	(0.000243)	(6.65e-05)	(0.000234)	(4.81e-05)	
NARCISSISM4	6.84e-05	0.000155	4.92e-05	6.94e-05	2.15e-06	
	(6.87e-05)	(0.000195)	(7.04e-05)	(0.000434)	(4.65e-05)	
NARCISSISM1sq		0.520**	0.474**			
		(0.231)	(0.215)			
NARCISSISM2sq		7.30e-09				
		(3.13e-06)				
NARCISSISM3sq		1.12e-06				
		(2.12e-06)				
NARCISSISM4sq		-1.22e-06				
		(2.26e-06)				
NARC1_2				0.00255		
				(0.00723)		
NARC1_3				0.000882		
				(0.00268)		
NARC1_4				0.00364		
				(0.00622)		
NARC2_3				4.56e-06		
				(9.21e-06)		
NARC2_4				2.45e-05		
				(1.90e-05)		
NARC3_4				7.69e-07		
				(5.72e-06)		
NARC1_2_3				-5.51e-05		
				(0.000104)		
NARC2_3_4				-3.54e-07		
				(2.71e-07)		
NARC1_3_4				-6.90e-05		
				(8.68e-05)		
NARC1_2_4				-0.000436*		
				(0.000253)		
NARC1_2_3_4				6.67e-06*		
				(3.73e-06)		
CROSSBORDER	-0.00410	-0.00463	-0.00477	-0.00269		-0.00451
	(0.00338)	(0.00340)	(0.00334)	(0.00349)		(0.00311)
PAYMENT1	-0.00247	-0.00417	-0.00415	-0.000575		-0.00201
	(0.00713)	(0.00700)	(0.00693)	(0.00761)		(0.00696)
PAYMENT2	-0.00357	-0.00287	-0.00314	-0.00389		-0.00375
	(0.00393)	(0.00406)	(0.00385)	(0.00411)		(0.00394)
ACQPREMIUM	-0.00995*	-0.00986*	-0.00911*	-0.00988*		-0.00988*
	(0.00518)	(0.00561)	(0.00518)	(0.00553)		(0.00504)
SAMEINDUSTRY	-0.00109	-0.00109	-0.000729	0.000243		-0.00107
	(0.00361)	(0.00378)	(0.00358)	(0.00392)		(0.00357)
DEALSIZE	8.94e-05	-0.000164	-6.85e-05	0.000185		-5.15e-05
	(0.000761)	(0.000773)	(0.000750)	(0.000830)		(0.000767)
ACQTOBINSQ	-0.0138	-0.0107	-0.0116	-0.0133		-0.0125
	(0.00915)	(0.00919)	(0.00917)	(0.00943)		(0.00856)
ACQLEVERAGE	0.000618	0.00109	0.00111	0.000831		0.000698
	(0.00151)	(0.00156)	(0.00148)	(0.00159)		(0.00148)
ACQSIZE	0.00121	0.00307	0.00256	0.00139		0.00167
	(0.00348)	(0.00377)	(0.00351)	(0.00368)		(0.00341)
Constant	-0.00935	-0.0213	-0.0162	-0.00972	-0.00117	-0.0129
	(0.0418)	(0.0458)	(0.0420)	(0.0445)	(0.00478)	(0.0404)
Observations	196	196	196	196	196	196
R-squared	0.241	0.262	0.258	0.280	0.074	0.236

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Again, the first regression (1) shows the results for the base model regressing CAR3 on the four different narcissism measures as well as the control variables. This regression also shows high significance for NARCISSISM1 with a positive sign and an estimation value of 0.0956. NARCISSISM 2 is found to be significant on a five percent level with a negative sign and coefficient of -0.000143, which is in line with the CAR5 regression model. NARCISSISM3 and 4 are consistently not found significant in this model. The only coefficient estimate that is found to be significant on a ten percent level for the control variables is the dummy ACQPREMIUM and thus if a premium is paid for the transaction or not. This is also in line with the other regressions (2-6). According to hubris theory outlined earlier, paying acquisition premiums points to an overpayment for a transaction, which should be recognised by an efficient market and thus negatively impact CARs. The negative sign of the coefficient thus confirms this theory. To check the results for robustness, several supporting regressions (2-6) are run changing model specifics and adding further variables.

Regression (2) also incorporates quadratic terms of the four narcissism measures. Adding these terms changes most of the coefficient estimates in the model. NARCISSISM1 and 2 are not found to be significant anymore and NARCISSISM1 turns its sign, pointing to a negative impact now. Additionally, the squared term of the first narcissism measure is significant on a five percent level, pointing to a quadratic relationship. This implies that narcissistic characteristics have a negative effect until a minimum turning point and then have a positive effect on CAR3, meaning that highly narcissistic characteristics are as positive as having no narcissistic characteristics at all. This significance still holds in regression (3) just adding the squared term of NARCISSISM1 to the base model.

The regression (4) also tests for interaction terms of the different narcissism scores. Two of them show significance on a ten percent level but with very low coefficient estimates, which is why they are not considered as substantial contribution for the hypothesis analysis and the impact on CAR3.

Regressing CAR3 just on the 4 narcissism measures (5) shows significance for NARCISSISM1 on a five percent level and for NARCISSISM2 on a one percent level. Dropping the other two narcissism measures from the base model as can be seen in regression (6), both remain to show significance and are thus seen to be robust to model specific changes. Except for the regressions where squared terms are included, both coefficient estimates keep their sign, comparable to the

CAR5 regressions. It has to be recognised that the squared term for NARCISSISM1 is also significant and will thus be considered in the analysis part. R squared is comparable but slightly lower to the values in the CAR5 regression models.

MA_INTENSITY regression model

The base regression model is the following:

$$MA_{INTENSITY} = \propto +\beta_1\, NARCISSISM1 + \beta_2\, NARCISSISM2 + \beta_3\, NARCISSISM3 + \beta_4\, NARCISSISM4 + \beta_5\, CROSSBORDER + \beta_6\, PAYMENT1 + \beta_7\, PAYMENT2 + \beta_8\, ACQPREMIUM + \beta_9\, SAMEINDUSTRY + \beta_{10}\, DEALSIZE + \beta_{11}\, ACQTOBINSQ + \beta_{12}\, ACQLEVERAGE + \beta_{13}\, ACQSIZE + u$$

The model also controls for industry and year dummies. Table 9 shows the regression results for this model.

Table 9 - MA_INTENSITY regression model

DESCRIPTION	Base Model	Model including squared terms of the narcissism variables	Model including various interaction terms between the narcissism variables	Base Model without control variables	Base Model only including NARCISSISM1&2
REGRESSION	(1)	(2)	(3)	(4)	(5)
VARIABLES	MA_INTENSITY	MA_INTENSITY	MA_INTENSITY	MA_INTENSITY	MA_INTENSITY
NARCISSISM1	0.274	0.0793	0.870*	0.141	0.284*
	(0.177)	(0.299)	(0.518)	(0.188)	(0.163)
NARCISSISM2	-3.68e-05	-0.000401	0.00261*	-0.000480***	-4.70e-05
	(0.000115)	(0.000492)	(0.00138)	(0.000155)	(0.000112)
NARCISSISM3	-4.17e-05	0.000639	0.000584	-9.52e-05	
	(0.000151)	(0.000469)	(0.000504)	(0.000167)	
NARCISSISM4	-4.81e-05	-0.000210	0.000328	-0.000125	
	(0.000138)	(0.000434)	(0.000861)	(0.000108)	
NARCISSISM1sq		0.662			
		(1.486)			
NARCISSISM2sq		5.71e-06			
		(6.39e-06)			
NARCISSISM3sq		-6.81e-06*			
		(3.98e-06)			
NARCISSISM4sq		1.07e-06			
		(4.97e-06)			
NARC1_2			-0.0232		
			(0.0153)		
NARC1_3			-0.00762		
			(0.00663)		
NARC1_4			-0.00862		
			(0.0160)		
NARC2_3			-2.98e-05*		
			(1.79e-05)		
NARC2_4			-4.91e-05		
			(3.66e-05)		
NARC3_4			-5.34e-06		
			(1.03e-05)		
NARC1_2_3			0.000167		
			(0.000213)		
NARC2_3_4			6.17e-07		
			(4.85e-07)		
NARC1_3_4			9.42e-05		
			(0.000201)		
NARC1_2_4			0.000533		
			(0.000547)		
NARC1_2_3_4			-5.21e-06		
			(7.43e-06)		
CROSSBORDER	0.0179**	0.0167**	0.0153*		0.0189**
	(0.00792)	(0.00832)	(0.00854)		(0.00819)
PAYMENT1	0.00574	0.00510	-0.000410		0.00521
	(0.0124)	(0.0107)	(0.0107)		(0.0129)
PAYMENT2	-0.00170	-0.00165	0.000220		-0.00178
	(0.00933)	(0.00944)	(0.00931)		(0.00951)
ACQPREMIUM	0.0115	0.0146	0.0117		0.0119
	(0.0135)	(0.0127)	(0.0131)		(0.0136)
SAMEINDUSTRY	-0.00210	0.00130	-0.00271		-0.00151
	(0.00755)	(0.00746)	(0.00776)		(0.00809)
DEALSIZE	0.0158***	0.0158***	0.0165***		0.0159***
	(0.00244)	(0.00231)	(0.00269)		(0.00241)
ACQTOBINSQ	-0.0323*	-0.0267*	-0.0322*		-0.0346*
	(0.0185)	(0.0155)	(0.0181)		(0.0179)
ACQLEVERAGE	-0.00425	-0.00263	-0.00606**		-0.00424
	(0.00270)	(0.00273)	(0.00291)		(0.00265)
ACQSIZE	-0.0174**	-0.0161***	-0.0166**		-0.0182***
	(0.00741)	(0.00605)	(0.00750)		(0.00645)
Constant	0.103	0.0928	0.0357	0.0402**	0.0955
	(0.0731)	(0.0706)	(0.0876)	(0.0188)	(0.0709)
Observations	196	196	196	196	196
R-squared	0.476	0.494	0.508	0.070	0.475

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In order to analyse the effect of CEO narcissism on the respective company's M&A-intensity five different regression are conducted. For all five regressions MA_INTENSITY serves as dependent variable. The base model includes the four different narcissism variables and all control variables. This first regression (1) shows no statistical significance for any of the main explanatory variables. Considering the control variables, there is statistical significance for the variable DEALSIZE on a one percent level, for CROSSBORDER and ACQSIZE on a five percent level and for ACQTOBINSQ on a ten percent level. These control variables have the expected sign and are in line with previous research using CAR as the dependent variable (Schwert, 2000; Loderer & Martin, 1990; Moeller, et al., 2004; Faccio, et al., 2006). The other control variables show no statistical significance at all. NARCISSISM1 has a coefficient of 0.274 which is relatively high in comparison to the other narcissism variables whose value in each case approaches zero. The positive sign indicates a positive impact of NARCISSISM1 on MA_INTENSITY. The R-squared of the regression is 0.476 indicating that the variables explain an appropriate part of the variance in M&A intensity.

In addition to the base model, the second regression (2) also includes the squared terms of the four narcissism variables. Again, none of the narcissism variables shows statistical significance. With 0.0793 the coefficient of NARCISSISM1 is quite lower compared to the first regression but still has a positive sign, showing positive bias in the first regression. The other narcissism variables coefficients still have relatively marginal values with both positive (NARCISSISM3) and negative (NARCISSISM2; NARCISSISM4) signs. Considering the squared terms, statistical significance on the ten percent level can be found for NARCISSISM3sq, however there is no statistical significance for the other squared terms. NARCISSISM3sq's coefficient has a negative sign but is of marginal value. The other squared terms' coefficients have a positive sign but also a marginal value, except for NARCISSISM1sq with a coefficient of 0.662. Sign, magnitude and significance for the control variables almost remain the same for the second regression. Since the squared terms in the second regression do not show a higher statistical significance, they are not included in the further regressions.

However, the third regression (3) includes all potential interaction terms of the four narcissism variables in order to control if the impact on MA_INTENSITY is perhaps mediated by one of the other narcissism variables. The results for NARCISSISM1 and NARCISSISM2 show statistical significance on the ten percent level with coefficients of 0.87 and 0.00261 (reversed sign for NARCISSISM2). Furthermore, there is statistical significance on the ten percent level

for the interaction term NARC2_3, however the coefficient has a marginal value. Again, sign, magnitude and significance for the further control variables almost remain the same.

The fourth regression (4) only includes the four narcissism variables of the base model and shows statistical significance on the one percent level for NARCISSISM2 with a coefficient of -0.00480. The coefficient of NARCISSISM1 with 0.141 is quite lower than in the third regression, remains its positive sign but loses its statistical significance. Like in the first regression the coefficients of NARCISSISM3 and NARCISSISM4 have marginal values with a negative sign and no statistical significance. The R-squared value of the fourth regression is obviously lower compared to the first regression, since all control variables are dropped. With a value of 0.070 only a small part of the variance in M&A intensity is explained by the four narcissism variables.

The fifth regression (5) replicates the base model but only includes the variables NARCISSIM1 and NARCISSISM2 to measure the narcissism impact on MA_INTENSITY, as those variables were the important and most significant ones in the CAR regression models. NARCISSISM2 loses any statistical significance and reaches a marginal value, whereas NARCISSISM1 shows statistical significance on the ten percent level like in the third regression. Nevertheless, NARCISSISM1 has a coefficient of 0.284, which has the same sign but is quite lower than in regression three. Compared to the first and second regressions, the control variables show almost no changes in their values and remain sign and significance. The same applies to the R-squared value whose coefficient is 0.475.

Concluding, also in this regression model, the only narcissism measure that are found to be significant at least in some regressions are NARCISSISM1 and NARCISSISM2. Nevertheless, they cannot be seen as robust, as they vary considerably in sign and magnitude in the different regressions.

6. Analysis

In this chapter, the authors analyse the regression results presented in the previous chapter and connect them to the hypotheses stated in this paper. The analysis is supported and linked to theories and earlier research on the investigated topic. First, the correlation between the four different narcissism variables is analysed in detail before then analysing the two stated hypotheses.

6.1 Correlation of narcissism variables

Before starting to analyse the specific hypotheses stated in chapter 3.4 it is important to take a closer look at the correlation of the four different narcissism variables, as this paper is the first to compare different measures for this phenomenon. Except for NARCISSISM4 – evaluates CEO narcissism based on social media – the approach for all narcissism variables (NARCISSISM1-3) have already been used similarly in previous research to measure narcissism of mangers, CEOs and CFOs. NARCISSISM4 does not exist in this version yet but is inspired by Chatterjee and Hambrick (2007). Nevertheless, there has been no research so far that correlated different measures of narcissism in order to examine their mutual relationship. Since all of these measures have been used to measure the same behavioural phenomenon, narcissism, previous research has neglected this interrelationship. This lack of research has to be filled in order to understand CEO narcissism and its impact on various business activities, policies, successes and failures.

Table 10 - Correlation of narcissism variables

Observations: 196	NARCISSISM1	NARCISSISM2	NARCISSISM3	NARCISSISM4
NARCISSISM1	1			
NARCISSISM2	0.0328	1		
NARCISSISM3	-0.1656	0.1367	1	
NARCISSISM4	-0.2071	0.1839	0.1087	1

Considering the Pearson product-moment correlation matrix illustrated in table 10 which is limited to the four narcissism variables, it becomes apparent that these four variables show different correlation coefficients and partly also different signs. Since NARCISSISM1 and NARCISSISM2 have statistical significance in most of the regressions conducted on CAR3 and CAR5, their impact on CAR seems to be most interesting and relevant in this course of

analysis. The coefficient of 0.0328 signifies that there is almost no linear relationship between the variables which however does theoretically not mean that there is no relationship at all. This implies that both NARCISSISM1 and NARCISSISM2 measure narcissism on different bases. Primarily, both methods are distinguished by different measurement methods. NARCISSISM1 draws on certain aspects of verbal behaviour and measures narcissism based on the CEO's use of first person singular pronouns in CEO letters (Raskin & Shaw, 1988), whereas NARCISSISM2 measures narcissism on the grounds of graphological characteristics by analysing the signature of the respective CEO in annual reports. Apart from the measurement method, both variables differ from each other with regard to their underlying character traits that are investigated in order to classify a CEO as narcissist. While the analysis of verbal behaviour refers very strongly to overconfidence and thereby draws on an individual's tendency to overestimate abilities and performance (Moore & Healy, 2008; Aktas, et al., 2016; Malmendier & Tate, 2008), the graphological analysis seeks more for indications of increased individual ego and self-esteem when measuring narcissism (Zweigenhaft, 1977; Jorgenson, 1977; Ham, et al., 2018). Considering this, the non-correlation between NARCISSISM1 and NARCISSISM2 is quite reasonable. Furthermore, this non-correlation supports the findings of all CAR regression models (both CAR3 and CAR5), showing contradictory results for both measures, particularly a positive sign for NARCISSIM1 and a negative sign for NARCISSISM2.

Taking a look at the other two narcissism variables (NARCISSISM3 and NARCISSISM4) it becomes apparent that these variables show a higher correlation coefficient both among each other and also to the statistically significant variables NARCISSISM1 and NARCISSISM2, which varies between -0.2071 and 0.1839. Although the correlation coefficient is significantly higher than between NARCISSISM1 and NARCISSISM2, there is by far no perfect correlation. Moreover, both NARCISSISM3 and NARCISSISM4 point a negative correlation with NARCISSISM1. This suggests that NARCISSISM3 and NARCISSISM4 measure narcissism contradictorily to NARCISSISM1, which means that according to their measurement methods, they may find indications of narcissism when NARCISSISM1 finds contrary indications.

6.2 Analysis hypothesis 1

The first hypothesis was derived from hubris and empire building theory in chapter 3 and states that narcissistic CEO characteristics of the acquiring firm have a negative effect on M&A

performance. This hypothesis is tested by running the CAR5 and CAR3 regression models, which are outlined in detail in the previous chapter.

The four main explanatory variables of interest in order to reject the null hypothesis or not are NARCISSISM1-4. Earlier research found that narcissistic characteristics of target CEOs are negatively impacting acquirer's CARs (Aktas, et al., 2016) and that the market reaction at merger announcement is significantly lower for overconfident CEOs than for non-overconfident CEOs (Malmendier & Tate, 2008).

NARCISSISM1 measures narcissism by using the proportions of first-person singular to total first-person pronouns in CEO letters of the acquiring companies in the respective year of the transaction (Aktas, et al., 2016; Chatterjee & Hambrick, 2007). It is seen to tell something about narcissism, overconfidence and hubris by measuring how intense the CEOs push themselves into the foreground in their letters, rather than taking the perspective of the company in general. NARCISSISM1 is found to be significant in both CAR5 and CAR3 regression models under different circumstances and model specifics and is thus seen to be robust. It is found to have a positive impact on CARs and is hence contradicting with findings from Aktas et al. (2016) who use the same measure to investigate target CEO's narcissism on acquirer's CARs. The findings mean that narcissistic characteristics have a positive impact on M&A performance and therefore create value. This is not in line with theories like hubris and empire building, stating that narcissists overpay for acquisitions by paying too high acquisition premiums or just want to extend their empires while neglecting value creation aspects. Concerning NARCISSISM1, the null hypothesis of a negative effect of narcissistic characteristics on M&A performance can be rejected, contrasting with findings from Aktas et al. (2016). It must be mentioned that also the squared term of NARCISSISM1 is found to be significant in regression (2) and (3) of the CAR3 regression model, indicating a quadratic relationship between this variable and the 3-days CAR. This finding suggests that CEOs narcissism has a negative impact on CAR3 down to a minimum turning point and then has positive impact if the CEO is highly narcissistic. This is whatever not arguable with any existing theory but may imply that extreme personal traits and hence obvious characteristics are not as bad as rudiments of it. One explanation for this could be that highly narcissistic CEOs are found to be extremely innovative as a result of their overconfidence (Hirshleifer, et al., 2012). This overconfidence facilitates innovative growth opportunities by increasing investment in risky projects, for example by obtaining more patents

(ibid). This, however, indicates a quadratic effect on CAR that turns positive for high narcissism and rejects the null hypothesis.

The second measure for narcissism analyses the CEO's signature in annual reports using different characteristics like size and legibility that are interpreted as signs for narcissism in graphology (Nauer, 2013; Ploog, 2016). It is thus seen to tell something about how the CEOs present themselves in their letters, mainly self-portrayal and an increased individual ego. NARCISSISM2 is likewise NARCISSISM1 found to be significant in both regression models under different model specifics and seen to be robust. Interestingly, this measure shows a negative impact of narcissism on CARs, which then is in line with theory and earlier findings in research (Aktas, et al., 2016). Even if the coefficient has a very low value, it shows significance for a negative impact, which is contradictory to the first measure of narcissism used in this study. It shows that the regression outcome is extremely dependent on how to define and measure the psychological phenomenon of narcissistic characteristics. The results using this measure gives evidence that narcissistic characteristics of the acquirer's CEO destroy value in an M&A context. It is thus failed to reject the null hypothesis.

NARCISSISM3 uses the CEO's photograph in the annual report as a sign for seeking a great deal of visibility. Just like NARCISSISM4, which uses social media platforms to analyse the CEO's attention/recognition seeking, both measures are not found to be significant in the regression models. Repeatedly they change their signs and magnitude, which is why they are not seen as robust to model specific changes. Both measures cannot reject the null hypothesis. They however support the findings that it is extremely important how narcissism is measured and defined in order to find significance and also if it can be seen as a characteristic trait that destroys or creates value in an M&A context.

The interaction terms combining narcissism measure 1, 2 and 4 and the one combining all four measures are found to be significant on a ten percent level in the CAR3 regression model. Chatterjee (2007) developed a measure for narcissism that is often used in corporate finance research and consists of 5 individual measures which are then combined into one. Suggesting that the interaction terms are significant in the regression models supports this way of measuring narcissism and combining individual measures to one. This could mitigate bias in the individual measures and capture more characteristics of narcissism in one holistic variable. However, in the context of this study this cannot be clearly identified.

6.3 Analysis hypothesis 2

Narcissists aim for huge and visible transactions (APA, 1994). Together with the empire building theory, stating that managers may acquire companies just for the sake of enhancing their empires rather than creating wealth for both company and shareholders (Lewellen, et al., 1985), this provides the theoretical basis for hypothesis number two. The hypothesis states that narcissistic CEOs have a positive effect on M&A intensity. M&A intensity is measured by the deal size divided by market capitalisation of the acquiring company. It is tested by running the MA_INTENSITY regression model, which is outlined in the previous chapter.

The four main variables of interest in order to reject the null hypothesis or not are NARCISSISM1-4. Research on the effect of CEOs narcissism on M&A intensity of the specific deals and thus if narcissists can be linked to bigger and more intense acquisitions does hardly exist yet. However, Ham et al. (2018) lately executed a study on this topic and used a similar measure for M&A intensity, finding that narcissistic CEOs invest more in M&A expenditures.

NARCISSISM1 is found to have a positive impact on M&A intensity in all regressions of the MA_INTENSITY model. Using this measure suggests that narcissistic CEOs can be linked to bigger transactions with higher intensity, which is in line with findings from Ham et al. (2018). The magnitude of the estimate changes with every model specific change but stays robust in its sign. The null hypothesis of a positive impact thereby cannot be rejected. Significance for this can only be found in two of the five regressions.

The second measure for narcissism shows a negative impact on M&A intensity in the regressions. Contradictory to the first measure, it states that narcissistic characteristics do not lead CEOs to do bigger or more intense transactions. The contrasting behaviour of this variable in comparison to the first one is mainly due to non-collinearity between both variables, which was outlined in more detail previously. The null hypothesis can be rejected when using this measure of narcissism. However, the estimates are also just found to be significant in two of the five regressions.

NARCISSISM3 and NARCISSISM4 are not robust in their sign and not found to be statistically significant. They do not seem to incorporate any information explaining the change in M&A intensity and are therefore not elaborated further at this point of analysis.

Summarising, also the analysis of hypothesis two shows that the outcome is extremely dependent on the definition and measurement of narcissism variables. There is no unambiguous and meaningful result to clearly reject the hypothesis or not, as different measures for the same phenomenon show different results.

6.4 Cross-cultural validity

The validity of the overall results is limited to the used sample and cannot be generalised across countries or continents. The results of this study reflect the European market considering the data material used from Zephyr, Thomson Reuters, Bloomberg, annual reports and social media platforms. A newly investigated study on narcissistic thinking of different countries was conducted by Zaromb et al. (2018). The study shows that Russia, UK, India and some other Asian countries are seen as more narcissistic than most of the European countries and even than the United States, which are commonly referred to be as a narcissistic country. Taking into consideration that European countries except for the UK are not seen as very narcissistic, this study could have led to different results when conducted on another sample containing different continents or countries.

7. Conclusion

The last chapter first describes the overall problem and highlights the contribution of this study. After this, the main findings and impacts of narcissistic CEO characteristics are outlined. Further it points out the implications and critically appreciates the study. Finally, further research opportunities are recommended.

For a considerable time, plenty of research has investigated different business decisions, activities and policies with regard to their impact on M&A performance. On closer inspection, the M&A context is one of the most examined fields in corporate finance research. For a long time, this research has focused primarily on "hard" economic, business- and finance related issues. Latterly, one of the most recent research trends has been to investigate “softer”, more behavioural issues, like decisive characteristics of central decision-makers such as CFOs or CEOs. In the course of this trend, the research has developed from the analysis of individual character traits such as overconfidence to holistic personality structures like narcissism. Despite increasing popularity, there are only a few papers in the corporate finance context that have dealt with the impact of CEO narcissism on M&A performance (Aktas, et al., 2016; Malmendier & Tate, 2008). Apart from this, there has been no research touching upon the relationship between narcissistic CEOs and M&A intensity by now. This research study was set out in order to fill the overall research gap, contribute and develop this emerging research trend. To achieve this, this study for the first time compares and correlates four different narcissism variables. They are analysed for how far they have an impact on cumulative abnormal returns. Moreover, this study is the first to also investigate the impact of CEO narcissism on the respective company’s M&A intensity.

Analysing the 50 biggest listed European companies between 2010 and 2019, this study finds that different measures of narcissism, although investigating the same psychological phenomenon, lead to completely different results. Thereby, only the variable measuring a CEO’s verbal behaviour, and the variable graphologically analysing the CEO’s signature show statistical significance, while the variable analysing the CEO’s photograph in annual reports and the variable examining the CEO’s social media presence show no significance at all. The analysis of verbal behaviour indicates a positive impact of CEO narcissism on the acquiring company’s CAR, whereas the graphological analysis signals a negative impact of CEO narcissism on this measure of M&A performance. Hence, there is no clear support or refutation of the hypothesis that narcissistic CEO characteristics negatively affect M&A performance.

Just as for M&A performance, the analysis of the impact of narcissistic CEOs on M&A intensity does not show clear results either. In fact, different results are obtained for the different measures. The analysis of verbal behaviour also shows a positive impact of CEO narcissism on M&A intensity whereas the graphological analysis indicates a negative impact on M&A intensity. However, since the results are not robust, it is not possible to support or refute the hypothesis that narcissistic CEO characteristics have a positive effect on M&A intensity. Even if no general conclusion can be drawn about the impact of CEO narcissism on both dependent variables CAR and M&A intensity, both the measure of verbal behaviour and the graphological analysis seem to incorporate any information that explain the changes in the respective dependent variable. Since all four narcissism measures use different characteristics of a narcissist to measure the same phenomenon, it is difficult to assign a general validity to a single variable for the assessment or measurement of narcissism.

As there has been no previous research yet to compare and correlate different narcissism measures, and just little research included multiple measures of narcissism (Chatterjee & Hambrick, 2007; Zhu & Chen, 2015; Buyl, et al., 2019; Tang, et al., 2018; Oesterle, et al., 2016; Olsen & Stekelberg, 2016), almost all results in this overall research field using just one measure for narcissism have to be critically questioned on the basis of these results. Even though each of the narcissism measures previously used in business research are profound and scientifically recognised, there is no scientific basis that justifies their interchangeable application. Hence, the results of different papers are not comparable. However, this study also has to be challenged due to some inevitable limitations. Firstly, all results of this study are limited to the underlying sample, companies listed in the Euro Stoxx 50 and the selected period. Secondly, all narcissism measures were constructed manually, whereby a subjective influence cannot be completely eliminated and the variables potentially could suffer from individual bias.

Since the investigation of narcissism in corporate finance is a very recent research field, there is considerable scope and need for future research. Since eminent clinical measurement methods for narcissism are not feasible in this research area, future research should initially focus on finding a suitable method for measuring narcissism. A major condition for a default method in corporate finance research is that all data is accessible and measurable. In order to achieve this, interdisciplinary research should be conducted. It is highly recommended to incorporate the field of psychology in order to find truly variables that are medically or rather psychologically correct to measure narcissism. Supplementary they must be available to

researchers in this field. In addition, further variants for the measurement of narcissism should be compared and analysed. These variables should be checked for possible interactions and if they are combinable in a manner similar to the approach of Chatterjee and Hambrick (2007). In order to obtain further sound and comparable research results in business and corporate finance research, it is therefore indispensable to develop a standardised and uniform measurement method for narcissism. Moreover, the phenomenon of narcissism should also be investigated for other samples, countries and continents in order to include cross cultural aspects. Interesting for this entire research field would also be to measure the long-term effects of narcissism on M&As. Another contributing possibility would be to include and analyse the post-merger integration process, as just the short-term effects around the announcement date have mainly been measured and investigated so far.

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Appendix

Appendix 1 – Sample breakdown (countries & industries)

Countries	Acquirer	Targets
Argentina	0	1
Australia	0	2
Austria	0	1
Belgium	2	4
Brazil	0	3
Canada	0	2
Chile	0	1
China	0	1
Colombia	0	2
Czech Republic	0	2
Democratic Republic of Congo	0	2
Denmark	0	1
Egypt	0	3
Finland	3	2
France	104	33
Germany	37	15
Great Britain	0	11
India	0	6
Ireland	5	0
Israel	0	1
Italy	17	17
Kenya	0	2
Luxembourg	0	1
Mauritius	0	1
Morocco	0	1
Netherlands	10	6
Pakistan	0	1
Peru	0	1
Poland	0	6
Portugal	0	2
Romania	0	3
Russia	0	6
Serbia	0	1
Singapore	0	1
Slovakia	0	1
South Africa	0	1
South Korea	0	2
Spain	36	30
Sri Lanka	0	1
Sweden	0	2
Switzerland	0	2
Taiwan	0	1
Turkey	0	2
Ukraine	0	3
United States	0	27
	214	214

Industries	**Acquirer**	**Targets**
Agriculture, Forestry and Fishing	0	3
Construction	38	40
Finance, Insurance and Real Estate	48	53
Manufacturing	80	73
Mining	4	2
Retail Trade	17	28
Services	0	2
Transportation, Communications, Electric, Gas and Sanitary service	11	5
Wholesale Trade	16	8
	214	214

Appendix 2 - T-test CAR

$$H_0: CAR = 0$$

$$t_{CAR} = \frac{\overline{CAR_{i,t}}}{(\sigma(CAR_{i,t})/\sqrt{n}}$$

T-test CAR3

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
car_3_~s	214	.0030778	.001668	.0244001	-.00021	.0063656

mean = mean(car_3_days) t = 1.8452
Ho: mean = 0 degrees of freedom = 213

Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9668 Pr(|T| > |t|) = 0.0664 Pr(T > t) = 0.0332

T-test CAR5

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
car_5_~s	214	.0032821	.0018133	.0265267	-.0002923	.0068564

mean = mean(car_5_days) t = 1.8100
Ho: mean = 0 degrees of freedom = 213

Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9641 Pr(|T| > |t|) = 0.0717 Pr(T > t) = 0.0359

The null can be rejected on a ten percent level in both cases and thus shows that the means of both CARs differ significantly from zero, which is important to run the regressions and get valid results.

Appendix 3 – Testing for linearity using Ramsey's RESET test

CAR5 regression model

```
Ramsey RESET test using powers of the fitted values of car_5_days
       Ho:  model has no omitted variables
                  F(3, 165) =      0.50
                   Prob > F =      0.6819
```

The null cannot be rejected and thus no sign for misspecification is present in this model.

CAR3 regression model

```
Ramsey RESET test using powers of the fitted values of car_3_days
       Ho:  model has no omitted variables
                  F(3, 165) =      2.48
                   Prob > F =      0.0629
```

The null can be rejected on the ten percent level. The test thus shows slightly some sort of misspecification in the model. Squared terms of the narcissism variables are added to the model and the test was redone.

```
Ramsey RESET test using powers of the fitted values of car_3_days
       Ho:  model has no omitted variables
                  F(3, 161) =      0.75
                   Prob > F =      0.5230
```

Adding the squared variables solves for the problem and the model does no longer suffer from misspecification.

M&A intensity model

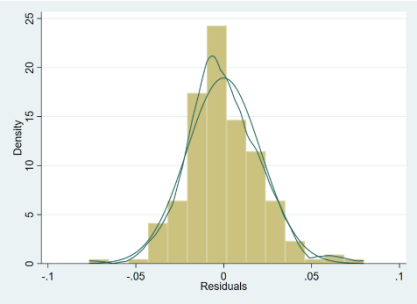
```
Ramsey RESET test using powers of the fitted values of ma_intensity
       Ho:  model has no omitted variables
                  F(3, 165) =     53.39
                   Prob > F =      0.0000
```

The test clearly shows some sort of misspecification as the null can be rejected on a one percent significance level.

In order to solve for the problem of misspecification in two models, squared and also interaction terms of the main explanatory variables (NARCISSISM1-4) are added to the regression models.

Appendix 4 – Testing for normality using frequency histograms and the Jarque-Bera test

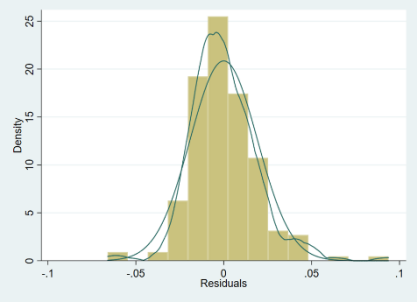
CAR5 regression model



The null hypothesis of normality can be rejected on a one percent level with a p-value of 4.7e-05.

```
Jarque-Bera normality test:  19.93 Chi(2)  4.7e-05
Jarque-Bera test for Ho: normality:
```

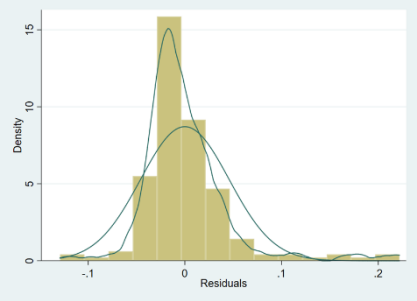
CAR3 regression model



The null hypothesis of normality can also be rejected for this model on a one percent level with a p-value of 1.4e-25.

```
Jarque-Bera normality test:  114.5 Chi(2)  1.4e-25
Jarque-Bera test for Ho: normality:
```

M&A intensity regression model



The null hypothesis of normality can also be rejected for this model on a one percent level with a p-value of 4.e-128.

```
Jarque-Bera normality test:  586.9 Chi(2)  4.e-128
Jarque-Bera test for Ho: normality:
```

Even though the test shows non-normality for all models, normality can be assumed due to the central limit theorem, as the sample is seen to be large enough.

Appendix 5 – Pearson Correlation Matrix

Observations: 196	NARCISSISM1	NARCISSISM2	NARCISSISM3	NARCISSISM4	DEALSIZE	ACQTOBINSQ	ACQSIZE	ACQLEVERAGE	CROSSBORDER	SAMEINDUSTRY	ACQPREMIUM	PAYMENT1	PAYMENT2
NARCISSISM1	1												
NARCISSISM2	0.0328	1											
NARCISSISM3	-0.1656	0.1367	1										
NARCISSISM4	-0.2071	0.1839	0.1087	1									
DEALSIZE	-0.1047	-0.2032	-0.0031	-0.0841	1								
ACQTOBINSQ	-0.1004	-0.2774	0.2105	0.25	0.073	1							
ACQSIZE	0.1827	0.4351	0.0071	0.0334	-0.0247	-0.552	1						
ACQLEVERAGE	0.1616	0.0484	-0.1979	-0.2266	-0.1838	-0.3971	0.1764	1					
CROSSBORDER	0.0431	0.1328	-0.304	-0.0455	-0.1715	-0.2086	0.1283	0.2584	1				
SAMEINDUSTRY	0.0368	-0.0511	-0.1013	-0.0757	0.1013	0.1179	-0.0279	0.2437	-0.0755	1			
ACQPREMIUM	-0.0643	-0.1802	-0.0881	-0.0389	0.2658	0.0991	-0.1402	-0.1244	-0.0792	-0.0765	1		
PAYMENT1	-0.0331	0.2001	-0.0625	-0.0177	0.0076	-0.1836	0.1321	0.2813	0.0815	0.1246	-0.0248	1	
PAYMENT2	-0.0248	-0.0491	-0.0248	-0.0353	0.0719	-0.0159	-0.0625	-0.0164	0.1559	-0.144	0.3129	-0.2132	1

Appendix 6 – Testing for heteroskedasticity using the Breusch-Pagan test

CAR5 regression model

	CAR5
VARIABLES	uhatsq
NARCISSISM1	-0.00136
	(0.000838)
NARCISSISM2	8.53e-07
	(2.02e-06)
NARCISSISM3	2.21e-06
	(1.89e-06)
NARCISSISM4	-1.38e-06
	(1.57e-06)
DEALSIZE	7.41e-05***
	(2.54e-05)
ACQTOBINSQ	-0.000395
	(0.000308)
ACQSIZE	-0.000249**
	(0.000117)
ACQLEVERAGE	1.52e-05
	(2.97e-05)
CROSSBORDER	7.88e-06
	(9.72e-05)
SAMEINDUSTRY	-0.000154
	(0.000113)
PAYMENT1	-0.000250
	(0.000206)
PAYMENT2	-8.81e-05
	(0.000164)
ACQPREMIUM	0.000167
	(0.000234)
Constant	0.00280**
	(0.00129)
Observations	196
R-squared	0.124

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(1) NARCISSISM1 = 0
(2) NARCISSISM2 = 0
(3) NARCISSISM3 = 0
(4) NARCISSISM4 = 0
(5) DEALSIZE = 0
(6) ACQTOBINSQ = 0
(7) ACQSIZE = 0
(8) ACQLEVERAGE = 0
(9) CROSSBORDER = 0
(10) SAMEINDUSTRY = 0
(11) PAYMENT1 = 0
(12) PAYMENT2 = 0
(13) ACQPREMIUM = 0

F(13, 182) = 1.15
Prob > F = 0.3218

CAR3 regression model

	CAR3
VARIABLES	uhatsq
NARCISSISM1	-0.000680
	(0.000840)
NARCISSISM2	-1.40e-06
	(1.56e-06)
NARCISSISM3	6.50e-07
	(1.75e-06)
NARCISSISM4	-3.42e-07
	(1.59e-06)
DEALSIZE	5.69e-05**
	(2.37e-05)
ACQTOBINSQ	-0.000427
	(0.000412)
ACQSIZE	-0.000243*
	(0.000142)
ACQLEVERAGE	-1.07e-05
	(2.65e-05)
CROSSBORDER	-1.76e-05
	(0.000115)
SAMEINDUSTRY	-0.000164*
	(9.07e-05)
PAYMENT1	-0.000102
	(0.000191)
PAYMENT2	-9.18e-05
	(0.000213)
ACQPREMIUM	0.000120
	(0.000294)
Constant	0.00287*
	(0.00164)
Observations	196
R-squared	0.093

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(1) NARCISSISM1 = 0
(2) NARCISSISM2 = 0
(3) NARCISSISM3 = 0
(4) NARCISSISM4 = 0
(5) DEALSIZE = 0
(6) ACQTOBINSQ = 0
(7) ACQSIZE = 0
(8) ACQLEVERAGE = 0
(9) CROSSBORDER = 0
(10) SAMEINDUSTRY = 0
(11) PAYMENT1 = 0
(12) PAYMENT2 = 0
(13) ACQPREMIUM = 0

F(13, 182) = 0.90
Prob > F = 0.5584

M&A intensity regression model

	MA_INTENSITY
VARIABLES	uhatsq
NARCISSISM1	0.0441***
	(0.0168)
NARCISSISM2	-2.27e-05**
	(1.09e-05)
NARCISSISM3	6.85e-06
	(1.65e-05)
NARCISSISM4	8.52e-06
	(9.58e-06)
DEALSIZE	0.000927***
	(0.000299)
ACQTOBINSQ	-0.00414**
	(0.00172)
ACQSIZE	-0.00225***
	(0.000690)
ACQLEVERAGE	-0.000556*
	(0.000296)
CROSSBORDER	0.00133*
	(0.000799)
SAMEINDUSTRY	-0.00108
	(0.000721)
PAYMENT1	0.000561
	(0.00139)
PAYMENT2	5.75e-05
	(0.000793)
ACQPREMIUM	0.00105
	(0.00152)
Constant	0.0189***
	(0.00585)
Observations	196
R-squared	0.292

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(1) NARCISSISM1 = 0
(2) NARCISSISM2 = 0
(3) NARCISSISM3 = 0
(4) NARCISSISM4 = 0
(5) DEALSIZE = 0
(6) ACQTOBINSQ = 0
(7) ACQSIZE = 0
(8) ACQLEVERAGE = 0
(9) CROSSBORDER = 0
(10) SAMEINDUSTRY = 0
(11) PAYMENT1 = 0
(12) PAYMENT2 = 0
(13) ACQPREMIUM = 0

F(13, 182) = 1.79
Prob > F = 0.0473