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A Review of Overconfidence in Behavioral Finance

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Abstract

Behavioral finance can be dichotomized into limits to arbitrage and cognitive psychology. While limits to arbitrage describes when markets are inefficient, cognitive psychology refers to how people think. In this review we focus on one well-established bias of cognitive psychology, namely overconfidence. Throughout the literature there are three distinct ways in which overconfidence has been defined: (1) overestimation, (2) overplacement and (3) overprecision. We shortly summarize the ideas of conventional theory about overconfidence, and present the most significant findings of the relevant literature. Hereby we differentiate between studies that investigate overconfidence on the micro level (i.e. individual-level data) and the macro level (i.e. aggregated-level or market-level data). We will also discuss inconsistency across different measures of overconfidence and the reverse phenomena of overconfidence, i.e. underconfidence. To stay within the scope of this work we place our main focus on experimental studies.

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1. Introduction

One of the most significant discussion in behavioral finance is on overconfidence. Traditional finance models mostly assume economic agents to be rational "wealth maximizers". However, empirical studies provides us with evidence that this is not always the case. Psychological evidence proposes that humans are prone to biases and heuristics which influence our decision making. Behavioral finance is the intersection of finance and psychology. Its primary concerns are the bounds of rationality and therefore it aims to explain why humans make irrational financial decisions using behavioral and cognitive psychological theory combined with traditional finance theory. Behavioral finance can be dichotomized into limits to arbitrage and cognitive psychology. Limits to arbitrage describes when markets are inefficient. Cognitive psychology explains to how people think. In the past three decades, cognitive psychology has been studied extensively to better understand the systematic errors humans do in their thinking (Ritter, 2003). The growing body of literature has produced several significant findings and documented many patterns regarding how people behave. One of the most robust findings in the psychology of judgment is that economic agents are prone to overconfidence (e.g., DeBondt and Thaler, 1995). People, especially entrepreneurs and investors, are overconfident about their own abilities. Their overconfidence has many manifestations. In this paper I will present some of the most significant findings of the relevant literature whereby the main focus is on experimental evidence. The advantage of laboratory experiments over field experiments is the ability to directly observe and compare behaviors, while controlling for external variables and their potential impact on financial decision making (Duxbury, 2015).

Before looking at financial evidence regarding overconfidence it is important to understand that the growing body of literature contains inconsistency about the term overconfidence. Moore & Healy (2008) identify three different definitions (see Figure 1). First, overconfidence can be seen as an overestimation of one's actual performance. Second, overconfidence is perceived as overplacement of one's relative performance (i.e., "better-than-average effect"). Finally, sometimes overconfidence is defined as excessive precision (overprecision) in one's beliefs (often referred to as miscalibration).

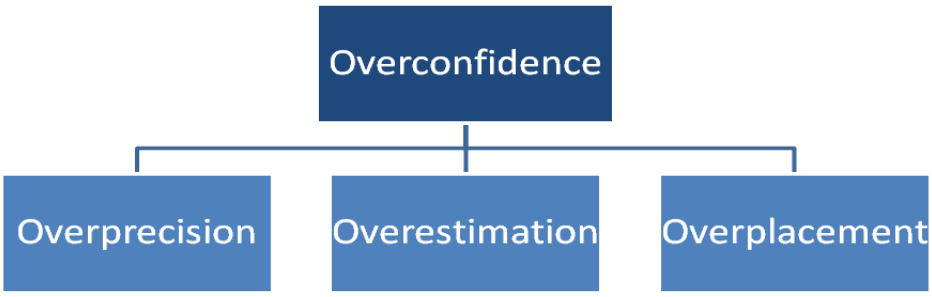

Figure 1: The 3 Types of Overconfidence

2. Overconfidence

A considerable amount of financial literature has been published on overconfidence. These studies examine how the overestimation of one's abilities and precision of one's forecasts affect financial decision making and thus affect financial markets on an aggregated level. Several theoretical models have evolved that try to explain this overconfidence and predict its effect on market behavior (e.g. Daniel, Hirshleifer, & Subrahmanyam, 1998; Gervais & Odean,

2001; Odean, 1998). The consensus of these models suggests that investors with high overconfidence exhibit higher trade volumes, decreased expected utility and take excessive risks which ultimately translates into increased price volatility of assets (see Figure 2).

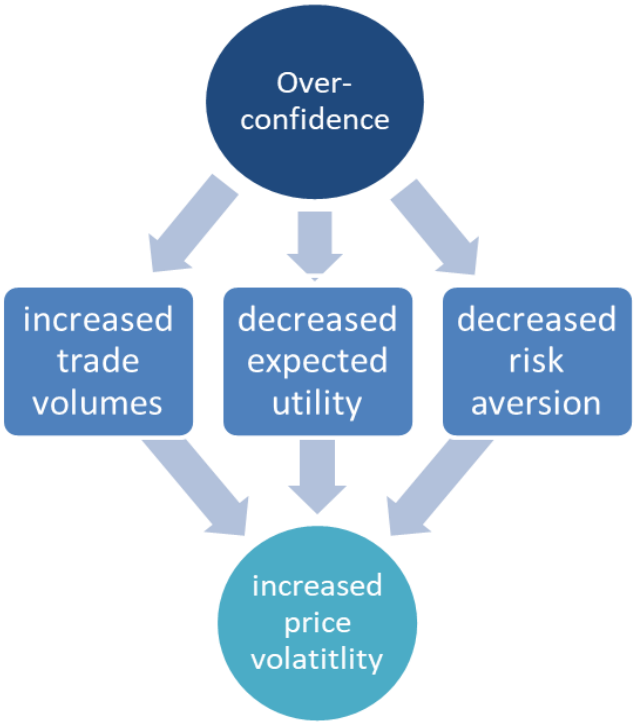

Figure 2: Theoretical implications of overconfidence

Several empirical studies investigate overconfidence on micro (i.e. individual-level data) and on macro (i.e. aggregated-level or market-level data) topics as dichotomized by Pompian (2012). Analyzing individual level data, researchers found that investors with higher overconfidence trade too much which negatively affects their profits (e.g. Odean, 1998; Barber & Odean, 2001). Barber & Odean (2001) focus in their seminal work on gender differences in terms of trade volume. The authors examine account data of over 35,000 households to analyze differences of common stock investments between both sexes. Their findings show that men trade 45 percent more than women and thereby reduce their returns even more than women which is partly due to transaction costs. This vast trading differences leads to one full point of return differences between genders. Furthermore, their findings were strongest between single men and women. Other studies found that besides the relationship between overconfidence and trade volume, overconfidence leads to an under-diversification in investment portfolios (Goetzmann & Kumar, 2008), because investors feel overconfident about the significance of their private information and in their capability in interpreting them (Odean, 1999; Chuang & Lee, 2006). Furthermore, studies found that investors with overconfidence reveal a strong bias towards domestic stocks, known as home bias (Kilka & Weber, 2000). In contrast to studies on micro topics, Statman, Thorley, & Vorkink (2006) investigate the link between security turnover and returns and find that share turnover is positively related to lagged returns for many months. The finding that stock return increase stock turnover is consistent with Chuang & Lee (2006). The authors find that overconfident investors engage in excessive trading (they are especially prone underestimate risk and trade more in riskier securities) and thus partly cause an increase in price volatility

of assets. When analyzing the prediction that theoretical models of overconfidence carry out on a macro level (i.e. the link between market outcomes and investors overconfidence), researchers have to use proxies, as overconfidence is not directly observable. However, this process inherits certain weaknesses. To overcome most these shortcoming experimental designs can be applied to examine cause and effect relationships under a controlled environment (Duxbury, 2015).

Over the past two decades there has been a dramatic increase in experimental research on overconfidence. To stay within the scope of this work I will mainly focus on experiments which resemble market settings. There have been several studies in the experimental literature reporting on overconfidence based on market setting (Biais, Hilton, Mazurier, & Pouget, 2005; Deaves, Lüders, & Luo, 2009; Glaser & Weber, 2007; Kirchler & Maciejovsky, 2002; Nelson et al., 2001). According to Griffin and Tversky (1992) people are overconfident, i.e., systematically overestimate the correctness of their own beliefs (also known as miscalibration), because they overrate strength of information (i.e. salience) but underrate the weight of information (i.e. statistical reliability). Nelson et al. (2001) study how information weight and strength impact overconfidence, trading behavior (i.e. number of shares traded by an investor), market-level overconfidence (i.e. extremity of the market prices), and wealth (i.e. trading profit) in two laboratory experiments. Their participants trade stocks at an artificial financial market. Their results show that low-weight and high-strength information lead investors to make more extreme evaluations of stock prices compared to height-weight and low-strength information. Yet, they could not find a difference between the trades of investors with more extreme evaluations and investors with less extreme evaluations on an aggregated level. Hence, weight and strength of information affect overconfidence in market prices the same way they affect investors at an individual level. As a result, they suggest that trading decisions neither worsen nor lessen the biases of individuals. This finding that overconfidence investors lose wealth compared to non-overconfident investors is in consistency with Biais, Hilton, Mazurier, & Pouget (2005) who suggest that overconfidence leads to trade losses.

However, the experimental behavioral finance literature has also produced some more surprising findings. Contrary to the predictions of the theoretical models neither Biais, Hilton, Mazurier, & Pouget (2005) nor Glaser & Weber (2007) find evidence for a relation between overconfidence (miscalibration) and trade volume of individual investors. This finding is striking because theoretical models that account for overconfident investors primary do so because of the calibration literature. In line with the literature, Glaser & Weber (2007) suggest that the common methods of modeling and motivating overconfidence that depend on the calibration literature have to be regarded with caution. Yet there are also inconsistences in terms of confidence and gender within the experimental literature. Barber & Odean (2001) find that men are overconfident and thus trade more excessively than women. In contrast to this finding, however, Deaves, Lüders, & Luo (2009) who examine if overconfidence encourages trading in a laboratory financial market, do not find a difference between men and women in trading activity. In line with Barber & Odean (2001), a recent study by Biais, Hilton, Mazurier, & Pouget, (2005) finds that male investors to trade more than female investors, but do not find a correlation between gender and overconfidence (i.e., miscalibration). Another surprising result comes from Kirchler & Maciejovsky (2002) who examine overconfidence at an individual level in a laboratory experiment using two different measures, subjective miscalibration and differences between subjective certainty and

objective accuracy. While their research suggests that overconfident investors earn less than others, they do not observe that trading volume influences individual wealth. The authors conclude that the methodology used to investigate for overconfidence moderates the existence of overconfidence. This inconsistence across diverse measures of overconfidence is in consistence with other studies (e.g. Glaser & Weber, 2007； Deaves, Lüders, & Luo, 2009).

There are more findings of inconsistency across different measures of overconfidence. In their experiment, Acker and Duck (2008) examine differences between referential overconfidence (also known as 'better-than-average' effect, in which individuals estimate their ability to be higher than the average) and stand-alone overconfidence. This relationship between different types of overconfidence is of especially high importance in the behavioral finance literature, since overconfidence is commonly defined as the investors' mistaken belief in the precision of his information (e.g., Daniel, Hirshleifer, & Subrahmanyam, 1998). This definition indicates a miscalibration of the investors, however it indirectly suggests that the precision is being evaluated in comparison to other individuals' precision of the information (i.e. referential judgement). To address this issue, Acker and Duck (2008), use data from an online stock-market game played by undergraduates to investigate whether there is a correlation between these two characteristics. Moreover, the authors point out that biased self-attribution (i.e. the propensity to regard situations that affirm one's opinions or superior ability as sign of one's ability, whereas situations that contradict them are regarded as sabotage or noise) take an central role in the behavioral finance literature (see Gervais & Odean, 2001; Daniel, Hirshleifer, & Subrahmanyam, 1998) and thus further investigate differences between biased self-attribution and overconfidence. Acker and Duck (2008) strongly confirm the existence of overconfidence (of both referential overconfidence and stand-alone), yet they suggest that these different measures of overconfidence are not in correlation with each other. In consistence with prior research (e.g. Glaser & Weber, 2007) the authors conclude that the usage of one kind of overconfidence as a justification for the existence of another kind of overconfidence can be misleading for financial behavior models. Kaustia and Perttula (2012) investigate overconfidence of professionals in their area of expertise and examine the effects of various debiasing methods. To do so they conduct survey field experiments utilizing different debiasing methods. Their experiment revealed that financial professionals are prone to overconfidence in terms of referential overconfidence, probability calibration, and unfounded confidence. Their study proposes that overconfidence in probability assessment might be a deeply rooted tendency, possibly unconnected to referential overconfidence. Debiasing attempts lead to mixed results in their survey. On the one hand explicit warnings reduce referential overconfidence. On the other hand, there are not very successful in mitigating miscalibration in probability assessments.

Recent developments in the field of overconfidence have led to an interest in the reverse phenomena underconfidence and the change from overconfidence to underconfidence. Hoelzl and Rustuchini (2005) aim to deliver a reliable measure of the better-than-average' effect and to assess its reliability in an experiment and thus conduct an experiment with a 2x2 design (i.e., no payment versus payment and difficult versus easy task, and) where participants select between options, instead of uttering statements. The authors find that a change from an easy and familiar task to non-familiar task, moves choices from overconfidence to underconfidence. This outcome is significant under financial payments and weak when no payments are offered. Another study by Dittrich et al. (2005) experimentally induces risk aversion and compares the evaluation of actual investment decisions with

alternative choices to investigate overconfidence in an investment setting. Investors are to select their own investment first and afterwards are presented with three additional investment alternatives, including the optimal one, for which investors have the choice to substitute their initial choice with an alternative for payment. In this experiment overconfidence is defined as the persistent overvaluation of the initial choice. Further, Dittrich et al. (2005) find that overconfidence decreases with individual perceived uncertainty. This finding is consistent with Hoelzl and Rustuchini (2005) who find that overconfidence decreases when task uncertainty increases.

In an experimental study, Fellner et al. (2004) analyze egocentric biases (i.e., overreliance of one's own point of view) in financial decisions making. The authors conduct an experiment in which investors have to design individual portfolios from assets of which all possible combination have the same variance and expected return. Afterwards investors are offered two alternative portfolios (i.e., a portfolio designed by a self-selected expert and the average portfolio). The findings suggest that "illusion of expertise" (i.e. the tendency of investors to favor one's own investment choice to an unjustifiable degree) prevails and is stable individually (i.e., over several periods), over alternative investment choices (i.e., the average portfolio and the portfolio of the expert), and for both evaluation methods (i.e., willingness to pay and willingness to accept). Fellner et al. (2004) conclude that over two-third of their subjects were unwilling to neither switch to the average portfolio nor to the expert's portfolio, which indicates overconfidence.

3. Conclusion

In this paper I provide insights from a selected range of experimental findings of the growing body of literature on overconfidence. In order to have a proper discussion, it is of vast importance to be clear about the methodologies of overconfidence. As explained in the introduction, the three commonly used definitions of overconfidence include overestimation, overplacement and overpresicion. The ideas of conventional theory about overconfidence are shortly summarized, and after looking at empirical evidence of the vast behavioral finance literature, I present insights from the experimental standpoint on overconfidence. To stay within the scope of this work I mainly focus on experiments which resemble market settings. Hereby it is clear to see that most studies mainly focus on overconfidence as miscalibration (i.e. overpresicison). One of the most common proxies for empirical field-based research is trading volume, yet neither Biais, Hilton, Mazurier, & Pouget (2005) nor Glaser & Weber (2007) find evidence of a correlation between trading volume and overconfidence. Moreover, another common proxy for overconfidence is gender. Yet Biais, Hilton, Mazurier, & Pouget (2005) find no evidence for the relation between gender and overconfidence. As a result, I conclude that the in the empirical literature used proxies are problematic and may bias the results. Moreover, calibration is just one manifestation of overconfidence. Therefore, it is also of importance to further analyze the other proposed manifestations of overconfidence (e.g. better-than-average effect, or differences between subjective certainty and objective accuracy) and their effects on financial decision making. I introduce a variety of studies that investigate the correlation between different overconfidence measures (Kirchler & Maciejovsky, 2002; Glaser & Weber, 2007; Acker and Duck, 2008; Deaves, Lüders, & Luo, 2009) which show that there is at most a weak correlation and these studies even present inconsistences across the same measure. The inconsistency in measures and methodology is problematic to current research as well as to future research as researchers might wrongly

assume the different types of overconfidence to be the same. Thus, it is crucial for further research to clarify their methodologies and their assumptions which is additionally enhanced by the fact that each type of overconfidence responds differently to the same debiasing methods (see Kaustia and Perttula, 2012).

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