The Impact of CEO Overconfidence on Firm Strategic Risk-Taking in Europe: Investigating the Moderating Role of Culture

Clemens Kuess

Dissertation written under the supervision of Cristina Mendonça

Dissertation submitted in partial fulfilment of requirements for the International MSc in Management at Universidade Católica Portuguesa and for the MSc in Strategy, Innovation, and Management Control at WU University of Economics and Business, 10.09.2025.

Abstract

Biases in decision-making may distort decisions in corporate contexts. This study focuses on overconfidence – a trait that top managers are particularly prone to – among the upper echelons and its impacts on strategic risk taking. Additionally, since executives operate under varying levels of discretion due to contextual factors, the study investigates in how far cultural values shape the latitude of action in overconfident manager's risk-taking initiatives. Using a European sample of firms and directors who are classified as overconfident based on their stock-option exercising behaviour and personal characteristics that are related to overconfidence, I provide evidence that overconfident CEOs invest more in terms of capital expenditures than their counterparts, but no effect was found when measuring risk-taking as research and development expenses. Cultural values were inconsistently found to be significant in moderating the relationship, depending on model specification and variable measurement. The results imply that CEO overconfidence may be a positive personality trait depending on the needs of the business and that cultural values can be considered for CEO hiring processes, even though further research is needed to better understand the contextual dimensions that facilitate or inhibit executive risk-taking.

Title: The Impact of CEO Overconfidence on Firm Strategic Risk-Taking in Europe: Investigating the Moderating Role of Culture

Author: Clemens Kuess

Key Words: Biased decision-making, CEO overconfidence, strategic risk-taking, managerial discretion, cultural values

Resumo

Os preconceitos na tomada de decisões podem distorcer as decisões em contextos corporativos. Este estudo centra-se no excesso de confiança — uma característica a que os gestores de topo são particularmente propensos — entre os escalões superiores e os seus impactos na assunção de riscos estratégicos. Além disso, uma vez que os executivos operam sob vários níveis de discricionariedade devido a fatores contextuais, o estudo investiga em que medida os valores culturais moldam a latitude de ação nas iniciativas de assunção de riscos dos gestores excessivamente confiantes. Utilizando uma amostra europeia de empresas e diretores classificados como excessivamente confiantes com base no seu comportamento de exercício de opções sobre ações e características pessoais relacionadas com o excesso de confiança, apresento evidências de que os CEOs excessivamente confiantes investem mais em termos de despesas de capital do que os seus homólogos, mas não foi encontrado qualquer efeito ao medir a assunção de riscos como despesas de investigação e desenvolvimento. Os valores culturais foram considerados significativos de forma inconsistente na moderação da relação, dependendo da especificação do modelo e da medição das variáveis. Os resultados sugerem que o excesso de confiança do CEO pode ser uma característica positiva da personalidade, dependendo das necessidades da empresa, e que os valores culturais podem ser considerados nos processos de seleção do CEO, embora sejam necessárias mais pesquisas para compreender melhor as dimensões contextuais que facilitam ou inibem a assunção de riscos por parte dos executivos.

Título: O impacto da excessiva confiança dos CEOs na assunção de riscos estratégicos pelas empresas na Europa: Investigando o papel moderador da cultura

Autor: Clemens Kuess

Palavras-chave: Tomada de decisões tendenciosa, excesso de confiança do CEO, assunção de riscos estratégicos, discricionariedade gerencial, valores culturais

Table of Contents

Tables

Figures

1. Introduction

Topic Presentation

In his landmark book *Thinking Fast and Slow*, Kahneman (2011) called optimistic overconfidence "the most significant of the cognitive biases" (p. 255). Broadly speaking, overconfidence refers to the notion that individuals' subjective perceptions of their own ability are inflated (Anderson et al., 2012).

Overconfidence has been used in the business context to explain, for example, why Roger Smith in his tenure period in the 1980s at General Motors invested $40 billion in the automation of plants, believing it would make the automotive business future proof and cut labour costs (Malmendier & Tate, 2005b). According to the authors, Smith's vision led to large rounds of layoffs only to hire more workers subsequently to guide the robots. All in all, the investment produced negative market perceptions due to lacking technology readiness (Malmendier & Tate, 2005b). Similarly, Hirshleifer et al. (2012) argue that the same self-confidence trait of Steve Jobs, former CEO of Apple, that made him one of the most influential innovators (Bloomberg, 2004) could also be viewed as a major risk factor for his business and its investors.

This relationship between CEO characteristics and firm performance has received substantial interest in academia, with one of the most prominent attributes being overconfidence, which is the focus of this thesis. In a meta-analytical literature review about the relationship between CEO overconfidence and firm performance, Burkhard et al. (2023) aggregated previous literature into a model that this study adopts. In their model, the authors found that one channel through which CEO overconfidence and firm performance are related is strategic risk-taking. Strategic risk-taking describes a set of strategic actions, such as major investments, pursued by CEOs that involve uncertainty, are hard to reverse, and shape the future of the firm (Kolev & McNamara, 2022).

However, the relationship between CEO overconfidence and strategic risk-taking is not straightforward, as there are multiple factors that determine a CEO's leeway in making decisions. Those factors make up managerial discretion (Hambrick & Finkelstein, 1987). As Crossland & Hambrick (2007) have demonstrated, the macro-environment in which CEOs act makes a difference in how much leeway a manager can have. They report that cultural values (i.e. the beliefs, norms, and attitudes that are shared within groups) are one such factor that constrain the latitude of action available to top managers. These cultural values were also shown

to be related to investment levels in general (Shao et al., 2013). The authors of this study find that firms in individualistic countries invest more in long-term assets than do firms in collectivist cultures. They additionally distinguish between research and development (R&D) expenses and capital expenditure (CAPEX), finding that only the former is sensitive to individualism. There are also numerous studies that examine cross-cultural variation in overconfidence that find higher overconfidence among collectivist cultures (Yates et al., 1997; Yates et al. 1998), but these findings are challenged by more recent research (Moore et al., 2018). Taken together, these findings provide motivation to more closely explore the role of culture in the association between CEO overconfidence and strategic risk-taking.

Prior research on the topic offers a conflicting view on whether overconfidence is a positive or negative phenomenon. On the one hand, CEO overconfidence leads to value-destroying M&A deals and unsuccessful product launches (Malmendier & Tate, 2008; Simon & Houghton, 2003). On the other hand, overconfident CEOs may prove themselves as highly valuable since their increased risk-taking may build competitive advantages by increasing innovation efforts (Galasso & Simcoe, 2011; Hirshleifer et al., 2012) and producing superior stock returns (Bharati et al., 2016).

I will measure the variables of interest, those are CEO overconfidence, strategic risk-taking, and culture, in the following ways. As it is difficult to obtain first-hand psychological information on CEOs, overconfidence among them is proxied by their stock option exercise behaviour (Malmendier & Tate, 2005a) and a demographic indicator that incorporates age, gender, education, professional background, and CEO/Chairman duality (Li & Zhang, 2022). Strategic risk-taking refers to corporate investment as measured by R&D expenses and CAPEX. Finally, I use the Global Leadership and Organizational Behavior Effectiveness (GLOBE) model developed by House et al. (2004) to measure cultural dimensions.

This thesis addresses the following research gaps: First, it offers a more granular approach to studying the moderating effect of culture in the CEO overconfidence – strategic risk-taking relationship than previous papers (e.g., Burkhard et al., 2023), since it incorporates cultural dimensions instead of the broader construct of national institutions that additionally encompasses legal systems, governance practices, and government regulations (Crossland & Hambrick, 2007). Second, while most of the academic papers in this field restrict themselves to US samples (e.g., Ben-David et al., 2013; Galasso & Simcoe, 2011; Hirshleifer et al., 2012; Malmendier & Tate, 2005a, 2005b, 2008) and only some have expanded their data collection to

Asian studies (e.g., Li & Tang, 2010; Li & Zhang, 2022), the following analysis will make use of a dataset covering most of Europe. As Europe is different to the US in terms of governance models and business practices such as financing mode, ownership structures, corporate control, and labour markets (Aguilera & Jackson, 2003), investigating this region and testing the validity of previous results is of academic interest. Moreover, this study makes use of cultural variation within Europe, which is especially apparent between Western and Eastern Europe (Akaliyski, 2018; Mamatzakis et al., 2024).

Problem Statement and List of Research Questions

The aim of this thesis is to study the boundary conditions in the macro-environment that firms are embedded in that may inhibit or enable overconfident CEOs to pursue their risky strategies. Culture is one such boundary condition that may have an influence in how far CEOs may take high-stakes decisions themselves rather than relying on consultation or in how far leaping into uncertainty is tolerated at all (Crossland & Hambrick, 2011). To study this phenomenon, I will follow Malmendier & Tate (2005a) and construct a CEO overconfidence measure using stock-option data from BoardEx. To test the relationship with strategic risk-taking proxied via R&D spending (Hirshleifer et al., 2012; Galasso et al., 2011) and capital expenditures (Malmendier & Tate, 2005a), I will employ a correlational analysis together with multiple regression models. As part of the moderation analysis, GLOBE (House et al., 2004) culture dimensions pertaining to the location of the headquarters of the firms will be used. Measuring culture via headquarter location assumes that the CEO's attitudes, beliefs, and behaviours are influenced by the country in which they work (Ferris et al., 2013).

This study, therefore, aims to provide answers to the following research questions:

RQ1: Does CEO overconfidence lead to higher strategic risk-taking overall?

RQ2: Do cultural differences affect the strength of this relationship?

Managerial and Academic Relevance

This thesis adds to the academic discourse in the following ways: Current literature on CEO overconfidence and its positive main effect on strategic risk-taking has predominantly focused on US samples (Ben-David et al., 2013; Galasso & Simcoe, 2011; Hirshleifer et al., 2012), with some analyses conducted within the Asian context (Li & Tang, 2010; Li & Zhang, 2022). Moreover, previous research has found that, depending on the country, CEO effects differ (Crossland & Hambrick, 2011). Shao et al. (2013) also showed that cultural dimensions as such

can influence investment levels, but they do not investigate simultaneous overconfidence effects. I add to this research in the following ways. First, as of my knowledge, no paper to this date has examined the relationship between CEO overconfidence and strategic risk-taking in a European context. Second, I would expect the relationship between overconfidence and the pursuit of risky strategies to be impacted not only by country, but by cultural dimensions. This adds granularity in understanding the mechanisms driving the differences of CEO effects and their latitude of action.

The objective of this study is to also provide relevant insights for managerial purposes. The findings of this study could be useful when deciding on the set-up of control mechanisms that foster or curtail risky behaviour. If culture is found to be a driving force in the link between overconfidence and risk-taking, it should be considered when implementing board and oversight structures as well as compensation contracts for executives. The results may also have implications for CEO selection. Hiring overconfident executives might prove fruitful for companies in some cultural contexts and may have detrimental effects in other settings. For example, hiring highly overconfident CEOs to improve firm performance through innovation or expansion could be beneficial in cultures that would otherwise inhibit willingness or the possibility to take risks.

Overview of the Thesis' Structure

The rest of this thesis is structured as follows. Relevant literature covering the topics of overconfidence, strategic risk-taking, and culture is summarised in the next section to develop my hypotheses. Then, the methodology and underlying dataset is presented before providing the results of the analysis. Subsequently, the discussion section will reconcile the results with existing literature and provide further context, whilst showing limitations of the study. The last section concludes the thesis.

2. Literature Review

Overconfidence and its Impact on Corporate Outcomes

The following chapter will define overconfidence before presenting effects of overconfidence among the general population and, subsequently, in corporate contexts.

Biases and heuristics shape human decision-making and judgement. One of the most prominent biases that is exhibited by individuals is overconfidence (Kahneman, 2011). Overconfidence bias generally describes the tendency of individuals to overestimate their abilities (Dunning et al., 2004).

In the psychology literature, Moore & Healy (2008) distinguish overconfidence into three separate types: overestimation, overplacement, and overprecision. First, overestimation refers to the notion of individuals thinking that they are better than they really are (Moore & Healy, 2008). Second, holding beliefs that one is better than others is called overplacement (Moore & Healy, 2008). Third, overprecision describes the phenomenon of individuals being too certain about the accuracy of their predictions, meaning people tend to be too sure that they are correct (Moore & Healy, 2008).

More recent contributions in psychology advocate for a separate measurement of these three distinctive concepts (Moore & Schatz, 2017), yet most research in management and finance employs a broader perspective and aims to measure the whole construct of overconfidence that includes all three of those aspects (Burkhard et al., 2023). As Malmendier & Tate (2015) put it, overconfidence refers to the inflated view of value creation ability that a manager holds.

In the general population, overconfidence bias is a well-studied phenomenon. People often hold overly optimistic views of their own skills and traits (Dunning et al., 2004). For example, 70% of high school students believe that they have above-average leadership skills while only 2% felt that they were below average for this skill, which highlights a skewed self-perception of the students' own abilities (College Board, 1976-1977). College students were also shown to overestimate the probability that their answers to general knowledge questions would be correct (Fischhoff et al., 1977). The overconfidence effect is, however, not only present in student samples. Cambridge & Shreckengost (1980) report that analysts at the US Central Intelligence Agency were overly optimistic about the accuracy of their forecasts regarding future global events. Also, surgeons in training were found to be overconfident when developing diagnoses based on the analysis of X-ray scans of their patients (Oksam et al., 2000). Moreover,

motorcyclists systematically bias their own estimation of their driving skills upwards, believing that they would be less likely to cause accidents than other bikers (Rutter et al., 1998). Related streams of the self-enhancement literature (Kunda, 1987; Weinstein, 1980) further document the general propensity of individuals to overestimate probabilities of positive future events.

The overconfidence effect can also be observed in the workplace context. Previous research has found that, unconditional of the organizational hierarchy, people hold upward-biased views of themselves that are not necessarily in line with actual job performance (Dunning et al., 2004). For example, sizeable proportions, in this case up to 40%, of hired engineers at high-tech firms thought to be in the top 5% of all engineers (Zenger, 1992). Landier & Thesmar (2003) found that overconfidence among entrepreneurs is an ambivalent trait. The authors find that on the one hand, overconfident founders worked harder, but on the other hand, they tended to quit loss-making projects too late, resulting in loss of money. Often, though, organizations control for these kinds of biases by adopting certain policies and procedures that limit detrimental performance effects (Dunning et al., 2004). In turn, this means that where such control mechanisms are lacking, the biases may find their way into decision-making. For instance, the decision to invest into new projects where no past knowledge is applicable or other important decisions typically made by C-suite executives or top management teams are less likely to be governed by strict corrective measures (Dunning et al., 2004).

Overconfidence Among CEOs

This subsection describes the prevalence of overconfidence among the upper echelons of companies and discusses effects stemming from manager's characteristics.

The question remains whether CEOs and other top managers are susceptible to the overconfidence bias. There are several reasons that would support this case. Overconfidence bias, especially the better-than-average effect, may be predominantly prevalent among individuals with high abilities, since they might fail to identify the correct comparison group (Camerer & Lovallo, 1999). CEOs could fall back to this heuristic and compare themselves to average corporate managers, not C-level executives, so they might believe that they are better than average, a phenomenon called reference group neglect (Camerer & Lovallo, 1999; Malmendier & Tate, 2005b). Additionally, the overconfidence effect tends to be more pronounced when evaluating ambiguous and not clearly defined outcomes (Moore & Kim, 2003). This is certainly true for decisions that a CEO must make, such as picking investment programmes (Malmendier & Tate, 2005b). These circumstances make it difficult for CEOs to

compare their performances across firms, making it hard to detect overestimation in their judgements (Malmendier & Tate, 2005b). CEOs are also prone to the illusion of control effect: Given that CEOs are the highest authority when making important strategic decisions such as large investments and have large control over their decisions, they might also think that they can control the outcome (Langer, 1975; Malmendier & Tate, 2005b). This leads them to be too optimistic about the success of such decisions (March & Shapira 1987). Individuals also tend to overestimate outcomes to which they are highly committed (Weinstein, 1980). CEOs are expected to be very committed to the outcomes of their corporate decisions, since in most cases a large portion of their compensation and their future employability are tied to their success (Malmendier & Tate, 2005b). Lastly, managers in high levels of the organizational hierarchy typically do not receive frequent and substantiated feedback (Malmendier & Tate, 2005b), creating a surrounding that nurtures bias in decision-making (Nisbett & Ross, 1980). However, research from the psychology literature stream documents conflicting evidence, such as the Dunning-Kruger effect. Kruger & Dunning (1999) found that people with high levels of expertise, which CEOs can be argued to be, actually underestimate their abilities in comparison to peers. In their seminal work, the authors explain this by stating that top performers assume that others would be similarly proficient as they are on a specific task. In one of the studies they conducted, though, Kruger & Dunning (1999) report an increase to more precise self-appraisals once the very competent group was aware of the poorer performance of other participants.

The relationship between overconfidence and corporate decision-making can be studied through the lens of upper echelon theory (UET; Hambrick & Mason, 1984). UET posits that the traits of the top management team influence firm strategy and, therefore, firm performance (Hambrick & Mason, 1984). Hambrick & Mason (1984) argue that executives base their decision-making on their own interpretations, which are shaped by experiences, values, and personalities. UET is based on the concept of bounded rationality, highlighting the fact that decision-makers have idiosyncratic knowledge and beliefs of the situations that they are in and are unable to digest the full breadth of available information (Cyert & March, 1963; Hambrick, 2007; March & Simon, 1958). This may lead to distorted views of the situation and biased decisions (Hambrick, 2007).

In this view of UET, top managers and their characteristics matter, having led to a plethora of research on the effects of certain managerial attributes. In the past, upper echelons literature has mainly focused on studying readily observable characteristics of managers, such as age, education, experience or other demographic variables due to data obtainability issues

(Hambrick, 2007). I will highlight age, gender, tenure, and education in this paragraph. First, CEO age was shown to be negatively associated with firm risk-taking, as young leaders reportedly employ more aggressive strategies in the hope of achieving excessively high returns (Yim, 2013). Similarly, Serfling (2014) reported that with increasing CEO age, stock return volatility decreases through de-risking investment policies, decreases in R&D spending, more diversified firm operations, and reduced leverage. Second, Huang & Kisgen (2013) reported that male executives choose supposedly riskier paths than their female counterparts, as they find that male executives have a higher propensity to engage in acquisitions and debt issuances. Martin et al. (2009) provide further evidence that female CEOs are perceived as more risk-averse by financial markets. Third, CEO tenure is another well-studied variable within the field of UET that is usually negatively associated with firm strategic actions. Explanations rest upon the interpretations that long-tenured CEOs tend to invest less in risky projects to protect their legacies and that they are able to accumulate power (Meyer, 1975; Miller, 1991), allowing them to surround themselves with like-minded people (Zajac & Westphal, 1996). This makes CEOs feel more comfortable in their position and decreases their willingness to push forward new strategic initiatives (Miller, 1991). Likewise, newly appointed CEOs might feel the need to prove themselves early on in their tenures and might, therefore, make major decisions in the beginning of their tenure (Prendergast & Stole, 1996). Lastly, UET scholars have turned their attention to the level of education of executives. Formal education allows individuals to build knowledge and acquire skills, ultimately increasing their abilities (Wally & Baum, 1994; Wang et al., 2016). Education is, therefore, positively associated with strategic actions (Wang et al., 2016), since CEOs with high levels of education are expected to be more receptive to the dynamic environment, new technologies, and novel ideas in general (Thomas et al., 1991). Relatedly, Kish-Gephart & Campbell (2015) found that the social background of executives shapes their strategic risk-taking choices. CEOs from the lower and upper social class were shown to engage in higher strategic risk-taking behaviour compared to CEOs from the middle social classes (Kish-Gephart & Campbell, 2015). All of these findings suggest that, indeed, even readily observable characteristics of decision-makers matter in the corporate context.

More contemporary UET research has expanded to investigate psychological traits and personality attributes of CEOs. Such a deeper investigation of the personal characteristics of CEOs found a few interesting relationships. To gain insights into the personality traits of executives, some studies employed the Big Five framework that describes the “patterns of thoughts, feelings, and behaviours” (Roberts, 2009, p. 140) of individuals in certain situations.

When examining the Big Five personality traits, a higher likelihood of acquisitions and larger deal sizes were documented for extravert CEOs (Aabo et al., 2023; Malhotra et al., 2017). Narcissism has also been shown to impact firm strategies (Brunzel, 2021) and was linked to higher M&A expenditures and overinvestment into R&D (Chatterjee & Hambrick, 2007; Ham et al., 2018). Humility, a concept that describes being self-aware, open to feedback, and mindful of one's abilities and limitations (Ou et al., 2014; Tangey, 2009; Templeton, 1997), has also received academic interest. Ou et al. (2015) found that CEO humility is positively related to firm performance through strategic ambidexterity. Firms that performed well were moreover shown to have humble CEOs that put the firms before themselves, allowing superior strategizing (Collins, 2001). Another related psychological trait is overconfidence, which is the focus of this thesis.

CEO overconfidence has been linked to detrimental outcomes for both the individual in question and the focal firm. On the individual level, CEOs who classify as being low (vs. high) on optimistic traits are 81% (vs. 48%) more likely to be forcefully fired than moderately optimistic CEOs are (Campbell et al., 2011). This gives rise to the idea that balanced calibration is important. In a supplemental analysis, the authors show that this effect holds only for the subset of firms that employ rigid governance mechanisms that ensure that boards act in the interests of shareholders. Still, the size of the economic impact of overconfidence on CEO turnover is comparable to situations in which CEOs are responsible for stock returns that are two standard deviations below the industry mean (Campbell et al., 2011). On the firm level, overconfidence has been put into relation to the probability of corporate failure. Leng et al. (2021) report that firms in the United Kingdom are more likely to go bankrupt if they are led by overconfident CEOs. They provide two channels for that phenomenon: First, innovative sectors (or firms with high R&D spending) seem to nurture investment environments that facilitate riskier decision-making. Second, firms that score low on accounting conservatism, that is the speediness of recognizing losses and requiring stronger proof to recognize gains, exacerbate the effect of overconfidence on corporate insolvency (Leng et al., 2021). The negative consequences of CEO overconfidence are also reflected in higher stock price crash risk since negative net present value projects are viewed as value creating and therefore held on to for too long (Kim et al, 2016). These findings show that overconfidence is an ambivalent trait that can have negative consequences.

On a related note, CEO overconfidence has also been linked directly to accounting practices. Because overconfident managers tend to hold upwards-biased projections of their investment

projects, they are more propended to engage in late loss recognition and less conservative accounting (Ahmed & Duellman, 2013). The authors argue that managers may, for example, overestimate collection probabilities of outstanding receivables or useful lives of assets, which overstates the actual values.

Multiple studies investigated the relationship between CEO overconfidence and strategic decisions such as investments and financing. First, studies linked overconfidence to M&A behaviour. In one of the first studies linking CEO overconfidence, or as it was called originally, hubris, to corporate outcomes, it was acknowledged that engaging in corporate M&A can be analysed through individual distortions in decision-making (Roll, 1986). Specifically, managerial hubris, e.g. in the form of believing that their valuations are accurate and correct, was found to be a factor that could explain corporate takeover premiums and value-destroying acquisitions (Roll, 1986). Building upon these findings, Malmendier & Tate (2008) empirically document that overconfident CEOs are 65% more likely to make acquisitions than their non-overconfident counterparts. Moreover, overconfident CEOs are responsible for higher drops in stock prices following merger announcements. Second, Malmendier & Tate (2005a) generally study the effects of overconfidence on corporate investment in a previous paper in which they developed their overconfidence measure that builds upon a CEO's option exercising behaviour. They find that corporate investment is more sensitive to cash-flow for overconfident CEOs. The authors argue that because overconfident managers overestimate the returns of their undertaken investments, they tend to invest too much when internal cash-flows are plentiful and underinvest when they would need external financing. Using different methods, i.e. surveys of US CFOs and experiments, the effect of heightened investment levels due to overconfidence were reproduced (Ben-David et al., 2013; Pikulina et al., 2017), while Ben-David et al. (2013) additionally found compelling evidence that miscalibrated managers use higher amounts of debt financing. All in all, these results suggest that overconfidence is positively related to investment intensity.

Whether CEO overconfidence produces beneficial or detrimental outcomes in terms of firm performance remains unclear, as a recent meta-analytical review by Burkhard et al. (2023) concludes that empirical evidence is mixed and both sides of the phenomenon can be argued. This is why the authors suggest strategic risk-taking as a mediator in the broad relationship between CEO overconfidence and firm performance, as it is suitable to explain organizational performance improvements (Hoskisson et al., 2017).

Overconfidence and Strategic Risk-Taking

The following subsection will dive deeper into the relationship between overconfidence and strategic risk-taking, which is the relationship in focus of this thesis.

Firm strategic risk taking is one of the crucial factors that can define a firm's success and failure (Shapira, 1995). As a construct, it refers to large-scale investments that involve uncertainty, are irreversible, and have the ability to influence the future trajectory of a firm (Kolev & McNamara, 2020). Previous research has shown that personal characteristics of executives indeed shape their risk-taking behaviours since it is an activity that relies more on subjective assessments than rational calculations (Chatterjee & Hambrick, 2011). Overconfidence plays a major role in risk taking. Decision-makers were found to be overconfident when estimating success and mostly downplay the attached uncertainties (Ben-David et al., 2013). This finding was confirmed in an experimental setting by Camerer & Lovallo (1999), where overconfident study participants decided to enter a market more frequently, with negative profits in consequence.

Because overconfidence affects how people make choices and estimate payoffs and risks, it is feasible to assume that executives inhibit this bias when making strategic decisions, especially those that involve risk (Li & Tang, 2010). Previous literature suggests that there are three mechanisms that describe CEOs and their risk-taking behaviour.

First, cognitive mechanisms such as assigning probabilities to future events and evaluating payoffs influence the decision-making process of overconfident CEOs (Burkhard et al., 2023). When such distortions arise, overconfident CEOs hold inflated views of their control over outcomes and the chances of success (Li & Tang, 2010). Overconfidence also leads to CEOs placing more weights on their own information than outside information, so they are likely to underestimate the impacts of adverse external factors on success probability (Chen et al., 2015; Langer, 1975). Additionally, overconfident CEOs regard themselves as highly capable and therefore make errors when estimating which resources and capabilities are required to reach the desired outcome (Burkhard et al., 2023; Hayward & Hambrick, 1997; Moore & Healy, 2008). Overconfidence also limits the search for new information (Finkelstein et al., 2009). Taken together, these effects may make overconfident CEOs believe that their strategic risk-taking results in overly positive outcomes (Li & Tang, 2010), while they neglect the potential downside risk (Hayward et al., 2006).

Second, CEO overconfidence is related to strategic risk taking through motivational mechanisms (Burkhard et al., 2023). Overconfidence influences the way CEOs set objectives and their respective attainability, with CEO's usually high self-efficacy beliefs acting as a motivator to set challenging goals (Bandura, 1989; Burkhard et al., 2023). If people set such challenging goals, they usually make use of riskier strategies to meet them (Ordóñez et al., 2009). Moreover, overconfidence is associated with greater perseverance in tackling problems (Bi et al., 2016), so even if the first results of an action are below expectations, overconfident CEOs tend to escalate their commitment and deploy additional resources towards these causes (Brockner, 1992). These behaviours tend to increase the willingness to take risks (Burkhard et al., 2023).

Third, social mechanisms can transmit CEO overconfidence into strategic risk-taking (Burkhard et al., 2023). Overconfident CEOs tend to be seen as persuasive and competent and, therefore, can wield their influence on other high ranking internal stakeholders (Anderson et al., 2012; Von Hippel & Trivers, 2011), which enables them to select risky strategic courses of action. Their skewed perceptions about the success of their actions paired with their feeling of being in control of external shocks allows overconfident CEOs to paint bright futures for their firms (Picone et al., 2014; Shipman & Mumford, 2011), which reduces negative feedback from other senior managers and decreases friction to conduct strategic actions that align with the CEO's risk appetite (Burkhard et al., 2023).

All three of these mechanisms taken together suggest that overconfident CEOs will underestimate the risks tied to their strategic decisions, which makes them risk-seeking (Chatterjee & Hambrick, 2007; Sitkin & Pablo, 1992). To be able to measure strategic risk-taking, most academic studies rely on proxies that essentially capture the tendency and willingness to invest into new projects that are characterized by higher than usual uncertainty surrounding their success (Li & Tang, 2010). Several studies aim to empirically test this relationship between CEO overconfidence and strategic risk-taking. I will highlight three streams of research that commonly show that overconfident CEOs make bolder decisions, which leads to a higher likelihood of engaging in corporate innovation activities. First, Galasso & Simcoe (2011) acknowledge that overconfident CEOs may engage more heavily in exploration and strategic risk-taking (Bernardo & Welch, 2001; Goel & Thakor, 2008), and, therefore, decide to study innovation-related outcome variables. Upon arrival of an overconfident CEO, they document an increase of 25% to 35% in citation-weighted patent counts and economically similar impacts for R&D spending. Their results also point to a

strategic shift in R&D, rather than just plain expenditure increases. It is noted that the effect of managerial overconfidence is stronger when the CEO faces less restraints in making decisions (Galasso & Simcoe, 2011). Second, Hirshleifer et al. (2012) similarly hypothesizes that overconfident CEOs would display higher tendencies to invest in risky and challenging undertakings, for which the authors use innovative projects, such as developing new business models, products, services, or new technologies, as their proxy. The authors provide evidence that firms which are led by overconfident CEOs experience higher stock return volatility, which can be explained by executives implementing riskier projects. In line with Galasso & Simcoe (2011), a positive impact of CEO overconfidence on R&D spending as well as patent and citation count was reported (Hirshleifer et al., 2012). Strikingly, the effect mainly appears in innovative sectors, which Hirshleifer et al. (2012) explain with the fact that such industries present ample and solid growth opportunities, leading to benefits if CEOs are overconfident. Within these innovative industries, the authors document that overconfident CEOs are more likely to transform their risky decision-making into firm value than their non-confident counterparts (Hirshleifer et al., 2012). Third and more recently, research has been able to partly replicate these findings in different contexts apart from US-based samples. The main positive effect of CEO overconfidence on corporate innovation productivity, as measured in patent citations, was reproduced in the Chinese business environment (Li & Zhang, 2022). Additionally, the authors find that, when a corporation is state owned, the relationship between CEO overconfidence and innovation turns insignificant, possibly due to the CEO not always having the last say in state-owned firms.

To summarize, previous literature discussed above has predominantly found arguments that would indicate a positive relationship between CEO overconfidence and strategic risk-taking (e.g., Galasso & Simcoe, 2011; Hirshleifer et al., 2012; Li & Zhang, 2022). After all, risk-taking usually requires at least moderate overconfidence, as precise estimations of people's abilities might hinder them to pursue an opportunity (Morony et al., 2013).

Therefore, I propose the following hypothesis:

H1: CEO Overconfidence is positively associated with strategic risk-taking.

As mentioned in the introduction, the relationship between overconfidence and strategic risk-taking might be different depending on the context. As pointed out by Burkhard et al. (2023), studying context is a fruitful research avenue, and one of those contextual variables is culture.

Culture

In order to understand how culture may constrain or empower corporate decision-making, I will clarify in this section what culture is and how it affects decision making in general. Loosely defined, culture refers to the shared beliefs, values, and attitudes of a group. As one of the most prestigious scholars in this field, Hofstede (1980) defines culture as the "collective programming of the mind which distinguishes the members of one human group from another" (p. 25). In the context of this thesis, culture refers to national culture.

To describe what constitutes culture, Hofstede developed a cultural values framework that used survey data collected at IBM in the late 1960s and once again in the early 1970s (Kirkman et al., 2006). By running a country-level factor analysis, he initially proposed four dimensions of culture: individualism-collectivism, power distance, uncertainty avoidance, and masculinity-femininity (Hofstede, 1980). In later stages, Hofstede (1991) added a fifth dimension based on research by the Chinese Culture Connection (1987) called long-term versus short-term orientation. A final sixth dimension named indulgence versus restraint was added by Hofstede et al. (2010). The Hofstede model is the most frequently used measure in cultural values research (Kirkman et al., 2006). In the following, I will briefly describe the dimensions of the model according to Hofstede (2011):

- The individualism-collectivism dimension captures the degree in how far individuals in a society are embedded in social groups. The more individualistic a culture is, the higher is the expectation that individuals are self-sufficient and concerned with their own and their close family's well-being. On the collectivist end of the spectrum, people are born into close-knit groups, such as extended family, that protect themselves and stay loyal to each other.
- Power distance refers to the notion of how acceptable it is for less powerful members in a given culture that power is distributed unequally. This has implications for the way that parenting is expected (treating the child as equal or requiring obedience) and whether subordinates work together with the boss or for the boss.
- Uncertainty avoidance describes the level of comfort a society feels with ambiguous, unstructured, and novel situations. Cultures that avoid uncertainty aim to codify in law or behavioural rules how to behave in certain situations to minimize this ambiguity.
- The masculinity-femininity dimension captures the distribution of certain values between the genders. In high-masculinity cultures, men's values differ more from

women's in regard to displaying emotion, being assertive, as well as work and family arrangements. In high-femininity cultures, men and women are expected to share values, meaning they should both be caring and balance their family duties with work.

- The construct of long-term versus short-term orientation describes how far societies thrive for future rewards on the one hand, and how important the past and the present is on the other hand.
- The indulgence versus constraint dimension is, again, defined by its two extremes. Indulgence is characterized as a tendency that permits gratification of basic human desires, such as having fun or being at ease. In contrast, constraint is to be understood as an attitude that limits this gratification by enforcing strict norms.

Another very prominent model of cultural values and cultural practices is the Global Leadership and Organizational Behavior Effectiveness (GLOBE) model. The overarching goal of the GLOBE research project was to link cultural values and practices with leadership and organisational processes (House et al., 2002). This model includes nine cultural dimensions: Uncertainty avoidance, power distance, societal collectivism, in-group collectivism, gender egalitarianism, assertiveness, future orientation, performance orientation, and lastly, humane orientation (House et al., 2004). The first six dimensions are rooted in previously conducted research of Hofstede (1980). There are, however, some notable differences. Collectivism is split into institutional and in-group collectivism, with the former referring to the "societal emphasis on collectivism […] by means of laws, social programs or institutional practices" (House et al., 2002, p. 6), and the latter referring to cohesiveness and loyalty in families and organisations (House et al., 2002). Second, Hofstede's (1980) masculinity-femininity dimension is divided into the dimensions assertiveness and gender egalitarianism (House et al., 2002). Future orientation is based on a society's relationship with time (House et al., 2002), which can be centred around the past, present, or future (Kluckhohn & Strodtbeck, 1961), and their tendency to plan ahead or postpone gratification (House et al., 2004). Performance orientation refers to the need of achievement and in how far a society values performance gains and excellence, whereas humane orientation describes the degree to which societies value caring and altruistic behaviours (House et al., 2004).

For the purposes of this thesis, the GLOBE dataset of cultural dimensions will be used. There are several reasons justifying this choice. Even though Hofstede's model remains the most frequently used model in cross-cultural research (Venaik & Brewer, 2010), it has its shortcomings: Hofstede's model is criticised to be US-centric and faces generalisability issues

since the data was collected at a single company, namely IBM (Javidan et al., 2006). In contrast, the GLOBE project collected data from over 17,000 managers from 951 organisations in 62 cultures (House et al., 2004). Specifically, I focus on two cultural dimensions, namely individualism and uncertainty avoidance.

Given that there is significant variation in the dimension scores in cultural models across countries, it is of research interest how they manifest in daily life situations such as decision-making. For example, collectivist decision-makers may tend to integrate opinions from others more into their decision-making process than individualists since they want to adhere to social norms (Yates & Oliveira, 2016). Moreover, cognitive styles tend to be different across cultures (Choi, 2016). Holistic thinking, characterized by paying attention to the context and the relationships therein (Nisbett et al., 2001), is associated with collectivistic culture, whereas analytical thinking, that is building formally logical arguments and focusing on the main object of interest, is more common in individualistic cultures (Varnum et al., 2010). People from different cultures also seem to vary in how much focus they direct to certain information. Elliot et al. (2001) document that Koreans, Asian Americans, and Russians are more concerned with avoiding losses than their European American counterparts when setting goals. Therefore, avoiding threats or negative outcomes seems to be more pronounced in East Asian cultures than among Western ones (Hamamura et al., 2009).

Cultural differences were also found to impact the salience of overconfidence (Yates et al., 1998; Yates et al., 1997). On the one hand, past research has found that individuals from Confucian Asian countries (including Singapore, Taiwan, Hong Kong, and South Korea) display higher overconfidence bias than their North American peers (Yates et al., 1998). The same effect of higher levels of overconfidence in Eastern cultures were also found when comparing Turkish with American business students (Whitcomb et al., 1995). On the other hand, Morony et al. (2013) point out that Confucian Asians inhibit lower levels of overconfidence than people from European countries. Moore et al. (2018) also report mixed results, finding higher confidence in the accuracy of estimates in their collectivist participants in one study and higher confidence in the accuracy of estimates in the individualistic subsample in another study. Chui et al. (2010) argue that individualism is related to overconfidence, as individualistic people tend to put more focus on their own strengths, since they learn to think about themselves as above average when growing up, introducing overconfidence bias (Heine et al., 1999; Markus & Kitayama, 1991). To sum up, there seems to be no consensus in past

research that establishes the direction of the effect between culture and the level of overconfidence.

More specifically though, a stream of literature provides evidence that a relationship between culture and risk-taking exists in a corporate setting. A study in the banking sector by Kanagaretnam et al. (2014) argues that highly individualistic countries reward risk-taking and that the higher levels of overconfidence in these countries will lead to less conservative and more volatile corporate earnings. Moreover, the authors also include the uncertainty avoidance dimension in their study, which they show to be positively associated with financial reporting conservatism and negatively correlated with risk-taking. Gaganis et al. (2019) confirm the positive relationship between individualism and risk-taking and the negative link between uncertainty avoidance and risk-taking in their study covering the insurance industry. They also find that high scores for uncertainty avoidance damper risk-taking behaviour. The direct effect of individualism on corporate investment has also been investigated, with Shao et al. (2013) finding higher R&D investments at firms in individualistic countries, which they explain through the channel of risk-taking.

Now that I have established that decision-making and risk-taking varies between cultures and overconfidence seems to be influenced by the cultural environment (even though scholars disagree on the direction of the effect), the next section is going to deal with culture as a boundary condition in the CEO overconfidence – strategic risk-taking relationship.

Culture as Managerial Discretion in Corporate Decision-Making

Contributions in the literature stream of UET (e.g., Chatterjee & Hambrick, 2007; Finkelstein & Hambrick, 1990; Hambrick & Mason, 1984; Hambrick et al., 1996) have analysed multiple top management team or executive characteristics that influence organizational outcomes. To understand the factors that limit or enable managers to steer the course of action in a firm, Hambrick & Finkelstein (1987) introduced the concept of managerial discretion that described the latitude of action a corporate manager has in making decisions. Higher levels of managerial discretion, therefore, allow CEOs to have greater influence in decisions that subsequently affect performance (Hambrick & Quigley, 2014). Managerial discretion may arise from the environment, the organisation, and the individual (Hambrick & Finkelstein, 1987), with a large body of research focusing on the industry specifics that shape managerial discretion (Wangrow et al., 2015).

Crossland & Hambrick (2007) were the first to make the case that even macro-environments, such as national institutions, matter in determining managerial discretion. In their study, they found that, among other factors, differences in cultural values could explain the variance of the "CEO effect", i.e. in how far a CEO matters for performance, across the U.S., Japan, and Germany. In their view, the cultural context that senior executives act in is relevant, since it prescribes social norms and expectations. Cultural values, in this sense, create a set of accepted behaviours (Hambrick & Finkelstein, 1987), and behaviours that do not fall within those boundaries may be objected, limiting the discretion of executives (Crossland & Hambrick, 2011).

Individualism is one such dimension that affects managerial discretion. This is due to the fact that unilateral decision-making by senior management is accepted in individualistic cultures (Crossland & Hambrick, 2007). Contrastingly, collectivist cultures expect group consultation and consensus-based decision-making, which limits an executive's leeway in making unilateral decisions (Crossland & Hambrick, 2011). The studies conducted by Crossland & Hambrick (2007, 2011) also find that uncertainty avoidance is a facet of managerial discretion. High uncertainty avoiding cultures tend to be risk-averse and resistant to change (House et al., 2004), constraining executives in their ability to pursue risky strategies, while low uncertainty avoiding cultures may not classify such actions as radically unconventional (Crossland & Hambrick, 2007, 2011).

Based on these findings, I developed the following hypothesis:

> H2: The CEO Overconfidence – strategic risk-taking relationship is moderated by individualism, with the relationship being more pronounced in highly individualistic cultures.
>
> H3: The CEO Overconfidence – strategic risk-taking relationship is moderated by uncertainty avoidance, with the relationship being weaker in highly uncertainty avoiding cultures.

3. Methods

I investigated the previously stated hypotheses by analysing existing datasets. To construct this thesis' dataset, information on executives was obtained from BoardEx (Boardex, 2025), and accounting data were gathered from Compustat (Compustat, 2025). While BoardEx offers executive level information, Compustat provides firm-level financial data. I started with the Organization Summary – Composition of Officers, Directors, and Senior Managers dataset in BoardEx Europe and filtered to only include observations that contain the keyword "CEO" in their role variable and simultaneously are classified as executive directors in the seniority variable. This is in line with Wharton Research Data Services' guideline to extract data on CEOs (Wharton Research Data Services, n.d.). I expanded this dataset to arrive at a firm-year structure. If there were multiple observations per firm-year, I kept the director that is also Chairman of the firm. If none of the directors also serves as Chairman, I took the one with the highest tenure in the firm. This dataset was then used to merge the rest of the variables onto it.

To conduct the study, I had to collect information on CEO overconfidence, strategic risk-taking, cultural dimensions, total assets, property, plants, and equipment per employee (PPE/Employee), cash holdings, operating income, leverage, revenue, and CEO tenure. I proxied CEO overconfidence using two operationalisations of that variable. First, I employed a method developed in the seminal work of Malmendier & Tate (2005a), that aims to infer CEO overconfidence from the stock option exercise behaviour of the executives. Second, I followed Li & Zhang (2022) and used an indicator of CEO personal characteristics that incorporates their age, gender, education, background, and duality status, all of which are related to overconfidence. Strategic risk-taking was also measured in two instances, which are capital expenditures (CAPEX) scaled by total assets and research and development (R&D) expenses scaled by total assets. I included the following as other explanatory variables that act as controls: Cash expressed as a ratio to total assets, capital intensity expressed as the ratio of property, plants, and equipment to number of employees (PPE/Employees), Return on Assets (ROA) expressed as the ratio of operating income before depreciation to total assets, leverage as the ratio of the sum of short-term debt and long-term debt to total assets, revenue as the net revenues of the firm in a given year, and revenue growth as revenue divided by prior year revenue minus one. All numeric values were transformed to Euro currency using the annual average foreign exchange rates. To reduce the effects of outliers, the numerical data was winsorised at the 1% and 99% levels. The model, therefore, aligns closely with Hirshleifer et al. (2012), with the

caveat that I was unable to access market data to obtain information on Tobin's Q and stock return. Table 1 below lists all collected variables and includes their source.

Table 1. Data Sources

Variable	Description	Source
Independent Variables		
CEO Overconfidence (options)	Indicator based on stock-option holding behaviour of CEOs	BoardEx
CEO Overconfidence (demographic)	Indicator based on personal characteristics, i.e. age, gender, education, professional background, and CEO/Chairman duality	BoardEx
Collectivism	GLOBE societal values collectivism (in-group)	GLOBE 2004
Uncertainty Avoidance	GLOBE societal values uncertainty avoidance	GLOBE 2004
Dependent Variables		
R&D Expenses	R&D scaled by total assets	Compustat
Capital Expenditures	CAPEX scaled by total assets	Compustat
Control Variables		
Sales	Sales of the firm each year	Compustat
PPE/Employees	Plant, property, and equipment divided by number of employees	Compustat
Sales Growth	Sales each year divided by prior-year sales minus 1	Compustat
ROA	Ratio of operating income before depreciation to total assets	Compustat
Book Leverage	Sum of long-term and short-term debt in relation to total assets	Compustat
Cash	Ratio of cash holdings to total assets	Compustat
CEO Tenure	Years of tenure in the firm of the CEO	BoardEx

Measuring CEO Overconfidence

To measure CEO overconfidence, I employed two distinct methodologies. First, I followed Li & Zhang (2022) who link overconfidence to individual attributes of CEOs such as their age, gender, formal education attainment, professional background, and whether they also serve as Chairman in the company that they lead. The indicators are set up as follows: If the CEOs age

is below the mean age of the sample, the age indicator equals 1, and 0 otherwise. If the CEO is male, the gender indicator is set to 1, and 0 otherwise. If the CEO holds a master's degree or above or an MBA, the education indicator is set to 1, and 0 otherwise. For the education indicator, I slightly deviate from Li and Zhang's (2022) operationalisation, as they only require CEOs to hold bachelor's degrees or above. In my sample, however, almost all executives hold a degree or have graduated. If the CEO has obtained education in business, management or law, the background indicator equals 1, and 0 otherwise. Lastly, if the CEO also holds the position of Chairman, the CEO duality indicator is set to 1, and 0 otherwise. As is done in Li & Zhang (2022), I consider a CEO to be overconfident if the sum of these five variables is 4 or above.

Table 2 lists descriptive statistics on the CEO-level variables that were used to produce the demographic measure of CEO overconfidence.

Table 2. Demographic CEO Overconfidence Variable Composition

Variable	**Non-Confident (*N* = 26,371)**	**Overconfident (*N* = 7,062)**	**Overall (*N* = 33,433)**
Tenure			
Mean (*SD*)	11.7 (7.27)	11.6 (7.23)	11.7 (7.26)
Median [*Min, Max*]	10.0 [2.00, 36.0]	10.0 [2.00, 36.0]	10.0 [2.00, 36.0]
Director Age			
Mean (*SD*)	54.3 (8.23)	48.8 (7.18)	53.1 (8.33)
Median [*Min, Max*]	55.0 [24.0, 95.0]	49.0 [24.0, 80.0]	53.0 [24.0, 95.0]
Gender			
F	1,012 (3.8%)	75 (1.1%)	1,087 (3.3%)
M	25,359 (96.2%)	6,987 (98.9%)	32,346 (96.7%)
Education Indicator			
0	15,804 (59.9%)	137 (1.9%)	15,941 (47.7%)
1	10,567 (40.1%)	6,925 (98.1%)	17,492 (52.3%)
Background Indicator			
0	22,847 (86.6%)	1,552 (22.0%)	24,399 (73.0%)
1	3,524 (13.4%)	5,510 (78.0%)	9,034 (27.0%)
CEO Duality			
0	16,886 (64.0%)	2,511 (35.6%)	19,397 (58.0%)
1	9,485 (36.0%)	4,551 (64.4%)	14,036 (42.0%)

Note: Education indicator: 1 = The BoardEx qualification variable indicates education that is at or above graduate level (Master's degree, MBA, PhD, L.L.M., Doctorate, Doctor of Law, and Dipl. Ing.), 0 = otherwise. Background indicator: 1 = The BoardEx qualification variable indicates professional education (MBA, CPA, Law Degrees, Executive Programs, Accountants, and

Management Degrees), 0 = otherwise. CEO duality, 1 = The BoardEx duality variable indicates that the CEO is also Chairman of the board, 0 = otherwise.

Second, I make use of the methodology developed by Malmendier & Tate (2005a), and for my specification I follow the adaptations put forth by Leng et al. (2015). Malmendier & Tate (2005a) argue that overconfident CEOs are excessively exposed to the risks that the companies they lead face. Since they receive large parts of their compensation in the form of stock-option plans, their personal wealth is largely tied to firm performance (Malmendier & Tate, 2005a). In the absence of hedging opportunities, CEOs are therefore under-diversified, so risk-averse CEOs should exercise their options early if they exceed a certain profitability threshold (Hall & Murphy, 2000, 2002; Lambert, Larcker & Verrecchia, 1991; Meulbroek, 2001). Overconfident CEOs, however, subjectively estimate abnormally high future returns of their investment projects. Believing in ever-rising stock prices under their leadership, overconfident CEOs delay exercising their options to take even higher profits from their variable compensation contracts (Malmendier & Tate, 2005a). Based on the framework of Hall & Murphy (2002), Malmendier & Tate (2005a) calibrate individual option packages to arrive at an in-the-money threshold of 67% for which newly vested options should be exercised by rational CEOs. Option moneyness can be thought of the profitability of option packages once exercised. To be classified as overconfident in my sample, a certain CEO needs to exhibit this behaviour (i.e. option moneyness $\geq 67\%$ and option is not exercised in the year of vesting) once and is classified as overconfident for the sample period, aligning with the idea that overconfidence as a trait is consistent across time (Hirshleifer et al., 2012). When constructing the stock-option based variable, an overconfident CEO exhibited the behaviour of holding deep in-the-money stock options without exercising them during or after the vesting year roughly three times, on average.

This stock-option based measure was calculated using BoardEx Europe (Boardex, 2025) data. As Leng et al. (2015) have argued, this dataset allows a fine-grained approach to studying the phenomenon of overconfidence in CEOs since it provides data on individual option packages, rather than Compustat's annual averages. I followed Leng et al. (2015) and started with the *Accumulated Wealth – Options* dataset in BoardEx to construct the overconfidence measure. I calculated the in-the-money percentage by subtracting the exercise price from the stock price and dividing the difference by the exercise price of the option package (Leng et al., 2015). If an option did not appear as expired in the annual statement, I assume it was exercised (Leng et al.,

2015). Overconfident CEOs were therefore classified as such if they fail to exercise deep in-the-money options during or after the year of vesting.

A breakdown of the demographics was also added for the stock-option based CEO overconfidence measure. See Table 3 below.

Table 3. Breakdown of Demographic Variables by Overconfidence (stock options)

Variable	Non-Confident (*N* = 2,450)	Overconfident (*N* = 791)	Overall (*N* = 3,241)
Tenure			
Mean (*SD*)	13.8 (7.99)	15.4 (7.03)	14.2 (7.80)
Median [*Min, Max*]	12.0 [2.00, 36.0]	15.0 [2.00, 32.0]	13.0 [2.00, 36.0]
Director Age			
Mean (*SD*)	54.4 (7.32)	54.9 (7.72)	54.6 (7.43)
Median [*Min, Max*]	55.0 [26.0, 83.0]	55.0 [30.0, 77.0]	55.0 [26.0, 83.0]
Gender			
F	8 (0.3%)	21 (2.7%)	29 (0.9%)
M	2,442 (99.7%)	770 (97.3%)	3,212 (99.1%)
Education Indicator			
0	1,238 (50.5%)	388 (49.1%)	1,626 (50.2%)
1	1,212 (49.5%)	403 (50.9%)	1,615 (49.8%)
Background Indicator			
0	1,939 (79.1%)	556 (70.3%)	2,495 (77.0%)
1	511 (20.9%)	235 (29.7%)	746 (23.0%)
CEO Duality			
0	1,382 (56.4%)	461 (58.3%)	1,843 (56.9%)
1	1,068 (43.6%)	330 (41.7%)	1,398 (43.1%)

Note: Education indicator: 1 = The BoardEx qualification variable indicates education that is at or above graduate level (Master's degree, MBA, PhD, L.L.M., Doctorate, Doctor of Law, and Dipl. Ing.), 0 = otherwise. Background indicator: 1 = The BoardEx qualification variable indicates professional education (MBA, CPA, Law Degrees., Executive Programs, Accountants, and Management Degrees), 0 = otherwise. CEO duality, 1 = The BoardEx duality variable indicates that the CEO is also Chairman of the board, 0 = otherwise.

Measuring Strategic Risk-Taking

The outcome variable of interest is strategic risk-taking, which was operationalized in two separate ways. First, with research and development expenses, and second, with capital expenditures. R&D expenses capture innovation-related input resources that are deployed in a

strategic manner and have unusually high uncertainties and risks attached (Li & Tang, 2010). Since firms are not required by law to publish their R&D expenses, there are many missing values. In contrast, capital expenditures are not necessarily innovation-related, but they account for the investment behaviour of a firm and ultimately, its CEO. Following Malmendier & Tate (2005a), I scaled capital expenditures by total assets. I did the same for the R&D variable, as is done in Hirshleifer et al. (2012).

Measuring Culture

The culture variables that act as moderators are derived from the GLOBE research project. The GLOBE 2004 project is one of the most influential studies in the field of social science that shapes our understanding of culture and leadership theory (GLOBE, n.d.). Condensing data from more than 17,000 middle managers across 951 organizations in 62 societies, GLOBE has found nine cultural dimensions that are scored on a scale from one to seven. (House et al., 2004). In the original dataset, though, the societal values scores for in-group collectivism and uncertainty avoidance range from 4.06 to 6.52 and 3.16 to 5.61, respectively. As my review of the literature demonstrates, the individualism-collectivism and uncertainty avoidance dimensions matter in the context of CEO strategic behaviour and may put constraints on their field of action. I used the GLOBE values variables that reflect the culture as it should be. Furthermore, I used the in-group collectivism scores to proxy collectivism, since they more closely reflect attitudes of individuals (House et al., 2004). To add GLOBE culture data to the BoardEx dataset, I matched via the location of a company headquarter office. This is in line with previous research that argues that headquarter location influences the way in which people work through assimilation (Ferris et al., 2013). This way, I was able to match cultural dimension variables to 20 countries that were present in my dataset. I assigned British territories such as Gibraltar, Guernsey, the Isle of Man, and Jersey the cultural values of Great Britain. As Germany's cultural values are reported separately for former West Germany and East Germany, I took an average.

The following analysis consisted of the following steps. First, bivariate correlations between all variables are displayed. Then, simple regression models are shown using the main variables of interest, i.e. CEO overconfidence, strategic risk-taking, and culture. To check those results for robustness, a more comprehensive model was tested, including the previously introduced variables as additional controls. The multivariate regression model was specified following Hirshleifer et al.'s (2012) approach, with a few adaptations. Due to data availability issues, I

omitted stock return and Tobin's Q variables. To study H2 and H3, I added culture variables to test the moderation effect.

The sample analysed in this thesis consists of European firms during the time period of December 2000 to December 2023. Since I had two panels, one per operationalisation of CEO overconfidence, I present those separately for CEO overconfidence measured by personal characteristics and for observations where CEO overconfidence was measured by stock option behaviour. The dataset including the demographic overconfidence measure has 33,433 observations, includes 4,990 unique board members, and 3,276 unique firms in 36 countries. The dataset with the stock-option based overconfidence measure has 3,241 observations, includes 368 unique board members, and 325 unique firms in 17 countries. Regressions including the cultural variables reduced the number of countries due to data availability.

4. Results

Descriptive Statistics, Correlations and Mean Comparisons

Table 4 shows the descriptive statistics for all numeric variables used in the further analysis. My demographic overconfidence indicator classified 7,062 out of 33,433 (approximately 21%) director-firm-years as overconfident, leaving 26,371 observations that were classified as non-overconfident. The stock-option based CEO overconfidence variable categorised 791 observations out of 3,241 (approximately 24%) total datapoints as overconfident.

Table 4. Descriptive Statistics

Variable	***N***	***Mean***	***SD***	***Min***	***P25***	***Median***	***P75***	***Max***
Year	33,433	2013.11	6.52	2000	2008	2014	2019	2023
PPE/Employees	22,756	167.15	501	0.6	16.09	40.69	91.36	3,823.64
Cash	28,633	0.12	0.14	0	0.03	0.08	0.15	0.76
ROA	28,767	0.07	0.14	-0.67	0.03	0.08	0.13	0.38
Leverage	23,420	0.5	0.21	0.05	0.36	0.5	0.62	1.3
Revenue	28,974	3,933.79	10,806.23	0	82.96	445.29	2302.27	72,665.08
Tenure	33,433	11.68	7.26	2	6	10	16	36
R&D	11,704	6.4	10.81	0	0.64	2.41	7.18	66.59
CAPEX	22,653	4.32	4.34	0.05	1.43	3.07	5.63	24.37
Revenue Growth	26,141	0.16	0.74	-1	-0.04	0.06	0.18	5.68
UA	30,184	4.02	0.51	3.16	3.63	4.02	4.43	5.09
Collectivism	30,184	5.48	0.3	4.06	5.2	5.42	5.72	6.04

Table 7 presents a correlation matrix using Pearson coefficients for all variables that were subsequently added to the regression models. The variable that measures strategic risk taking as R&D expenses scaled by total assets did not show a statistically significant association with the demographic CEO overconfidence dummy. However, capital expenditures scaled by total assets were positively correlated with CEO overconfidence, and this correlation was significant at the 1% level. This shows that CEO overconfidence is related to higher corporate capital investments, but not innovation-related investments.

A comparison of average values for R&D expenses and capital expenditures, however, showed that overconfident CEOs seem to significantly invest more in terms of both measures than their non-overconfident peers ($p < .01$ and $p < .001$, respectively). Table 5 lists descriptive statistics

for all variables used in the following regression models for overconfident and non-overconfident CEOs, separately for both variable measurements. Economically speaking, overconfident CEOs increase their R&D expense ratios and capital expenditure ratios by 0.73% and 0.43%, respectively.

Table 5. Descriptive Statistics by CEO Overconfidence Group (demographic)

Variable	**OC = 0 (*N* = 26,371)**	**OC = 1 (*N* = 7,062)**	***p***
R&D/Assets	6.25 (10.65)	6.98 (11.40)	.003
Capex/Assets	4.23 (4.30)	4.66 (4.48)	< .001
Total assets	13,870.03 (50,052.95)	13,125.50 (53,110.44)	.308
PPE per employee	168.31 (498.59)	162.83 (509.99)	.501
Cash/Assets	0.12 (0.14)	0.13 (0.15)	< .001
Return on assets (ROA)	0.07 (0.14)	0.06 (0.16)	< .001
Leverage	0.50 (0.21)	0.50 (0.24)	.607
Revenue	4,090.00 (11,107.03)	3,350.21 (9,577.78)	< .001
Revenue growth	0.16 (0.72)	0.19 (0.79)	.003
CEO tenure (years)	11.69 (7.27)	11.63 (7.23)	.547
Collectivism = 1 (% yes)	10,239 (42.8%)	2,026 (32.3%)	< .001
Uncertainty avoidance = 1 (% yes)	12,038 (50.4%)	3,035 (48.3%)	.004

Table 6 below lists descriptive statistics in terms of the option-based overconfidence classification.

Table 6. Descriptive Statistics by CEO Overconfidence Group (stock options)

Variable	**OC = 0 (*N* = 2,450)**	**OC = 1 (*N* = 791)**	***p***
R&D/Assets	5.75 (10.90)	4.67 (5.15)	.084
Capex/Assets	4.08 (3.72)	4.52 (3.78)	.015
Total assets	30,922.71 (75,256.66)	17,377.30 (48,146.08)	< .001
PPE per employee	113.83 (262.72)	111.04 (289.49)	.828
Cash/Assets	0.10 (0.12)	0.12 (0.12)	< .001
Return on assets (ROA)	0.08 (0.12)	0.12 (0.08)	< .001
Leverage	0.51 (0.19)	0.51 (0.17)	.877
Revenue	10,724.68 (17,362.69)	8,959.37 (13,014.47)	.015
Revenue growth	0.12 (0.67)	0.12 (0.47)	.953
CEO tenure (years)	13.80 (7.99)	15.38 (7.03)	< .001
Collectivism = 1 (% yes)	824 (35.7%)	211 (27.3%)	< .001
Uncertainty avoidance = 1 (% yes)	1,405 (60.8%)	424 (54.8%)	.003

Table 7. Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. R&D/Assets	1.00													
2. Capex/Assets	**-0.12**	1.00												
3. Total Assets	**-0.13**	0.02	1.00											
4. PPE/Employees	**-0.12**	**0.21**	**0.02**	1.00										
5. Cash	**0.45**	**-0.14**	**-0.13**	**-0.10**	1.00									
6. ROA	**-0.60**	**0.16**	**-0.03**	**0.03**	**-0.28**	1.00								
7. Leverage	0.00	-0.01	**0.03**	**0.02**	**-0.20**	**-0.09**	1.00							
8. Revenue	**-0.15**	**0.03**	**0.65**	**0.05**	**-0.13**	**0.06**	**0.06**	1.00						
9. Revenue Growth	**0.13**	**0.05**	**-0.03**	**0.03**	**0.09**	**-0.02**	**-0.05**	**-0.03**	1.00					
10. Tenure	-0.02	**-0.02**	**-0.07**	**-0.08**	**-0.03**	**0.11**	-0.01	**-0.05**	**-0.05**	1.00				
11. CEO OC (demographic)	0.03	**0.04**	-0.01	0.00	**0.04**	**-0.04**	0.00	**-0.03**	0.02	0.00	1.00			
12. CEO OC (options)	-0.05	**0.05**	**-0.08**	0.00	**0.07**	**0.13**	0.00	**-0.05**	0.00	**0.09**	0.02	1.00		
13. Collectivism	**-0.04**	-0.01	0.01	**0.08**	**-0.08**	**0.03**	**0.04**	**-0.06**	0.02	**-0.02**	**-0.09**	**-0.14**	1.00	
14. UA	**-0.07**	**0.06**	**0.04**	**0.10**	**-0.06**	0.02	**0.14**	0.02	0.00	**0.06**	**-0.03**	**-0.07**	**0.52**	1.00

Note: OC is the abbreviation for overconfidence. UA is the abbreviation for uncertainty avoidance. $\mathbf{p < 0.001}$, $p < 0.01$, $\mathbf{p < 0.05}$

Regression Models

CEO Overconfidence and Strategic Risk-Taking

To test H1, i.e. the relationship between CEO overconfidence and strategic risk-taking, a series of regression models was developed, using both measures of CEO overconfidence, the demographic one and the stock option based one, as well as both measures of strategic risk-taking, R&D expenses and capital expenditures. All independent variables were lagged by one year (as in Hirshleifer et al., 2012), and the numeric control variables were standardized to have mean of 0 and standard deviation of 1. All regressions included year fixed-effects and industry fixed-effects based on the sectors reported by BoardEx. Standard errors were clustered at the firm level. Table 8 shows simple (Models 1.1 and 1.2) and multivariate (Models 1.3 and 1.4) regressions using capital expenditures as the dependent variable.

Table 8. CEO Overconfidence and Capex

Dependent Variable = Capital Expenditures/Total Assets (%)				
	(1.1)	(1.2)	(1.3)	(1.4)
OC (demographic)	0.38**		0.48***	
	(0.16)		(0.16)	
OC (options)		0.30		-0.16
		(0.38)		(0.32)
PPE/Employees			0.45***	3.12***
			(0.13)	(0.69)
Cash			0.01	0.30*
			(0.07)	(0.17)
ROA			0.67***	1.01***
			(0.09)	(0.17)
Leverage			-0.09	0.19
			(0.07)	(0.14)
Revenue			-0.18***	-0.33**
			(0.05)	(0.17)
Revenue Growth			0.20***	-0.10
			(0.06)	(0.11)
Tenure			-0.03	0.02
			(0.07)	(0.14)
N	20,752	2,290	15,521	1,743

Dependent Variable = Capital Expenditures/Total Assets (%)				
	(1.1)	(1.2)	(1.3)	(1.4)
Adjusted R^2	.14	.22	.18	.40

Note: *$p < .1$; **$p < .05$; ***$p < .01$

In the univariate regression models, CEO overconfidence measured with the demographic approach showed a statistically significant positive impact on capital expenditures ($p < .05$), whereas the option-based CEO overconfidence measure showed no statistically significant relationship. Model 1.1 showed that overconfidence among CEOs approximately leads to an approximate 0.4% increase in capital expenditures scaled by assets. Models 1.3 and 1.4 added control variables following Hirshleifer et al. (2012). Again, the demographic CEO overconfidence displayed a highly significant impact on capital expenditures, whereas the stock-option based measure of CEO overconfidence remained insignificant. Upon adding the controls in Model 1.3, the CEO overconfidence coefficient obtained a descriptively larger effect size and displayed higher statistical significance ($p < .01$). These results suggest that CEO overconfidence, as measured by individual characteristics of the CEO, positively affects strategic risk-taking proxied by capital expenditures, which is in line with H1.

Table 9 takes R&D/Assets as the dependent variable. The model specification stayed the same. None of the model specifications showed a significant relationship between CEO overconfidence and R&D intensity.

Table 9. CEO Overconfidence and R&D Spending

Dependent Variable = R&D/Assets (%)				
	(2.1)	(2.2)	(2.3)	(2.4)
OC (demographic)	0.61		-0.13	
	(0.52)		(0.42)	
OC (options)		-1.56		-0.03
		(1.46)		(1.30)
PPE/Employees			-0.15	-1.68
			(0.12)	(1.22)

Dependent Variable = R&D/Assets (%)				
	(2.1)	(2.2)	(2.3)	(2.4)
Cash			2.00***	1.53*
			(0.27)	(0.85)
ROA			-2.87***	-2.50**
			(0.35)	(0.97)
Leverage			-0.01	-0.74
			(0.29)	(0.71)
Revenue			-0.26***	-0.11
			(0.1)	(0.25)
Revenue Growth			0.24	0.09
			(0.18)	(0.29)
Tenure			0.24	-0.19
			(0.19)	(0.58)
N	10,887	1,334	8,829	1,087
Adjusted R^2	.31	.39	.45	.47

Note: *$p < .1$; **$p < .05$; ***$p < .01$

In summary, these results suggest that CEO overconfidence, as measured by the individual characteristics of CEOs, is positively related to capital expenditures scaled by total assets, whereas there is no significant relationship between CEO overconfidence and R&D expenses. These findings partially support H1, since they are contingent on the operationalisation of strategic risk-taking.

CEO Overconfidence, Strategic Risk-Taking, and the Moderating Effect of Culture

To test whether cultural values impact the strength between the relationship of CEO overconfidence and strategic risk-taking, cultural main effects and interaction terms between CEO overconfidence and the measures for the cultural variables of interest, i.e. collectivism and uncertainty avoidance, were introduced to the regression equation. Table 10 shows models regressing capital expenditures on both CEO overconfidence indicators, respectively, and the cultural dimensions simultaneously, controlling for the previously introduced additional explanatory variables.

Table 10. CEO Overconfidence, Capex, and Culture

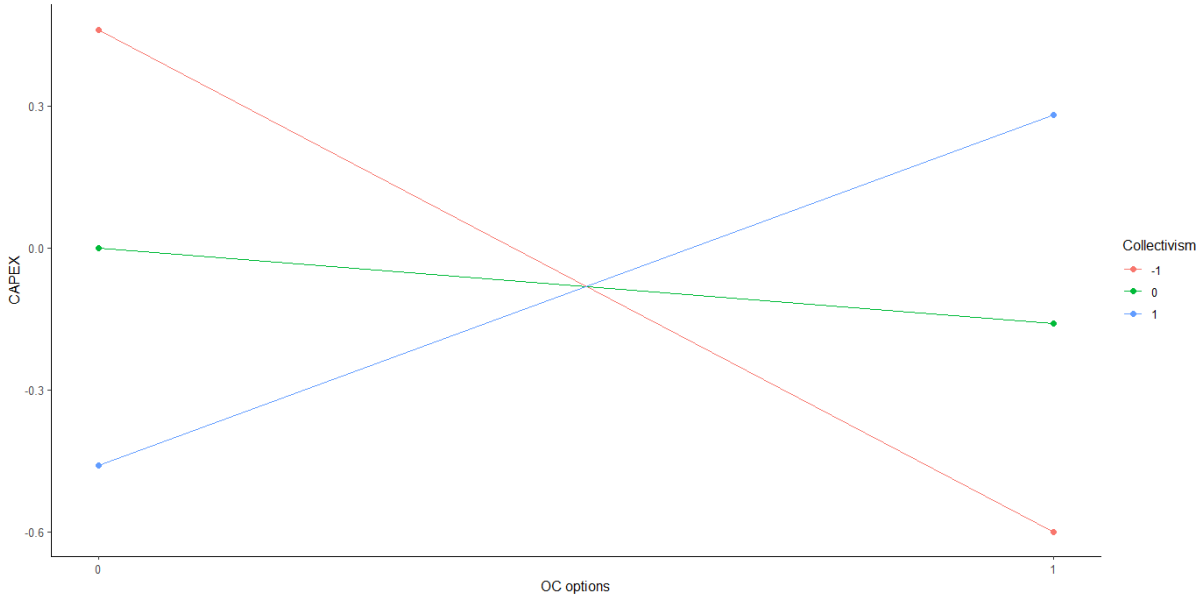
Dependent Variable = Capital Expenditures/Assets (%)				
	(3.1)	(3.2)	(3.3)	(3.4)
OC (demographic)	0.34**	0.52***		
	(0.16)	(0.17)		
OC (options)			0.31	-0.16
			(0.39)	(0.35)
Collectivism	-0.28***	-0.33***	-0.29*	-0.46***
	(0.11)	(0.11)	(0.17)	(0.17)
UA	0.24**	0.09	0.19	0.50***
	(0.11)	(0.11)	(0.19)	(0.19)
OC (demographic) * Collectivism	0.06	0.10		
	(0.17)	(0.17)		
OC (demographic) * UA	0.14	0.32		
	(0.22)	(0.21)		
OC (options) * Collectivism			1.63**	0.90*
			(0.75)	(0.48)
OC (options) * UA			-0.36	-0.54
			(0.52)	(0.37)
PPE/Employees		0.47***		2.54***
		(0.13)		(0.65)
Cash		0.01		0.29*
		(0.07)		(0.16)
ROA		0.66***		0.99***

Dependent Variable = Capital Expenditures/Assets (%)				
	(3.1)	(3.2)	(3.3)	(3.4)
		(0.09)		(0.17)
Leverage		-0.09		-0.02
		(0.08)		(0.14)
Revenue		-0.19***		-0.35*
		(0.06)		(0.19)
Revenue Growth		0.21***		-0.03
		(0.07)		(0.11)
Tenure		-0.04		-0.04
		(0.07)		(0.13)
N	19,168	14,301	2,155	1,647
Adjusted R^2	.14	.18	.28	.43

Note: *$p < .1$; **$p < .05$; ***$p < .01$

Models 3.1 and 3.2 showed a significant positive effect of CEO overconfidence on capital expenditures. In countries that are classified as collectivistic, capital expenditures scaled by total assets decreased, on average, and this effect was significant across all models. Uncertainty avoidance was significantly positively related to capital expenditures in Model 3.1 and 3.4 at $p < .05$ and $p < .01$, respectively. The positive interaction effect between CEO overconfidence and collectivism was insignificant in Model 3.1 and Model 3.2, but turned significant ($p < .05$ and $p < .1$) when using the option-based measure for CEO overconfidence. Contrary to what was put forth in H2, the interpretation of this effect is that overconfident CEOs invest more in terms of capital expenditures the higher a culture scores on collectivism. The interaction effect of CEO overconfidence and uncertainty avoidance produced no statistically significant result across all models, suggesting that this factor is irrelevant in explaining variations in capital expenditures. To investigate the interaction effects more closely if they were significant, I plotted the relationships between capital expenditures and collectivism manipulated by the overconfidence group. Figure 1 displays this relationship for the coefficients on the previously mentioned main variables for Model 3.4, which is the model measuring overconfidence via the stock option-based proxy and including controls.

Figure 1. Interaction Effect between OC (options) and Collectivism in Model 3.4



Note: OC = 1 refers to the group of overconfident CEOs, whereas OC = 0 captures non-overconfident CEOs.

As Figure 1 shows, the relationship between capex and overconfidence is negative in individualistic cultures and positive for collectivistic cultures. At the mean level for collectivism in the sample, non-overconfident CEOs actually spend more in terms of capex than their overconfident counterparts.

Now for the next regression models, the dependent variable was set to research and development expenditures scaled by total assets. Table 11 displays the results in a similar fashion as did the previous one.

Table 11. CEO Overconfidence, R&D Spending, and Culture

Dependent Variable = R&D/Assets (%)				
	(4.1)	(4.2)	(4.3)	(4.4)
OC (demographic)	0.47	-0.16		
	(0.57)	(0.46)		
OC (options)			-2.22	-0.50
			(1.70)	(1.61)

Dependent Variable = R&D/Assets (%)				
	(4.1)	(4.2)	(4.3)	(4.4)
Collectivism	0.19	0.46	-2.30**	-1.90**
	(0.38)	(0.32)	(1.11)	(0.83)
UA	-1.19***	-1.30***	1.61	1.56
	(0.38)	(0.32)	(1.12)	(1.01)
OC (demographic) * Collectivism	-1.32**	-1.02**		
	(0.59)	(0.44)		
OC (demographic) * UA	1.56**	1.22**		
	(0.76)	(0.61)		
OC (options) * Collectivism			0.21	1.29
			(1.70)	(1.73)
OC (options) * UA			-1.30	-1.95
			(1.44)	(1.40)
PPE/Employees		0.00		-1.13
		(0.11)		(1.39)
Cash		2.04***		1.30*
		(0.29)		(0.76)
ROA		-2.95***		-2.44***
		(0.35)		(0.92)
Leverage		0.13		-0.88
		(0.31)		(0.82)
Revenue		-0.31***		-0.40
		(0.11)		(0.32)
Revenue Growth		0.18		0.04
		(0.18)		(0.27)
Tenure		0.31		-0.55
		(0.20)		(0.63)
N	10,162	8,223	1,275	1,041
Adjusted R^2	.31	.45	.41	.49

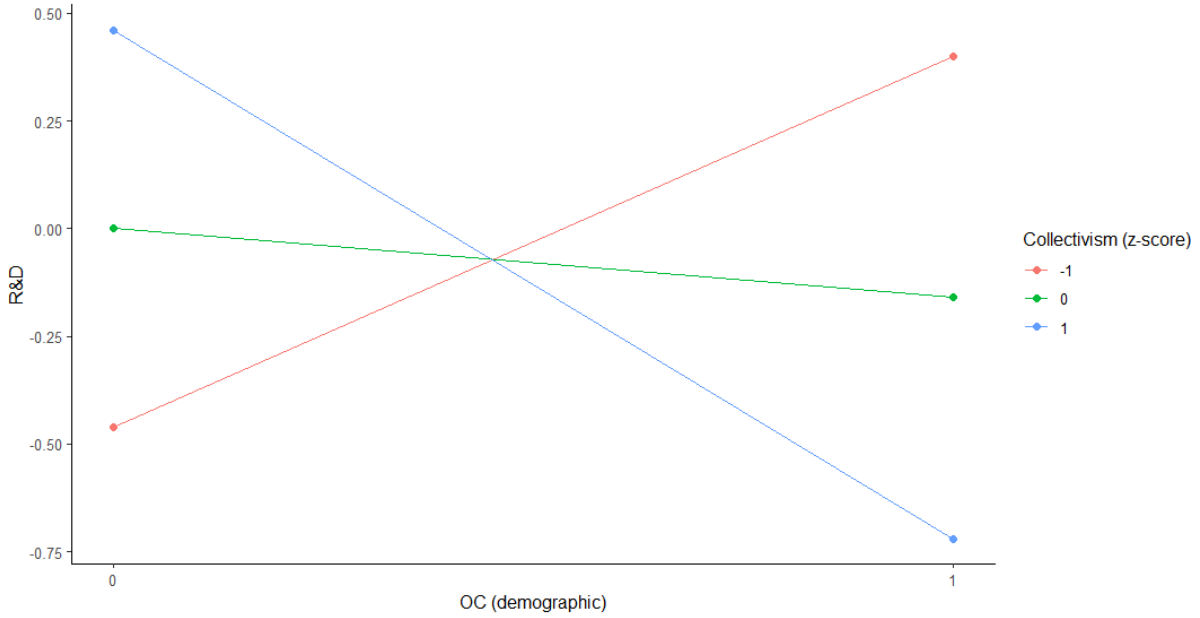
Note: *$p < .1$; **$p < .05$; ***$p < .01$

As was the case when testing the main effect of CEO overconfidence on R&D spending, I found no significant result for this relationship in any of the models displayed above. Collectivism showed a negative ($p < .05$) relation to R&D spending in the models using the option-based CEO overconfidence variable, whereas uncertainty avoidance was negatively ($p < .01$) related to R&D investment for the demographic CEO overconfidence measure. The interaction effects

produced significant coefficients ($p < .05$) in Model 4.1 and Model 4.2. First, the interaction between CEO overconfidence and collectivism was negative and significant across model specification when using the demographic overconfidence variable. This is in line with the prediction in H2 that CEO overconfidence is dampened in collectivist cultures. In contrast to H3, however, overconfident CEOs tend to invest more in terms of R&D when the culture that the company is headquartered in is characterized by a higher degree of uncertainty avoidance.

Similarly to the previous regression output table, I further investigated the significant interaction effects and plotted the relationships between R&D and the culture variables by overconfidence group for the coefficients on the three variables of interest in the regression models that include control variables. Figure 2 shows the significant interaction effect between overconfidence (demographic) and collectivism in Model 4.2.

Figure 2. Significant Interaction between OC (demographic) and Collectivism in Model 4.2

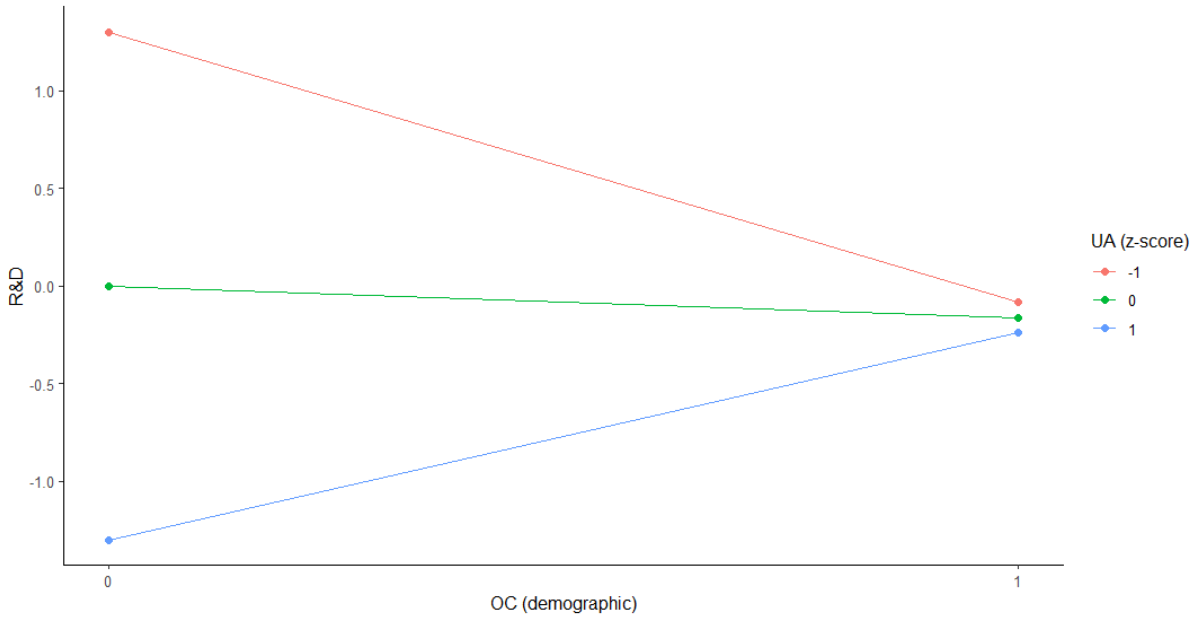


Note: OC = 1 refers to the group of overconfident CEOs, whereas OC = 0 captures non-overconfident CEOs.

Figure 2 shows that overconfident CEOs tended to invest less in terms of R&D the higher the collectivism score of a given country, whereas the opposite is true for non-overconfident CEOs. In the sample mean of collectivism, overconfident CEOs again invest less than their non-overconfident counterparts do.

I did the same analysis for the positive and significant interaction effect between overconfidence and uncertainty avoidance in Model 4.2. Figure 3 below shows the result.

Figure 3. Significant Interaction between OC (demographic) and UA in Model 4.2



Note: OC = 1 refers to the group of overconfident CEOs, whereas OC = 0 captures non-overconfident CEOs.

Figure 3 displays the relationships between R&D spending and overconfidence by level of uncertainty avoidance. In highly uncertainty avoiding cultures, overconfidence among CEOs leads to relatively higher R&D, whereas in cultures classified as low uncertainty avoidance, overconfident CEOs invest less.

The results in this section partly support H2, as I found two conflicting directions for the coefficient on the interaction effect between CEO overconfidence and collectivism. H3 is not supported, since the interaction effect between overconfidence and uncertainty avoidance was positive when significant, indicating that CEO overconfidence has an increasingly positive effect on investment the higher a culture scores on the uncertainty avoidance dimension.

5. Discussion

Summary of Results

In summary, the effects of CEO overconfidence on strategic risk-taking are conditional on the measurement for overconfidence among CEOs, the operationalization of strategic risk-taking, and the model specification. Concerning the main effect covered by H1, the demographic indicator of CEO overconfidence that takes into account gender, age, education, background, and CEO/Chairman duality leads to higher capex spending independent of model specification. No such consistent impact was found on R&D expenses.

When adding the cultural dimensions to the models to test H2 and H3, many effects changed or became inconsistent. However, there were some overarching patterns. First, when regressing capital expenditures on culture and CEO overconfidence including controls, firms headquartered in highly collectivistic cultures invest less than firms in low-collectivism cultures if non-overconfident CEOs (in both measures) were employed. Moreover, in the specifications that used the option-based CEO overconfidence variable, the interaction effect between CEO overconfidence and collectivism was positive, indicating that in collectivist cultures, overconfident CEOs invest more.

The models predicting R&D expenses showed that the relationship between overconfident CEOs as measured by their demographic characteristics and R&D spending is negatively moderated by collectivism but positively moderated by uncertainty avoidance. In models using the same measurement for CEO overconfidence, uncertainty avoidance itself was negatively related to R&D spending independent of model specification. In models where CEO overconfidence was proxied by the stock option-based indicator, collectivism is directly negatively related to R&D.

This has the following implications for my hypotheses. H1 was partially supported in the sense that CEO overconfidence had an effect on capital expenditures, but not on R&D expenses. H2 was partially supported, since interaction effects of CEO overconfidence and collectivism were positive and negative, conditional on model specification and variable measurement. H3 was not supported, as I found the exact oppositive effect, i.e. a positive interaction between uncertainty avoidance and CEO overconfidence when modelling R&D expenses with the demographic CEO overconfidence variable.

Connection to Existing Literature

I found evidence that the proposed link between CEO overconfidence and higher capital investment as documented by Ben-David et al. (2013) also holds in a European sample. This result is also in line with Malmendier & Tate (2005a), who find that overconfident CEOs invest more, though only if they internally generate enough cash. My study, however, does not align with previous research that has investigated innovation-related outcome variables, i.e. R&D expenses or patenting activity (Galasso et al., 2011; Hirshleifer et al., 2012; Li & Zhang, 2022). Even though my model is similar to that of Hirshleifer et al. (2012), I did not replicate consistent positive and statistically significant coefficients for the relationship between CEO overconfidence and R&D spending scaled by total assets. One reason could be that by not including the market-based variables Tobin's Q and stock return due to data availability issues, I introduced omitted variable bias into my model, distorting the true coefficients. This argument is weakened by similar values for the adjusted R-squared values between my and their models. Another possible explanation for the insignificant result is the sample, given that it included European rather than US based firms and CEOs. As Graham et al. (2013) find, CEOs in the US display different personal characteristics than their non-US peers. For example, the authors find that CEOs in the US display higher optimism levels than non-US executives do, albeit with a seemingly more direct measurement approach where they administer psychometric tests. A generally lower absolute level of optimism among European CEOs, even if I classified them as overconfident using my methodologies, could explain why I did not find a positive link between risky and uncertain R&D spending and overconfidence measures. It might also be the case that European oversight is stronger through the two-tier system (Belot et al., 2014). The two-tier board is characterized by having a management board being responsible for running the business, and a supervisory board that acts as a control mechanism tasked with evaluation of management (Tipurić & Cindrić, 2025). This governance model is mainly present in continental Europe (Tipurić & Cindrić, 2025) and could limit the power of the CEO overconfidence trait in high-risk decisions like R&D projects. This means that CEOs in Europe could, frankly, not matter as much as CEOs in the US do, and thereby their impacts on firm-level outcomes could be smaller or not present at all (Crossland & Hambrick, 2007).

The question remains, then, why capital expenditure was positively associated with CEO overconfidence consistently in my models, and R&D expenses were not. It might be that due to different, more concentrated ownership structures (e.g., bank-owned or family-owned), the shareholders are more concerned with reducing risk (Jumreornvong et al., 2020). This could

lead to executives facing lower levels of discretion in high-risk decisions such as innovative R&D (Roe, 1993) but may still allow overconfident CEOs to aggressively pursue the expansion of the current business through capex. In family-owned firms, Anderson et al. (2012) make the case that such firms indeed spend more on capex but dislike riskier R&D projects.

The effects of culture are partly consistent with previous literature. Similar to Shao et al. (2013), who do not test for overconfidence, I also found that collectivism reduces R&D spending in models that include the option-based CEO overconfidence variable. Unlike them, I found that this effect holds for models where the dependent variable was capital expenditures, irrelevant of the CEO overconfidence measure that I used. Shao et al. (2013) find no effect of uncertainty avoidance on R&D investment, yet I found a negative effect of uncertainty avoidance on R&D spending in my models that used the demographic CEO overconfidence measurement. However, my model specifications are different to those of Shao et al. (2013), since I tested for the main effect of overconfidence and the moderation of overconfidence with culture and they focus on culture only. The differences in outcomes can further be attributed to different measurements of the culture variables (Hofstede vs. GLOBE), and that their sample is global, while mine includes only European firms. Indeed, studies by Lewellyn & Bao (2015) or Nam et al. (2014) using GLOBE cultural dimensions also find negative correlations between uncertainty avoidance and R&D intensity. The choice of cultural model, therefore, has a great influence on the results, which is not surprising since the same labels across Hofstede and GLOBE capture different concepts (Venaik & Brewer, 2016).

In line with Crossland & Hambrick's (2007) argumentation, I find that overconfident CEOs (demographic measurement) in collectivist cultures have a weaker effect on firm-level outcomes (in my case, R&D) than they do in individualistic countries. This may be because CEOs in high-individualism countries are able to unilaterally guide decision-making and are also expected to do so by other stakeholders (Crossland & Hambrick, 2007). In the models using the demographic CEO overconfidence variable, I find that overconfident CEOs have a stronger impact on R&D spending in high uncertainty avoidance cultures. Crossland & Hambrick (2011) report that executives in these cultures typically have less managerial discretion and, therefore, may not be able to invest into bold and risky projects where the outcome and its success is hard to predict. In this vein, my study contradicts this point. Moreover, at this point in time, I am not aware of previous research that could explain the positive interaction effect on capital expenditures that I find between CEO overconfidence (option-based) and collectivism, with no striking multicollinearity issue identified when

checking VIF values. I hypothesized that collectivism would give managers less leeway, and therefore, their overconfidence should not be able to translate into tangible firm outcomes, since they face constraints from consensus-based decision styles that would eliminate the overconfidence effect. Still, it could be the case that individuals from collectivistic countries display higher levels of overconfidence (Acker & Duck, 2008; Fang & Li, 2004), which may allow them to persuade others or push through their decisions.

My findings add to the UET literature in the following ways. First, I document that executive traits, in this case overconfidence, also have effects in European samples, even though they are not consistent across operationalisations of the dependent variable and measurement of CEO overconfidence. Second, and more narrowly, I add to the CEO overconfidence literature that is grounded in corporate finance and strategic management by analysing a European dataset that can be compared to results that were found in U.S. and Asian samples. Third, I borrow from the intersection of cross-cultural management, psychology, and decision-making literature to extend the current focus of CEO overconfidence research by moderation effects of culture.

Implications

The implications of my thesis are manifold. CEO overconfidence, often viewed as a negative trait, can lead to higher capital investment, but not higher R&D expenses. Cultural dimensions, namely collectivism and uncertainty avoidance, were found to play a significant role in their main relationship to strategic risk-taking as well, and the interaction effects between culture and CEO overconfidence also displayed some significant results, yet they were conditional on model specification and measurement of overconfidence. It can be concluded that moderators of executive effects on firm outcomes seem to matter, since they could have the power to influence the latitude of action that is available to top executives. It is noteworthy that this study did not investigate the performance consequences of having overconfident CEOs, even though they were found to be positive in a recent meta-analytical review (Burkhard et al., 2023).

The results of this thesis also provide room for practical relevance. First and foremost, in European firms, placing overconfident managers at the top of firms does not seem to have an impact on innovation-related activities in models that exclude culture. Given that R&D intensity of private companies is a main pillar of economic policy in the European Union to keep the continent competitive (Moncada-Paternò-Castello & Grassano, 2022), the overconfidence trait among CEOs will not help to close the R&D gap to other economies. However, capital expenditure is affected, suggesting that overconfident CEOs want to invest aggressively. A

reason why they do not spend heavily on R&D might be that the structure of the economy in Europe with a relatively low share of companies in high-tech sectors (Moncada-Paternò-Castello & Grassano, 2022) makes higher R&D investment not worth it. Secondly, the results suggest that culture plays a role either directly in how far risky decisions are taken, or inhibits or pronounces CEO overconfidence effects. This can be of practical relevance in executive selection and contracting decisions. For example, taking a firm that is headquartered in an individualistic (collectivistic) country, hiring an overconfident CEO might produce better (worse) results when the company is in need of innovations and therefore should increase R&D budgets. In highly uncertainty avoidant cultures, overconfident CEOs might prove fitting if lifting R&D spending is the goal, but in low uncertainty avoidance, selecting overconfident managers for the CEO position can backfire if R&D increases are a priority (as can be seen in Figure 3). Such hiring decisions are attached with true economic value, since most empirical studies on the link between R&D expenses and firm value indicate that there exists a positive relationship (Pindado et al., 2010).

Limitations and Future Studies

I want to point out that this study has its limitations. One very striking one is the limited number of observations that have non-missing data on the option-based CEO overconfidence variable and R&D expenses. This is due to the fact that the BoardEx Europe – Accumulated Wealth dataset only covers a limited number of executives, and therefore, firm-years, and R&D expenses are not required to be reported by every firm. The stock option-based overconfidence measure, which follows Malmendier & Tate's (2005a) seminal work, also faces the problem of not actually capturing overconfidence, since it could be that managers hold deeply in-the-money options because of positive stock performance, which I did not control for due to data accessibility reasons.

The measure for the demographic CEO overconfidence variable that was introduced by Li & Zhang (2022) is also indirect and might not capture true overconfidence. Still, the determinants of this indicator stem from previous literature. It also allowed a much larger sample size. The alternative to administer psychological tests to CEOs to measure their overconfidence level would have been out of scope for this thesis. Another problem of the overconfidence measures is that they are binary. Future studies could adopt a more fine-grained approach to see if there is a sweet spot of overconfidence (as some studies indicate, e.g., Campbell et al., 2011), and how different levels of overconfidence are constrained or amplified by culture. This can be done

by defining cut-off points for underconfident, moderately confident, and overconfident CEOs (Campbell et al., 2011) or by surveying executives directly (Ben-David et al., 2013).

The assumption of proxying cultural dimensions via headquarter location might also affect the results. Traditionally, nationality is based on the country of birth (Ferris et al., 2013). Still, the headquarter-based measurement assumes that attributes and characteristics can be assimilated when gathering experiences or living in a given country (Ferris et al., 2013). This difference in measurement can have meaningful consequences, since CEOs that work in firms that are headquartered in their hometowns were shown to engage less in risk-taking than do their counterparts (Chen et al., 2024). Therefore, cultural differences between individuals and national culture instead of one of the absolute constructs on their own could be more meaningful.

A fruitful avenue for future research in this domain could also be to analyse a global database. It would be interesting to see if effects become more consistent when including countries that are on the extreme ends of particular cultural dimensions, for example when comparing a highly individualistic country with a highly collectivistic culture. Another problem of a European database is that due to its deep history, countries have adopted different forms of capitalism and governance mechanisms (De Jong, 1997), so the models could integrate more contextual variables, like board characteristics (Kraft et al., 2024) or the dynamism of the environment (Burkhard et al., 2023). This could introduce new conditions that might explain when or why overconfident executives produce the results they do.

As with every correlational and regression approach, the issue of causality remains. Alternative explanations revolve around reverse causality (it might be the case that firms that spend a lot on capex or R&D hire overconfident CEOs) and endogeneity (there could be factors that influence both overconfidence and investment that are not controlled for in the models). Lastly, I want to point out some ways that could potentially offer causal evidence for my hypotheses. First, CEOs could be directly surveyed or interviewed to gauge their overconfidence levels (in a similar fashion as Ben-David et al., 2013 did), which would eliminate the need to proxy this variable with arguably noisy measures. This likely leads to a smaller sample due to difficulty of obtaining responses. However, given the high frequency of use of option-based overconfidence measures, several validity tests have been conducted (Kaplan et al., 2022; Malmendier & Tate, 2005b). While Malmendier & Tate (2005b) add a measurement that captures the external perception of the press in regard to overconfident CEOs that is correlated

with the option-based indicator, Kaplan et al. (2022) validate one of Malmendier & Tate's (2005a) option-based variables through executive assessments. I could find no such validity tests for the demographic overconfidence variable that is based on Li & Zhang's (2022) work. To tackle the reverse causality issue, future studies could restrict the sample to long-lasting CEOs and remove years of new CEO appointment, as this CEO-firm matching issue should be most prevalent when hiring new executives (Hirshleifer et al., 2012). Second, other confounding factors should be added. For example, it might be that individualistic countries have higher gross domestic products and therefore invest more money (Shao et al., 2013). To capture innovation-related outcomes rather than inputs, patenting data and citation counts could improve the meaningfulness of this research (as is done in Galasso & Simcoe, 2011 or Hirshleifer et al., 2012), as investment alone does not entail innovation success.

Conclusion

This thesis tested the relationship between CEO overconfidence and strategic risk-taking. Two measurements for CEO overconfidence were employed, one based on the stock-option exercising behaviour of CEOs, and one based on their personal characteristics. Strategic risk-taking was operationalised via capital expenditures and R&D expenses. Additionally, a moderation analysis testing the interaction effect between overconfidence and cultural dimensions, specifically collectivism and uncertainty avoidance, was conducted.

In the models analysing the main effect of CEO overconfidence, this executive trait was found to be positively related to capital expenditures, but not R&D investments. Regression models testing the interaction between the cultural dimensions and CEO overconfidence found mixed results that were conditional of the dependent variable and the measurement of CEO overconfidence. In some tests, however, the interaction term displayed consistently significant results across model specifications, indicating that culture has the potential to influence managerial discretion, and therefore may weaken or strengthen CEO overconfidence effects.

6. Appendix

Table 12. Yearly Breakdown of Firms, CEOs, and CEO Overconfidence (demographic)

Report Year	Firms	CEOs	Overconfident CEOs (demographic)
2000	713	708	168
2001	800	791	185
2002	868	858	202
2003	916	905	210
2004	973	958	225
2005	1057	1042	235
2006	1160	1146	279
2007	1282	1263	306
2008	1342	1321	310
2009	1359	1342	320
2010	1400	1384	323
2011	1444	1426	343
2012	1486	1465	344
2013	1530	1504	352
2014	1595	1570	351
2015	1661	1641	350
2016	1698	1669	350
2017	1738	1710	342
2018	1770	1742	338
2019	1744	1720	328
2020	1719	1694	314
2021	1775	1748	314
2022	1740	1716	295
2023	1672	1643	278

Table 13. Yearly Breakdown of Firms, CEOs, and CEO Overconfidence (stock options)

Report Year	Firms	CEOs	Overconfident CEOs (option-based)
2000	133	129	37
2001	147	140	38
2002	158	151	44
2003	157	151	46
2004	172	164	53
2005	174	166	53

Report Year	Firms	CEOs	Overconfident CEOs (option-based)
2006	174	167	49
2007	177	169	48
2008	177	169	44
2009	170	164	43
2010	161	155	38
2011	148	142	34
2012	150	143	34
2013	143	136	32
2014	138	132	30
2015	125	119	27
2016	121	114	28
2017	115	109	26
2018	110	103	22
2019	96	92	15
2020	82	80	15
2021	80	78	14
2022	70	67	11
2023	60	57	10

Table 14. Country List and Cultural Variables

ISO3	Country	Collectivism	UA
AUT	Austria	5.266026	3.656410
CHE	Switzerland	4.943396	3.158491
CZE	Czech Republic	4.062500	3.642917
DEU	Germany	5.200598	3.630462
DNK	Denmark	5.498408	3.815287
ESP	Spain	5.793478	4.763043
FIN	Finland	5.417803	3.851818
FRA	France	5.424658	4.264726
IRL	Republic Of Ireland	5.736486	4.019595
GBR	United Kingdom - England	5.546296	4.114815
GRC	Greece	5.455556	5.093333
HUN	Hungary	5.540378	4.660825
ITA	Italy	5.723592	4.467958
GBR	Jersey	5.546296	4.114815
NLD	Netherlands	5.172945	3.244863
POL	Poland	5.744755	4.708042
PRT	Portugal	5.937500	4.431818
RUS	Russian Federation	5.787500	5.071667

ISO3	Country	Collectivism	UA
SWE	Sweden	6.039199	3.603426
TUR	Turkey	5.766892	4.671622
GBR	Isle Of Man	5.546296	4.114815
SVN	Slovenia	5.709288	4.991603
GBR	Guernsey	5.546296	4.114815
GBR	Gibraltar	5.546296	4.114815

Table 15. *P*-Values of Regression Coefficients

Variables	Capex simple model	Capex full model	R&D simple model	R&D full model
SRT ~ OC				
OC (demographic)	.016	.003	.238	.761
OC (options)	.435	.610	.284	.981
SRT ~ OC (demographic) + CULTURE				
OC (demographic)	0.039	0.002	0.413	0.731
Collectivism	0.008	0.002	0.608	0.144
UA	0.028	0.412	0.002	0.000
OC (demographic) x Collectivism	0.712	0.564	0.024	0.020
OC (demographic) x UA	0.532	0.128	0.041	0.046
SRT ~ OC (options) + CULTURE				
OC (options)	0.433	0.658	0.194	0.757
Collectivism	0.081	0.008	0.039	0.022
UA	0.324	0.007	0.151	0.123
OC (options) x Collectivism	0.030	0.064	0.902	0.454
OC (options) x UA	0.493	0.147	0.364	0.164

Note: SRT = strategic risk-taking, OC = overconfidence, UA = uncertainty avoidance

7. References

Aabo, T., Hanousek, J., Pantzalis, C., & Park, J. C. (2023). CEO personality traits and corporate value implication of acquisitions. *Journal of Empirical Finance*, *73*, 86-106. https://doi.org/10.1016/j.jempfin.2023.05.006

Acker, D., & Duck, N. W. (2008). Cross-cultural overconfidence and biased self-attribution. *The Journal of Socio-Economics*, *37*(5), 1815-1824.

Aguilera, R. V., & Jackson, G. (2003). The Cross-National Diversity of Corporate Governance: Dimensions and Determinants. *Academy of Management Review*, *28*(3), 447-465. https://doi.org/10.5465/amr.2003.10196772

Ahmed, A.S., & Duellman, S. (2013). Managerial Overconfidence and Accounting Conservatism. *Journal of Accounting Research*, *51*, 1-30. https://doi.org/10.1111/j.1475-679X.2012.00467.x

Anderson, C., Brion, S., Moore, D. A., & Kennedy, J. A. (2012). A status-enhancement account of overconfidence. *Journal of Personality and Social Psychology*, *103*(4), 718–735. https://doi.org/10.1037/a0029395

Anderson, R. C., Duru, A., & Reeb, D. M. (2012). Investment policy in family controlled firms. *Journal of Banking & Finance*, *36*(6), 1744-1758. https://doi.org/10.1016/j.jbankfin.2012.01.018

Bandura, A. (1989). Human agency in social cognitive theory. *The American Psychologist*, *44*(9), 1175-1184. https://doi.org/10.1037/0003-066x.44.9.1175

Belot, F., Ginglinger, E., Slovin, M. B., & Sushka, M. E. (2014). Freedom of choice between unitary and two-tier boards: An empirical analysis. *Journal of Financial Economics*, *112*(3), 364-385. https://doi.org/10.1016/j.jfineco.2014.02.011

Ben-David, I., Graham, J. R., & Harvey, C. R. (2013). Managerial Miscalibration. *The Quarterly Journal of Economics*, *128*(4), 1547–1584. https://doi.org/10.1093/qje/qjt023

Bernardo, A.E., & Welch, I. (2001). On the Evolution of Overconfidence and Entrepreneurs. *Journal of Economics & Management Strategy*, *10*(3), 301-330. https://doi.org/10.1111/j.1430-9134.2001.00301.x

Bharati, R., Doellman, T., Fu, X. (2016). CEO confidence and stock returns. *Journal of Contemporary Accounting & Economics*, *12 (1)*, 89-110. https://doi.org/10.1016/j.jcae.2016.02.006

Bi, Y., Dang, Q., Li, S., Guo, J., & Zhang, B. 2016. The effect of overconfidence on persistent behavior: The mediation effect of "I think I can do it" rather than "I'm attracted to it." *Psychological Reports*, *118*, 138-153.

Bloomberg (2004, November 1). *Steve Jobs: He Thinks Different*. https://www.bloomberg.com/news/articles/2004-10-31/steve-jobs-he-thinks-different

BoardEx (2025). *BoardEx - Europe* [Data set]. Wharton Research Data Services. https://wrds-www.wharton.upenn.edu/pages/get-data/boardex/boardex-europe/

Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review*, *17*, 39-61.

Brunzel, J. (2021). Overconfidence and narcissism among the upper echelons: a systematic literature review. *Management Review Quarterly*, *71*(3), 585-623. https://doi.org/10.1007/s11301-020-00194-6

Burkhard, B., Sirén, C., van Essen, M., Grichnik, D., & Shepherd, D. A. (2023). Nothing Ventured, Nothing Gained: A Meta-Analysis of CEO Overconfidence, Strategic Risk Taking, and Performance. *Journal of Management*, *49*(8), 2629-2666. https://doi.org/10.1177/01492063221110203

Cambridge, R. M., & Shreckengost, R. C. (1980). *Are You Sure?: The Subjective Probability Assessment Test. Information Science Center*. Office of Training, Central Intelligence Agency.

Camerer, C., & Lovallo, D. (1999). Overconfidence and Excess Entry: An Experimental Approach. *American Economic Review*, *89*(1), 306-318. https://doi.org/10.1257/aer.89.1.306

Campbell, T., C., Gallmeyer, M., Johnson, S. A., Rutherford, J., & Stanley, B. W. (2011). CEO optimism and forced turnover. *Journal of Financial Economics*, *101*(3), 695-712. https://doi.org/10.1016/j.jfineco.2011.03.004

Chatterjee, A., & Hambrick, D. C. (2007). It's All about Me: Narcissistic Chief Executive Officers and Their Effects on Company Strategy and Performance. *Administrative Science Quarterly*, *52*(3), 351–386. https://doi.org/10.2189/asqu.52.3.351

Chatterjee, A., & Hambrick, D. C. (2011). Executive Personality, Capability Cues, and Risk Taking: How Narcissistic CEOs React to Their Successes and Stumbles. *Administrative Science Quarterly*, *56*(2), 202-237. https://doi.org/10.1177/0001839211427534

Chen, G., Crossland, C., & Luo, S. (2015). Making the same mistake all over again: CEO overconfidence and corporate resistance to corrective feedback. *Strategic Management Journal*, *36*, 1513-1535. https://doi.org/10.1002/smj.2291

Chen, J., Hu, P., Liu, S., & Liu, X. (2024). Too scared to make mistakes at home: CEO hometown identity and corporate risk-taking. *Research in International Business and Finance*, *70*. https://doi.org/10.1016/j.ribaf.2024.102387

Chinese Culture Connection (1987). Chinese values and the search for culture-free dimensions of culture. *Journal of Cross-Cultural Psychology*, *18*(2), 143-164. doi:10.1177/0022002187018002002

Choi, B. (2016). The Influence Of Cultural Thinking Style On Consumer Cognitive Complexity Underlying Wine Purchase Decisions. *Journal of Applied Business Research*, *32*(4), 1257-1272. https://doi.org/10.19030/jabr.v32i4.9735

Chui, A. C. W., Titman, S., & Wei, K. C. J. (2010). Individualism and Momentum around the World. *The Journal of Finance*, *65*(1), 361–392. http://www.jstor.org/stable/25656294

College Board (1976–1977). *Student descriptive questionnaire*. Educational Testing Service.

Collins, J. C. (2001). *Good to great: Why some companies make the leap . . . and others don't*. Harper Business.

Compustat (2025). *Compustat Global* [Data set]. Wharton Research Data Services. https://wrds-www.wharton.upenn.edu/pages/get-data/compustat-capital-iq-standard-poors/compustat/global-daily/

Crossland, C., & Hambrick, D. C. (2007). How national systems differ in their constraints on corporate executives: a study of CEO effects in three countries. *Strategic Management Journal*, *28*, 767-789. https://doi.org/10.1002/smj.610

Crossland, C., & Hambrick, D. C. (2011). Differences in Managerial Discretion Across Countries: How Nation-level Institutions Affect the Degree to which CEOs Matter. *Strategic Management Journal*, *32*(8), 797–819. https://doi.org/10.1002/smj.913

Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Prentice Hall/Pearson Education.

De Jong, H.W. (1997). The Governance Structure and Performance of Large European Corporations. *Journal of Management & Governance*, *1*, 5–27. https://doi.org/10.1023/A:1009931211940

Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed Self-Assessment: Implications for Health, Education, and the Workplace. *Psychological Science in the Public Interest*, *5*(3), 69-106. https://doi.org/10.1111/j.1529-1006.2004.00018.x

Elliot, A. J., Chirkov, V. I., Kim, Y., & Sheldon, K. M. (2001). A Cross-Cultural Analysis of Avoidance (Relative to Approach) Personal Goals. *Psychological Science*, *12*(6), 505-510. https://doi.org/10.1111/1467-9280.00393

Ferris, S. P., Jayaraman, N., & Sabherwal, S. (2013). CEO Overconfidence and International Merger and Acquisition Activity. *Journal of Financial and Quantitative Analysis*, *48*(1), 137–164. doi:10.1017/S0022109013000069

Finkelstein, S., & Hambrick, D. C. (1990). Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly*, *35*(3), 484–503. https://doi.org/10.2307/2393314

Finkelstein, S., Cannella, S., Hambrick, D., & Cannella, A. (2009). *Strategic leadership: Theory and research on executives, top management teams, and boards*. Oxford University Press.

Fischhoff, B., Slovic, P., & Lichtenstein, S. (1977). Knowing with certainty: The appropriateness of extreme confidence. *Journal of Experimental Psychology: Human Perception and Performance*, *3*(4), 552–564. https://doi.org/10.1037/0096-1523.3.4.552

Gaganis, C., Hasan, I., Papadimitri, P., & Tasiou, M. (2019). National culture and risk-taking: Evidence from the insurance industry. *Journal of Business Research*, *97*, 104-116. https://doi.org/10.1016/j.jbusres.2018.12.037

Galasso, A., & Simcoe, T. S. (2011). CEO Overconfidence and Innovation. *Management Science*, *57*(8), 1469-1484. https://doi.org/10.1287/mnsc.1110.1374

GLOBE (n.d.). *About the Studies*. https://globeproject.com/studies.html

Goel, A.M., & Thakor, A.V. (2008). Overconfidence, CEO Selection, and Corporate Governance. *The Journal of Finance*, *63*(6), 2737-2784. https://doi.org/10.1111/j.1540-6261.2008.01412.x

Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics*, *109*(1), 103-121. https://doi.org/10.1016/j.jfineco.2013.01.010

Hall, B. J., & Murphy, K. J. (2000). Optimal Exercise Prices for Executive Stock Options. *American Economic Review*, *90*(2), 209–214. https://doi.org/10.1257/aer.90.2.209

Hall, B. J., & Murphy, K. J. (2002). Stock options for undiversified executives. *Journal of Accounting and Economics*, *33*(1), 3-42. https://doi.org/10.1016/S0165-4101(01)00050-7

Ham, C., Seybert, N. & Wang, S. (2018). Narcissism is a bad sign: CEO signature size, investment, and performance. *Review of Accounting Studies*, *23*, 234–26. https://doi.org/10.1007/s11142-017-9427-x

Hamamura, T., Meijer, Z., Heine, S. J., Kamaya, K., & Hori, I. (2009). Approach - Avoidance Motivation and Information Processing: A Cross-Cultural Analysis. *Personality and Social Psychology Bulletin*, *35*(4), 454-462. https://doi.org/10.1177/0146167208329512

Hambrick, D. C. (2007). Upper Echelons Theory: An Update. *The Academy of Management Review*, *32*(2), 334–343. http://www.jstor.org/stable/20159303

Hambrick, D. C., & Finkelstein, S. (1987). Managerial discretion – a bridge between polar views of organizational outcomes. *Research in Organizational Behavior*, *9*, 369-406.

Hambrick, D. C., & Mason, P. A. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *The Academy of Management Review*, *9*(2), 193–206. https://doi.org/10.2307/258434

Hambrick, D. C., & Quigley, T. J. (2014). Toward more accurate contextualization of the CEO effect on firm performance. *Strategic Management Journal*, *35*(4), 473-491. https://doi.org/10.1002/smj.2108

Hambrick, D. C., Cho, T. S., & Chen, M. J. (1996). The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves. *Administrative Science Quarterly*, *41*(4), 659–684. https://doi.org/10.2307/2393871

Hayward, M. L. A., & Hambrick, D. C. (1997). Explaining the Premiums Paid for Large Acquisitions: Evidence of CEO Hubris. *Administrative Science Quarterly*, *42*(1), 103-127. https://doi.org/10.2307/2393810

Hayward, M. L., Shepherd, D. A., & Griffin, D. (2006). A hubris theory of entrepreneurship. *Management Science*, *52*, 160-172.

Heine, S. J., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard? *Psychological Review*, *106*(4), 766-794. https://doi.org/10.1037/0033-295X.106.4.766

Hirshleifer, D., Low, A., & Teoh, S.H. (2012). Are Overconfident CEOs Better Innovators? *The Journal of Finance*, *67*, 1457-1498. https://doi.org/10.1111/j.1540-6261.2012.01753.x

Hofstede, G. (1980). *Culture's Consequences: International Differences in Work Related Values*. Sage.

Hofstede, G. (1991). *Cultures and Organizations: Software of the Mind*. McGraw-Hill.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, *2*(1). https://doi.org/10.9707/2307-0919.1014

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and Organizations: Software of the Mind* (Rev. 3rd ed.). McGraw-Hill

Hoskisson, R. E., Chirico, F., Zyung, J., & Gambeta, E. (2017). Managerial Risk Taking: A Multitheoretical Review and Future Research Agenda. *Journal of Management*, *43*(1), 137-169. https://doi.org/10.1177/0149206316671583

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (2004). *Culture, Leadership, Organizations: The GLOBE Study of 62 Societies*. Sage Publications.

House, R., Javidan, M., Hanges, P., & Dorman, P. (2002). Understanding Cultures and Implicit Leadership Theories across the Globe: An Introduction to Project GLOBE. *Journal of World Business*, *37*(1), 3-10. https://doi.org/10.1016/S1090-9516(01)00069-4

Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, *108*(3), 822-839. https://doi.org/10.1016/j.jfineco.2012.12.005

Javidan, M., Dorfman, P. W., De Luque, M. S., & House, R. J. (2006). In the Eye of the Beholder: Cross Cultural Lessons in Leadership from Project GLOBE. *Academy of Management Perspectives*, *20*(1), 67–90. http://www.jstor.org/stable/4166219

Jumreornvong, S., Treepongkaruna, S., Prommin, P., & Jiraporn, P. (2020). The effects of ownership concentration and corporate governance on corporate risk-taking. *Accounting Research Journal*, *33*(1), 252-267. https://doi.org/10.1108/ARJ-09-2018-0144

Kahnemann, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.

Kanagaretnam, K., Lim, C. Y., Lobo, G. J. (2014). Influence of National Culture on Accounting Conservatism and Risk-Taking in the Banking Industry. *The Accounting Review*, *89*(3), 1115–1149. https://doi.org/10.2308/accr-50682

Kaplan, S. N., Sørensen, M., & Zakolyukina, A. A. (2022). What is CEO overconfidence? Evidence from executive assessments. *Journal of Financial Economics*, *145*(2), 409-425. https://doi.org/10.1016/j.jfineco.2021.09.023

Kim, J. B., Wang, Z., & Zhang, L. (2016). CEO Overconfidence and Stock Price Crash Risk. *Contemporary Accounting Research*, *33*, 1720-1749. https://doi.org/10.1111/1911-3846.12217

Kirkman, B., Lowe, K., & Gibson, C. (2006). A quarter century of Culture's Consequences: A review of empirical research incorporating Hofstede's cultural values framework. *Journal of International Business Studies*, *37*, 285–320. https://doi.org/10.1057/palgrave.jibs.8400202

Kish-Gephart, J. J., & Campbell, J. T. (2015). You don’t forget your roots: The Influence of CEO Social Class Background on Strategic Risk Taking. *The Academy of Management Journal*, *58*(6), 1614–1636. https://doi.org/10.5465/amj.2013.1204

Kluckhohn, F. R., & Strodtbeck, F. L. (1961). *Variations in value orientations*. Row, Peterson.

Kolev, K. D., & McNamara, G. (2022). The role of top management teams in firm responses to performance shortfalls. *Strategic Organization*, *20*(3), 541-564. https://doi.org/10.1177/1476127020962683

Kraft, P. S., Dickler, T. A., & Withers, M. C. (2024). When do firms benefit from overconfident CEOs? The role of board expertise and power for technological breakthrough innovation. *Strategic Management Journal*, *46*(2), 381–410. https://doi.org/10.1002/smj.3657

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, *77*(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

Kunda, Z. (1987). Motivated inference: Self-serving generation and evaluation of causal theories. *Journal of Personality and Social Psychology*, *53*(4), 636–647. https://doi.org/10.1037/0022-3514.53.4.636

Lambert, R. A., Larcker, D. F., & Verrecchia, R. E. (1991). Portfolio Considerations in Valuing Executive Compensation. *Journal of Accounting Research*, *29*(1), 129–149. https://doi.org/10.2307/2491032

Landier, A., & Thesmar, D. (2003). Financial Contracting with Optimistic Entrepreneurs: Theory and Evidence. *Working Paper*. https://dx.doi.org/10.2139/ssrn.479581

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*(2), 311–328. https://doi.org/10.1037/0022-3514.32.2.311

Leng, J., Ozkan, A., Ozkan, N., & Trzeciakiewicz, A. (2021). CEO overconfidence and the probability of corporate failure: evidence from the United Kingdom. *The European Journal of Finance*, *27*(12), 1210–1234. https://doi.org/10.1080/1351847X.2021.1876131

Lewellyn, K. B., & Bao, S. R. (2015). R&D Investment in the Global Paper Products Industry: A Behavioral Theory of the Firm and National Culture Perspective. *Journal of International Management*, *21*(1), 1-17. https://doi.org/10.1016/j.intman.2014.12.001

Li, J., & Tang, Y. (2010). CEO Hubris and Firm Risk Taking in China: The Moderating Role of Managerial Discretion. *Academy of Management Journal*, *53*(1), 45-68. https://doi.org/10.5465/amj.2010.48036912

Li, S., & Fang, Y. (2004). Respondents in Asian Cultures (e.g., Chinese) are More Risk-Seeking and More Overconfident than Respondents in Other Cultures (e.g., in United States) but the Reciprocal Predictions are in Total Opposition: How and Why? *Journal of Cognition and Culture*, *4*(2), 263-292. https://doi.org/10.1163/1568537041725123

Li, Z., & Zhang, Y. (2022). CEO Overconfidence and Corporate Innovation Outcomes: Evidence from China. *Frontiers in Psychology*, *13*, 1-13. https://doi.org/10.3389/fpsyg.2022.760102

Malhotra, S., Reus, T. H., Zhu, P., & Roelofsen, E. M. (2017). The Acquisitive Nature of Extraverted CEOs. *Administrative Science Quarterly*, *63*(2), 370-408. https://doi.org/10.1177/0001839217712240

Malmendier, U., & Tate, G. (2005a). CEO Overconfidence and Corporate Investment. *The Journal of Finance*, *60* (6), 2661-2700. https://doi.org/10.1111/j.1540-6261.2005.00813.x

Malmendier, U., & Tate, G. (2005b). Does Overconfidence Affect Corporate Investment? CEO Overconfidence Measures Revisited. *European Financial Management*, *11*, 649-659. https://doi.org/10.1111/j.1354-7798.2005.00302.x

Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics*, *89* (1), 20-43. https://doi.org/10.1016/j.jfineco.2007.07.002

Malmendier, U., & Tate, G. (2015). Behavioral CEOs: The Role of Managerial Overconfidence. *Journal of Economic Perspectives*, *29*(4), 37–60. https://doi.org/10.1257/jep.29.4.37

Mamatzakis, E.C., Neri, L., & Russo, A. (2024). Do cultural differences affect the quality of financial reporting in the EU? An analysis of Western EU countries vis a vis Eastern EU countries. *Journal of Accounting & Organizational Change*, *20*(2), 248-275. https://doi.org/10.1108/JAOC-09-2022-0129

March, J. G., & Shapira, Z. (1987). Managerial Perspectives on Risk and Risk Taking. *Management Science*, *33*(11), 1404-1418. https://doi.org/10.1287/mnsc.33.11.1404

March, J.G., & Simon, H.A. (1958). *Organizations*. Wiley.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224–253. https://doi.org/10.1037/0033-295X.98.2.224

Martin, A. D., Nishikawa, T., & Williams, M. A. (2009). CEO Gender: Effects on Valuation and Risk. *Quarterly Journal of Finance and Accounting*, *48*(3), 23–40. http://www.jstor.org/stable/23075251

Meulbroek, L. K. (2001). The Efficiency of Equity-Linked Compensation: Understanding the Full Cost of Awarding Executive Stock Options. *Financial Management*, *30*(2), 5–44. https://doi.org/10.2307/3666404

Meyer, M. W. (1975). Leadership and Organizational Structure. *American Journal of Sociology*, *81*(3), 514-542. https://doi.org/10.1086/226106

Miller, D. (1991). Stale in the Saddle: CEO Tenure and the Match between Organization and Environment. *Management Science*, *37*(1), 34–52. http://www.jstor.org/stable/2632491

Moncada-Paternò-Castello, P., & Grassano, N. (2022). The EU vs US corporate R&D intensity gap: investigating key sectors and firms. *Industrial and Corporate Change*, *31*(1), 19–38. https://doi.org/10.1093/icc/dtab043

Moore, D. A., & Healy, P. J. (2008). The trouble with overconfidence. *Psychological Review*, *115*(2), 502–517. https://doi.org/10.1037/0033-295X.115.2.502

Moore, D. A., & Kim, T. G. (2003). Myopic Social Prediction and the Solo Comparison Effect. *Journal of Personality and Social Psychology*, *85*(6), 1121–1135. https://doi.org/10.1037/0022-3514.85.6.1121

Moore, D. A., & Schatz, D. (2017). The three faces of overconfidence. *Social and Personality Psychology Compass*, *11*(8), 1–12. https://doi.org/10.1111/spc3.12331

Moore, D. A., Dev, A. S., & Goncharova, E. Y. (2018). Overconfidence Across Cultures. *Collabra: Psychology*, *4*(1), 36. https://doi.org/10.1525/collabra.153

Morony, S., Kleitman, S., Lee, Y. P., & Stankov, L. (2013). Predicting achievement: Confidence vs self-efficacy, anxiety, and self-concept in Confucian and European countries.

International Journal of Educational Research, *58*, 79-96. https://doi.org/10.1016/j.ijer.2012.11.002.

Nam, D., Parboteeah, K. P., Cullen, J. B., & Johnson, J. L. (2014). Cross-national differences in firms undertaking innovation initiatives: An application of institutional anomie theory. *Journal of International Management*, *20*(2), 91-106. https://doi.org/10.1016/j.intman.2013.05.001

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*(2), 291–310. https://doi.org/10.1037/0033-295X.108.2.291

Nisbett, R., & Ross, L. (1980). *Human Inference: Strategies and Shortcomings of Social Judgement*. Prentice Hall.

Oksam, J., Kingma, J., & Klasen, H. J. (2000). Clinicians' recognition of 10 different types of distal radial fractures. *Perceptual and Motor Skills*, *91*(3), 917–924. https://doi.org/10.2466/pms.2000.91.3.917

Ordóñez, L., Schweitzer, M., Galinsky, A., & Bazerman, M. (2009). Goals gone wild: The systematic side effects of overprescribing goal setting. *Academy of Management Perspectives*, *2*, 6-16.

Ou, A. Y., Tsui, A. S., Kinicki, A. J., Waldman, D. A., Xiao, Z., & Song, L. J. (2014). Humble Chief Executive Officers' Connections to Top Management Team Integration and Middle Managers' Responses. *Administrative Science Quarterly*, *59*(1), 34-72. https://doi.org/10.1177/0001839213520131

Ou, A. Y., Waldman, D. A., & Peterson, S. J. (2015). Do Humble CEOs Matter? An Examination of CEO Humility and Firm Outcomes. *Journal of Management*, *44*(3), 1147-1173. https://doi.org/10.1177/0149206315604187

Picone, P. M., Dagnino, G. B., & Mina, A. (2014). The Origin of Failure: A Multidisciplinary Appraisal of the Hubris Hypothesis and Proposed Research Agenda. *Academy of Management Perspectives*, *28*(4), 447-468. https://doi.org/10.5465/AMP.2012.0177

Pikulina, E., Renneboog, L., & Tobler, P. N. (2017). Overconfidence and investment: An experimental approach. *Journal of Corporate Finance*, *43*, 175-192. https://doi.org/10.1016/j.jcorpfin.2017.01.002

Pindado, J., De Queiroz, V., & De La Torre, C. (2010). How Do Firm Characteristics Influence the Relationship between R&D and Firm Value? *Financial Management*, *39*, 757-782. https://doi.org/10.1111/j.1755-053X.2010.01091.x

Prendergast, C., & Stole, L. (1996). Impetuous Youngsters and Jaded Old-Timers: Acquiring a Reputation for Learning. *Journal of Political Economy*, *104*(6), 1105–1134. http://www.jstor.org/stable/2138935

Roberts, W. B. (2009). Back to the future: Personality and Assessment and personality development. *Journal of Research in Personality*, *43*(2), 137-145. https://doi.org/10.1016/j.jrp.2008.12.015

Roe, M. J. (1993). Some Differences in Corporate Structure in Germany, Japan, and the United States. *The Yale Law Journal*, *102*(8), 1927-2003. https://doi.org/10.2307/796856

Roll, R. (1986). The Hubris Hypothesis of Corporate Takeovers. *The Journal of Business*, *59*(2), 197–216. https://doi.org/10.1086/296325

Rutter, D. R., Quine, L., & Albery, I. P. (1998). Perceptions of risk in motorcyclists: Unrealistic optimism, relative realism and predictions of behaviour. *British Journal of Psychology*, *89*(4), 681–696. https://doi.org/10.1111/j.2044-8295.1998.tb02710.x

Serfling, M. A. (2014). CEO age and the riskiness of corporate policies. *Journal of Corporate Finance*, *25*, 251-273. https://doi.org/10.1016/j.jcorpfin.2013.12.013

Shao, L., Kwok, C., & Zhang, R. (2013). National culture and corporate investment. *Journal of International Business Studies*, *44*, 745–763 (2013). https://doi.org/10.1057/jibs.2013.26

Shapira, Z. (1995). Risk taking. Russell Sage.

Shipman, A. S., & Mumford, M. D. (2011). When confidence is detrimental: Influence of overconfidence on leadership effectiveness. *The Leadership Quarterly*, *22*(4), 649–665. https://doi.org/10.1016/j.leaqua.2011.05.006

Simon, M., & Houghton, S. M. (2003). The Relationship between Overconfidence and the Introduction of Risky Products: Evidence from a Field Study. *Academy of Management Journal*, *46*(2), 139-149. https://doi.org/10.5465/30040610

Sitkin, S. B., & Pablo, A. L. (1992). Reconceptualizing the Determinants of Risk Behavior. *The Academy of Management Review*, *17*(1), 9–38. https://doi.org/10.2307/258646

Sully de Luque, M., & Javidan, M. (2004). Uncertainty Avoidance. In R. House, P. Hanges, M. Javidan, P. Dorfman, & V. Gupta (Eds.), *Culture, Leadership and Organizations: The GLOBE Study of 62 Societies* (pp. 602-653). Sage.

Tangney, J. P. (2002). Humility. In C. R. Snyder, & S. J. Lopez (ed.), *Handbook of Positive Psychology* (pp. 411-419). Oxford University Press.

Templeton, J. M. (1997). *Worldwide Laws of Life*. Templeton Foundation Press.

Thomas, A. S., Litschert, R. J., & Ramaswamy, K. (1991). The performance impact of strategy-manager coalignment: An empirical examination. *Strategic Management Journal*, *12*(7), 509-522. https://doi.org/10.1002/smj.4250120704

Tipurić, D., & Cindrić, L. (2025). *Two-Tier Boards: Exploring the Dynamics of Supervisory and Management Boards in Corporate Governance*. Springer Nature.

Varnum, M. E., Grossmann, I., Kitayama, S., & Nisbett, R. E. (2010). The Origin of Cultural Differences in Cognition: Evidence for the Social Orientation Hypothesis. *Current Directions in Psychological Science*, *19*(1), 9–13. https://doi.org/10.1177/0963721409359301

Venaik, S., & Brewer, P. (2010). Avoiding uncertainty in Hofstede and GLOBE. *Journal of International Business Studies*, *41*, 1294–1315. https://doi.org/10.1057/jibs.2009.96

Venaik, S., & Brewer, P. (2016). National culture dimensions: The perpetuation of cultural ignorance. *Management Learning*, *47*(5), 563-589. https://doi.org/10.1177/1350507616629356

Von Hippel, W., & Trivers, R. (2011). The evolution and psychology of self-deception. *Behavioral and Brain Sciences*, *34*(1), 1-16. https://doi.org/10.1017/S0140525X10001354.

Wally, S., & Baum, J. R. (1994). Personal and structural determinants of the pace of strategic decision making. *Academy of Management Journal*, *37*(4), 932-956. https://doi.org/10.5465/256605

Wang, G., Holmes, M.R. Jr., Weichun Zhu, I. O. (2016). Do CEOs Matter to Firm Strategic Actions and Firm Performance? A Meta-Analytical Investigation Based on Upper Echelons Theory. *Personnel Psychology*, *69*(4), 775-862. https://doi.org/10.1111/peps.12140

Wangrow, D. B., Schepker, D. J., & Barker, V. L. (2014). Managerial Discretion: An Empirical Review and Focus on Future Research Directions. *Journal of Management*, *41*(1), 99-135. https://doi.org/10.1177/0149206314554214

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, *39*(5), 806–820. https://doi.org/10.1037/0022-3514.39.5.806

Wharton Research Data Services (n.d.). *Finding CEOs in Boardex*. https://wrds-www.wharton.upenn.edu/pages/support/support-articles/boardex/finding-ceos-in-boardex/

Whitcomb, K.M., Önkal, D., Curley, S.P., & Benson, P. G. (1995). Probability judgment accuracy for general knowledge. Cross-national differences and assessment methods. *Journal of Behavioral Decision Making*, *8*(1), 51-67. https://doi.org/10.1002/bdm.3960080105

Yates, J. F., & De Oliveira, S. (2016). Culture and decision making. *Organizational Behavior and Human Decision Processes*, *136*, 106-118. https://doi.org/10.1016/j.obhdp.2016.05.003

Yates, J.F., Ju-Whei, L., & Bush, J. GG. (1997). General Knowledge Overconfidence: Cross-National Variations, Response Style, and "Reality". *Organizational Behavior and Human Decision Processes*, *70*(2), 87-94. https://doi.org/10.1006/obhd.1997.2696

Yates, J.F., Ju-Whei, L., Shinotsuka, H., Patalano, A. L., & Sieck, W. R. (1998). Cross-Cultural Variations in Probability Judgement Accuracy: Beyond Knowledge Overconfidence? *Organizational Behavior and Human Decision Processes*, *74*(2), 89-117. https://doi.org/10.1006/obhd.1998.2771

Yim, S. (2013). The acquisitiveness of youth: CEO age and acquisition behavior. *Journal of Financial Economics*, *108*(1), 250-273. https://doi.org/10.1016/j.jfineco.2012.11.003

Zajac, E. J., & Westphal, J. D. (1996). Who shall succeed? How CEO/board preferences and power affect the choice of new CEOs. *Academy of Management Journal*, *39*(1), 64–90. https://doi.org/10.2307/256631

Zenger, T. R. (1992). Why do employers only reward extreme performance? Examining the relationships among performance, pay, and turnover. *Administrative Science Quarterly*, *37*(2), 198–219. https://doi.org/10.2307/2393221