



UNIVERSIDADE CATÓLICA PORTUGUESA

Is the Extraversion of French Retail Investors Linked to their Overconfidence Bias?

An Exploratory Study on the Overconfidence
Levels of French Retail Investors.

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by

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Resumo

Esta tese examina os conceitos de extroversão e excesso de confiança e explora em profundidade os mecanismos psicológicos que explicam a ligação entre os dois fatores.

Utilizando uma amostra transversal de dados primários recolhidos junto de 104 investidores de retalho franceses entre dezembro de 2023 e janeiro de 2024, exploramos os níveis de extroversão e excesso de confiança dos investidores de retalho franceses e utilizamos o teste de correlação de Spearman para medir a correlação entre os dois.

Os resultados sugerem que, embora os investidores de retalho franceses apresentem baixos níveis de excesso de confiança, a sua extroversão está positivamente e significativamente correlacionada com o viés de excesso de confiança, especialmente quando têm um elevado nível de educação ou menos de 2 anos de experiência.

Isto implica que os investidores de retalho franceses poderiam medir os seus níveis de extroversão para avaliar se são propensos a ter excesso de confiança durante a tomada de decisões e ajustar as suas decisões em conformidade. Os resultados também implicam que as autoridades reguladoras francesas devem visar os investidores com um elevado nível de educação e sem experiência, uma vez que estes tendem a ser mais propensos a tornar-se demasiado confiantes.

Esta tese abrange uma população e um tipo de cultura que ainda não tinham sido estudados sob esta forma.

Palavras-chave: finança comportamental, viés de excesso de confiança, extroversão, modelo de cinco fatores, investidores de retalho franceses

Abstract

This dissertation examines the extraversion and overconfidence concepts and does an in-depth exploration of the psychological mechanisms that explain the connection between the two factors.

Using a cross-section sample of primary data collected from 104 French retail investors between December 2023 and January 2024, we explore the extraversion and overconfidence levels of French retail investors and use Spearman's rank-correlation coefficient test to measure the correlation between the two.

Findings suggest that although French retail investors display low levels of overconfidence, their extraversion is positively and significantly correlated to the overconfidence bias, especially when they are highly educated or have less than 2 years of experience.

This implies that French retail investors could measure their extraversion levels to gauge whether they are prone to being overconfident during decision-making and adjust their decision-making accordingly. The results also imply that French regulators should target highly educated and inexperienced investors as they tend to be more prone to becoming overconfident.

This thesis covers a population and a culture type that had yet to be studied in this form.

Key-words: behavioral finance, overconfidence bias, extraversion, five-factor model, French retail-investor

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Chapter 1

Introduction

General Background

Overconfidence is a bias rooted in cognitive and motivational mechanisms which leads investors to overestimate their knowledge, skills, and information, often resulting in uninformed or irrational decisions (Fischhoff et al., 1977).

Extraversion, like the other four broad traits of the Five-Factor model (FFM), is defined by the facet-traits it encompasses. Extraversion's facets are gregariousness, assertiveness, activity level, excitement-seeking, and positivity. Therefore, extraversion is a personality trait that encompasses all behaviors related to these facets (Costa & McCrae, 1992).

Behaviors such as self-confidence, impulsivity, and optimism are measured by extraversion and can be connected to overconfidence (Ilmarinen, 2018). This apparent connection prompted authors to explore it to find ways to mitigate the bias' negative effects (Baker et al., 2021; Lin, 2011).

Moreover, recent reports by different regulators show that overconfidence has been rising since the pandemic due to a new generation of younger, unexperienced, and risk-seeking retail-investors (Lin et al., 2022; OECD, 2023). Indeed, around 20% of French retail-investors belong to this generation called "new-retail-investors". In addition to adopting riskier behaviors as seen by their preference for crypto-currencies and derivatives. They are also more overconfident than previous generations, as 67% consider themselves to have high financial knowledge despite scoring an average of 50% on a basic test provided by the OECD (OECD, 2023).

Research Gaps

Previous research on this topic is hindered by its predominant focus on multiple biases and personality traits, resulting in a lack of in-depth analyses regarding the relationship between extraversion and overconfidence (Baker et al., 2021, 2022). Moreover, these studies, primarily conducted on college campuses or single companies within collectivist societies, often lack representation from key demographic groups, particularly women, which may result in biased conclusions (Baker et al., 2021; Lin, 2011).

Research Question

Is the extraversion of French retail-investors linked to their overconfidence bias? This thesis aims to make an in-depth exploration of the relationship between extraversion and overconfidence whilst addressing some of the previous gaps in research. By studying French retail-investors, this thesis covers an individualistic culture, ensures female representation, and maximizes the diversity of profiles by not limiting the sample to a single company or class of students. Moreover, this study will gauge whether French retail-investors have high overconfidence levels, considering the recent rise in overconfident behaviors observed by French regulators.

Originality

Originality is derived from using a new database and focusing on only one trait and bias. Indeed, French retail-investors have yet to be studied and should ensure a more diverse representation of sociodemographic profiles, notably from women (Baker et al., 2022). Additionally, French culture is individualistic, in comparison to previously studied cultures which are collectivistic (Hofstede, 2001). Furthermore, by focusing on the relationship between only two factors, we will complexify our understanding of this relationship and thus our conclusions (Baker et al., 2021; Lin, 2011).

Contribution to knowledge

At an academic level, this thesis will expand the empirical evidence by covering a new population from an individualistic culture, thereby enriching our understanding of overconfidence across cultures. Moreover, by focusing solely on two factors, this thesis aims to unravel the psychological mechanisms underlying their connection.

At a management level, French regulators may gain a new metric to predict and thus reduce overconfidence amongst French retail-investors. By considering the impact of extraversion on overconfidence, they may develop more adequate policies aimed at reducing the latter. Generally, all financial agents may use extraversion to gauge how much overconfidence impacts their decision-making or that of others, enabling them to make more rational choices, optimize gains, and enhance predictive accuracy.

Presentation of the following chapters

The second chapter will address the research question theoretically using the available literature. The third chapter will outline the research methodology used for this study. The fourth chapter will present the results and test the hypotheses. Finally, the fifth chapter will present the conclusions and discuss their impact on academia and management.

Chapter 2

Literature Review

Key concepts

Extraversion

The concept of extraversion was coined in modern psychology by Carl Jung. He believed that individuals could be classified under an extraversion-introversion spectrum, depending on whether they gravitate more to the external or internal world, respectively (Kantor et al., 1923). By this, he meant that extroverts tend to seek external stimuli as they derive energy and fulfillment from social interactions. Whereas introverts are more introspective and get drained of energy when confronted with social interactions (Wilt & Revelle, 2016). This concept influenced many authors but was dismissed for its inability to be scientifically tested (Eysenck, 1991).

Hans Eysenck, another influential author, later developed a new concept of extraversion, that was backed by biological factors and could, therefore, be supported by scientific testing (Eysenck, 1991). He also categorized individuals along an extraversion-introversion spectrum based on baseline cortical arousal (BCA) levels. He found that extroverts have lower BCA levels that lead them to seek more external stimuli, as opposed to introverts who have higher BCA levels and therefore avoid social situations to not become overstimulated (Eysenck, 1963). This concept was also influential but was criticized for being overly dependent on biological factors, and for not encompassing all behaviors that people associate with extraversion (Sujit, 2013).

Later, Oliver John (2008) developed the FFM as a holistic model of personality modeling, which identifies five uncorrelated broad traits, one of which is extraversion. These traits adhere to a hierarchical structure, where each broad trait encompasses multiple facets that measure more specific behaviors, and each facet comprises nuances that measure even more specific behaviors (Ilmarinen, 2018). In this model, extraversion is defined by five facets which are gregariousness, assertiveness, activity-level, excitement-seeking, and positivity. Thus, high extraversion implies being gregarious, assertive, energetic, easily excitable, and positive. Conversely, introverts exhibit opposite behaviors (John et al., 2008). Some authors believe this concept to be incomplete as they argue that warmth should be included as a facet of extraversion. However, the consistency of extraversion measures across various models diminishes the significance of this contention (Ilmarinen, 2018).

The FFM's concept of extraversion was chosen for this thesis for two reasons. Firstly, it's viewed as the most comprehensive measure, incorporating all behaviors naturally associated with the trait, unlike Eysenck's model, which lacks certain aspects like assertiveness and positivity (John et al., 2008). Secondly, the FFM aligns with Eysenck's widely accepted criteria for a personality model paradigm, making it the most used model for measuring personality (Ilmarinen, 2018). Thus, adopting the FFM's extraversion concept facilitates comparisons with other studies. Jung's concept was excluded due to its outdated nature and impracticality for large-scale studies.

Overconfidence

Overconfidence was first defined by Fischhoff (1977) as an overly positive miscalibration of one's chances of success for a given task. This concept involved presenting questions to respondents and then prompting them to

estimate how many questions they answered correctly. Their estimated number of correct answers was then compared to their actual performance and any overly optimistic guess by the respondent was considered as overconfidence. This miscalibration approach attributed overconfidence to heuristic-induced mistakes during decision-making. Despite finding its uses in psychology, this approach was criticized for disregarding the importance of the bias's motivational factors and for being unable to explain overconfidence phenomena observed in practical fields (Skala, 2008).

Consequently, the positive illusions approach studied these phenomena to expand understanding of the overconfidence bias and its motivational aspects. Alicke (2009) considers that overconfidence results from the use of construal mechanisms which consist of re-interpreting situations in a way that protects one's self-esteem. These mechanisms prevent the individual from facing negative feedback, thus resulting in the creation of a general overestimation of self that is then manifested through positive illusions. However, some criticized this approach, questioning the validity of the tests used to prove positive illusions and making remarks about the inherent difficulties that come with quantifying subjective psychological data (Skala, 2008).

Modern definitions of overconfidence now incorporate teachings from both the miscalibration and positive illusions approaches, often adapting these definitions to the context of the bias being studied. In behavioral finance, Baker (2022) defines overconfidence as the tendency of investors to overestimate their knowledge, skills, and information relative to others, leading to uninformed or irrational decisions. Baker notes that this bias can manifest through various means, such as a preference for private information or self-attribution bias. However, some psychology authors criticize these definitions for their lack of precision, suggesting they may result in inconsistent findings and conclusions (Moore & Healy, 2008).

Baker's (2022) definition of overconfidence has been chosen for this thesis because it is the evolution of the miscalibration and positive illusion approaches (Skala, 2008). Moreover, this definition is widely used in studies that explore the connection between extraversion and overconfidence, thus using it facilitates study comparability (Baker et al., 2021; Lin, 2011). Although criticisms of this definition are acknowledged, the primary aim of this thesis remains to derive applicable conclusions for French retail-investors, making an adapted definition more advantageous.

Main theories

EMH and Behavioral Finance

Traditional finance operates on the assumption that agents are homo-economicus, meaning they exhibit rational behavior, seek to maximize utility, and can process vast amounts of information simultaneously. This assumption simplifies financial models by making them more predictable and consistent as the complexity of human decision-making is ignored (Kahneman & Tversky, 1979).

This assumption led to the creation of the efficient market hypothesis (EMH) theory (Fama, 1970). This theory suggests that prices depend only on available information, and price adjustments follow a random walk pattern, meaning that each price is independent of the previous one (Malkiel, 2003). It also suggests that any arbitrage opportunities in the market would swiftly vanish as fully rational and informed agents would exploit them until they were eradicated (Fama, 1970). Initially embraced by most in finance, this model served as the foundation for subsequent financial theories.

However, by the 1980s, doubts arose regarding the validity of this model, and its use of the homo-economicus. This is because financial phenomena, such as excessive stock volatility, seemed unexplainable within the framework of the EMH. Shiller (2003) realized that these phenomena could only be explained if investors were not fully rational. Around the same time, Kahneman and Tversky (1979) presented their prospect theory which accounted for the cognitive limitations of decision-makers and proved that, when under uncertainty, people make decisions based on the potential value of gains and losses rather than the utility of the decision. This theory provided a more realistic framework for decision-making and was consequently applied to financial markets by Thaler (1990) to better understand and model the behaviors of investors and market participants, thereby contributing to the development of behavioral finance. Behavioral finance is a field that uses principles from decision-making psychology to analyze financial theory, aiming to identify and explain financial phenomena that would otherwise be unexplainable (Barberis, 2013; Hammond, 2015).

Nowadays it is widely accepted that agents exhibit partial rationality in decision-making, often using heuristics to make quick decisions (Tversky & Kahneman, 1974). Heuristics are mental strategies or shortcuts individuals use to simplify complex decision-making processes. Adaptive in nature, they enable quick judgments or solutions without extensive information processing, aiding in dealing with complex situations beyond our brain's full processing capacity (Tversky & Kahneman, 1974). Heuristics can lead to biases, which are systematic deviations from rationality that are associated with financial phenomena such as stock market bubbles and excessive trading, which makes studying them essential (Barberis, 2013). Biases can also stem from emotions,

giving us three categories of biases. Cognitive biases are attributed to errors in thinking and judgment caused by heuristics (Kahneman & Tversky, 1979). Emotional biases are driven by emotions like fear, greed, and anxiety (Thaler, 1999). Behavioral biases stem from both heuristics and emotions and often manifest in observable behavioral patterns (Kahneman & Tversky, 1979).

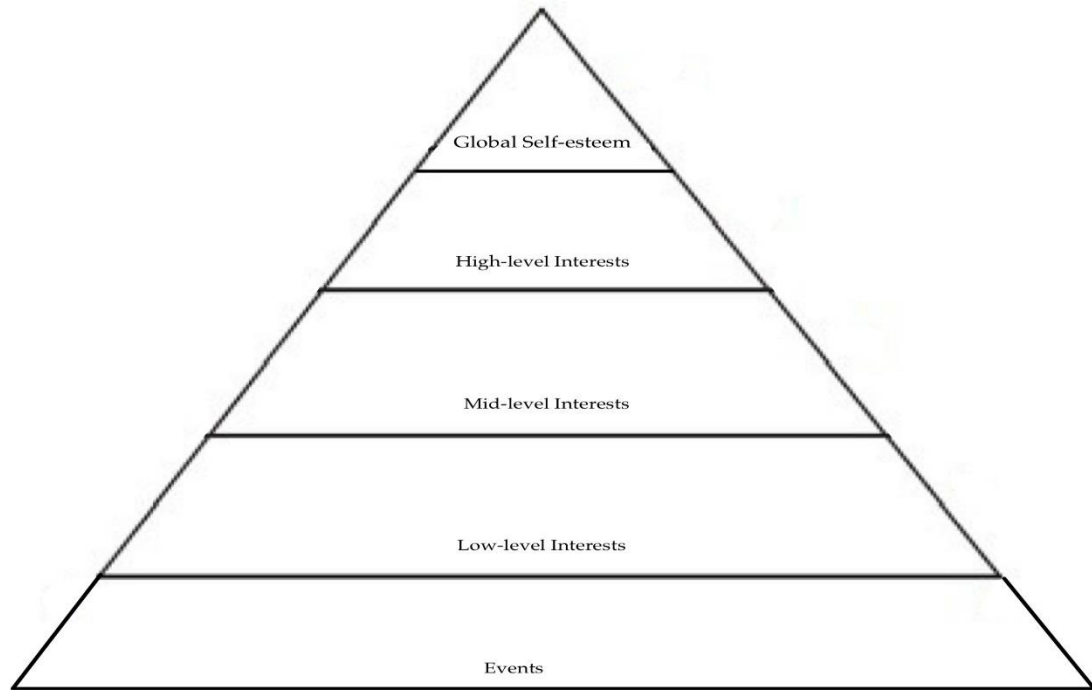
The study of these biases and their impacts on financial decisions within behavioral finance has faced criticism due to the field's main challenge which has to do with translating qualitative and subjective psychological data into quantitative and objective data to be used in financial models (Skala, 2008). This process can introduce bias into the data which can then result in overly complex and unprecise models that lack predictive power (Kahneman & Tversky, 1979). However, behavioral finance has helped elucidate financial phenomena that would have been unexplainable otherwise. Recognizing its flaws is important to diminish their impact, but they do not invalidate the valuable contributions of the field.

Overconfidence

Self-enhancement theory

Understanding the overconfidence bias requires exploring how individuals cultivate a general overestimation of self. Alicke and Sedikides's (2009) theory on self-enhancement provides an insight into this phenomenon. Their theory suggests that individuals possess psychological interests regarding their skill-levels, social status, and self-perceptions that they aim to protect. These interests are structured hierarchically, with global self-esteem at the top and consequent levels including less important and more specific interests. This hierarchical arrangement is significant as it illustrates the interconnectedness of

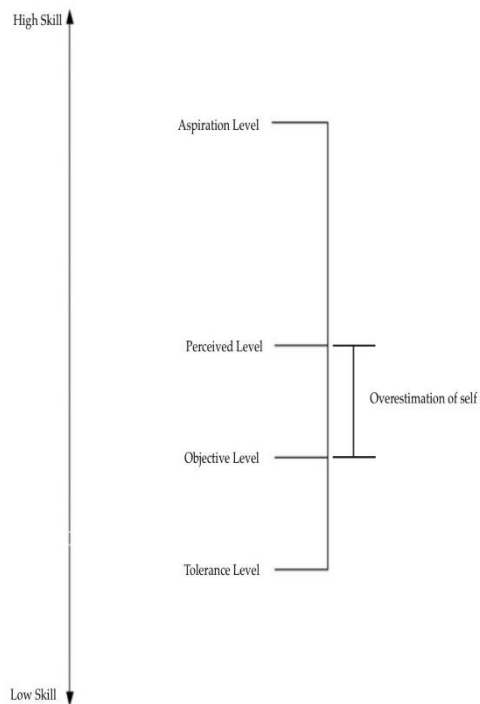
all interests (see Figure 1). Therefore, when events impact lower-level interests, they inevitably impact global self-esteem (Alicke & Sedikides, 2009).



Source: Self-elaborated

Then, they explain that each interest involves four skill-levels. In order from highest to lowest, they are the aspiration level, the perceived level, the objective level, and the tolerance level. The aspiration level is the skill-level the individual aims to achieve. The perceived and objective levels represent their self-perceived and actual skill-levels, respectively. The tolerance level indicates the skill-level the individual wants to avoid falling below (see Figure 2).

Figure 2: Depiction of skill-levels.



Source: Self-elaborated

The perceived and objective levels will fluctuate between the aspiration and tolerance levels in response to events, as individuals strive to move closer to the first and away from the latter (Alicke & Sedikides, 2009).

To achieve this, individuals employ self-enhancement strategies through primary or secondary control. Primary control is done whenever possible and entails taking direct action to address a situation. When taking action isn't an option, individuals resort to exerting secondary control, which involves using construal mechanisms to reinterpret the situation in a way that safeguards their psychological interests. Both methods aim to maintain high levels of global self-esteem (Alicke & Sedikides, 2009).

To understand how these concepts play out, let's imagine a successful investor facing a scenario where a stock he purchased loses all its value. His psychological interest in viewing himself as a successful investor is being harmed. To address this, he may exert primary control by finding a solution to

make up for his losses, thus increasing his objective skill-level as an investor. If that isn't possible, he will have to exert secondary control and re-interpret the situation by, for example, blaming some factor out of his control as the reason why he incurred those losses. This will preserve his self-perceived skill-level, but not his objective skill-level, thus resulting in a growing difference between the two, which results in a general overestimation of self (Alicke & Sedikides, 2009). This general overestimation of self then affects decision-making by making the investor have excessive certainty about his chances of success. In financial markets, this manifests as the better-than-average effect, overly precise predictions, excessive trading, and other signs of overconfidence studied in behavioral finance (Baker et al., 2022).

Dual process theory

The metacognitive perspective of the dual process theory explores how this general overestimation of self leads to biased decision-making through cognitive processes. This theory suggests that there are two types of information processing named type 1 and type 2. Type 1 processes generate quick, intuitive responses using heuristics by integrating background knowledge and pragmatic implicatures. Type 2 processes, in contrast, are slower and more deliberate as they offer context-independent and fully rational answers (Kahneman & Tversky, 1979).

The theory suggests that type 1 processes are always preferred, as they are effortless since they don't require working memory resources. Type 2 processes, on the other hand, are only used when the intuitive response from type 1 is deemed inappropriate. This assessment of the appropriateness of the type 1 process is known as the feeling of rightness (FOR), which is a metacognitive process that relies on intuitive memory retrieval mechanisms (Thompson et al.,

2011). Essentially, individuals gauge the correctness of the heuristic response from the type 1 process by evaluating how quickly and fluently they can retrieve it from their memories as well as considering the emotion associated with it. Thus, if the intuitive response is quickly accessible, comes to mind effortlessly, and is attached to a positive emotion, the FOR is heightened, and the type 2 processes are not engaged (Thompson et al., 2011).

However, memory retrieval mechanisms are flawed as people who overestimate themselves remember past positive experiences more vividly than negative ones (Moore & Healy, 2008). Thus, individuals with a general overestimation of self will tend to positively miscalibrate their FOR, leading them to accept more incorrect responses from type 1 processes whilst maintaining high confidence levels, which is the definition of overconfidence.

Therefore, overconfidence in decision-making is the result of a miscalibration of the FOR that is triggered by an overly positive image of self that stems from the constant use of self-enhancement strategies and the human memory's bias toward positive memories (Alicke & Sedikides, 2009; Thompson et al., 2011). These mechanisms highlight how cognitive limitations and the psychological imperative to maintain high confidence and happiness levels contribute to overconfidence.

Extraversion

The FFM and its measurement of extraversion were chosen for this thesis because they're considered the standard tool for measuring personality. Understanding how these two were constructed is crucial for assessing their validity. In the 1990s, personality psychologists started searching for a personality modeling paradigm as they believed it would facilitate coordinated

research and accelerate the rate of discoveries (Eysenck, 1991). Consequently, Eysenck developed a set of criteria that a paradigm must meet to gain consensus among personality psychologists. These criteria, totaling 14, are categorized into taxonomic and causal criteria. The taxonomic criteria regard the construction of the FFM as a tool for identifying, describing, and measuring behaviors and the causal criteria concern the characteristics of the broad traits of the model (Eysenck, 1991).

Taxonomic criteria

The taxonomic criteria state that a paradigm personality model should be holistic, grounded in a natural science theory of personality, and produce replicable outcomes. It should clearly define personality traits, organize them hierarchically, and ensure that the broad traits are not correlated. Eysenck also believes that the broad traits of the paradigm should be the result of using factor analysis (Eysenck, 1991). Additionally, meta-analyses should compare models that meet these criteria to determine the most effective one. As discussed earlier, the FFM largely adheres to these criteria, but further explanation is needed regarding its theoretical foundation, replicability, and performance in meta-analyses.

The FFM is rooted in the general integrative trait approach, which asserts that general principles of personality can be established using inductive logic. This method involves applying factor analysis to data from questionnaires and lexicons to identify behavioral patterns and link them to personality traits (Fleeson & Jayawickreme, 2015). In this approach, personality is defined by traits which are stable characteristics that impact an individual's thoughts, feelings, and behaviors across diverse situations and over time (Kahneman & Tversky, 1979). The scientific method is then used to test the existence of these

traits. This confirms that the FFM is based on a natural science theory of personality and uses factor analysis to determine its broad traits (Eysenck, 1991). Moreover, John (2008) notes that numerous authors have identified the five broad traits of the FFM using different datasets, thus demonstrating the model's replicability and success in meta-analyses.

Causal criteria

The causal criteria state that the broad traits should be consistent over time, easily observable, universal, have a genetical and physiological backing, and lead to socially relevant conclusions (Eysenck, 1991). Firstly, extraversion remains relatively stable throughout an individual's life despite short-term variations. While people may exhibit different behaviors along the extraversion-introversion spectrum daily, their mean levels of extraversion tend to stay consistent over time (Ilmarinen, 2018).

Secondly, the observability of the trait is tested using self-other and other-other correlations. Self-other correlations compare self-ratings with ratings from others, while other-other correlations measure consistency between different individuals' assessments of the same behavior. The self-other and other-other correlations for extraversion are the highest of the five main factors, indicating high observability (Ilmarinen, 2018).

Thirdly, the universality of the big five personality traits, particularly extraversion, is evident as the broad trait is recognized across different cultures (McCrae & Terracciano, 2005). While some niche and isolated cultures may not recognize extraversion exactly as described in the big five, they recognize broad factors that can be described as a mixture between the extraversion and agreeableness broad traits of the FFM. Even so, these niche cultures are exceptions and even though extraversion is not perfectly universal, it is more

widely recognized than equivalent broad traits from other personality measuring models (Ilmarinen, 2018).

Fourthly, the genetic and physiological factors that explain extraversion are explored in multiple studies. Researchers test the genetic heritability of extraversion by comparing levels in identical and non-identical twins. This method assumes that both sets of twins are raised in similar environments. Therefore, greater variation in non-identical twins suggests that genetics play a role in determining extraversion levels. Though exact genetic predictors are elusive, studies suggest genes related to neurotransmitter systems could explain extraversion (Ilmarinen, 2018). This relates to Eysenck's concept which considered that differences in extraversion could be explained by cortical arousal levels (Eysenck, 1963).

Finally, the social relevance of studying extraversion is supported by its links to various psychological and social phenomena, such as mental illnesses, academic performance, and criminality (Ilmarinen, 2018). In behavioral finance, extraversion was found to be linked to professional performance, risk-seeking behaviors, or biased decision-making (Lin, 2011). Thus, demonstrating that studying extraversion can lead to socially relevant conclusions.

Therefore, we see that the FFM and its extraversion trait fit all the criteria set by Eysenck which explains why this method for measuring extraversion has become the paradigm (Eysenck, 1991).

Description of extraversion's facets

To understand how extraversion relates to overconfidence, it's important to delve into its facets. (McCrae & Terracciano, 2005). Gregariousness pertains to sociability, with highly gregarious individuals actively seeking interactions within group settings. Assertiveness reflects a person's inclination to take

charge and lead group activities. Activity level encompasses nuances like vigor and energy, suggesting high scorers in this facet prefer a fast-paced lifestyle. Excitement-seeking relates to the tendency of extroverted individuals to seek risk. Finally, positivity captures the inclination to experience positive feelings (McCrae & Terracciano, 2005).

Link between extraversion and overconfidence

Self-assessment and comparisons with others shape self-esteem, thus the need for self-enhancement is linked to social and personal factors such as environment and personality (Alicke & Sedikides, 2009). Considering that gregariousness and assertiveness measure the inclination to seek social acceptance and leadership roles, it can be inferred that high scorers in these facets are more sensitive to peer pressure (McCrae & Terracciano, 2005). Thus, they will self-enhance more, inevitably developing an overly positive image of self through the psychological mechanisms mentioned in the self-enhancement theory. This is supported by a study showing that extroverts experience increased self-esteem and overconfidence when comparing themselves to others (Vaughan-Johnston et al., 2021). Therefore, highly gregarious and assertive people will have a higher FOR in situations involving direct-social-comparison, thus increasing their chances of becoming overconfident. Moreover, moderate overconfidence can lead to greater success in social settings, further exacerbating overconfidence in these individuals through mechanisms of self-presentation (Baumeister, 1982).

The positivity facet, which measures sensitivity to positive emotions, may amplify the effect of events that boost self-esteem. This can facilitate the creation of an overly positive self-image, leading to higher overconfidence through the mechanisms previously discussed (Thompson et al., 2011).

Excitement-seeking is linked to risk-aversion as high scorers in this facet have a higher tolerance for risk. Considering that the FOR is negatively linked to perceived risk, we understand that a higher tolerance towards risk translates to a higher average FOR. Therefore, high scorers in this facet have a higher average FOR in all situations, which translates to a higher chance of being overconfident (Thompson et al., 2011).

Finally, activity-level encompasses impulsivity, which may translate into a higher than average FOR during decision-making, therefore increasing overconfidence levels (Thompson et al., 2011).

Given the numerous connections established between different facets of extraversion and overconfidence, it's reasonable to consider the notion that extraversion could predict overconfidence. Authors like Baumeister (1982) propose a bidirectional relationship, supported by his self-presentation theory, which states that individuals modify their behavior to shape impressions. According to this theory, individuals engage in self-presentation to enhance social interactions, gain social or material advantages, and shape their identity. They adapt their behaviors in response to social feedback, and sometimes these adjustments become permanent, illustrating how social pressure shapes personalities (Baumeister, 1982).

Considering that moderate overconfidence is generally perceived positively in social contexts, individuals may become overconfident to receive social appraisal. This can consist of adopting confident and risk-seeking behaviors which are measured by the extraversion broad trait. Therefore, overconfidence may increase extraversion levels (Baumeister, 1982).

This effect can be accentuated in investment contexts, where competitiveness is strong and prediction accuracy is a crucial skill. Investors may adopt overly

precise and overconfident behaviors to seek social validation, thereby adding extraverted tendencies to their behavior (Baker et al., 2022).

In conclusion, ample theoretical evidence suggests a strong link between extraversion and overconfidence, with theories supporting both directions of this relationship.

Empirical evidence

Little empirical evidence studies the correlation between extraversion and overconfidence. Thus, limited empirical evidence finds a positive correlation between the two. Moreover, most studies that investigate this link test the relationship between multiple biases and all five broad factors. This often leads to simple analyses of results, which obstructs the elaboration of a complex understanding of the relationship (Baker et al., 2021, 2022; Lin, 2011). Nevertheless, the values of extraversion, overconfidence, and their correlations from previous studies will be presented and discussed to identify any underlying patterns.

Mean overconfidence and extraversion levels are often not provided, as the focus is usually on their correlation. Nonetheless, Baker et al. (2022) found a mean overconfidence value of 3.39 and Lin (2011) found a value of 3.43, showing little variation. With limited data, no strong conclusions can be made. Regarding extraversion, most studies find a value around 3.5 with little variation. Baker et al.'s (2022) study stands as an outlier as they found a mean extraversion level of 4.045, this result will be explored later. Excluding this study, no strong conclusions can be made about extraversion levels due to the lack of variation.

Most studies find a positive and significant link between extraversion and overconfidence, with the average correlation coefficient being around 0.15. For instance, Lin (2011) reported a coefficient of 0.15 for Taiwanese retail-investors, Schaefer (2004) observed a coefficient of 0.18 for American students, and Zaidi and Tauni (2012) identified a coefficient of 0.156 for Iranian retail-investors. However, Baker et al. (2021) deviates from this pattern, revealing a higher correlation coefficient of 0.359 for Indian retail-investors. This outlier may be explained by the inclusion of overconfidence questions involving direct-social-comparison, which amplifies overconfident behavior among high scorers in extraversion (Vaughan-Johnston et al., 2021). Including such questions likely contributed to the higher correlation observed in the study. Remarkably, among studies of this nature, Baker et al.'s (2022) paper stands out as the only one that did not uncover a statistically significant relationship between extraversion and overconfidence. Given the methodological similarities between both Baker et al.'s studies, a comparative analysis can help identify factors that explain the absence of a significant correlation in the 2022 study.

Firstly, the 2021 study uses structural equation modeling (SEM) whereas the 2022 study uses multiple regression analysis. SEM is more effective at identifying relationships between social measures because it accounts for measurement errors that come with self-reported values (Mueller & Hancock, 2018). This difference in statistical methods may partially explain why the 2021 study identifies a statistically significant relationship between extraversion and overconfidence, while the 2022 study does not.

However, the most relevant differences between both studies regard the samples and the questions used to measure overconfidence. The 2021 study surveys Indian retail-investors whereas the 2022 study surveys Indian

professional-investors. Additionally, while half of the questions in the 2021 study put the respondent into a state of direct-social-comparison, only a quarter of the questions in the 2022 study do so. These differences are important because previous studies have shown that although professional-investors tend to be better calibrated regarding their decision-making, they also tend to overestimate themselves in relation to others more (Menkhoff et al., 2013). Thus, demonstrating that professional-investors are more sensitive to the effect of direct-social-comparison.

The 2022 study's emphasis on minimizing the use of direct-social-comparison questions decreases the likelihood of professional-investors exhibiting overconfident behavior despite having very high levels of extraversion (4.045). Even so, this doesn't explain why the correlation between the two factors is not significant, as in this case there should still be a significant, albeit weaker correlation. To explain this lack of correlation, the self-presentation theory must be used. The theory explains that professional-investors put on a persona of high confidence and assertiveness when they are in a professional setting because these behaviors are positively rewarded in the financial field (Liu, 2019). Many respondents may portray high extraversion without truly embodying these traits (Baumeister, 1982). Consequently, they consistently exhibit high extraversion levels but not necessarily high overconfidence levels, leading to the observed lack of correlation between both factors.

In conclusion, the correlation between extraversion and overconfidence is complex and influenced by multiple factors. While most empirical evidence indicates a positive and significant relationship between the two, it's essential to account for variables like direct-social-comparison, self-presentation, and cultural context. These factors not only affect extraversion and overconfidence separately but also their correlation.

Research context

Macroeconomic conditions

Globally, the economy has faced significant volatility since the Covid-19 crisis. Rising worldwide inflation and increasing interest rates have strained economic stakeholders. The OECD's Consumer Confidence Index has steadily declined since June 2021, hitting a low of 96.5 in July 2022. Recent geopolitical tensions have further worsened the index, keeping it below the 100-point mark since June 2021, indicating widespread pessimism among OECD households about their financial future and investment prospects (OECD, 2023a). Similar pessimism is evident in other economic indicators. For example, the US Expectations Index plummeted to 73.7 in September 2023, historically indicating an impending economic downturn (TCB, 2023). Likewise, Japan's Consumer Confidence Index has been on a downward trend since July 2023 (COJ, 2023).

Financial markets

France's financial sector is robust and diverse, reflecting its status as a major global economy. Paris serves as a key financial hub, hosting numerous prominent institutions. However, recent events such as the Ukraine-Russia conflict, high inflation rates, and banking crises, including the Silicon Valley bank scare and the bankruptcy of Crédit Suisse, have introduced uncertainty.

These events have caused spikes in the VSTOXX, a volatility index tied to the EURO STOXX 50, reaching 32.02 on 15/03/2023, coinciding with the Credit

Suisse bankruptcy, indicating market fear. The American equivalent, the VIX index, has shown a similar trend.

Despite challenges, the CAC 40 index, representing France's top 40 companies, has been bullish, recording an 11.02% increase over 2022. This outperforms indices such as the DAX (+9.54%), FTSE 100 (-0.01%), DOW JONES (+2.62%), and IBEX 35 (+5.51%), indicating strong performance relative to other major economies. Factors contributing to this success include the relaxation of China's COVID-19 policies, which opened the second biggest luxury market and benefited companies like LVMH, Kering, Hermès, and L'Oréal, comprising approximately 37.5% of the CAC 40's capitalization. Additionally, only 2 out of the 40 companies reported negative results for 2022 (Marion, 2023).

Market regulations

In France and Europe, strict regulations govern financial institutions and investors, both professional and retail. French retail-investors must adhere to rules set by the European Securities and Markets Authority (ESMA), including MiFID II, aimed at enhancing transparency from financial institutions. This regulation mandates institutions to provide retail-investors, for whom trades are made, with detailed information about the trades and associated costs, ensuring their protection (OECD, 2023b). Furthermore, institutions must rigorously assess the suitability of complex financial products for clients, considering their risk preferences. This aims to provide retail-investors with comprehensive information for well-informed decisions, ultimately reducing biased choices (Pauley, 2020). The French regulator, the Autorité des Marchés Financiers (AMF), has also implemented regulations to safeguard investor

rights. Furthermore, it offers educational materials and tools designed to assist retail-investors in making informed decisions (AMF, 2022, 2023).

French retail-investors

The number of retail-investors in France surged from around 1.15 million in 2019 to 1.43 million by 2022, this is part of a global trend linked to the Covid-19 pandemic and the rise of crypto-assets (OECD, 2023b). Referred to as “new-retail-investors” by the OECD, these individuals began investing during the lockdowns and are typically younger, less risk-averse, and possess less investment knowledge than traditional investors (AMF, 2022). In 2021, French retail-investors accounted for 2.1% of the French equity market, showing a rise from 1.6% in 2018, reaching a peak of 2.9% during the lockdowns in April 2020 (Chatillon et al., 2021).

French retail-investors possess distinct characteristics compared to populations in previous studies, notably in demographics. For starters, Women comprise 30% of French retail-investors, contrasting with only 14% of India’s (Baker et al., 2021). Additionally, France stands out with over 50% of individuals under 35 holding tertiary education degrees, against 20,5% for India (OECD, 2020). This contributes to a relatively high level of financial literacy among investors (S&P, 2014). So, French retail-investors should be less overconfident than retail-investors from previously studied populations.

However, the “new-retail-investors”, that now represent around 20% of total French retail-investors, have been shown to be more overconfident than traditional investors. Indeed, despite 67% perceiving themselves as highly financially literate, they achieve lower scores on financial literacy tests

compared to traditional investors (OECD, 2023b). Naturally, this overconfidence manifests in their investment decisions as they embrace riskier strategies. On average, traditional French retail-investors hold 3.48 products, while French new-retail-investors hold 3.12. Moreover, 54% of new-retail-investors invest in crypto-assets, as opposed to only 25% of traditional retail-investors. Conversely, 47% of traditional retail-investors opt for guaranteed life-insurance, whereas only 33% of new-retail-investors do so. This inclination towards risk-taking is further illustrated by the fact that 79% of new-retail-investors actively gamble (OECD, 2023b). In addition to taking riskier investment decisions, new-retail-investors also rely more on social media for financial information and are more susceptible to emotional influences and peer pressure in their financial decision-making processes.

This recent transformation of the average French retail-investor has resulted in a rise of risky behaviors, prompting concerns from regulatory bodies such as the AMF. Consequently, these regulators are now considering measures to educate and oversee these new-retail-investors (OECD, 2023b).

Another crucial distinction between French retail-investors and those in previous studies lies in their cultural background. Indeed, France exhibits a more individualistic culture, emphasizing personal achievements, independence, and self-expression over collective goals or group harmony (Hofstede, 2001). These cultural nuances influence behaviors through the mechanisms presented in the self-enhancement and self-presentation theories (Alicke & Sedikides, 2009; Baumeister, 1982). Therefore, French retail-investors are expected, on average, to demonstrate higher levels of competitiveness, self-reliance, lower risk-aversion, and a more short-term focus compared to investors from cultures such as India or Taiwan (Hofstede, 2001).

Hypotheses

H1: French retail-investors express high levels of overconfidence.

Efforts by France to educate and support investors in making informed financial decisions could mitigate overconfident behavior (AMF, 2022, 2023). Moreover, the prevailing pessimistic sentiment in France and Europe, along with the population's cautious approach, may also temper overconfidence (Hatch et al., 2018). Furthermore, France's relatively lower level of extraversion, a trait often linked to overconfidence, suggests that French retail-investors may be less prone to overconfidence (Schmitt et al., 2007).

However, every indicator suggests that French retail-investors are likely to exhibit high levels of overconfidence. Firstly, France's individualistic culture emphasizes traits such as competition, self-confidence, and superiority, fostering overconfidence (Hofstede, 2001). Additionally, success in finance often hinges on outperforming others, further promoting overconfident behavior (Baumeister, 1982).

Moreover, recent reports indicate that the new generation of French retail-investors is much more overconfident and prone to peer pressure. They prefer obtaining financial information from financial influencers and social media which promote riskier behavior as evidenced by their investing habits (OECD, 2023b). Additionally, the two studies that present average overconfidence levels of 3.4 used data that was collected prior to 2019, before the arrival to the market of new-retail-investors. Therefore, French retail-investors should, through the mechanisms presented in the self-presentation and self-enhancement theories, have high overconfidence levels (Alicke & Sedikides, 2009; Baumeister, 1982).

H2: Extraversion is positively and directly correlated to overconfidence among French retail-investors.

Baker et al's (2022) study has shown that sociodemographic and contextual factors may affect the significance of the correlation between extraversion and overconfidence. Thus, considering the higher education levels of French investors, coupled with negative economic and social contexts, and efforts by regulatory bodies like the AMF to promote financial literacy, these factors might attenuate the significance of the correlation coefficient (AMF, 2022, 2023).

However, the theories of self-enhancement and self-presentation suggest that a bi-directional relationship between extraversion and overconfidence exists. Indeed, the first suggests that extraverted individuals have a higher chance of becoming overconfident as they have a higher proclivity to applying self-enhancement strategies which widen the gap between an individual's self-perceived and objective level at a skill, thus making the individual more overconfident (Alicke & Sedikides, 2009). The second explains that because overconfident behaviors are celebrated, specifically in the financial field, investors will adopt behaviors related to self-confidence, risk-seeking, and impulsivity, which are all measured by different facets of extraversion (Baumeister, 1982). Numerous studies conducted across various countries and time periods support this relationship (Baker et al., 2021; Schaefer et al., 2004; Zaidi & Tauni, 2012) Moreover, recent reports have shown that French new-retail-investors are simultaneously more overconfident and display behaviors of impulsivity, risk-seeking, and assertiveness which are measured under extraversion (OECD, 2023b).

In conclusion, the amount of theoretical and empirical evidence supporting the relationship between extraversion and overconfidence outweighs factors

potentially leading to a non-significant relationship. Therefore, extraversion and overconfidence should be significantly and positively correlated.

Chapter 3

Methodology

Method

The qualitative approach is valuable for in-depth analysis of complex phenomena through techniques like interviews and controlled observations. It offers flexibility for tailored research, enabling clear data collection (Cleland, 2017). However, subjectivity from the researchers can introduce bias, limiting generalizability due to smaller sample sizes. Moreover, qualitative research demands more time and resources (Rahman, 2016).

Conversely, the quantitative method suits large-scale studies with structured tools like surveys. Its established methodology promotes objectivity and enhances study replicability. Nevertheless, it may lack depth in understanding nuances, prioritizing broad and generalizable patterns (Rahman, 2016). For this thesis, the quantitative method is more suitable due to its objectives of achieving generalizability and comparability with prior research (Baker et al., 2022).

Data collection techniques

This thesis uses a questionnaire to collect primary data, focusing on French retail-investors' extraversion and overconfidence levels. Questionnaires facilitate data collection from a large and diverse sample, enhancing study robustness (Dillman et al., 2014; Holmes, 2009). In addition to being more cost and time-effective, they also standardize the data, aiding in result interpretation

and comparability (Holmes, 2009; Regmi et al., 2017). However, they may suffer from self-report bias and limited depth of information. To mitigate bias, respondent anonymity will be ensured, clarifying that responses are solely for this study (Oppenheim, 1992). While complementary qualitative methods can address the depth issue, their integration is hindered by cost and time constraints (Creswell, 2014). Other quantitative methods such as secondary data analysis and observational studies were considered but not selected. Secondary data analysis was impractical due to data availability issues, while observational studies posed time constraints and introduced biases (Miller & Brewer, 2003).

Sample selection

The research utilizes random sampling, focusing solely on French retail-investors without stratifying the population (Taherdoost, 2016). This approach ensures equal chances of inclusion for all individuals, promoting representativeness and reducing bias. It aids in drawing statistically valid conclusions about the population, providing a solid foundation for the inferences and generalizations made in this thesis. Additionally, it is often more cost-effective and easier to implement compared to other sampling methods. However, drawbacks include the need for a larger sample size and the potential underrepresentation of certain sociodemographic groups (Acharya et al., 2013). A standard 95% confidence level and a 5% margin of error are considered to measure the sample size. Regarding the population proportion, AMF states that 2.1% of the French population are retail-investors (Santos et al., 2023).

$$n = \frac{Z^2 * p * (1 - p)}{E^2}$$

$$n = \frac{1.96^2 * 0.021 * (1 - 0.021)}{0.05^2} \approx 32$$

Therefore, the sample should have at least 32 respondents (Acharya et al., 2013).

Implementation method

Google Forms was used to gather data. Online surveys offer convenience and data management benefits, which should increase the response rate (Joinson, 1999). Notably, they maximize reach, resulting in a larger sample, statistical power, and higher diversity in sociodemographic profiles (Gosling et al., 2004). While internet access discrepancies may impact representativeness, 92.5% of French households had internet access in 2022, thus mitigating this limitation (Eurostat, 2023). However, self-selection bias poses a significant risk. To address this, the survey will include questions on respondents' sociodemographic profiles to filter out undesirable data, and the introductory message will clearly define the target population (Wright, 2006).

Despite their limitations, online surveys stand as the best tool for gathering data. Their advantages far outweigh their disadvantages, especially considering the precautions taken to mitigate them. Google Forms was specifically chosen because it is popular and intuitive, which should increase the response rate (Regmi et al., 2017).

Variables

The survey, presented in French to enhance response rates, comprises three parts. The first gathers demographic information to characterize the sample, control for confounding variables, and facilitate group analysis (Baker et al., 2021). The second and third sections respectively measure overconfidence and extraversion, using eight sentences each. Respondents rate their agreement with these sentences on a 5-point Likert scale, generating self-reported measures for both variables, with the mean score providing a holistic measure (Baker et al., 2021; Lin, 2011).

The overconfidence sentences are taken from previous successful studies on the subject (Baker et al., 2021; Lin, 2011). These sentences are based on the influential work of Pompian (2006), who used different manifestations of overconfidence, such as the attribution bias, unrealistic optimism, or overplacement to measure the bias (Skala, 2008).

Other methods for measuring overconfidence such as those presented in Moore and Healy's (2008) study were pondered. However, they involve complex and lengthy tests, which could reduce response rates and complicate the data gathering and processing (Schaefer et al., 2004).

The extraversion sentences are taken from the French version of the Big Five Inventory (BFI-fr). The BFI is a FFM inventory, meant to measure one's full personality, where each question measures a different facet.

Other common methods such as the NEO PI-R and the NEO-FFI were equated. The NEO PI-R, with its 240 questions, is better suited for situations with no time constraints and where the respondents have a certain level of psychological literacy. The NEO-FFI, on the other hand, would be more

relevant for this thesis as it is a simplified and shorter version of the NEO PI-R with only 60 questions (Costa & McCrae, 1992). However, the BFI being shorter yet as effective as the NEO-FFI, has also been translated into multiple languages and was successfully used in cross-cultural studies, demonstrating its effectiveness and universality (John et al., 2019; Schmitt et al., 2007). Additionally, it is generally more understandable for non-English speakers (John & Srivastava, 1999; Plaisant et al., 2010). Thus, making it the best inventory for this thesis.

To access the survey in this thesis, please refer to Appendix A.

Collection structure

Initially, pilot tests were made with individuals within our target population to detect and rectify any potential issues within the survey instruments, ensuring the accuracy and reliability of the data collected (van Teijlingen & Hundley, 2002). Then, a list of potential respondents was built containing people who followed renowned French financial press pages on LinkedIn. The goal was to engage with a diverse range of French retail-investors, irrespective of background or profession (Regmi et al., 2017).

Subsequently, the respondents were contacted with an introductory message outlining the survey's goals, ensuring respondent confidentiality, explaining data usage, providing an estimated completion time, and requesting voluntary participation to foster trust and cooperation. This message was repeated in the survey's opening page, accompanied by a question asking respondents to accept the conditions, an essential procedure to respecting participant rights (Regmi et al., 2017). To optimize response rates and minimize non-response bias, periodic reminders were sent to individuals who had not yet participated

in the survey, reinforcing the importance of their input and maintaining engagement with the study. Upon data collection, a message thanking the respondents for their participation was sent, acknowledging their time and attention (Regmi et al., 2017). Consequently, the data was downloaded, and the survey closed, ensuring data integrity and confidentiality.

Main methodology

Given the cross-sectional nature of the data and the hypotheses of this thesis, the main tool chosen for testing them is correlation analysis. Pearson's correlation coefficient, Spearman's rank correlation coefficient, and structural equation modeling (SEM) were commonly used in previous similar studies (Baker et al., 2022; Lin, 2011).

SEM is popular in behavioral finance because it accounts for the measurement errors inherent with self-reported values, allows for the simultaneous examination of multiple variables, and allows to test causality. However, for this thesis, which aims to explore only the correlation between extraversion and overconfidence, SEM isn't ideal. Establishing causality would necessitate extensive experimental controls and longitudinal data collection beyond the study's scope and resources. Consequently, using SEM to study the correlation between just two factors isn't optimal (Mueller & Hancock, 2018).

Choosing between Pearson's and Spearman's methods depends on the data characteristics since they are both adequate to test the hypotheses. Pearson's correlation coefficient assesses the linear relationship between two continuous variables, assuming a normal distribution. Hence, this model is not adequate because the two main variables of the thesis are ordinal, which also makes it more likely for the data to not be normally distributed (Hauke & Kossowski,

2011). Conversely, Spearman's coefficient is non-parametric, suited for ordinal and non-normally distributed data as it ranks variables rather than relying on their specific numerical values. This makes it robust against outliers and suitable for detecting monotonic relationships. Furthermore, Spearman's method shows more stability with small samples compared to other methods, making it the most suitable for the thesis (Winter et al., 2016).

Software

Statistical Product and Service Solutions (SPSS) was selected for this thesis. SPSS offers robust analysis tools that are user-friendly, catering to researchers with diverse statistical expertise levels (Field, 2010). While alternatives like Mplus offer advanced features, they come with steeper learning curves and higher costs (Muthén & Muthén, 2017). Additionally, SPSS's extensive documentation and support resources facilitate data analysis and troubleshooting.

Chapter 4

Results

Descriptives

The initial exploratory analysis of the database involved identifying general patterns and conducting data analysis. From December 2023 to January 2024, 399 French retail-investors were contacted and 140 completed the forms, resulting in a response rate of 35.1%. After removing 36 responses due to missing data or profile incompatibility, 104 respondents remained.

Table 1 summarizes the demographic characteristics of the 104 survey respondents. There are 85 males (81.7%) and 19 females (18.3%), displaying an overrepresentation of males in the sample. Furthermore, 76% of respondents fall in the 18-35 age group, and 64.4% have at least a master's degree, suggesting that the average retail-investor in the sample is younger and more educated than the average French retail-investor. Moreover, 81.7% of respondents have less than 5 years of investment experience, indicating that most of the sample consists of new-retail-investors. This explains the youth and higher education level and suggests potentially higher levels of overconfidence among respondents.

Variable		N	%
Gender	Male	85	81,70%
	Female	19	18,30%
Age	18-35	79	76,00%
	+36	25	24,00%
Education level	High School/Associate's Degree	17	16,30%
	Bachelor's	20	19,20%
	Master's/Ph.D.	67	64,40%
Investment experience (years)	-2	40	38,50%
	2-5	45	43,30%
	+5	19	18,30%

Table 1 : Sociodemographic Profile of Respondents

Then, the distribution of extraversion and overconfidence was tested using the Kolgomorov-Smirnov and Shapiro-Wilk tests. Neither factor followed a normal distribution, confirming the choice of Spearman's rank-correlation-test as the best method for the thesis.

Subsequently, the inter-term validity of extraversion and overconfidence is tested as they are constructed values. Cronbach's alpha test assesses if items used to construct values measure the same underlying construct, yielding a measure between 0 and 1. Values >0.7 indicate construct validity. Both extraversion (0.880) and overconfidence (0.729) demonstrated acceptable values. The results of the Cronbach's alpha tests are found in Table 2.

Variable	Cronbach's α
Extraversion	0,88
Overconfidence	0,729

Table 2: Cronbach's alpha test of extraversion and overconfidence.

Main results

Considering that both constructed values are valid, a general descriptive analysis of the data can be conducted. A general descriptive analysis of the data was conducted to understand key characteristics such as averages and spread, using medians and percentiles due to the non-normal distribution of both factors. The results are summarized in Table 3. French retail-investors express low levels of overconfidence (3.063) and average levels of extraversion (3.625).

The extraversion levels (2.875-4.125) demonstrate greater variability than overconfidence levels (2.750-3.594).

Variable	Mean	Standard-Deviation	Median	P25-P75	Min-Max
Extraversion	3,4952	0,8029	3,625	2,875-4,125	1,875-5,000
Overconfidence	3,1418	0,6251	3,063	2,750-3,594	2,000-4,750

Table 3: Descriptive analysis of extraversion and overconfidence.

P25: 25th percentile | P75: 75th percentile

The descriptive analysis is then enhanced by segregating sociodemographic categories and employing non-parametric tests to identify potential statistically significant differences in extraversion and overconfidence among these categories.

Mann-Whitney's U test and Wilcoxon's signed-rank-test were used for Gender and Age because they involve only two categories. Kruskal-Wallis' test was used for Education Level and Investment experience because they have more than 2 categories. The results, available in Tables 4 and 5, indicate that there is mostly no statistically significant difference in extraversion and

overconfidence among sociodemographic groups. The only exception regards a statistically significant difference in overconfidence based on years of experience, where more experience signifies more overconfidence. Thus, except for experience, no sociodemographic factor influences overconfidence or extraversion levels.

Overconfidence		N	Mean	Std Deviation	Min-Max	Median	P25-P75
Gender	Men	85	3,157	0,63	2,00-4,75	3,125	2,750-3,625
	Women	19	3,072	0,61	2,00-4,25	3	2,750-3,375
	<i>Mann-Whitney's U</i>	778,5	<i>Wilcoxon's W</i>	968,5	<i>Z = -0,245</i>	<i>Significance</i>	0,807
Age	18-35	79	3,085	0,626	2,00-4,50	3	2,625-3,500
	+36	25	3,32	0,601	2,25-4,75	3,125	2,875-3,750
	<i>Mann-Whitney's U</i>	765,5	<i>Wilcoxon's W</i>	3925,5	<i>Z = -1,693</i>	<i>Significance</i>	0,091
Education Level	High School/Associate Degree	17	3,103	0,583	2,25-4,13	3,125	2,625-3,562
	Bachelor's	20	3,1	0,579	2,00-4,50	3	2,750-3,562
	Master's/Ph.D.	67	3,125	0,655	2,00-4,75	3,125	2,750-3,625
	<i>Kruskal-Wallis' H</i>	0,22	<i>df</i>	2		<i>Significance</i>	0,896
Investment experience in the stock market (years)	-2	40	2,903	0,51	2,00-4,25	2,875	2,625-3,125
	2-5	45	3,206	0,619	2,00-4,50	3,125	2,750-3,688
	+5	19	3,493	0,685	2,25-4,75	3,5	3,125-4,125
	<i>Kruskal-Wallis' H</i>	11,962	<i>df</i>	2		<i>Significance</i>	0,003

Table 4: Group analysis of the differences in Overconfidence between sociodemographic categories.

P25: 25th percentile | P75: 75th percentile

Extraversion		N	Mean	Std Deviation	Min-Max	Median	P25-P75
Gender	Men	85	3,440	0,794	1,88-5,00	3,5	2,875-4,000
	Women	19	3,743	0,819	2,38-5,00	3,75	3,250-4,375
	<i>Mann-Whitney's U</i>	647,5	<i>Wilcoxon's W</i>	4302,5	<i>Z = -1,348</i>	<i>Significance</i>	0,178
Age	18-35	79	3,456	0,771	1,88-5,00	3,5	2,875-4,000
	+36	25	3,620	0,903	2,00-5,00	3,875	2,875-4,250
	<i>Mann-Whitney's U</i>	826,5	<i>Wilcoxon's W</i>	3986,5	<i>Z = -1,227</i>	<i>Significance</i>	0,22
Education Level	High School/Associate Degree	17	3,132	0,802	2,00-4,63	3	2,500-3,750
	Bachelor's	20	3,325	0,755	2,00-4,38	3,4375	2,2750-3,9375
	Master's/Ph.D.	67	3,638	0,789	1,88-5,00	3,75	3,000-4,125
	<i>Kruskal-Wallis' H</i>	5,634	<i>df</i>	2		<i>Significance</i>	0,06
Investment experience in the stock market (years)	-2	40	3,541	0,855	1,88-5,00	3,6875	2,875-4,000
	2-5	45	3,439	0,722	2,00-4,88	3,375	2,875-4,000
	+5	19	3,533	0,905	2,00-5,00	3,875	2,875-4,250
	<i>Kruskal-Wallis' H</i>	0,608	<i>df</i>	2		<i>Significance</i>	0,738

Table 5: Group analysis of the differences in Extraversion between sociodemographic categories.

P25: 25th percentile | P75: 75th percentile

Then, a Spearman's rank-correlation-test was conducted to measure the correlation between extraversion and overconfidence, revealing a significant and positive correlation (0.201*) at a 0.05 level. To complexify our understanding of this relationship, sociodemographic categories were segregated to investigate how these variables can moderate or influence the correlation between extraversion and overconfidence. The group analysis shows, when segregating between sociodemographic categories, that the correlation between extraversion and overconfidence is significant and positive for individuals with a master's degree (0.269*) at a 0.05 level and those with less than two years of experience (0.478**) at a 0.01 level. Thus, these findings suggest that the impact of extraversion on overconfidence is particularly pronounced among retail-investors with higher levels of education and limited experience. Results from these tests are found in Tables 6 and 7.

Correlation	Overconfidence		
	Spearman's ρ	Significance (2-tailed)	N
Extraversion	0,201*	0,04	104

Table 6: Spearman's Correlation coefficient test between extraversion and overconfidence.

* *The correlation is significant at the 0.05 level (2-tailed)*

Sociodemographic-categories		N	Spearman's ρ
Gender	Men	85	0,2
	Women	19	0,267
Age	18-35	79	0,209
	+36	25	0,178
Education Level	High School/Associate Degree	17	0,135
	Bachelor's	20	0,082
	Master's/Ph.D.	67	0,269*
Investment experience in the stock market (years)	-2	40	0,478**
	2-5	45	0,023
	+5	19	0,167

Table 7: Spearman's Correlation coefficient test between extraversion and overconfidence (Segmented Sociodemographic-categories).

* The correlation is significant at the 0.05 level (2-tailed)

** The correlation is significant at the 0.01 level (2-tailed)

Discussion

The initial hypothesis suggested that French retail-investors would demonstrate elevated levels of overconfidence. However, the results reveal a median level of overconfidence in our sample (3.063), significantly lower than the average (3.4) reported in previous studies (Baker et al., 2022; Lin, 2011). Therefore, the first hypothesis is rejected as the overconfidence level is below average.

This outcome was unexpected considering that the median extraversion levels (3.625) of our sample are comparable to those reported in previous research. Furthermore, both the individualistic culture of the French and the recent surge in overconfident new-retail-investors suggested that the average French retail-investors would exhibit high levels of overconfidence (Hofstede, 2001).

This may be attributed to a potential bias introduced by the data collection method. Indeed, the respondents were contacted because they follow renowned French financial press pages on LinkedIn, which are monitored by the AMF to ensure the dissemination of accurate and safe information within the markets (Santos et al., 2023). This selection method may have attracted investors with a more traditional and therefore risk-averse approach to investing, as the overconfident new-retail-investors described by the OECD tend to prefer non-conventional sources of information that weren't used to contact respondents (OECD, 2023). This explanation is supported by the self-presentation theory, which suggests that investors may adopt prudent and risk-averse behaviors advocated by traditional French financial press to maximize returns, thus exhibiting lower overconfidence levels (Baumeister, 1982). A similar trend is observable in Baker et al.'s (2022) study, where professional-investors also exhibit low levels of overconfidence despite having high levels of extraversion.

The second hypothesis proposed a positive correlation between extraversion and overconfidence, which is confirmed in this thesis, by a significant correlation coefficient of 0.201 at the 0.05 level. This finding aligns with previous studies, which typically report coefficients between 0.15 and 0.3 (Baker et al., 2021; Lin, 2011; Zaidi & Tauni, 2012). Therefore, the second hypothesis is confirmed.

The correlation is further reinforced in cases where investors have at least a master's degree (0.269) and less than 2 years of experience (0.478), which are defining characteristics of new-retail-investors. Despite the observed low levels of overconfidence, these results indicate a higher propensity for overconfidence among extroverted new-retail-investors (OECD, 2023).

Overall, the correlation coefficient result confirms the expected link between extraversion and overconfidence that is supported by self-presentation and self-enhancement theories (Baumeister, 1982). In a culture valuing personal success, competitiveness, and risk-taking, like that of French retail-investors, individuals are more likely to exhibit overconfidence (Hofstede, 2001). This effect is exacerbated among extroverts who, due to their higher susceptibility to peer pressure, are more inclined to display overconfidence through self-presentation (Alicke & Sedikides, 2009).

Furthermore, the dual process theory can explain the strengthening effect of the lack of experience on the correlation between extraversion and overconfidence. The theory suggests that decision-making relies on memory retrieval systems influenced by past experiences. Hence, inexperienced retail-investors are more susceptible to biased decision-making. In this case, the sample comprises highly educated yet young and inexperienced investors who, despite exhibiting low levels of overconfidence, are still more prone to it than their older, more experienced counterparts (Evans & Stanovich, 2013).

Chapter 5

Conclusions

Conclusions

This thesis contributes to empirical evidence by reaffirming the correlation between extraversion and overconfidence. It expands on previous studies by identifying this relationship within an individualistic culture, a context not previously explored. Interestingly, the correlation coefficient mirrors that found in collectivistic cultures, suggesting that cultural type does not influence the strength of this relationship.

Additionally, the thesis addresses the behavior of new-retail-investors, a group of concern for regulators due to their self-centered approach and distrust of traditional investment methods and sources of information. Despite their asocial tendencies and already high levels of overconfidence, the findings show that the correlation between extraversion and overconfidence not only persists but is particularly relevant for new-retail-investors.

Implications for management

Given that French retail-investors exhibit low levels of overconfidence, the AMF's current strategy appears effective and can be maintained. However, the relationship between extraversion and overconfidence is stronger among younger and highly educated individuals. With an increase in overconfident behavior in this group, the AMF may need to focus on educating these investors about how peer pressure influences overconfidence.

Many of these new-retail-investors prefer unconventional and unregulated sources of information, such as social media. To reach these investors, the AMF should enhance its social media presence with dynamic videos and posts. These materials could emphasize the importance of developing introverted behaviors, such as thoughtfulness and self-reliance, to prevent overconfidence in financial decisions.

For individual investors, the study offers practical insights. First, investors can assess their extraversion levels to identify any tendencies toward overconfidence and work on adopting more introverted behaviors. Second, the metrics examined in the thesis can improve algorithmic trading strategies by enhancing sentiment analysis. Algorithms could, for instance, monitor social media for increases in extraverted sentiments, which may predict a rise in overconfidence in the markets.

Investment advisors can also use extraversion as a metric to assess their clients' susceptibility to overconfidence. They might also advise highly extroverted and highly educated clients with limited investment experience to focus on long-term financial goals and practice introverted behaviors during decision-making to mitigate the risks associated with overconfidence.

Limitations

Firstly, the sample size of 104 respondents may not accurately represent French retail-investors, potentially limiting the generalizability of the results. Moreover, the method used to gather respondents via LinkedIn may have introduced selection bias.

Additionally, the reliance on self-reported measures through surveys raises concerns about social desirability bias and the overall accuracy of the

measurements. Several steps were taken to mitigate this risk, but it is always present with self-reported measures.

Furthermore, the method used to study the relationship between extraversion and overconfidence, and the impact of direct-social-comparison on the bias doesn't allow to establish causality between these factors, highlighting the need for longitudinal studies to explore these dynamics over time.

Future investigations

Future studies could improve sample quality by enlarging its size and incorporating investors from various countries, thus enabling a deeper examination of how culture impacts the association between extraversion and overconfidence. Moreover, researchers could investigate the causality between overconfidence and extraversion using longitudinal designs to uncover temporal dynamics and causal pathways. Furthermore, conducting analyses at the facet level may unveil new insights into the relationship between extraversion and overconfidence. Replicating this study with a focus on another broad personality trait could similarly shed light on the connection between different personality traits and overconfidence.

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Appendices

Appendix A: Survey

Part 1 of 6 :

Enquête sur l'extraversion et l'excès de confiance des investisseurs français.

Cette enquête est réalisée dans le cadre de mon mémoire de master à la Católica Porto Business School. Cette enquête recueille des données sur l'extraversion et l'excès de confiance des investisseurs français. L'objectif de cette enquête étant de déterminer s'il existe un lien entre ces deux facteurs et de le comprendre.

L'enquête comprendra trois parties. La première recueillera des données sociodémographiques, la deuxième des données votre biais d'excès de confiance et la dernière partie recueillera des données sur vos niveaux d'extraversion. Ce test prendra 5 minutes à compléter.

Vous ne pouvez remplir le questionnaire qu'une seule fois et nous vous demandons de le réaliser seul. Toutes les questions sont obligatoires.

Votre engagement dans cette étude est entièrement volontaire, il n'y a aucun risque ni frais à votre charge, et aucune forme de rémunération n'est prévue. Les données que vous fournirez seront confidentielles et anonymes et ne seront utilisées que dans le cadre de ce mémoire. Si vous participez à l'étude et que vous souhaitez, pendant le déroulement des questions, vous en retirer, vous pouvez le faire sans pénalité.

Si vous avez des questions ou si vous avez besoin d'éclaircissements sur l'étude, vous pouvez contacter l'investigateur principal (Carlos Costa) à tout moment à l'adresse électronique suivante : pdc.carlos@gmail.com.

Je tiens à vous exprimer ma gratitude anticipée pour votre collaboration et pour le temps que vous consacrerez à remplir ce questionnaire, qui revêt une grande importance pour la réalisation de cette étude.

Je déclare avoir pris connaissance des informations communiquées dans le message précédent et j'accepte de participer à l'étude et au traitement de mes données fournies dans les conditions proposées.

- Oui, je souhaite participer à cette enquête
- Non, je ne souhaite pas participer à cette enquête

Part 2 of 6 :

Investissez-vous dans les marchés boursiers?

- Oui
- Non

Part 3 of 6 :

Données démographiques.

Cette première partie du questionnaire récolte des données démographiques sur les participants. Celles-ci seront utilisées pour organiser les données, et tester quelques hypothèses qui reposent sur les profils démographiques des participants.

Déterminez-vous la "Certification Professionnelle" de l'AMF?

- Oui
- Non

Travaillez-vous en France ?

- Oui
- Non

Quel est votre sexe ?

- Homme
- Femme

Quel âge avez-vous ?

- Entre 18 et 35 ans
- Entre 35 et 50 ans
- Entre 50 et 65 ans
- Plus de 65 ans

Quel niveau d'éducation avez-vous atteint ?

- Baccalauréat
- BTS ou équivalent (bac +2)
- Licence ou équivalent (bac +3)
- Master ou équivalent (bac +5)
- Doctorat ou équivalent

Depuis combien de temps investissez-vous dans les marchés financiers?

- Moins de 2 ans
- Entre 2 et 5 ans
- Entre 5 et 10 ans
- Plus de 10 ans

Part 4 of 6 :

Bias d'excès de confiance (Overconfidence).

Cette partie du questionnaire vise à mesurer votre niveau d'excès de confiance. Vous serez invité(e) à lire des énoncés et à indiquer, en utilisant une échelle de 1 à 5, dans quelle mesure vous êtes en désaccord ou d'accord avec chaque déclaration. (1= en total désaccord; 3 = neutre; 5= en total accord)

Je suis un investisseur expérimenté.				
1	2	3	4	5

Je sens qu'en moyenne, mon investissement est plus performant que le marché boursier.				
1	2	3	4	5

Lorsque j'achète un investissement gagnant, j'ai le sentiment que mes actions et mes connaissances ont influé sur le résultat.				
1	2	3	4	5

J'ai plus confiance dans mes propres opinions en matière d'investissement que dans celles d'analystes financiers.				
1	2	3	4	5

Les investissements rentables que j'ai réalisés par le passé étaient principalement dus à mes compétences spécifiques en matière d'investissement.				
1	2	3	4	5

Je pense que mes compétences et mes connaissances du marché boursier peuvent m'aider à surperformer le marché.				
1	2	3	4	5

Ma capacité à prédire le cours futur des actions est généralement meilleure que celle des autres.				
1	2	3	4	5

Je laisse rarement une situation défavorable devenir incontrôlable.				
1	2	3	4	5

Part 5 of 6 :

Extraversion.

Cette dernière section du questionnaire a pour but d'évaluer votre degré d'extraversion, l'un des cinq traits de personnalité du modèle de mesure de personnalité connu sous le nom de 'Five Factor Model'. Pour cela, le modèle BFI-Fr, une version traduite en français du BFI, sera utilisé pour mesurer votre niveau d'extraversion.

Vous serez invité(e) à lire des énoncés et à indiquer, en utilisant une échelle de 1 à 5, dans quelle mesure vous êtes en désaccord ou d'accord avec chaque déclaration. (1= en total désaccord; 3 = neutre; 5= en total accord)

Je suis sociable/extraverti.				
1	2	3	4	5

Je suis bavard.				
1	2	3	4	5

Je communique avec beaucoup d'enthousiasme.				
1	2	3	4	5

Je suis plein d'énergie.				
1	2	3	4	5

J'ai une forte personnalité, je m'exprime avec assurance.				
1	2	3	4	5

Je suis quelquefois timide, inhibé.				
1	2	3	4	5

Je suis réservé.				
1	2	3	4	5

J'ai tendance à être silencieux.				
1	2	3	4	5

Part 6 of 6 :

Je vous remercie !

Je tiens à vous exprimer ma sincère gratitude pour avoir pris le temps de répondre à mon enquête. Votre participation est extrêmement précieuse pour moi, et votre contribution m'aidera à mieux comprendre ce sujet.

Vos réponses réfléchies et vos commentaires me permettront d'analyser les données et d'en tirer des enseignements significatifs et, en fin de compte, d'améliorer la qualité de mon mémoire.

Une fois de plus, je tiens à vous exprimer ma gratitude pour votre participation et pour avoir contribué à la réalisation de mes objectifs de recherche.

Je vous prie d'agréer, Madame, Monsieur, l'expression de mes salutations distinguées,

Carlos COSTA