Do Retail Investors Fall for Bad Boys?

An empirical study of whether narcissistic CEOs manipulate retail investors into financial peril

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Contrary to most S&P500 companies, Tesla has no marketing budget to speak of (Tesla, 2022). Instead, they rely almost exclusively on Elon Musk's twitter account.

"If I am a narcissist (which might be true), at least I am a useful one"

– Elon Musk, CEO of Tesla, Twitter, 08.07.2018.

Abstract

The purpose of this thesis is to investigate whether retail investment decisions are influenced by CEO personalities, and whether it has adverse financial implications. Specifically, we are interested in the notion that narcissistic CEOs exploit retail investors to finance their personal agendas, at the cost of shareholder returns. Our research question is motivated by the current media narrative, portraying CEOs, such as Elon Musk, as narcissists manipulating vulnerable retail investors.

In order to provide empirical evidence, we leverage a custom narcissism index and Robinhood trading data to study a sample of CEOs from the Technology and TMT sector in the S&P 500 index. Applying a panel data regression, we find that CEO narcissism does in fact influence retail investor holdings through the moderation of media coverage, either deliberately and/or inadvertently. Contrary to the media narrative, however, we find the effect to be predominantly negative and find no evidence of adverse financial outcomes.

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1. Introduction

At the end of 2020, the total market value of the U.S. stock market amounted to approximately $33.89T (The World Bank, 2022). In comparison, the total valuation was at $707B in 1965 (SEC, 1965), implying a CAGR of c. 7.3%. The same trend, however, has not been reflected in retail stock ownership. Between 1965 and 2019, individual retail stock ownership in the U.S. declined by approximately 65 percentage-points, from 80% in 1965, to 15% in 2019 (Bloomberg, 2021a; Ross, 2021). Although part of the decline may be attributed to the sheer size of the market, the emergence of retirement plans in the 1960s (Davis & Strasser, 1970; ERISA, 1974), and a shift from direct to indirect ownership by the use of asset managers in the 1980s (Greenwood & Scharfstein, 2013), the increased complexity, concentration of ownership, and professionalization of the stock market has accelerated the comparative disadvantages of retail investors (Greenwood & Scharfstein, 2013).

Despite these developments, however, the layman's interest in financial markets has recently sparked yet again. At the outset of the COVID-19 pandemic, retail stock ownership surged from a stable 15% to 19% of the total U.S. market capitalization – reaching a peak of 24% in the first quarter of 2021 (Bloomberg, 2021a). Part of the growth may be attributed to increased leisure time, increased savings (OECD, 2020) and the emergence of "meme stocks" (Moss, et al., 2021). Furthermore, the democratization of finance through digital trading platforms, reduced brokerage fees and increased access to information (Erturk, et al., 2007), in combination with surging bull markets, has bolstered investment and retail investor confidence (Tan, 2021).

Meanwhile, journalists have debated whether CEOs communication with retail shareholders contribute to move financial markets. Elon Musk in particular, has repeatedly been accused of narcissistic tendencies, spreading self-enhancing information and misleading investment advice directly on Twitter (Bloomberg 2022; CNBC, 2015, 2021; Reuters, 2019). While Twitter is a relatively new phenomenon, CEOs attempting to captivate prospective retail shareholders is not. Interestingly, however, the relationship between CEO characteristics and its influence on retail investor behavior has received little, if any, scholarly attention. This thesis attempts to contribute to the existing gap in literature by investigating how CEO personalities, specifically narcissism, attract retail investors through their influence on companies' media coverage, and whether this has adverse financial implications for retail investors.

To build our case, we first establish that media coverage is related to retail investor holdings. Second, we investigate whether CEO narcissism moderates[1] this relationship, and third, we evaluate the potential adverse consequences for retail investors. In order to quantify media coverage and measure retail investor holdings we rely on data from Factiva and Robinhood, respectively. Media coverage is measured in terms of volume (number of articles) and sentiment (ratio of positive- /negative words), while retail holdings are aggregated at the firm level. Next, we apply a custom index (NCEO) to measure whether CEO narcissism moderates the relationship between retail investor holdings and media coverage. While the NCEO index is based on the validated methodology of Chatterjee and Hambrick (2007), we adjust the measure for technological- and governance related advancements. Lastly, we evaluate retail investor outcomes in terms of abnormal return. We also add further nuance by testing whether these relationships differ for companies with exceptional growth prospects or those who are particularly ESG-focused.

Our final sample includes balanced data for 32 companies with observations ranging from May 2018 through February 2020. Thus, we are able to leverage the cross-sectional and longitudinal attributes, apply a panel data regression model, and adjust for time fixed effects. Due to the time-invariant nature of narcissism, however, we also include control variables to adjust for entity related effects. While the media portrays narcissistic CEOs as "bad boys" who mislead vulnerable retail investors to suboptimal investment decisions, we find no evidence of this notion. First, we find that CEO narcissism negatively moderates a net positive relationship between media coverage and retail investor holdings. The one exception would be for growth stocks, where narcissistic CEOs are able to moderate the effect of news sentiment to their advantage. Next, we find no evidence that the deliberate and/or inadvertent influence of narcissistic CEOs leads to adverse financial outcomes. On the contrary, we find that, had narcissistic CEOs been more persuasive in the case of ESG-focused stocks, retail investors would have reaped the benefit of abnormal returns.

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1 The term "moderator" was defined by Hayes (2018) as "The effect of X on some variable Y is moderated by W if its size, sign, or strength depends on or can be predicted by W. In that case, W is said to be a moderator of X's effect on Y, or that W and X interact in their influence on Y."

As a basis for our analysis, we rely on a theoretical framework at the cross-section of retail investor behavior and CEO narcissism, within the overarching discipline of behavioral finance. While there has been extent research within both strings of literature, evidence from empirical studies has remained limited due to data accessibility and confidentiality constraints. Having gained access to data from one of the leading retail trading platforms in the US, Robinhood, we contribute to the relatively small selection of studies empirically investigating retail investor behavior. Furthermore, as our research relates to CEO narcissism, we rely both on traditional literature from the psychology discipline, and a more recent string of research on CEO narcissism within the fields of finance and economics. In 2007, Chatterjee and Hambrick introduced an unobtrusive measure that made it possible to derive estimates of CEO narcissism relying only on publicly available information. Thus, the foundation was set for quantitative studies on CEO narcissism in upper echelons research. While most papers to date have focused on firm outcomes relating to strategic and operational issues, we contribute to the literature by applying the lens of an outside stakeholder, namely, the retail investor.

The first segment of our thesis covers literature on retail investor behavior and CEO narcissism, in addition to discussing the interdependencies between the two. In the process, we motivate our analysis step by step, first introducing a particular string of literature and consecutively developing related hypotheses. Next, we move on to methodology, outlining our motivation for sample selection, variable selection, and the econometric model. In this segment we focus particularly on the development and validation of our CEO narcissism measure. As we move on to present our findings, we discuss their statistical and economic significance, and relate our findings to existing literature. Lastly, we present our conclusion, condensing our findings to answer the overarching research question.

2. Literature Review and Hypothesis Development

In this segment we introduce our theoretical framework and break our research question down to five hypotheses. We present the relevant literature in two segments, starting with retail investor behavior, before introducing the concept of CEO narcissism. In the process, we first construct hypothesis 1 to motivate the relationship between media coverage and retail investor holdings. Next, we develop hypotheses 2, 3 and 4 to understand the ways in which CEO narcissism moderates this relationship, adding situational cues for nuance. Having outlined our hypotheses with regards to retail investor holdings, we construct hypothesis 5, which attempts to answer whether the influence of narcissistic CEOs leads to adverse financial outcomes for retail investors.

2.1 Behavioral Finance and Retail Investors

In the finance literature, retail investors are often referred to as individuals and households who lack extensive investment experience and sophistication (Langevoort, 2009). Furthermore, they are contrasted to institutional investors in terms of their limited access information (Chan-Jane & Wu, 2017), and sensitivity to human life-cycle-considerations (Shefrin & Thaler, 1988). For the same reasons, a growing body of research seems to suggest that retail investors make both predictable and costly mistakes (Wilkinson-Ryan & Fisch, 2014).

Motivated by the distinct characteristics of retail investors, several attempts have been made to study their behavior. In 2014, Jagongo and Mutswenje leveraged survey data to identify the most prevalent factors influencing retail investor investment decisions. They found that the reputation of the firm, the firm's industry status, expected corporate earnings, profits, past performance, share price, economic cycle and expected dividends were reported as most important. While these self-reported data are dominated by company fundamentals, however, experimental psychology suggest that retail investors are also susceptible to cognitive bias (Fong et al., 2014).

Within the field of behavioral finance, scholars have unveiled a growing body of cognitive biases influencing investment decisions. The pioneering paper within the field was published by Kahneman and Tversky in 1979, introducing Prospect Theory, which challenged the well-established utility theory and its underlying assumption of rational actors. In more recent years, Barberis & Thaler (2003) have argued that behavioral finance research should focus on two pillars: Limitations to arbitrage, referring to the restrictions that limit rational actors' ability to

correct for irrational interference, and psychology, which systemize the different kinds of deviations from a fully rational individual. In order to study these dynamics, there have been numerous attempts to apply traditional sociological methods such as focus groups, interviews, participant observations and surveys (Paisarn, et al., 2021). The most influential studies, however, have emerged in experimental psychology, combining theories from classical economics, finance, psychology, and sociology, with the intent to of introduce new ways of approaching traditional financial theories (Huang, et al., 2016). Over the past decades there has emerged empirical evidence of an expanding list of cognitive biases which influence retail investors decisions.

2.1.2. Cognitive Biases

In this segment, we provide an overview of cognitive biases which may influence retail investors' investment decisions. While prior research has introduced an extensive list of potential biases, we choose to focus on the most prevalent factors related to our research question.

Confirmation Bias

Confirmation bias entails seeking out information that confirms a set of pre-determined beliefs, expectations, or hypotheses (Nickerson, 1998). For investors, this can have significant financial implications as they may fail to recognize information which would make a rational investor reconsider his/her position (Costa et. al 2017). Particularly in the digital age, confirmation bias may have become more prevalent as investors have increased access to a variety information-outlets. Moreover, retail investors are less likely to differentiate between high- and low-quality news flow, thus, relying on their gut feeling when interpreting information (Cutler, et al., 1989). This effect may be further accelerated by social media algorithms, which tailor content to each individuals' preferences (Hermida, et al., 2012).

Overconfidence

Overconfidence is a cognitive bias where individuals' subjective confidence in their own judgement is overestimated, particularly when their initial confidence is relatively high (Pallier, et al., 2002). Tekçe & Yılmaz (2015) found that male investors exert a particularly high degree of overconfidence. Thus, the effect is likely to be accelerated as men are overrepresented on retail trading platforms (Financial Times, 2020). On average, Baber and Odean (2000), found that overconfident investors have significantly lower expected returns due to excessive trading

activity. This tendency is confirmed by Tekçe and Yılmaz's (2015) research who found that men trade more often, and in larger quantities than women. Loibl & Hira (2011) also found that women are more inclined to seek financial advice. While this might be attributed to women's financial literacy, which Jiang et al. (2020) found to be significantly lower than for men, it may also be accelerated by male overconfidence.

Overoptimism

Overoptimism is closely linked to overconfidence and represents individuals' tendency to overestimate the probability of positive outcomes, particularly if individuals perceive the event to be under their discretion (Talwar et al. 2021). While the small share of retail investments is unlikely to have much impact on the performance of S&P 500 companies in general, there may be cases in which this is true, or that retail investors overestimate their influence. Prior research has suggested that overoptimism is most prominent in industries with substantial disagreements between alternative strategies or technologies (Steen, 2004). Moreover, Puri and Robinson (2007), have linked overoptimism to reduced diversification and excessive risk taking. Still, the authors argue, moderate levels of optimism are positively associated with good financial habits and prudent choices.

Familiarity Bias

Familiarity bias may lead investors to invest in known (attention-grabbing) stocks due to errors in processing information (which determines investment decisions) and the limited mental capacity of human beings, known as heuristic simplification (Kahneman & Tversky, 1973). In the case of retail investors, this is particularly relevant as he/she must navigate a vast range of opportunity with limited theoretical knowledge, experience, and information (Odean, 1999). As they limit their focus to a small selection of stocks, they may both miss out on opportunities and importantly, they may be drawn towards attention grabbing events which are irrelevant to future performance (Barber & Odean, 2008).

In support of this hypothesis, Hou et. al (2006) find that retail investors tend to overreact to price movements in bull markets, while they underreact to smaller, more routine events, such as earnings announcements. Furthermore, Grullon et al. (2004) found that the volume of both individual and institutional investors increases when companies spend more on product advertising, all else equal. In conjunction with these findings, Lou (2014) found that advertising expenditures lead to a rise of retail buying and a temporary shock in the stock price. Lastly, Seasholes and Wu (2004) found that retail investors are net buyers the day following a stock

price local high. Interestingly, within this group, first-time buyers were overrepresented, which might suggest that more experienced retail investors learn to regulate their behavior over time. This would be in line with Tekçe & Yılmaz' (2015) research who found that younger investors are more prone to be influenced by familiarity bias.

While familiarity bias might be influential by itself, social interactions have the potential to further accelerate the impact (Barber & Odean, 2008). According to Banjee and Fudenberg (2004), word of mouth may lead social groups to herd, referring to the social tendency to trust others judgement. Thus, investors might choose to invest without critically analyzing information. Particularly in the digital age, one might argue that the word of mouth-effect is more prominent as both the number of connections and the speed of interaction increases. Herding behavior has been suggested as a key driver of financial bubbles and market volatility (Shantha, 2018; Yao, et al., 2014). Moreover, Talwar et al. (2021) found that herding bias increased investors' trading activity when facing external stress, such as an economic recession or a global pandemic.

Synthesizing the literature on retail investor behavior, we find extent evidence that investors are not only influenced by company fundamentals but a variety of psychological biases. While bias might be somewhat skewed towards particular demographics, we argue that on average, retail investors can be investigated as not-fully-rational actors. As it relates both to the limited cognition of the retail investor and their tendency to engage in herding behavior, we argue that retail investors are particularly susceptible to media coverage both in terms of news volume and news sentiment. With regard to news volume, we hypothesize that the effect of being within the span of attention, regardless of the news content and sentiment, leads to increased retail investment. Furthermore, we argue that retail investors are particularly susceptible to positive news due to their limited financial literacy, confirmation bias, and resulting overoptimism. Thus, our hypothesis is that media coverage, measured in news volume and sentiment, is positively associated with retail investor holdings.

H1: Retail investor holdings are positively related to media coverage.

2.2 CEO Narcissism

The term narcissism originates from the Greek myth of Narcissus, the story of a young man who fell in love with his own image, (O'Reilly et al. 2014; Rijsenbilt et al. 2013) and was first introduced in the psychology discipline by Ellis (1898), a British researcher and psychologist who used narcissism to explain a condition of self-perverted love. As the trait was established as a psychological construct in the 20th century, numerous specifications of narcissism have surfaced. One of the most influential scholars in the field would be Sigmund Freud (1914), who noted that narcissists are prone to self-admiration and view other people as extensions of themselves. Building on Freud's theory, several scholars have studied the psychological construct, resulting in a consensus among researchers and psychiatrics that narcissism is a relatively stable condition (Emmons 1984, 1987; Raskin & Hall 1979; Wang 2016). Furthermore, most scholars agree that narcissism can be characterized by four distinct constructs, which were introduced by Emmons in 1987. Namely, exploitativeness/entitlement, leadership/authority, superiority/arrogance and self-absorption/self-admiration. Building on Emmons research, the American Psychiatric Association formally defined narcissism as a psychological construct of individuals with an immense sense of self-importance, uniqueness, arrogance, entitlement, exhibitionism, exploitativeness, self-admiration, self-absorption, and vanity (American Psychiatric Association (APA), 2000).

While narcissists may project self-esteem and confidence, however, their condition is fragile. Narcissistic individuals often try to compensate by acting superior to their peers, known as the narcissism paradox (Morf & Rhodewalt, 2001). As a response to being criticized by others, narcissistic individuals persistently look for praise and affirmation from others, and thus, they are more likely to cultivate underdeveloped feelings of empathy (Rijsenbilt & Commandeur, 2013). According to Campbell, Foster & Finkel (2002), narcissistic traits stem from a combination of early parental relationships and genetic factors. Thus, researchers have argued that an individual's level of narcissism is relatively stable over time and falls on a continuum, with the most severe cases being diagnosed as narcissistic personality disorder (Engelen, et al., 2016; Young, et al. 2016).

2.2.1. Narcissistic Personality Disorder (NPD)

According to research published by the American Medical Association, children who experience early childhood trauma, in the form of emotional abuse, physical, sexual, or severe neglect leads to an increased risk of narcissistic personality disorder (NPD) (Johnson,et al.

1999). As children's self-esteem is threatened by early traumatic experiences, such experiences may lead to feelings of emptiness, shame, and self-blame, which causes an urge to seek admiration, attention, and external validation (Young, et al., 2016).

However, individuals do not necessarily need to have suffered from childhood trauma to display narcissistic traits. According to Pinsky and Young (2009), there has been a significant increase in narcissistic personality traits among young Americans due to an increasing rate of inappropriate parenting, in the form of increasing pressure to perform well due to "helicopter" parents who form and shape every aspect of their children's lives. This parenting style has generated an immense pressure of other-oriented perfectionism among younger generations, which in turn erodes social relations because of the tendency to criticize others in response to gain praise and affirmation (Curran & Hill, 2022).

Besides poor parenting, several other factors have been proven influential in developing narcissistic traits. In particular, increased access to social media platforms and desire for fame, has encouraged the rise of narcissistic personality traits (Young & Pinsky, 2009). In addition, grade inflation in universities (Rojstaczer & Healy, 2012) has led to an increased belief of effortless success and rewards among younger generations – thereby fueling individuals' sense of arrogance, entitlement, and uniqueness (Young, et al., 2016).

2.2.2. CEO Narcissism

As leadership roles offer access to power, status and visibility, narcissists are generally drawn to top positions (Campbell & Campbell, 2009). Some scholars refer to narcissistic behavior as the dark side of the CEO personality (Olsen, et al., 2014; Resick, et al., 2009), and as O'Reilly et al. (2014) states: "They believe they're superior and thus not subject to the same rules and norms. Studies show that they are more likely to act dishonestly to achieve their goals. They know they're lying, and it doesn't bother them. They don't feel shame.". Narcissistic leaders are driven by their own self-serving interests, with an inflated sense of their importance to the firm. This in turn, may lead to counterproductive work behaviors such as abusive supervision (Paulhus & Williams, 2002), due to narcissistic leaders focusing their energy and time on enhancing their own self-image, rather than meeting customer-based or operational goals (Resick, et al., 2009). However, there might be a "bright" side of narcissistic leadership, as they tend to be characterized by a high level of charisma, self-esteem, self-efficacy, internal locus of control, and emotional control, which has shown to be associated with job-performance and satisfaction (Judge & Bono, 2001).

2.2.3. CEO Narcissism in Finance and Economics

The first contribution to empirical research on the topic on narcissistic CEOs was made by Chatterjee and Hambrick (2007). The authors introduced an unobtrusive measure of narcissism and studied the effect of CEO narcissism on firm strategy and performance in the technology sector. Since then, scholars have leveraged Chatterjee and Hambrick's narcissism index, as well as introducing new unobtrusive measures, to study the effects of narcissism on company performance and firm policies.

Excessive Risk Taking

In their pioneering paper, Chatterjee & Hambrick (2007) found that CEO narcissism is positively related to strategic dynamism (the number and size of acquisitions) and negatively related to ROA- and TSR fluctuations, introducing evidence that narcissistic CEOs prefer bold strategic actions resulting in big wins and losses. In support of Chatterjee and Hambrick's (2007) findings, Liu's (2009) found that narcissistic CEOs are more likely to conduct mergers and acquisitions and that the deals conducted by narcissistic CEOs significantly underperform deals conducted by less narcissistic CEOs. Closely linked to narcissism, Malmendier & Tate (2008) found that overconfident CEOs overpay for acquisition targets, indicating that they may overestimate their ability to realize synergies with the acquisition target. Later, in 2011, Chatterjee and Hambrick, introduced capability cues, defined as contextual signals that CEOs might interpret as indicators of their own abilities. They found that highly narcissistic CEOs were significantly bolstered by social praise, and in turn, they were less responsive to recent objective performance, resulting in excessive risk taking. In support of these findings, Patel et al. (2014) found that narcissistic leaders inhibit a weaker avoidance focus, meaning that they systematically focus less on hedging strategies, leading to particularly hard crashes during periods of crisis.

Building on the notion of excessive risk taking, Rijsenbilt & Commandeur (2013) found a statistically significant relationship between CEO narcissism and incidents of fraud. Similarly, O'Reilly et al. (2018) found that having a narcissistic CEO increases the firm's vulnerability to lawsuits. Looking beyond fraud and lawsuits, scholars have found a positive relationship between CEO narcissism and R&D-spending, as well as CEO narcissism and innovation, providing further evidence of narcissistic CEOs tendency to engage in risky behavior (Ham, et al., 2017; Kashmiri, et al., 2017).

Firm Performance

Within the field of finance, previous research on CEO narcissism has primarily focused on firm valuation and asset pricing. For instance, Olsen et al. (2014) documented a positive relationship between CEO narcissism and beating analysts' forecasts of EPS, as well as a positive relationship between CEO narcissism and stock prices. Patel and Cooper (2014) supported these findings with further evidence as they found narcissists' self-serving image and sense of importance to enable them to increase firm performance relative to their peers.

However, the fact that narcissistic CEOs outperform their peers in beating analysts' forecast, may potentially, at least in part, be attributed to accruals management (Buchholz, et al., 2018; Lin, et al. 2019; Marquex-Illescas, et al., 2019). For instance, Lin et al. (2019) found that narcissistic CEOs are more likely to engage in earnings management in response to the pressure of analysts' earnings targets. Similarly, Marquez-Illescas et al. (2019) found that CEO narcissism is positively related to the issuing of positive earnings announcements, reinforcing narcissistic leaders' grandiose self-image. Still, the researchers found no abnormal response in the stock market related to positive earnings announcements. These findings are in conjunction with Capablo et al. (2017) who found similar results when investigating the relationship between CEO narcissism and accruals management through signed discretionary accruals. In the defense of narcissistic CEOs, however, Olsen et al. (2014) found that narcissistic CEOs increased performance, EPS in particular, through real and operational activities, rather than accruals management.

One dimension of these operational activities may be entrepreneurial orientation, which Engelen et al. (2016) found to be moderated by CEO narcissism. Entrepreneurial activities have been found to increase financial performance as it enables companies to pursue new market opportunities (Zahra & Covin, 1995). Engelen et al. (2016) found that narcissistic CEOs, as a result of their desire for superiority and constant applause, act more entrepreneurially than their peers. Contrary to Zahra & Covin's (1995) research, however, they find that narcissistic CEOs generally weaken the positive impact of entrepreneurial orientation on financial performance. The exception would be for highly concentrated markets where narcissistic CEOs thrive and deliver superior performance (Engelen, et al., 2016).

Corporate Governance

Building on the literature on firm performance and risk taking, some scholars have studied CEO narcissism in in the context of corporate governance. For instance, Petrenko et al. (2016),

found that narcissistic CEOs tend to exhibit CSR-initiatives to reinforce their need for attention and building a grandiose self-image. The evidence suggests, however, that although CEO narcissism has positive effects on organizational CSR, having a narcissistic CEO, will reduce the effect of CSR on performance, suggesting that investors interpret these activities as "CSR-washing" (Petrenko, et al. 2016).

Narcissistic CEOs have also been found to influence the hiring of new directors, which has the potential to accelerate their risky behavior. Zhu and Chen (2015) investigate the relationship between narcissism, director selection, and risk-behavior in decision making. They find that narcissistic CEOs who exert strong discretion in corporate governance select directors showing similar levels of narcissistic tendencies onto their boards. In turn, the CEO is enabled to engage in risky behavior, not being challenged by his/her board of directors. The authors confirm this hypothesis as they find narcissistic CEOs to implement the same strategic initiatives as they executed in previous positions, indicating that a board of agreeable directors does not attempt to challenge the CEO with new input.

We hypothesize that CEO narcissism influences the relationship between media coverage and retail investor holdings, both in terms of news volume and news sentiment. With regards to volume, we argue that the facets of CEO narcissism have both a direct and indirect influence. First, we argue that the narcissistic tendency to seek admiration might lead the CEO to communicate directly with retail investors as he/she participates in traditional and social media. Second, we argue that narcissistic CEOs may attract media attention, consciously or unconsciously, as a result of their tendency to execute bold strategic actions like M&A activity and CSR initiatives. Furthermore, we are interested in the sentiment of media coverage and its effect on retail investor holdings. The literature suggests that narcissistic CEOs engage both in bolder profit generating activities (Engelen et al., 2016; Olsen et al., 2014; Zhu & Chen, 2015) and illegal/opportunistic activities (Buchholz, et al. 2018; Capalbo, et al. 2018; Lin, et al. 2019; Marquex-Illescas et al., 2019; O'Riley et al. 2018) than their peers. Thus, as the media reflects the CEOs behavior, news sentiment might have ambiguous effects on retail investor holdings. To shed light on this problem, we investigate the influence of CEO narcissism on the volume and sentiment of media coverage, and how this translates into retail investor holdings.

H2: CEO narcissism moderates the relationship between retail holdings and media coverage.

2.3 Situational Cues

2.3.1 Growth Stocks

Growth stocks are historically characterized as having a high P/B ratio (Capaul, et al., 1993; Fama & French, 2007), and in more recent times, a high Price-to-Earnings (P/E) ratio (Athanassakos, 2009). These developments draw on Basu's (1977) research which suggests that low Price-To-Earnings companies experience higher returns on average. Generally, growth stocks (high P/B and P/E) tend to be highly profitable and fast growing, whereas value stocks (low P/B and P/E) tend to be companies that are less profitable with steady growth (Fama & French, 2007).

We argue that the retail investors perception of growth stocks is particularly sensitive to media coverage as the company valuation is highly dependent on the future growth prospects. With regards to CEO narcissism, we argue that their experience with expressing superiority on a personal level may give them a competitive advantage in making a convincing case for their companies. The argument being that in both cases, they have limited evidence to back up their claims. While the urge to express superiority may help the CEO to display confidence in the future, however, self-bolstering may in some cases evoke disgust rather than admiration. As in hypothesis 2, we aim to investigate both the volume and sentiment of media coverage. With regards to volume, media attention is subject to the same dynamics as other stocks, including attention-grabbing events like bold strategic actions and scandals. In the case of growth stocks, however, company fundamentals such as rapid growth and high profitability, as well as the prospects of a strategic vision which has not yet materialized, can be highly influential. We argue that the velocity and persuasiveness with which these distinct attributes are communicated by the CEO are decisive. Thus, we investigate the distinctive characteristics and interconnections between narcissism and media coverage in the case growth stocks, and how this translates to retail investor holdings.

H3: CEO narcissism moderates the relationship between retail holdings and media coverage in stocks with exceptional growth prospects.

2.3.1 ESG-Focus

Over the past decades, ESG-measures have grown to become a popular input and, in some cases, a decisive criterion for investment decisions. The academic literature linking ESG- and financial performance dates back to a pioneering paper by Aldag and Bartol in 1978 (Friede &

Bassen, 2015). However, research on retail investors and ESG-focus has received limited scholarly attention (Moss, et al., 2020), with a few prominent studies conducted as lab experiments. In 2015, Cheng et al. found that nonprofessional investors (approximated by graduate students), perceive ESG to be a more important investment criterion if the indicators have strategic relevance. Other scholars, such as Martin and Moser (2016) found that retail investors positively value the managements' ESG-disclosures, even if they reduce cash flows. Thus, in conjunction with Cheng et al. (2015) findings, retail investor willingness to invest increase as a company pursue and/or communicate ESG-initiatives.

Building on this theory, we argue that ESG focused companies exhibit distinctive dynamics in the intersection of publicity, retail investor holdings and CEO narcissism. First, we hypothesize that publicity may influence retail holdings in ways that relate to positive news vs. negative news cycles. Specifically, that the impact of negative ESG-related news outweighs and outreaches the impact of positive ESG-related news (Capelle-Blancard & Petit, 2019). Furthermore, we build on the notion that narcissistic CEOs are prone to implement and exhibit ESG initiatives to bolster their own, and in extension, the firm's reputation (Beauchesne, 2014; Dabbebi et al. 2022; Petrenko et al., 2016). As our hypothesis regarding news volume and news sentiment point in different directions, we find it particularly interesting to investigate the interaction between media coverage, CEO narcissism and ESG-focus on retail investor holdings.

H4: CEO narcissism moderates the relationship between retail holdings and media coverage in ESG-focused companies.

2.4 Abnormal Return

In order to understand the financial implications of our findings in hypotheses 1 through 4, we investigate how retail investment decisions translate to abnormal returns. Since William Sharpe introduced the capital asset pricing model (CAPM) in 1964 (Strong, 1992) there have been developed several methods to calculate abnormal return, including the introduction of new factors to determine an appropriate rate of return. In 1992, Fama and French introduced size risk (SMB) and value risk (HML) factors, effectively establishing the renowned Fama-French Three Factor model. More recently, they expanded their original model, introducing the profitability (RMW) and investment aggressiveness (CMA) factors, also known as the Fama-French Five Factor benchmark model (Fama & French, 2014). The five-factor model is designed to capture the relationship between average return and size (measured by market capitalization), price ratios (B/M), profitability (weak minus low) and investment aggressiveness (conservative versus aggressive). Comparing actual returns with the benchmark models for expected returns enables investors to capture the deviations from expected return. Thus, enabling investors to determine the risk-adjusted performance (Strong, 1992). As the calculation is based on the assumption of an efficient market, however, this approach has been challenged by scholars claiming that the market (or some market participants in particular) is irrational, often referring to financial bubbles such as the stock market crash of 1987 and the "Internet bubble" in 2000 (Malkiel, 2003). In line with the media narrative and our overarching research question, we hypothesize that abnormal returns yield negative coefficients.

H5(1): Media coverage leads to abnormal returns.

H5(2): CEO narcissism moderates the relationship between media coverage and abnormal returns.

H5(3): CEO narcissism moderates the relationship between media coverage and abnormal returns in stocks with exceptional growth prospects.

H5(4): CEO narcissism moderates the relationship between media coverage and retail holdings in ESG-focused companies.

3. Methodology and Research Model

In this section we begin with outlining our sample selection and present our data sources. Next, we motivate our variable selection, discuss our assumptions, and validate the narcissism index measurement. Lastly, we present our model specifications and discuss its limitations. The resulting research model is illustrated in Figures 1a and 1b.

Figure 1a: Retail Investor Holdings Research Model

Figure 1a illustrates our research model for hypotheses 1a through 4a. We are interested in understanding whether company publicity attracts more retail investors (H1a), whether CEO narcissism moderates this relationship (H2a) and whether this effect is different for growth stocks (H3a) and ESG focused companies (H4a). We also include several control variables to control for confounding effects.

Figure 1b: Abnormal Return Research Model

Figure 1b illustrates our research model for hypotheses 1b through 4b. We are interested in understanding whether company publicity leads to abnormal returns (H1a), whether CEO narcissism moderates this relationship (H2a) and whether this effect is different for growth stocks (H3a) and ESG focused companies (H4a). We also include several control variables to control for confounding effects.
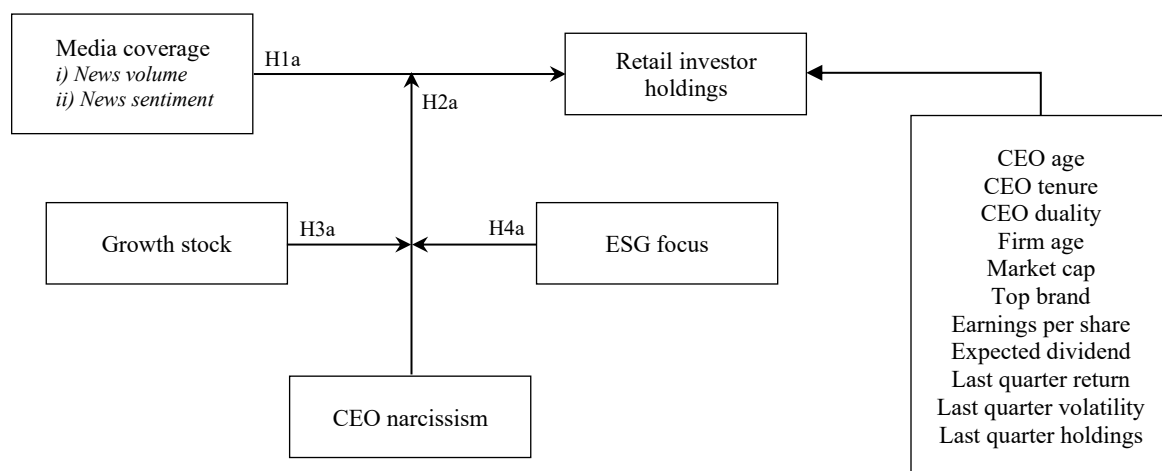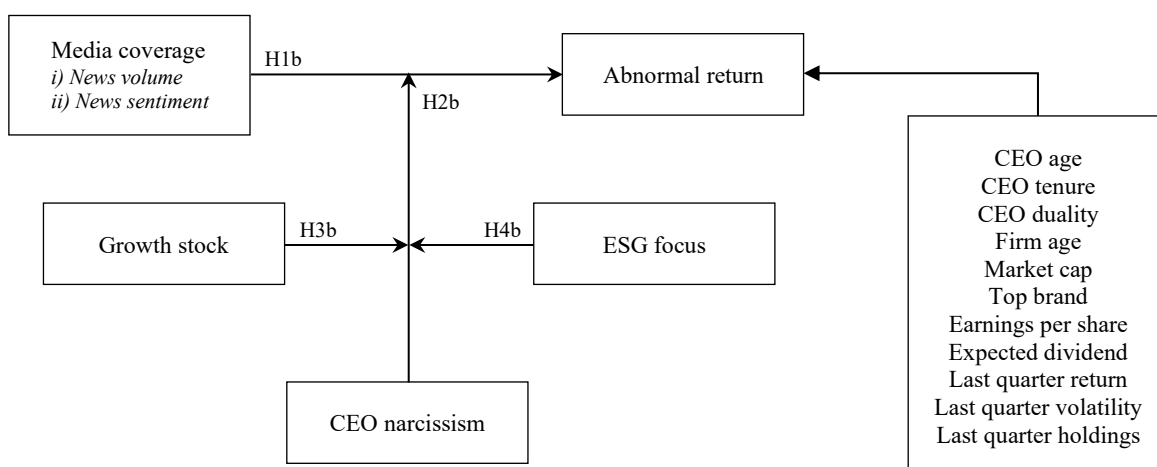
3.1. Sample

We analyzed a sample of companies from the Information Technology and Communication Services sectors in the S&P 500 index from June 2017 through mid-February 2020. In these industries, CEOs tend to exert particularly high discretion and thus, are more likely to display their narcissistic tendencies and influence firm outcomes (Chatterjee & Hambrick, 2007; Engelen, et al. 2016). We narrow down our sample to companies for which we have access to the data we deem necessary in order to conduct our regression analysis.

Due to regulatory restrictions, retail holdings data tends to be strictly confidential (Boehmer, et al., 2021). We did, however, locate data containing aggregated holdings for stocks traded on the Robinhood platform between the 5th of June 2017 and the 17th of February 2020 (Robintrack, 2021). While this is not a perfect measure of retail investor holdings, we argue that it functions as an informative proxy. Among the 631 companies listed on the S&P 500 index within our timeframe, we obtain holdings data on 545 companies which were traded on the Robinhood platform. We also eliminate succession effects by applying a filter for continued tenure between 2017 and 2019. Relying on Execucomp data from S&P Global Market Intelligence, we reach a total of 313 companies. Next, we apply a filter for the S&P Global Industry Codes on Information Technology and Communication Services from the Compustat database, yielding a sample size of 55 companies. As we are also interested in the companies' ESG focus, we retrieve data from the RepRisk database and select the companies which have received ratings, resulting in a sample size of 49 companies. Lastly, in order to calculate an unobtrusive measure of narcissism, the companies need to produce and publish annual reports which include a letter to shareholders. Thus, our final sample contains balanced data for 32 companies. Considering the reporting-frequency of our variables, we choose to apply quarterly data, yielding a total of 160 observations.

3.2 Dependent Variables

3.2.1 Retail Investor Holdings

We leverage data from the Robinhood trading platform as a proxy for retail investor holdings. The data includes the aggregated number of shares held for each stock, and we isolate quarterly holdings at closing. To construct a comparable measure, we multiply retail investor holdings with the respective company's share price, representing the exposure in USD. As there is large

variation in holdings, we calculate the natural logarithm to approximate a normal distribution and minimize outliers for regression analysis.

3.2.2. Abnormal Returns

We rely on the Fama-French Five factor model in order to calculate abnormal returns. The five regressors and the risk-free rate are downloaded from the Kenneth R. French website (French, 2022), while the actual return for our sample is retrieved from the CSRP database.

3.3. Independent Variables

3.3.1 Media Coverage

Volume

We obtained data on media coverage using the Dow Jones Factiva database, which covers more than 25,000 leading news- and business publications globally. For each quarter in our sample, we apply the built-in filter on company tickers and include major news and business sources. Our motivation to exclude minor publishers is that while they may publish many articles on a particular company, retail investors, on average, are less likely to be exposed to them. As the number of publications varies extensively in our sample, we apply the natural logarithm to approximate a normal distribution.

Sentiment

In order to calculate our news sentiment measure, we performed a textual analysis. First, we downloaded news articles aggregated by quarter for each of the companies in our sample from the Factiva database. Second, we uploaded the contents to R, cleaning the data for "stop words" and matching each word to the English dictionary. Third, we matched our data to the AFINN library (Nielsen, 2017), which contains a list of positive and negatively loaded words. Thus, we were able to calculate the ratio of positive vs. negative words, indicating news sentiment. Important to note, however, this measure should be interpreted as a relative rather than an absolute measure of sentiment. While the mean sentiment score in our sample is 3.886, the threshold for an article to be perceived as positive may both be higher or lower.

3.3.2 CEO Narcissism

In the psychology literature, the prevailing instrument for measuring narcissism is the Narcissistic Personality inventory (NPI), a survey-based questionnaire developed by Raskin & Hall (1979). In upper echelon research, however, top executives have been found reluctant to

answering these questionnaires (Cycyota & Harrison, 2006). Thus, we rely on publicly available information to derive our measure.

We leverage extant academic literature dating back to Chatterjee and Hambricks' (2007) pioneering paper on the construction of an unobtrusive measure of CEO narcissism. Since then, there have been numerous attempts to apply, modify and validate the measure within finance, accounting, and economics (Cragun, et al., 2020). We choose to develop our own measure, drawing on a decade of research findings, applying novel technology, and adjusting to the current world order. As it relates to Chatterjee & Hambrick's (2007) original measure, we have chosen to exclude CEOs relative compensation measures and include LinkedIn data as a novel indicator. Our motivation to exclude relative pay is that we find it to be negatively correlated with all the other indicators. Byul et al. (2019) found similar results in their analysis on narcissistic CEOs risk-taking behavior in commercial U.S. Banks and argue that this might be due to changes in norms, laws, and regulations regarding executive compensation. Furthermore, executive pay may be influenced by the fact that CEOs who come of age in worse economic times are likely to pay themselves less relative to their top executives (Bianchi, 2014). As to the application of novel technology, we choose to include LinkedIn as a new indicator motivated by the research by Aabo & Eriksen (2017), to compensate for the lost explanatory power of executive pay.

The resulting selection of indicators is rooted in the same criteria as introduced by Chatterjee and Hambrick in 2007. First the indicator must be under control of the CEO – not driven by external forces. Second, the indicator must reflect one or more characteristics of a narcissistic personality as defined in the psychology literature (Chatterjee & Hambrick, 2007). We apply Emmons (1987) facets of narcissism, including: exploitativeness/entitlement, self-absorption/-admiration, leadership/authority, and superiority/arrogance. While it is challenging to capture these facets in a mutually exclusive and collectively exhaustive manner, our indicators aim to capture the key components in a balanced manner. The results are displayed in Table 1a & 1b which outline the overlap of measures in a matrix structure.

We deploy five indicators of narcissistic traits which are either directly (an exact copy) or indirectly (motivated the same behavior) rooted in pervious literature:

1. Prominence of the CEO's photograph in a company's annual report (Buchholz, et al., 2018; Buyl et al., 2017; Chatterjee, 2009; Chatterjee & Hambrick, 2007, 2011; Engelen, et al., 2016; Gerstner, et al., 2013; Ingersoll, et al., 2017; Judd, et al., 2017; Kashmiri, et al., 2017;

Liu, 2009; Marquez-Illescas, et al., 2018; Oesterle, et al., 2016; Olsen et al., 2014; Olsen & Stekelberg, 2016; Patel & Cooper, Rijsenbilt, 2011; Rijsenbilt & Commandeur, 2013; Schrand & Zechman, 2012; Tang, et al., 2018; 2014; Zhu & Chen, 2014, 2015).

2. Relative use of first-person singular pronouns to second-person singular pronouns in the annual letter to shareholders (Buyl et al., 2019; Chatterjee, 2009; Chatterjee & Hambrick, 2007, 2011; Engelen, et al., 2016; Gerstner, et al., 2013; Ingersoll, et al., 2017; Kashmiri, et al., 2017; Liu, 2009; O'Reilly et al., 2018; Patel & Cooper, 2014; Rijsenbilt, 2011; Tang, et al., 2018; Zhu & Chen, 2014, 2015).

3. Number of signatures in the annual letter to shareholders. (Abdel-Meguid, et al., 2021; Buyl, et al., 2019; Cragun, 2018; Ham, et al., 2017, 2018)

4. Prominence of the CEO in companies' press releases (Buchholz, et al., 2018; Chatterjee, 2009; Chatterjee & Hambrick, 2007, 2011; Engelen, et al., 2016; Gerstner, et al., 2013; Ingersoll, et al., 2017; Kashmiri, et al., 2017; Liu, 2009; Patel & Cooper, 2014; Rijsenbilt & Commandeur, 2013; Tang, et al., 2018; Zhu & Chen, 2014, 2015).

5. CEO LinkedIn activity (Aabo & Eriksen, 2017).

To improve the validity of our five indicators, we leverage a similar approach to Chatterjee and Hambrick (2007), calculating the average of each indicator from the second- and third year of each CEOs tenure (t+1 and t+2), thus omitting the first-year effects, which is often associated with animalities due to succession processes.

3.3.2.1 CEO Photograph in Annual Reports

While displaying CEO photographs in annual reports is normal, not all companies choose to include them, and they vary significantly in size (Olsen, et al., 2014). Chatterjee and Hambrick (2007) motivate the use of this indicator as it accurately applies to three of Emmons' (1987) facets of narcissism. Namely, the narcissistic desire to lead and project authority ("I am a central figure to this company"), self-absorption/self-admiration ("I enjoy the visibility that comes with being CEO"), and exploitativeness/entitlement ("I deserve to be showcased"). To satisfy the indicator criteria of being under the CEO's discretion, Chatterjee and Hambrick conducted interviews with corporate communication professionals. Their findings confirmed that CEOs do in fact hold a great deal of discretion when it comes to their portrayal in annual reports (Chatterjee & Hambrick, 2011). Thus, one could arguably consider the prominence of a CEO photograph to be an unobtrusive measure for narcissistic tendencies. To classify the prominence of a CEOs photograph in an annual report, we use a similar, but not identical

approach to Chatterjee and Hambrick (2007). In addition to giving a greater score if the photograph occupies a whole page in the annual report, as introduced by Olsen, et al. (2014), we constructed a new category – whether the CEO photograph occupies less than a quarter of the page. This was motivated by the fact that small photographs seemed to cover the functional purpose of introducing the CEO rather than to boost his/her importance. Thus, the CEOs are rated on an incremental scale from 1 to 6 according to the following criteria:

1) No photograph of the CEO
2) The CEO was photographed with one or more executives.
3) The CEO photograph was of him (her) alone and occupied less than a quarter of a page.
4) The CEO photograph was of him (her) alone and occupied less than half a page.
5) The CEO photograph was of him (her) alone and occupied more than half a page.
6) The CEO photograph was of they him (her) alone and occupied a whole page.

3.3.2.2 Pronoun use in Shareholder Letters

According to Ramsay (1968) & Hogben (1977), speech reflects the most dominant and consistent personality trait for an individual. The use of first-person singular pronouns, reflects the individuals' sense of self-absorption, thus capturing the second facet of Emmons (1987) facet of narcissism - self-absorption/-admiration. Similar to Chatterjee and Hambrick (2007), we counted the total number of first-person singular pronouns (*I, me, mine, my, myself*), and divided the sum by the total number of second-person singular pronouns (*we, us, our, ours, ourselves*). While Chatterjee and Hambrick studied pronoun-use in CEO interviews, however, we choose to study the annual letter to shareholders in line with O'reilly et al.' (2018) innovation. They found that pronoun-use in the annual letter to shareholders yielded similar results to that of interviews.

3.3.2.3 Number of Signatures in Shareholder Letter

Researchers, such as Ham, et al. (2017) and Lin, et al. (2020), have found that the size of the CEOs signature in the annual letter to shareholders correlates with authoritativeness and exploitativeness, thus covering two facets of the narcissistic personality inventory. In 2021, however, Abdel-Meguid et al. (2021) found that signature size failed to pass their tests for robustness. Thus, we decided to alter the measurement to represent the number of signatures in the annual letter to shareholders. According to Engelen et. al (2016) the letter to shareholder is usually the output of top management, rather than the CEO alone. Thus, in line with Buyl et al. (2019), we argue that addressing the letter solely from the CEO suggests narcissistic

tendencies similar to those of the signature size indicator, namely authoritativeness and exploitativeness. Motivated by Buyl et al.' (2019) methodology, we note the number of signatures and reverse the score for practical reasons.

3.3.2.4 CEO Prominence in Company Press Releases

Public companies issue press releases covering a variety of matters, including fiscal results, new innovations, acquisitions, restructurings, and more. According to Chatterjee and Hambrick (2007) CEOs set strict guidelines for external company announcements, and personally review most press releases, with the exemption of routine issuances. Furthermore, they argue that narcissistic CEOs may desire to be mentioned as often as possible, in order to showcase their authority and exercise their vanity. Thus, this measure arguably captures the narcissistic facets of self-absorption, authority, and arrogance (Emmons, 1987). We use semi-automated word processing software to calculate the number of times the CEO was mentioned in the company's press releases divided by the total number of press releases during the CEOs tenure.

3.3.2.5 LinkedIn Narcissism Indicators

Aabo and Eriksen (2017) first introduced LinkedIn as a means to identify narcissistic personality traits amongst CEOs. Their argument is motivated by the findings of Buffardi and Campbell (2008) who found that narcissism predicts higher social media activity and more self-promoting content on Facebook. Further research also suggests that the CEO exempts close to absolute control of the contents on their profiles and thus, LinkedIn satisfies the criteria of representing CEO volition (Aabo & Eriksen, 2017). Aabo and Eriksen go on to present a selection of LinkedIn measures and relate these indicators to narcissistic traits. We rely on their research to choose our own set of indicators which is similar but not identical to their original proposal. The main distinction would be that we choose to include those who do not have a LinkedIn profile in our sample and assign them a score of 0. This is mainly motivated by data constraints as we value every datapoint in our relatively small sample. The impact of this choice is relatively small as we scale the LinkedIn indicator in our final measure. We also add a measure denominating the number of posts, and the inclusion and of a profile- and position-bio. Furthermore, contrary to the data gathered from annual reports and press releases we do not leverage historical data in our analysis. We find this approach to be appropriate as historical data might introduce bias due to developments in the popularity, interface and technological advancements on the LinkedIn platform. Furthermore, as psychiatrists have found narcissism

to be relatively stable over time (Campbell, et al., 2002; Cramer, 1998), we construct our measure based on 2022 data.

Number of Listed Skills

The "Skills" section can be added voluntarily to any LinkedIn profile and is meant to showcase strengths and abilities, so that other users in turn may observe, and accredit these skills. One might infer narcissistic traits both from the choice of adding such a section, and the excessive listing of skills (Aabo & Eriksen, 2017). The authors particularly argue that the listing of more than a handful of skills is redundant for any practical purposes. Their argument being that a large number of skills would be inherent to holding the position as CEO of a publicly listed company. Thus, they argue that listing skills is motivated by displaying superiority to gain acclaim and confirmation. We argue that these traits cover the superiority and self-admiration facets of narcissism (Emmons, 1987).

Number of Connections

On LinkedIn, the CEOs may add professional connections by sending invitations or accepting them. Following the reasoning of Buffardi and Campbell (2008), Aabo & Eriksen (2017) argue that narcissistic CEOs have a desire to display a wide range of connections on their profiles as it relates to their external perception of popularity. In further support of this indicator, Davenport et al. (2014) found a significant relationship between narcissism and the number of Facebook connections. Thus, we argue that this measure captures the leadership, authority, and superiority facets of narcissism (Emmons, 1987).

Number of Positions Listed

The most prominent part of the LinkedIn profile is the listing of previous positions. As most CEOs are expected to have an extensive professional background, Aabo and Eriksen (2017) argue that the number of listed positions merely serves the narcissistic desire to display achievements. Thus, we argue this section covers the narcissistic facets of self-absorption, self-admiration, superiority, and arrogance (Emmons, 1987).

Inclusion and Comprehensiveness of Position Bio

As the listing of positions is such a prominent feature of the LinkedIn profile, we add a second measure for further nuance. Namely, the inclusion and comprehensiveness of descriptions of achievements in listed positions. We argue that this activity accurately indicates the CEOs need to promote his/her superior qualities, self-admiration, and arrogance. Adding to the "number

of listed positions" indicator, the bio might indicate exploitativeness as listing of achievements indirectly takes credit for events which might in reality be attributable to a larger team. To measure the full extent of the nuances in this segment we choose to count the total number of words used to describe position-related achievement on the LinkedIn profile.

Inclusion and Comprehensiveness of LinkedIn Bio

The voluntary inclusion of a profile biography tends to highlight events and achievements both from personal and professional experience. Aabo & Eriksen (2017) particularly argue the extent to which a biography contributes to the comprehensiveness of the profile can be interpreted as the need to display superior capabilities. To capture the full specter of this measure we count the number of words in the biography rather than only denominating the inclusion. Arguably, this measure captures the self-admiration and superiority facets of narcissism (Emmons, 1987).

Number of LinkedIn Posts

We argue that posting content on LinkedIn may also provide evidence of narcissistic tendencies. As a social medium, the contents of LinkedIn posts offer access to the otherwise very restricted space of CEOs personalities. Specifically, these posts tend to promote achievements, events where the CEO is invited to speak, book reviews, thought leadership, and updates from personal lives. We argue that these events and attributes cover key aspects of Emmons (1987) facets, namely self-absorption, self-admiration, leadership, authority, superiority, and arrogance. As LinkedIn activity tends to be somewhat concentrated around a small selection of events, we count the total number of posts for the past two years to find comparable metrics.

3.3.2.6 NCEO-Measure Construction and Validity

Having completed the selection of indicators we move on to construct our final narcissism measure and assess the validity of our construct. First, we distill the LinkedIn data down to one indicator, before computing the arithmetic average, weighing the prominence of the CEO photograph 1/5, pronoun use in shareholder letter 1/5, number of signatures in shareholder letter 1/5, CEO prominence in company press releases 1/5 and finally, our LinkedIn indicator 1/5. Thus, we derive a final narcissism score (NCEO) theoretically ranging from zero to five. Our motivation for weighing the LinkedIn data as one indicator is twofold. First, we aim not to rely too heavily on any single data source. Second, as the LinkedIn narcissism measure is a relatively novel, it has not been validated as thoroughly as the other indicators in our selection.

In Table 1a and 1b, we display a complete overview of which facets of narcissism are covered by each of our indicators. While these are not mutually exclusive, they are collectively exhaustive, covering all of Emmons (1987) facets of narcissism. Thus, while our final score might be slightly weighted towards the more prominent facets, our indicators represent a promising selection to identify and measure narcissistic personalities.

Table 1: Indicator Validity for CEO Narcissism

Tables 1a and 1b provide an overview of the psychometric facets of narcissism which are covered by each of our narcissism indicators. The horizontal axis covers Emmon's (2007) facets of narcissism while the vertical axis includes our measures of CEO narcissism for LinkedIn data separately (Table1a), and all data (Table 1b). As one might observe, all facets of narcissism are covered in our final measure.

Table 1a: LinkedIn Data

	Exploitativeness	Entitlement	Self-absorption	Self-admiration	Leadership	Authority	Superiority	Arrogance
1. Profile			✓	✓				
2. Skills				✓			✓	✓
3. Connections					✓	✓	✓	
4. Positions			✓	✓			✓	✓
5. PositionBio	✓		✓	✓			✓	✓
6. Bio				✓			✓	
7. Posts		✓	✓	✓	✓	✓	✓	✓

Table 1b: NCEO Data

	Exploitativeness	Entitlement	Self-absorption	Self-admiration	Leadership	Authority	Superiority	Arrogance
1. AR Photo			✓	✓	✓	✓	✓	
2. Signatures	✓	✓	✓		✓			✓
3. Pronouns	✓		✓		✓		✓	
4. Prominence			✓	✓	✓			✓
5. LinkedIn	✓	✓	✓	✓	✓	✓	✓	✓

In Table 2a and 2b we display descriptive statistics and correlations for all indicators. As we calculate the standard deviation, the variation indicates that while CEOs are prone to narcissism in general (Campbell & Campbell, 2009; Engelen et al., 2016; Rosenthal & Pittinsky, 2006), the intensity of the condition differs substantially. This is in line with psychological research which defines narcissism on a continuum (Emmons, 1987). Thus, we choose to proceed with a continuous measure of narcissism.

Table 2: Descriptive Statistics for CEO Narcissism Indicators

Table 2a and 2b provide descriptive statistics and correlations for all indicators in our CEO narcissism measure. Table 2a covers the LinkedIn data which is merged into a single LinkedIn indicator in our final NCEO measure, covered in Table 2b.

Table 2a: LinkedIn Data

Indicator	Mean	S. D.	Max	1	2	3	4	5	6
1. Profile	0.70	0.46	1						
2. Skills	5.87	12.71	50	0.42*					
3. Connections	282	246	500	0.82***	0.53**				
4. Positions	3.72	4.56	20	0.76***	0.54***	0.81***			
5. PositionBio	3.61	8.72	36.75	0.36*	0.12	0.46**	0.36*		
6. Bio	62.45	96.87	390	0.57***	0.37*	0.63***	0.35*	0.52**	
7. Posts	10.09	19.61	58.80	0.51**	0.41*	0.65***	0.49**	0.50**	0.63***

*In the case of skills and connections in the LinkedIn data, the maximum limit is restricted not by CEO behavior, but restrictions imposed by the LinkedIn platform.
*The minimum value is 0 for all variables.

Table 2b: NCEO Data

Indicator	Mean	S. D	Min	Max	1	2	3	4
1. AR Photo	2.50	1.39	1.39	1.39				
2. Signatures	2.69	0.54	0.54	0.54	0.31			
3. Pronouns	0.04	0.04	0.04	0.04	0.48**	0.51**		
4. Prominence	0.11	0.10	0.10	0.10	0.16	0.22	0.28	
5. LinkedIn	2.14	2.14	2.14	2.14	-0.06	0.27	0.11	0.36*

Note: *p<0.1; **p<0.05; ***p<0.01

In order to derive our NCEO score, we first distilled down our LinkedIn data into one indicator. First, we calculated the natural logarithm for all continuous LinkedIn indicators. Second, we scale the indicators individually to a range between 0 and 1. Third, we calculate the sum of all indicators and produce a single measure of narcissism for each CEO, ranging from 1 to 7 (0-1 point for each of the seven indicators). The result yielded values ranging from 0 to 6.15 with a mean of 2.58 and a standard deviation of 2.14. Furthermore, we move on to construct our final NCEO score, repeating much of the same procedure. First, we scale each of our five indicators (including the LinkedIn measure) to a range from 0 to 1. Second, we calculate the sum of all indicators to arrive at a score ranging from 0 to 5 (0-1 point for each of the five indicators). The resulting narcissism measure (NCEO) yields values ranging from 0.11 to 4.15 with a mean of 2.06 and a standard deviation of 0.88.

Having constructed our narcissism measure, we move on to statistically assessing the validity of our construct. We begin with assessing the LinkedIn measure by calculating correlations, Bartlett test of homogeneity of variances, Kaiser-Meyer-Olkin factor adequacy, and conduct both exploratory and confirmatory factor analysis. The correlation of indicators is displayed in

Table 2a and are all significant but the Skills-PositionBio interaction. This indicates that the variables may explain one or several underlying concepts. Second, we calculate the Bartlett's score yielding a K-squared value of 13.85 at a <5% significance level, indicating that the variables explain similar constructs. Third, the Kaiser-Meyer-Olkin test yields factors ranging from 0.62 to 0.80 which we deem to be acceptable given the recommended threshold of > 0.70. Fourth, we move on to conduct an explanatory factor analysis and find our indicators to explain one underlying construct at an eigenvalue of 3.28 (well above the threshold of 1), which explains 55% of the variation. Furthermore, all of our indicators have loadings above 0.48 and range up to 0.98 which is above the threshold of 0.40. Lastly, we conduct a confirmatory factor analysis yielding scores of 0.90 and 0.86 on the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI), respectively. These are both higher than the acceptable cutoff at >0.80. Furthermore, the Root Mean Square Error of Approximation (RMSEA) yields a value of 0.17 and the Standardized Root Mean Square Residual (SRMR) returns 0.09. These are above their recommended thresholds of <0.08 and <0.05, respectively. When considering the sum of our analysis, the LinkedIn data seems to accurately explain one underlying construct. Given our indicators overlap with the facets of narcissism as depicted in Table 1a, we argue that this underlying concept encapsulates narcissism.

Having validated the explanatory power of LinkedIn data as a measure of CEO narcissism, we move on to validate our final NCEO indicator. Again, we start by calculating the correlation of our indicators, yielding somewhat heterogenous results. Few correlations are statistically significant and, while most variables are positively correlated, the LinkedIn indicator is negatively correlated to the prominence of CEO photographs in annual reports. Second, we calculate a Bartlett's K-squared value of 13.61 at a p-value <1% indicating that the indicators have relatively homogenous variation. Third, we conduct a Kaiser-Meyer-Olkin factor adequacy test which yields values ranging from 0.63 to 0.67, except our LinkedIn indicator which returns 0.52. These are all somewhat below the recommended threshold of 0.70. Moving on to the exploratory factor analysis, we find our indicators to explain one construct with an eigen value >1, returning at 1.51. All factors load in the range of 0.39-0.79, except the LinkedIn indicator loading at 0.26. Lastly, we conduct the confirmatory factor analysis which yields a CFI of 0.91 and a TLI of 0.82 which are both above the recommended threshold of 0.80. Furthermore, we calculate a RMSEA of 0.10 and a SRMR of 0.10 which are both above their recommended thresholds of <0.08 and <0.05. Throughout our validation analysis, results are heterogenous with some measures yielding above and some below recommended thresholds.

Specifically, the LinkedIn indicator is consistently yielding lower results than other indicators. This might be partly attributed to different weighting of the facets of narcissism. According to our specification in Table 1a and 1b, however, the indicator does not seem to differ significantly in this regard. One other explanation might be that the LinkedIn indicator explains an interaction of constructs rather than pure narcissism. When considering all the results of our statistical and qualitative validation, we find the NCEO measure to be sufficiently validated in order to apply the indicator for further analysis.

3.3.4 Growth Stocks

While the Information Technology and TMT industries already tend to display characteristics resembling growth stocks, we aim to study the upmost quartile. Thus, we construct a dummy variable based on three criteria: > sample median Price to Earnings (PE), > sample median Price Book (PB) and > sample median three-year CAGR. These measures are calculated on an annual basis and averaged over 2017 to 2018.

3.3.5 ESG-Focus

We measured ESG-focus by using the Reprisk proprietary database. Reprisk leverage advanced machine learning techniques to provide updated ESG ratings. The score is calculated using a rule-based methodology, by integrating international ESG and regulatory frameworks to capture the effects of climate change, pollution, human rights' violations, corruption, fraud, among other ESG-related attributes (RepRisk, 2022). As the ratings are published on a monthly basis, we calculated the average rating for each company in our dataset for the duration of our retail investor holdings data.

3.4 Control Variables

To reduce omitted variable bias, we control for cofounding factors which may influence our dependent variables (retail holdings and abnormal returns) and are correlated with the independent variables of interest (media coverage, growth stocks, and ESG-focus).

Firm Level

We argue that retail investors are likely to consider both historical data and current data to predict the future. In order to account for past performance, we include lagged variables for quarterly return and volatility. Furthermore, we include current company fundamentals like firm age, size (LogMCAP), earnings per share (EPS), expected dividend (last years' dividend

adjusted for three-year trend), and brand value, represented by a dummy variable denominating inclusion in the top 500 global brand ranking by Brand Finance in 2018 and 2019 (Brand Finance, 2022).

Industry Level

While we have restricted our sample to two sectors, we also control for S&P global industry codes denominating six subindustries in the Information Technology sector and five subindustries in the TMT sector.

CEO Level

In order to control for the possibility that other observable CEO characteristics than narcissism influence investment decisions we added controls for age, tenure and CEO duality (dummy denominating whether the CEO is also Chairman). These characteristics may influence the investors directly, as they may be attracted to any of these characteristics, or indirectly, as the same characteristics might manifest themselves in firm outcomes and media coverage through the actions of the CEO.

3.4 Model Specification

We leveraged R's panel data package, "plm", controlling for time-fixed effects on a balanced panel to estimate our regression models. Our motivation to apply time-fixed effects was to control for factors that are constant across entities, but vary over time, such as macroeconomic factors (e.g. economic growth, employment rates, inflation). We were particularly interested in controlling for factors that may have caused developments in the total invested capital in the retail segment. Furthermore, we argue that our data is likely to be identically, independently distributed (i.i.d), which is appropriate for our estimation model. While there are likely to be important confounding factors on the entity level, the time-invariant nature of narcissism restricts the application of entity-fixed effects for our regression models. Thus, we included control variables to address omitted variables that vary across companies but are constant over time. While reverse causality may represent a threat to internal validity (as one could argue that increased retail holdings lead to more media coverage), we assume this effect to be negligible. Moreover, to address the issue of heteroscedasticity, we use clustered standard errors for all regression models. We also test for multicollinearity by calculating a separate linear model yielding variance inflation factors below 10 and <20 results on the condition index, suggesting that multicollinearity should not be an issue in our research model.

4. Findings

Tables [3a](#) and [3b](#) provide descriptive statistics and correlations for the variables included in our regression analysis. All variables are standardized to reduce multicollinearity (Stock & Watson, 2015, p. 205), and ease the interpretability of our results. Furthermore, [Table 4a](#) presents the regression outputs in terms of news volume, while [Table 4b](#) provides the outputs related to news sentiment. Each table presents output related both to retail investor holdings, (Hypotheses 1 through 4) and abnormal returns (Hypotheses 5(1) through 5(4)). In this segment, we first present our findings related to retail investor holdings, and second, the findings related to abnormal returns. In the appendix, we also include a list of all our hypotheses and denominate whether they are supported by our findings ([Table 5](#)).

4.1. Retail Investor Holdings

Hypothesis 1 – Media Coverage

We find partial evidence supporting hypothesis 1, which states that retail investor holdings are positively related to media coverage. With regards to news volume, our regression output from model 3a (Table 4a) indicates a positive relationship (*p<0.01, β=107*) between news volume and retail investor holdings. Interestingly, however, we find no evidence supporting that news sentiment influences retail holdings (*p>0.10, β=.0002,* model 3a, Table 4b). Thus, we conclude that media coverage (in terms of news volume) is positively related to retail holdings.

Hypotheses 2 – CEO Narcissism

Having established a link between retail holdings and media coverage, we study the two-way interaction and find partial support for hypothesis 2, stating that CEO narcissism moderates the media coverage-retail holdings relationship. As we interpret our regression output from model 4a (Table 4a), we find that the degree of CEO narcissism negatively moderates (*p<0.10, β=-0.024*) the individual effect of news volume (*p<0.01, β=0.162*) on retail holdings. However, the moderation-effect is not large enough (considering the levels of CEO narcissism) to make the net effect of news volume on retail holdings negative (i.e., if $NCEO = NCEO_{Max} = 5$, the total effect of news volume on retail holdings is 0.162-5*.024= 0.042). On the other hand, we find no statistically significant effect of CEO narcissism on the relationship between news sentiment and retail holdings (*p>0.10, β =-0.003*), as illustrated in model 4a (Table 4b). Overall, the findings from model 4a (table 4a & 4b) suggest that the degree of CEO narcissism moderates the relationship between media coverage (through news volume) and retail holdings.

Hypothesis 3 – Growth Stocks

Interpreting model 5a, we find full support for hypothesis 3, which states that CEO narcissism moderates the relationship between media coverage and retail investor holdings, particularly in companies with exceptional growth prospects. In terms of news volume, our regression output suggests a negative moderation-effect, reflected by the three-way interaction term in Table 4a (*p<0.10, β=-0.137*). In terms of news sentiment, we find a positive moderation-effect (*p<0.05, β =0.079*), represented by the three-way interaction term in model 5a (Table 4b).

While the moderation-effect is negative with regards to news volume, the net effect of news volume on retail holdings is positive. Initially, we find a positive statistically significant relationship between news volume and retail holdings (*p<0.05, β=0.106*), which is further strengthened by the two-way interaction with growth stocks (*p<0.10, β=0.239*). Additionally, we find that retail investors generally invest more in growth stocks led by narcissistic CEOs (*p<0.10, β=0.500*). Thus, while news volume attracts retail investors, and more so under the situational cue of being classified as a growth stock, the CEOs degree of narcissism negatively moderates this relationship.

Furthermore, while we find CEO narcissism to have a positive moderation-effect on news sentiment for companies with exceptional growth prospects, the net effect of news sentiment on retail holdings is negative. Fist, we find a positive statistically significant relationship between news sentiment and retail holdings (*p<0.05, β=0.014*). For growth stocks, however, the effect is negative, illustrated by the two-way interaction term between growth stocks and news sentiment (*p<0.05, β =-0.223*). The effect is also positively moderated by the degree of CEO narcissism, illustrated by the two-way interaction between CEO narcissism and news sentiment (*p<0.05, β =-0.006*). Thus, in sum, our regression output suggests that although news sentiment negatively influences retail holdings in growth companies, the degree of CEO narcissism positively moderates this relationship.

Hypothesis 4 – ESG Focus

We find no evidence supporting hypothesis 4, which states that CEO narcissism moderates the relationship between media coverage and retail investor holdings under the situational cue of being an ESG-focused firm. Specifically, in model 6a, we find no significant difference in retail investor holdings either for the three-way interaction between news volume, CEO narcissism and ESG-focus (*p>0.10, β=-0.021, Table 4a*) or the three-way interaction between news sentiment, CEO narcissism and ESG-focus (*p>0.10, β=0.008, Table 4b*).

Furthermore, the isolated effect of news volume on retail holdings is not significant at any conventional levels in model 6a, Table 4a. The ESG-focus variable, however, is marginally significant and negatively influences retail investor holdings ($p<0.10$, β=-0.395). Moreover, we find that the interaction between news volume and ESG-focus is marginally statistically significant ($p<0.10$, β=0.059), thus implying that retail holdings increase with the volume of news, in ESG-focused firms. However, as our output from model 6a suggests, CEO narcissism does not moderate this relationship.

4.2. Abnormal returns

Hypotheses 5(1) through 5(4) – Financial Implications

We find no evidence supporting hypothesis 5(1) stating that media coverage is related to abnormal return. The evidence is represented by the statistically insignificant relationship between news volume and abnormal returns (*$p>0.10$, β=-0.005, model 3a, Table 4a*), and sentiment and abnormal returns (*$p>0.10$, β=-0.001, model 3a, Table 4b*).

However, we do find partial evidence supporting hypothesis 5(2), stating that CEO narcissism moderates the relationship between media coverage and abnormal returns. While the main- and interaction-effects of news volume and CEO narcissism on abnormal return in model 4b (Table 4a) are statistically insignificant, the interaction term between news sentiment and CEO narcissism (*$p<0.01$, β=0.007, Table 4b*) suggests that the degree of CEO narcissism positively moderates the negative effect of news sentiment on abnormal return (which is statistically significant (*$p<0.05$, β=-0.017*)). Additionally, in situations with highly narcissistic CEOs (specifically, when NCEO>2.43), the effect of news sentiment on abnormal returns turns positive (i.e., if NCEO = NCEO_{Max}= 5, the total effect of news sentiment on abnormal return becomes positive: *-0.017+5∗0.007 = 0.018*). Thus, we provide evidence that narcissistic CEOs positively moderate the relationship between media coverage (through news sentiment) and abnormal returns.

Moreover, we find no evidence supporting hypothesis 5(3) which states that CEO narcissism moderates the relationship between media coverage and abnormal returns in growth stocks. In model 5b, Table 4a, all main, two- and three-way interactions are insignificant, implying that being classified as a company with exceptional growth prospects does not moderate the relationship between news volume and CEO narcissism on abnormal returns. As for sentiment, we find that the main effect of news sentiment on abnormal returns is statistically significant

(*p<0.05, β=-0.018, model 5b, Table 4b*), and that it is moderated by the degree of CEO narcissism (reflected by a statistically significant two-way interaction term between CEO narcissism (*p<0.01, β=0.007*)). However, we find no significant relationship when introducing the growth stock classification, as follows from the two- and tree-way interaction terms with CEO narcissism and news sentiment. Thus, our findings suggest that being classified as a growth stock does not moderate the relationship between news sentiment and CEO narcissism on abnormal returns.

Finally, we find partial evidence supporting hypothesis 5(4), stating that CEO narcissism moderates the relationship between media coverage and abnormal returns in companies with high ESG focus. Specifically, the interaction term between news volume, CEO narcissism and ESG-focus positively moderates the effect of news volume on abnormal return (*p<0.01, β =0.030*), thus implying that CEO narcissism moderates the relationship between media coverage (through news volume) and abnormal returns in ESG-focused firms. However, in sum, our output suggests a net negative effect of news volume on abnormal returns. Individually, news volume positively influences abnormal returns, illustrated by the statistically significant coefficient of news volume (*p<0.01, β=0.539, model 6a, Table 4a*). Moreover, the relationship is negatively moderated by the degree of narcissism and ESG-focus, reflected by the two-way interaction terms between news volume and CEO narcissism (*p<0.01, β=-0.248*) and news volume and ESG-focus (*p<0.01, β=-0.065*). Additionally, the degrees of ESG-focus and CEO narcissism, individually, yield negative, statistically significant effects on abnormal returns (*p<0.05, β=-0.133*). While we find a net negative effect of news volume on abnormal returns, we find no significant relationships (in main effects, two- and three-way interactions), when investigating the relationship between news sentiment, CEO narcissism and ESG-focus on abnormal returns. Overall, the findings from regression 6b (table 4a & 4b), suggest that narcissistic CEOs moderate the relationship between media coverage (through news volume) and abnormal returns in ESG-focused companies.

5. Discussion

The overarching research question of our thesis is whether narcissistic CEOs attract retail investors through their influence on companies' media coverage, and whether it has adverse financial implications for retail investors. First, we establish a link between retail investor holdings and media coverage. Second, we investigate whether retail investors tend to favor narcissistic CEOs who influence company media coverage. Third, we investigate whether this

is particularly true in the case of being a growth stock or ESG-focused stock. Fourth, we look at whether these investment decisions create or destroy value for retail investors. Thus, we are able to present evidence speaking to narcissistic CEOs ability to attract retail investors, and how this translates into financial outcomes.

5.1 Media Coverage

With regards to hypothesis 1, we find that retail investors tend to favor stocks with higher news volume. Thus, our findings are in line with Barber and Odean's (2008) research who found that retail investors are net buyers of stock with high levels of news coverage. According to Baker & Nofsinger (2002) this effect may be attributed to the fact that retail investors believe stocks they know personally to be less risky than others. With regards to news sentiment, however, there are no significant findings. Thus, investors picking stocks according to news volume, regardless of news sentiment, strengthens the hypothesis that our findings can be attributed to familiarity bias.

Furthermore, the influence of familiarity bias may be accelerated as retail investors interact in digital and/or physical forums. Specifically, they may engage in herding behavior, replicating others' actions (Spyrou, 2013), and be influenced by confirmation bias as they are confined to silo-environments where other (potentially overconfident) investors pitch similar stock picks (Park et al., 2013). Consequently, as stocks become more popular, they may attract further media attention leading to increased investments (due to familiarity bias). If so, this may lead to overconfidence as retail investors' assumptions are confirmed and, in some cases, overoptimism if they perceive the events to be under their discretion (Steen, 2004). Thus begins a spiral where each cognitive bias accelerates the others.

One recent and somewhat extreme illustration of these dynamics would be the case of GameStop, a legacy gaming company which had been on a steady decline for years. At the outset of 2021, however, retail investors colluded to "take down Wall Street", resulting in a media cycle where increased retail holdings and media attention exploded (Bloomberg, 2021b). Evidently, the bubble burst and many retail investors lost their savings. This example illustrates not only how media coverage may increase retail investment, but how retail investors may neglect media news sentiment which is likely to have been predominantly negative.

5.2 CEO Narcissism

Having found partial support for hypothesis 1, we move on to discuss how CEO narcissism may influence the relationship between retail media coverage and retail investor holdings. As outlined in our findings, we find that CEO narcissism negatively moderates a net positive effect of news volume, while there are no significant results for news sentiment. Thus, we focus primarily on news volume in this segment.

In order to interpret our regression output in a structured manner, we constructed a framework illustrating the factors which may contribute to our findings (Figure 2). First, we discuss the components which may influence media coverage, (Stage 1) and second, we discuss how retail investors process media coverage in their investment decisions (Stage 2). While the relationships between the different components of our illustration are unlikely to be strictly linear, we find it helpful to illustrate it as a process. We will, however, also discuss the possibility of interconnections throughout our analysis.

Figure 2: Regression Interpretation

Figure 2 illustrates our interpretation-framework we apply to the discussion segment. In stage 1, we discuss the components which may influence the concept of media coverage. In stage 2, we discuss how retail investors may process media coverage as an input in their investment decisions.
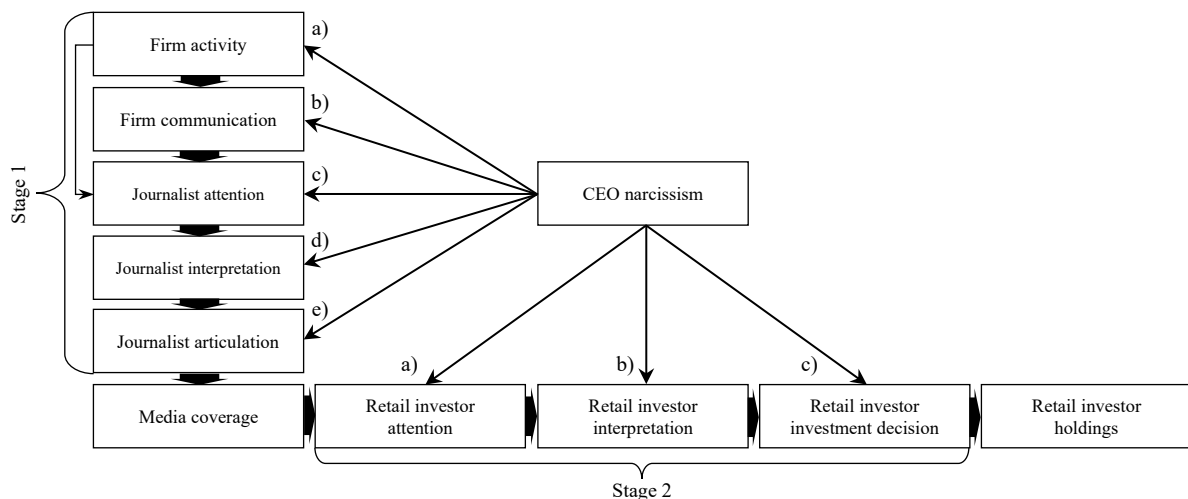
Stage 1 – The Components of Media Coverage

We start by analyzing why narcissistic CEOs might produce less attractive news content than their peers. In line with our framework, we argue that news content may be generated, moderated, or both, at five different levels (1a-1e).

With regards to firm activity (1a), narcissistic CEOs are known to engage in bold strategic actions and act more opportunistic than their peers (Chatterjee & Hambrick, 2011, 2007; Liu, 2009; Malmendier & Tate, 2008; Olsen et al. 2014). As retail investors are neither risk lovers nor risk averse on average (Dohmen, et al., 2011), bold strategic actions may yield heterogenous results. Opportunistic behavior, however, is likely to generate less attractive news content on average (Wathne & Heide, 2000). Furthermore, news content may be moderated by the company's communication efforts, to the extent that they capture journalists' attention. At this level, narcissistic CEOs may be particularly likely to intervene as they have a strong urge to express superiority both on behalf of themself, and in extension of themself, their companies (1b) (Buyl et al. 2019; O'Reilly et al. 2014; Resick et al. 2009).

One recent example of CEOs engaging in public discourse on behalf of their company would be Elon Musk's twitter response to the Tham Luang cave-incident in July 2018. In this case, Musk publicly stated (tweeted) that he would send engineers from Tesla to build a submarine and support the government of Thailand in extracting a group of children who were stuck in a flooded cave. At first, the statement generated significant positive news flow for Elon Musk, and arguable Tesla in extension. As events unfolded, however, the narrative would change drastically. Specifically, before Musk offered his help, there had been a local team of divers working to extract the children. One of the divers called out Musk's "knight in shining armor" efforts on Twitter, describing the episode a PR stunt with no real impact. In response, Musk was furious, referencing the diver as a "pedo guy" on twitter. If one were to argue Musk was a narcissist, one might draw parallels to the psychology literature, stating that narcissists' urge for affirmation and fragile sense of confidence makes them particularly sensitive to critique. In any case, this statement resulted in fierce backlash as the media and denounced his statement (The Washington Post, 2018). Similar behavior amongst narcissistic CEOs might contribute to explain the negative moderation-effect that we find narcissistic CEOs have of news volume.

Furthermore, whether news content is influenced by the firm or not, it needs to capture the journalists' attention. If journalists capture fewer, or less attractive news for companies led by narcissistic CEOs, either because of the contents that narcissistic CEOs generate or moderate, or because of general bias towards narcissistic CEOs, this may contribute to the negative moderation-effect of the news volume–retail holdings relationship (1c). One example would be confirmation bias, which could lead journalists to seek out information confirming their pre-determined hypotheses. If journalists are aware of research indicating, or generally suspect,

that narcissistic CEOs engage in more opportunistic behavior than their peers (O'Reilly et al., 2014), they may follow narcissistic leaders more closely.

When news content first captures the journalists' attention, the journalists proceed to interpret the information (1d). In this process, they may alter the news content, both deliberately and/or unconsciously (Soontjens, 2019). First, they may choose to change the content which is moderated by the firm's communication efforts as they apply the tools of critical journalism. Part of the journalist's profession is to decipher events and news content to identify the facts. Second, as narcissistic CEOs tend to focus on positive news (Marquez-Illescas, et al., 2019), this may trigger a response from journalists, leading them to interpret news more critically.

When journalists have interpreted the information, they choose whether or not to publish an article, and how they articulate the content (1d). Again, these actions may be influenced by CEO narcissism either directly, or indirectly through previous levels in stage 1. Directly, it may be the case that journalists are biased in their publishing because they dislike particular traits of narcissism like e.g., their lack of empathy. Indirectly, it may for example be a case where first, a narcissistic CEO takes bold strategic action (Chatterjee & Hambrick, 2007). Second, he/she intervenes and portrays the action as an expression of his/her superiority. Third, as the event captures the journalists' attention, they interpret the articulation as excessive bragging. And fourth, because media consumers tend to favor scandals and negatively loaded news (Jeon, et al., 2021), journalists both choose to publish the stories of excessive bragging and articulate the story in an unattractive way. Thus, the news content related to narcissistic CEOs may be less attractive as retail investors interpret the information.

Stage 2 – The Components of Retail Investor Interpretation

Having discussed how CEO narcissism may influence the origin of media coverage, we move on to discuss how retail investors react to media coverage. In stage 2, we have identified three touchpoints where CEO narcissism may influence retail investor behavior (2a-2c).

We argue that for retail investors to act on media coverage, the news content must first attract their attention (2a) (Barber & Odean, 2008). In this process, CEO narcissism may play a role either because of the way they have influenced news content as described in stage 1, or because retail investors acknowledge the CEOs narcissistic traits and find them inherently interesting. Following the logic in stage 1, retail investors may both be exposed to less attractive content for companies led by narcissists on average, and they might be aware that narcissistic CEOs

are prone to engage in opportunistic behavior (Cyert, et al., 2002). Thus, they may be particularly susceptible to acknowledge news confirming this belief due to confirmation bias.

Moreover, as retail investors acknowledge news articles, they move on to interpret the contents (2b). In this process they may be further influenced by CEO narcissism either directly through the type of news content, the lens they apply when analyzing the content, or a combination of both. In addition, there may be interconnections with different stages and levels of our framework. For example, the potential biases against narcissistic CEOs may be accelerated at several levels of interpretation through the mechanics of confirmation bias and incentives. First, if journalists find narcissistic behavior to be repellent, they may acknowledge mostly negative news due to confirmation bias. Second, retail investors may apply a similar lens, following the same logic. Over time, journalists may also acknowledge that media consumers (including retail investors) are more interested in negative news regarding narcissistic CEOs due to confirmation bias, and thus, adding to their own confirmation bias, they have financial incentives to focus on the negative behaviors of narcissistic CEOs.

Lastly, the way retail investors use media coverage as an input in their investment decisions may differ with levels of CEO narcissism (2c). Either because retail investors deem news coverage regarding narcissistic CEOs to be less relevant (due to stage 1 components), or because they suspect that narcissistic CEOs produce less reliable output (Buchholz, et al., 2018; Capalbo, et al., 2018; Ham, et al., 2017; Judd, et al., 2017; Lin, et al., 2019; Marquez-Illescas, et al., 2019; Patel & Cooper, 2014). One example of how CEOs can negatively moderate news reliability would be the event in which Elon Musk tweeted his intent to take Tesla private in 2018. Despite his stated intentions, Tesla remained public, and Musk was sued for market manipulation. After the trial, a U.S. judge decided "there was nothing concrete to it" and found that the tweet had singlehandedly caused billions of dollars in damages (Reuters, 2022). While Musk has disputed these arguments, one may argue that the episode significantly damaged his reputation as a reliable news source for investment decisions.

5.3 Situational Cues

5.3.1 Growth Stocks

Given the situational cue of being classified as a growth stock, we provide evidence that CEO narcissism moderates the relationship between news coverage and retail investor holdings, both in terms of news volume and sentiment. Thus, we split our discussion in two segments, analyzing each aspect of news coverage separately.

News Volume

Having found that news volume and CEO narcissism are both positively associated with retail investor holdings in growth stocks individually, it is particularly interesting to see that the interaction effect is negative. These findings may suggest that there is a mismatch between the influence of the CEOs actions and the communication said actions through media coverage.

We argue that for growth companies, there are particularly high expectations to the CEOs role in articulating the companies' growth prospects (1b). While narcissistic CEOs might make a strong and confident case, however, they may also be tempted to make unrealistic predictions which are not backed by convincing evidence (Chatterjee & Hambrick, 2009). If so, narcissistic CEOs may in turn become tempted to engage in accruals management (Buchholz, et al. 2018; Capalbo, et al. 2018; Lin, et al. 2019; Marquex-Illescas et al., 2019) to back up their unrealistic predictions. Furthermore, these situations may be particularly interesting to journalists as they offer an opportunity both to cover sensational news, and to engage in critical journalism (1c). Moreover, if CEOs capture the attention of journalists with bold actions or statements, such as an unexpected announcement of M&A activity (Chatterjee & Hambrick, 2007; Malmendier & Tate, 2008; Liu, 2009) to facilitate growth through empire building, news coverage may be skewed more towards CEO-specific news as opposed to event-based news. Thus, it may further accelerate the negative moderation-effect of CEO narcissism for growth stocks.

Assuming that CEOs in growth stocks are more active in company communication efforts than their peers, journalists may also perceive the CEOs role in the company to be particularly important. If so, journalists may concentrate relatively higher efforts of critical journalism on CEOs, compared to other events (1c). Furthermore, journalists may become increasingly critical in their interpretation if narcissistic CEOs are repeatedly shown to make false claims or are perceived as overly optimistic (Buchholz, et al., 2018) when discussing growth prospects.

Moreover, it may be the case that retail investors react differently to media coverage related to growth stocks. For example, as with journalists, retail investors may pay particularly close attention to CEO-related news because of the of CEOs role in articulating the company's growth prospects (2a). Additionally, they may interpret the statements of narcissistic CEOs particularly critically (2b) and prioritize the input in their investment decisions (2c) for the same reason.

News Sentiment

The fact that we find CEO narcissism to positively moderate the net negative influence of news sentiment indicates that retail investors are less sensitive to news sentiment when a growth company is led by a narcissistic CEO.

At first glance, the negative individual effect of news sentiment on retail investor holdings may seem counter intuitive. One explanation would be that retail investors expect more upside potential because of negative news coverage and thus, they attempt to "buy the dip". However, as our measure is constructed on a quarterly basis, it may also be the case that a higher ratio of positive sentiment over time makes retail investors particularly sensitive to negative sentiment, similar to experiencing an outsized negative shock when a company fails to meet an analyst's forecast, given a history of consistently beating forecasts (Lopez & Lynn, 2002). This effect might be accelerated for growth stocks as they promise exceptional growth. Furthermore, CEO narcissism may moderate the news sentiment–retail holdings relationship because of specific expectations to their behavior. If retail investors acknowledge that narcissistic CEOs tend to be overly positive about growth prospects (Marquez-Illescas et al., 2019), retail investors may not believe their statements to begin with. Rather, they suspect narcissistic CEOs to lie and expect the news to be negative. This may also be further accelerated if journalists perceive media consumers to be particularly interested in CEO-centric content and thus relate event-based news to the CEOs statements or actions.

5.3.3 ESG Focus

We find no evidence supporting that CEOs moderate the relationship between media coverage and retail investor holdings specifically for ESG-focused stocks. Given that retail investors favor ESG initiatives (Martin & Moser, 2016), and narcissistic CEOs are known to implement grandiose ESG initiatives (Dabebbi et al., 2022), one might expect this to reflect positively on the attraction of retail investors, particularly if the CEOs are able to communicate said efforts. On the other hand, narcissistic CEOs are also known to engage in more opportunistic behavior

than their peers (Cyert et al., 2002; O'Reilly et al., 2014), which arguably should reflect negatively from an ESG perspective. Thus, the effect of having a narcissistic CEO may yield random and heterogenous results as reflected in our findings.

5.3 Abnormal Returns

In order to answer the overarching research question of whether retail investment decisions translate to adverse financial outcomes, we measure outcomes in terms of abnormal returns. While we find no support for hypotheses 5(1) through 5(3), we do find support for hypothesis 5(4), stating that CEO narcissism influences the relationship between media coverage and abnormal return, specifically for ESG focused companies. Interestingly, however, the relationship is positive, and only statistically significant with regards to news volume.

Previous research has shown narcissistic CEOs to oversell their own achievements, particularly as it relates to ESG initiatives (Dabebbi et al., 2022). Thus, one might argue the disciplining effect of critical journalism to be particularly important. As our regression output suggests the three-way interaction to be positive, it might be the case that critical journalism increases with news volume. Either because the journalists' interpretation becomes more critical, the relative share of critical news in media coverage increases, or both. As we discuss in our conclusion, however, neither the positive moderation-effect in hypothesis 5(4) nor the insignificant findings in hypotheses 5(1) through 5(3) indicate any adverse outcomes for retail investors.

5.5 Limitations and Suggestions for Further Research

While empirical studies offer an effective to infer causality, there will always be limitations to validity. In this paper we focus exclusively on CEOs of large companies within the technology and TMT sectors. Thus, while we argue it is likely that narcissism may play a similar role in smaller companies and different industries, there may be differences both in terms of media coverage (Stage 1) and the way retail investors act on the information (Stage 2).

Second, the fact that we leverage Robinhood trading data as a proxy for retail investor holdings may skew our data towards particular demographics and behaviors. Specifically, the population of the Robinhood trading platform is known for its young population (Robinhood, 2021) and its rebellious culture (Welch, 2021). This resembles a relatively risk seeking group of investors (Wang & Hanna, 1997), with similar demographics to those Tekce & Yilmaz (2015) have found to be particularly susceptible to familiarity bias. Thus, provided the proper funding, we

would encourage further research to apply Boehmer et al.' (2021) methodology to identify retail investor trades leveraging the TAQ database.

Third, our news sentiment measure only captures the share of positive words on a quarterly basis. Thus, the absolute value does not provide an intuitive interpretation of whether the news content is in fact perceived as positive or negative. Furthermore, while one can infer some relevance from the relative changes over time across companies, there might be substantial information loss due to variation within quarters. For further research, we recommend using daily data and apply Jeon et al.'s (2021) sentiment analysis to categorize individual news by article.

Fourth, while we capture two key components of media coverage (news volume and sentiment) there is likely to be other information contained in news articles which influences retail investor holdings. Furthermore, as news articles are subject to the mediation of journalists, it would be interesting to explore a more direct means of communication. For further research, one might apply a more rigorous textual analysis to provide further nuance to the content and attempt to analyze Twitter data, provided the proper access and funding.

Lastly, while CEOs in S&P 500 companies are a relatively homogenous group, it would be interesting to investigate how narcissistic tendencies differ across cultural and biological factors. In our sample we only have male CEOs. In a larger sample, however, one may add controls for ethnicity, gender, etc., as one might expect both narcissism and retail investors response to media coverage varies with CEOs cultural and biological backgrounds.

6. Conclusion

In this thesis we study how CEO narcissism moderates the effect of media coverage on retail investor outcomes and find CEO personalities to have a significant impact. First, we find that narcissistic CEOs negatively moderate the positive effect of news volume on retail holdings. Second, we find that the negative moderation-effect is stronger for companies with exceptional growth prospects. Third, we compare retail investor stock picks to abnormal returns and find that they generally are no better or worse off than expected return. The only exception is that of a missed opportunity. Namely, retail investors could have captured abnormal returns by investing in ESG-focused stocks with narcissistic leaders and high media attention. These findings are derived from a panel data regression model focused on the technology and TMT sector in the S&P500 index and introduce CEO personality to the retail investor literature.

7. Appendix

Table 3a: Descriptive Statistics for Regression Variables

Table 3a provides descriptive statistics for all variables which are directly or indirectly included in our regression models. First, we look at our entire sample, then we drill down to understand how stock characteristics differ under situational cues, namely growth stocks and ESG-focused stocks. While growth stocks are identified with a dummy variable, we use the sample mean to identify stocks with a particularly high ESG focus.

	Sample				Growth stocks				ESG focus > Sample mean			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Independent variables												
Holdings	3,595,531	8,443,789	7,867	39,306,472	6,958,107	12,314,899	24,715	39,306,472	366,484	601,186	7,867	2,776,708
Log(Holdings)	12.619	2.281	8.970	17.487	14.133	2.130	10.115	17.487	11.816	1.445	8.970	14.837
Abnormal return	-0.025	0.128	-0.556	0.438	-0.013	0.148	-0.333	0.438	-0.018	0.134	-0.432	0.438
News volume	408	999	6	5610	555	907	16	2994	65	53	6	361
Log(News volume)	4.689	1.427	1.792	8.632	5.190	1.550	2.773	8.004	3.898	0.769	1.792	5.889
News sentiment	3.886	3.070	0.808	16.666	2.390	1.441	0.833	8.000	4.588	3.400	1.032	16.667
NCEO	2.167	0.807	0.924	4.164	1.872	0.777	0.928	2.964	2.072	0.821	0.924	4.164
Growth stock	0.188	0.392	0.000	1.000	1.000	0.000	1.000	1.000	0.118	0.324	0.000	1.000
ESG focus	8.000	1.216	3.818	9.000	7.735	0.794	6.773	9.000	8.794	0.294	8.045	9.000
CEO specific												
CEO age	57.256	6.907	34.000	74.000	58.433	4.739	48.000	63.000	58.541	6.041	48.000	74.000
CEO duality	0.234	0.416	0.000	1.000	0.417	0.456	0.000	1.000	0.265	0.427	0.000	1.000
CEO tenure	11.131	6.653	2.000	28.000	12.600	6.636	3.000	21.000	11.012	6.593	2.000	28.000
Firm specific												
P/E	43.347	49.890	-24.832	206.309	60.580	21.500	33.196	96.480	27.011	19.491	-24.832	84.541
P/B	7.186	9.102	-16.364	35.344	18.214	10.561	5.659	35.345	6.045	7.716	-15.092	28.988
Revenue growth	0.140	0.126	-0.038	0.648	0.236	0.068	0.156	0.361	0.111	0.085	-0.010	0.361
MCAP*	93,773	175,269	4,895	1,061,355	89,274	88,555	7,177	272,414	24,021	15,328	7,177	71786
Log(MCAP)	17.421	1.276	15.404	20.783	17.591	1.332	15.786	19.423	16.823	0.577	15.786	18.089
EPS	4.002	3.778	-2.556	30.047	3.346	1.939	1.365	8.062	3.662	2.384	-2.556	10.074
Lagged return	0.050	0.165	-0.668	0.481	0.090	0.189	-0.291	0.481	0.044	0.171	-0.543	0.481
Lagged volatility	0.019	0.007	0.007	0.047	0.020	0.008	0.011	0.037	0.019	0.007	0.007	0.036
Expected dividend	0.016	0.017	0.000	0.061	0.001	0.002	0.000	0.007	0.018	0.016	0.000	0.061
Top brand	0.344	0.476	0.000	1.000	0.500	0.509	0.000	1.000	0.176	0.383	0.000	1.000
Firm age	46.85	38.796	4.000	168.000	30.100	12.254	20.000	53.000	49.835	40.833	4.000	168.000

*MCAP denominated in MUSD

Table 3b: Correlation Matrix for Regression Variables

Table 3b provides a correlation matrix for all variables included in our regression analysis. While we observe that several variables are strongly correlated, none are above the thresholds of multicollinearity in our model. (N=160)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Holdings																		
2. Abnormal return	-0.19																	
3. News volume	0.77***	-0.31																
3. News sentiment	-0.48**	0.25	-0.46**															
5. NCEO	-0.04	0.08	-0.08	0.09														
6. Growth stock	0.32	0.12	0.17	-0.31	-0.18													
7. ESG focus	-0.59***	0.17	-0.81***	0.42*	-0.12	-0.11												
8. CEO age	-0.33	0.06	-0.22	0.01	-0.23	0.08	0.39*											
9. CEO duality	0.27	-0.19	0.34	-0.42*	0.01	0.21	-0.20	0.02										
10. CEO tenure	0.22	-0.31	0.21	-0.32	-0.14	0.11	-0.05	0.04	0.40*									
11. P/E	0.23	0.18	0.14	-0.08	-0.04	0.42*	-0.15	-0.12	0.01	-0.06								
12. P/B	0.42*	0.17	0.24	-0.17	-0.19	0.60***	-0.09	-0.12	-0.09	0.22	0.29							
13. Revenue growth	0.53**	0.12	0.43*	-0.30	-0.20	0.41*	-0.37*	-0.11	0.23	0.24	0.26	0.40*						
14. Log(MCAP)	0.77***	0.03	0.77***	-0.47**	-0.04	0.06	-0.63***	-0.25	0.10	-0.03	0.22	0.31	0.40*					
15. EPS	0.21	0.21	0.18	0.04	-0.14	-0.10	-0.09	0.14	-0.10	0.11	-0.11	0.14	0.39*	0.31				
16. Lagged return	-0.03	0.70***	-0.08	0.13	0.14	0.36*	-0.10	-0.01	0.03	-0.13	0.49**	0.28	0.18	0.12	0.18			
17. Lagged volatility	0.49**	-0.26	0.22	-0.01	-0.10	0.14	-0.08	-0.10	0.21	0.38*	-0.04	0.16	0.42*	-0.06	0.10	-0.30		
18. Expected dividend	-0.31	-0.15	-0.06	0.03	0.11	-0.44*	0.22	0.27	-0.20	-0.15	-0.41*	-0.29	-0.37*	-0.09	0.08	-0.38*	-0.30	
19. Top brand	0.81***	-0.30	0.68***	-0.43*	-0.11	0.16	-0.46**	-0.16	0.07	0.10	0.10	0.27	0.33	0.68***	0.17	-0.29	0.38*	0.03

*Note: *p<0.1; **p<0.05; ***p<0.01*

Table 4a: The Effect of CEO Narcissism on Retail Investor Outcomes via News Volume

This table presents the coefficients from our regression models, investigating how media coverage (through news volume), CEO narcissism and situational cues influence retail holdings (Models 1a-6a) and abnormal returns (Models 1b-6b). We apply a time-fixed effects regression models to a dataset with 160 observations, reflecting a balanced panel of 32 companies with five quarterly observations. Industry effects are included for all models. Specifications (1), (2) and (3) include only main effects while specification (4) calculates the moderation-effect of CEO narcissism. In Specification (5) and (6), we add situational cues of being 1) classified as a growth stock, or 2) a highly ESG-focused firm.

	Dependent variable: Log(Retail investor holdings)						*Dependent variable: Abnormal return*					
	Model 1a	Model 2a	Model 3a	Model 4a	Model 5a	Model 6a	Model 1b	Model 2b	Model 3b	Model 4b	Model 5b	Model 6b
Controls												
Lagged Log(Holdings)	0.962***	0.966***	0.989***	0.991***	0.985***	0.995***	-0.016	-0.014	-0.023	-0.021	-0.029*	-0.025
CEO age	-0.0004	-0.001	0.0003	0.001	0.002	-0.004	0.003*	0.003*	0.002	0.003*	0.005***	0.009***
CEO tenure	-0.0003	-0.0003	-0.002	-0.001	-0.001	-0.003	-0.001	-0.001	-0.001	-0.001	-0.001	-0.0005
CEO duality	0.031*	0.038**	0.032	0.013	0.024	0.051**	0.029	0.033	0.028	0.011	-0.002	-0.019
Firm age	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001**	0.0001	-0.00000	0.0001	0.0003	0.0002	0.00001
Log(MCAP)	-0.041	-0.043	-0.087***	-0.087***	-0.082**	-0.100***	0.052**	0.050**	0.062**	0.062**	0.075***	0.082***
Lagged volatility	-5.816*	-5.711	-6.676*	-6.862*	-6.997*	-7.323*	5.096	5.167	5.214	5.047	4.290	4.556
EPS	0.003*	0.003*	0.004**	0.002	0.002	0.002	0.003	0.003	0.003	0.001	0.001	-0.0002
Lagged return	0.099	0.097	0.133*	0.131*	0.134*	0.145*	-0.202*	-0.203*	-0.214*	-0.216*	-0.239*	-0.249*
Expected dividend	-0.646	-0.347	-1.030	-1.626	-0.955	-1.495	-1.331	-1.128	-1.322	-1.858	-1.992	-1.694
Top brand	0.085	0.072	0.049	0.029	0.016	0.055	-0.068***	-0.077**	-0.060*	-0.078**	-0.098*	-0.101***
Main effects												
Log(News volume)	0.075***	0.076***	0.107***	0.162***	0.106**	-0.323	-0.010	-0.010	-0.005	0.044	0.037	0.539***
News sentiment	0.002	0.002	0.0002	0.00001	-0.001	-0.0001	-0.002	-0.002	-0.001	-0.002	-0.002	-0.002
NCEO		-0.014	-0.030**	0.067	-0.023	-1.139		-0.010	0.002	0.090	0.062	1.130**
Growth stock			-0.115***	-0.134***	-1.267*	-0.157***				0.020	-0.309	-0.026
ESG focus			0.021	0.006	-0.013	-0.395*			0.017	0.004	-0.017	0.287*
Two-way interactions												
Log(News volume) x NCEO				-0.024*	0.0001	0.149				-0.021	-0.016	-0.248***
Log(News volume) x Growth stock					0.239*						0.037	
NCEO x Growth stock					0.500*						0.233	
Log(News volume) x ESG focus						0.059*						-0.065***
NCEO x ESG focus						0.143						-0.133**
Three-way interactions												
Log(News volume) x NCEO x Growth stock					-0.107*						-0.031	
Log(News volume) x NCEO x ESG focus						-0.021						0.030***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 4b: The Effect of CEO Narcissism on Retail Investor Outcomes via News Sentiment

This table presents the coefficients from our regression models, investigating how media coverage (through news sentiment), CEO narcissism and situational cues influence retail holdings (Models 1a-6a) and abnormal returns (Models 1b-6b). We apply a time-fixed effects regression models to a dataset with N=160 observations, reflecting a balanced panel of 32 companies with five quarterly observations. Industry effects are included for all models. Specifications (1), (2) and (3) include only main effects while specification (4) calculates the moderation-effect of CEO narcissism. In Specification (5) and (6), we add situational cues of being 1) classified as a growth stock, or 2) a highly ESG-focused firm.

		Dependent variable: Log(Retail investor holdings)						*Dependent variable: Abnormal return*					
		Model 1a	Model 2a	Model 3a	Model 4a	Model 5a	Model 6a	Model 1b	Model 2b	Model 3b	Model 4b	Model 5b	Model 6b
Controls													
	Lagged Log(Holdings)	0.962***	0.966***	0.989***	0.991***	0.981***	0.990***	-0.016	-0.014	-0.023	-0.027	-0.028	-0.024
	CEO age	-0.0004	-0.001	0.0003	0.0001	-0.002	0.002	0.003*	0.003*	0.002	0.003	0.005***	0.005**
	CEO tenure	-0.0003	-0.0003	-0.002	-0.002	-0.0001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	CEO duality	0.031*	0.038**	0.032	0.034	0.032	0.006	0.029	0.033	0.028	0.025	0.017	-0.010
	Firm age	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	0.0001	-0.00000	0.0001	0.0002	0.0001	0.001
	Log(MCAP)	-0.041	-0.043	-0.087***	-0.092***	-0.091**	-0.086**	0.052**	0.050**	0.062**	0.074***	0.078***	0.071**
	Lagged volatility	-5.816*	-5.711	-6.676*	-6.717*	-6.361*	-6.462	5.096	5.167	5.214	5.314*	4.990	4.477
	EPS	0.003*	0.003*	0.004**	0.004**	0.004**	0.002	0.003	0.003	0.003	0.002	0.002	-0.0004
	Lagged return	0.099	0.097	0.133*	0.131*	0.157*	0.128	-0.202*	-0.203*	-0.214*	-0.209*	-0.234*	-0.228*
	Expected dividend	-0.646	-0.347	-1.030	-0.997	-1.263	-1.382	-1.331	-1.128	-1.322	-1.405	-1.446	-2.174
	Top brand	0.085	0.072	0.049	0.051	0.106*	0.046	-0.068***	-0.077**	-0.060*	-0.066*	-0.093**	-0.073**
Main effects													
	Log(News volume)	0.075***	0.076***	0.107***	0.106***	0.113***	0.105***	-0.010	-0.010	-0.005	-0.003	-0.002	0.004
	News sentiment	0.002	0.002	0.0002	0.007	0.014**	0.102	-0.002	-0.002	-0.001	-0.017**	-0.018**	-0.026
	NCEO		-0.014	-0.030**	-0.021	0.005	-0.090		-0.010	0.002	-0.020	-0.028	-0.476*
	Growth stock			-0.115***	-0.116***	0.610**	-0.149***			0.037	0.040	-0.118	-0.026
	ESG focus			0.021	0.019	0.032	-0.019			0.017	0.022	0.005	-0.108
Two-way interactions													
	News sentiment x NCEO				-0.003	-0.006**	-0.064				0.007***	0.007***	0.017
	News sentiment x Growth stock					-0.223**						0.018	
	NCEO x Growth stock					-0.283***						0.038	
	News sentiment x ESG focus						-0.012						0.001
	NCEO x ESG focus						0.007						0.054
Three-way interactions													
	News sentiment x NCEO x Growth stock					0.079**						0.007	
	News sentiment x NCEO x ESG focus						0.008						-0.001

Note: *p<0.1; **p<0.05; ***p<0.01

Table 5: Hypotheses and Findings

Table 5 provides a list of all hypotheses and denominates whether they are supported by our data. For each hypothesis, we test both the volume and sentiment components of media coverage. If one or both components are supported, we consider the hypothesis to be supported.

Hypotheses	Supported?	
	Volume	*Sentiment*
Dependent variable: Retail holdings		
Hypothesis 1: Retail investor holdings are positively related to media coverage.	Yes (+)***	No
Hypothesis 2: CEO narcissism moderates the relationship between retail holdings and media coverage.	Yes (–)*	No
Hypothesis 3: CEO narcissism moderates the relationship between retail holdings and media coverage in stocks with exceptional growth prospects.	Yes (–)*	Yes (+)**
Hypothesis 4: Narcissistic CEOs moderate the relationship between retail holdings and media coverage in ESG-focused companies.	No	No
Dependent variable: Abnormal returns		
Hypothesis 5(1): Media coverage leads to abnormal returns.	No	No
Hypothesis 5(2): CEO narcissism moderates the relationship between media coverage and abnormal returns.	No	Yes (+)***
Hypothesis 5(3): CEO narcissism moderates the relationship between media coverage and abnormal returns in stocks with exceptional growth prospects.	No	No
Hypothesis 5(4): CEO narcissism moderates the relationship between media coverage and abnormal returns in ESG-focused companies.	Yes (+)***	No

*Note: *p<0.1; **p<0.05; ***p<0.01*

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