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## Financial overconfidence over time: Foresight, hindsight, and insight of investors



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#### ABSTRACT

Financial overconfidence leads to increased trading activity, higher risk taking, and less diversification. In a panel survey of online brokerage clients in the UK, we ask for stock market and portfolio expectations and derive several overconfidence measures from the responses. Overconfidence is identified in the sample in various forms. By matching survey data with participants' transactions and portfolio holdings, we find an influence of overplacement on trading activity, of overprecision and overestimation on diversification, and of overprecision and overplacement on risk taking. We explore the evolution of overconfidence over time and identify a role of past success and hindsight on subsequent investor overconfidence in line with learning to be overconfident.

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#### 1. Introduction

Overconfidence is among the most popular psychological explanations for investment behavior of private households. It has been linked to the portfolio turnover (Odean, 1998b; Glaser and Weber, 2007), diversification (Goetzmann and Kumar, 2008), and risk taking (Dorn and Huberman, 2005; Nosić and Weber, 2010) of investors. The implications of overconfidence in this context are mostly viewed negatively, leading to excessive trading, underdiversification, and increased risk taking. However, recent findings in psychology call for a reassessment of overconfidence, since the term covers several potentially distinct phenomena (Larrick et al., 2007; Moore and Healy, 2008). In addition, past research is incomplete in both the empirical measurement of overconfidence and the addressed aspects of investing behavior. And little is known about the development of financial overconfidence over time and its dynamic interaction with trading behavior. We provide, for the first time, a comprehensive study of several types of financial overconfidence, its consequences for various aspects of investment behavior, and its development over time.

In a panel survey of individual investors at a large bank in the United Kingdom, we ask participants for their return expectations and risk perceptions regarding the UK stock market and their

own portfolios. From these expectations, we construct overconfidence measures related to the three types of overconfidence commonly identified in the literature: overestimation, overplacement, and overprecision (Moore and Healy, 2008). The survey was administered every three months between September 2008 and September 2010, resulting in a total of nine survey rounds, which cover one of the most interesting times in recent stock market history. Participants are affluent, self-directed investors, who have an online brokerage account at the bank. Their transactions are recorded, which allows us to combine the survey responses with their actual trades and portfolio holdings. The trading and portfolio data include information about the trading frequency, turnover, diversification, and risk taking of investors.

We first document the presence of overconfidence in its various forms in the panel. Participants on average overestimate their portfolio returns and Sharpe ratio by a large degree compared to realized values. This overestimation of absolute performance is accompanied by an overplacement in relative performance expectations. Participants believe that their own portfolios will outperform the market (representing the average investor), while at the same time they perceive these portfolios as less risky than the market. Overprecision is also widespread in the investor sample. When return confidence intervals are compared to historical volatilities, elicited confidence intervals are too narrow by a factor of more than two. This miscalibration tends to be worse for participants' own portfolios than for the market in general. While for most

measures a majority of participants exhibit overconfidence, there is still great cross-sectional heterogeneity, which is a prerequisite for explaining differential behavior in trading and risk-taking.

The findings reveal a positive impact of overconfidence on trading activity and risk taking and a negative impact of overconfidence on the degree of diversification. This overall picture is nuanced in the types of overconfidence responsible for the examined aspects of investing behavior. For example, we do not find overprecision to be relevant for trading activity, which is in contrast to the theoretic literature on financial overconfidence (Daniel et al., 1998; Odean, 1998b), but in line with most of the previous empirical results (Glaser and Weber, 2007; Graham et al., 2009). Instead, we find an influence of overplacement on trading activity, of overprecision and overestimation on diversification, and of overprecision and overplacement on risk taking. This illustrates the importance of differentiating between the types of overconfidence to gain a deeper understanding of their complex interactions with investment behavior.

The results suggest a dynamic relation between overconfidence and trading behavior, which goes beyond the view of overconfidence as a stable personality trait. To learn more about the dynamics of overconfidence, we examine the individual variability of overconfidence over time, along with its possible causes. It has been proposed that this variability is driven by past investment success and failure, with success leading to an increase in overconfidence through a self-attribution bias (Daniel et al., 1998; Gervais and Odean, 2001). Our findings show that indeed past investment success strongly influences overprecision and overestimation for the subsequent estimation period, but has no effect on overplacement. This means that after having outperformed the market, investors overestimate their returns in the future and submit more narrow confidence intervals.

Alternatively, perceived success including a potential hindsight bias might affect overconfidence (Barberis and Thaler, 2003). Although we observe a positive correlation between perceived and actual portfolio returns, which shows that participants have some idea about their performance, the estimation errors are large and wide-spread. Investors do not consistently overestimate realized portfolio performance in hindsight, but perceived past success nevertheless contributes to increased levels of overconfidence in foresight. Investors who hold inflated views about past portfolio returns are subsequently subject to higher levels of overplacement.

In this paper, we extend the existing literature in two major ways. First by a systematic and multi-dimensional treatment of overconfidence and investment behavior. We establish a relation between overconfidence (in its various types) on the one hand and trading activity, portfolio diversification, and risk taking on the other. Previously, this link has often been only theoretically postulated (Odean, 1998b), verified by proxies such as gender (Barber and Odean, 2001), or the analysis has been restricted to one particular form of overconfidence (Graham et al., 2009; Grinblatt and Keloharju, 2009). In rare cases, two types of overconfidence were considered (Glaser and Weber, 2007; Deaves et al., 2009), but with the dependent variable limited to trading volume. Secondly, we aim for a better understanding of the dynamic development of overconfidence, as suggested by Gervais and Odean (2001). We confirm that financial overconfidence increases after an actual or perceived investment success. This question has not been empirically studied before with the exception of Deaves et al. (2010), who find financial forecasters have an increased level of overprecision after successful predictions.

#### 2. Theory and literature

#### 2.1. Definitions of overconfidence

Overconfidence is a well-documented bias in the psychology of judgment and has readily found its way into finance literature. While the notion of overconfident investors seems to have some immediate appeal in describing the behavior of financial market participants, recent evidence suggests that the underlying mechanisms are more complex. The term overconfidence encompasses at least three distinct phenomena we refer to as "types of overconfidence". In analyzing these different types, we adopt the terminology of Moore and Healy (2008) and distinguish overestimation, overplacement, and overprecision.

Overestimation: People can be overconfident with regard to their absolute ability or performance. They overestimate their personal outcome, such as the grade they will achieve on an exam or the time they will need to run a marathon (Grieco and Hogarth, 2009). Overestimation is often demonstrated in performance judgments before or after experimental tasks in which participants respond to general knowledge questions (Lichtenstein et al., 1982). Levels of overestimation increase with difficulty and the personal importance of tasks (Frank, 1935; Moore and Healy, 2008). Investment ranks high on both dimensions, therefore we expect considerable overestimation in judgments of financial performance. This prediction recognizes overestimation to be context specific, as it has been shown not to be universal (Moore and Healy, 2008; Blavatskyy, 2009; Clark and Friesen, 2009). Personal agency is important for overestimation, we thus do not consider cases of mere overoptimism (e.g., for market performance).

**Overplacement:** When it comes to relative comparisons within a group, the counterpart to overestimation is overplacement. It is closely related to the better-than-average (BTA) effect, which describes the tendency to view oneself above average in many domains (for a review, see Alicke and Govorun, 2005). For example, almost 90% of a sample of drivers in the US claim to be better than the average person with regard to driving safety (Svenson, 1981). The BTA effect is present in judgments of skills and abilities (Kruger and Dunning, 1999) and personality traits (Alicke et al., 1995). While BTA judgments are quite common, they are not ubiquitous. In contrast to overestimation, their levels are highest for easy tasks and might disappear or even reverse for unfamiliar or difficult tasks (Kruger, 1999; Moore and Cain, 2007; Moore and Healy, 2008; Clark and Friesen, 2009). This highlights again the context dependence of overconfidence measures. Results on the BTA effect have been called into question more generally by Benoît and Dubra (2011), who demonstrate that high fractions of people judging themselves as better than average can be rationalized. However, later studies with refined measurement confirm true overconfidence (Merkle and Weber, 2011; Burks et al., 2013; Benoît et al., 2015). Typically, the BTA effect is established for a population as a whole and does not imply individual overconfidence. This requires a comparison of the belief to the actual relative position in a domain. The degree of overplacement is then represented by the difference between the two positions (Larrick et al., 2007). In the absence of strong skill differences, BTA judgments are a good proxy for overplacement.

**Overprecision:** Another type of overconfidence occurs in the estimation of unknown values, specifically in questions for ranges in which a value will fall with a certain probability. People usually show overprecision and submit far too narrow intervals (Alpert and Raiffa, 1982; Klayman and Soll, 2004), regardless of whether general knowledge questions (e.g., "length of the Nile," Russo and Schoemaker, 1992) or financial values (e.g., "value of the Dow in one year," Glaser et al., 2013) are the target of the estimation. Often less than 50% of the true values fall within 90%

<sup>&</sup>lt;sup>1</sup> An exception is Deaves et al. (2009), who experimentally find an association between overprecision and trading activity.

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