

# Investor Sentiment in Financial Markets

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## Abstract

This paper reviews the literature in finance and economics on the theory and evidence relating to investor sentiment, i.e. the not (entirely) rational evaluation of asset characteristics. As sentiment may influence financial markets in the presence of limited arbitrage, it is one candidate explanation for different asset valuations across investors and for certain puzzles discussed in the literature. Various proxies are applied to capture sentiment. These proxies, useful as they might be, do not reveal factors influencing investors' evaluation of asset characteristics. Future research should focus on possible symptoms of sentiment, i.e. what makes investors become prone to sentiment. This is an important issue, since investors constantly have to process and interpret information which provides the basis for their actions. A consideration of personality traits which might have an influence on the individual proneness to sentiment could release new impulses and bring new insights.

*JEL-Classification:* G11, G12, G14, G17

*Keywords:* Investor Sentiment; Financial Markets; Proneness to Sentiment; Personality Traits

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# 1 Introduction

John Maynard Keynes wrote that the ‘market is subject to waves of optimistic and pessimistic sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a sound calculation’ (1936, p. 154) and that ‘it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance’ (1936, p. 163). Indeed, real-world financial markets demonstrate quite plainly that they are hit by waves of optimistic and pessimistic sentiment – at least from time to time (Baker and Wurgler 2007).

In early contributions, sentiment is linked to speculative bubbles (Smidt 1968), biased expectations (Zweig 1973), and noise (Black 1986).<sup>1</sup> As sentiment is associated with different attributes, the literature offers no universal definition. In DeLong et al. (1990a) it is investors’ formation of beliefs about future cash flows and investment risks that are not justified by existing facts. For Shleifer (2000, p. 12) it ‘reflects the common judgment errors made by a substantial number of investors, rather than uncorrelated random mistakes’. In Baker and Wurgler (2006) it is the propensity of investors to speculate which describes waves of optimism and pessimism. In Brown and Cliff (2004, p. 2) it represents the ‘expectations of market participants relative to a norm: a bullish (bearish) investor expects returns to be above (below) average, whatever average may be’. The latter corresponds to Smith (1776, p. 24) who noted that ‘the actual price at which any commodity is sold is called its market price. It may be either above, or below or exactly the same as its natural price’. In markets where irrational investors can move prices, sentiment reflects the difference in asset valuations between arbitrageurs and retail investors (Lee et al. 1991).<sup>2</sup> Sentiment may hence be categorized as the not (entirely) rational evaluation of asset characteristics (Shleifer 2000; Baker et al. 2008).

This survey aims to review the literature in finance and economics on the theory and evidence relating to investor sentiment. It starts with an outline of research based on the

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<sup>1</sup> We refrain from associating noise trading with either irrationality or sentiment, as trades unrelated to fundamentals can be generated by a whole host of rational considerations such as insurance companies requiring liquidity to meet an unexpected rush of claims.

<sup>2</sup> Retail investors are also referred to as irrational, unsophisticated, and individual investors, whereas arbitrageurs are denoted as institutional, rational, sophisticated, and professional investors in the literature. We use the term retail investors for investors who are prone to sentiment and the term arbitrageurs for investors who are not prone to sentiment throughout the paper, although arbitrageurs may be prone to sentiment too (Smith et al. 1988; Scharfstein and Stein 1990; Lakonishok et al. 1991; Greenwood and Nagel 2009).

shortcomings of the Efficient Market Hypothesis (EMH) and continues to sketch investor sentiment as a candidate explanation for different asset valuations across investors and for certain puzzles discussed in the literature. Various proxies are applied to capture investor sentiment. The proxies, however, do not reveal factors influencing investors' individual evaluation of asset characteristics. Therefore, future research should focus on possible symptoms of sentiment, i.e. what makes investors become prone to sentiment. In this context, the following directions for future research might be promising: sentiment might be pronounced differently across cultures, it might be depended on the respective level of experience, and possible symptoms of sentiment might be analysed in laboratory settings.

The rest of the survey is structured as follows. Section 2 suggests sentiment as a challenge to the EMH. Section 3 sketches sentiment as a candidate explanation for certain puzzles and section 4 as an explanation for investors' different evaluations of asset characteristics. Section 5 outlines the above described directions for future research. Section 6 concludes.

## **2 Sentiment as a Challenge to the EMH**

If capital markets were always efficient, sentiment would be of no concern. An efficient market is defined as a market where asset prices always fully reflect all the available information (Fama 1970). When information concerning the fundamental value of an asset hits the market, its price should react immediately and adjust accordingly to the new fundamental value. When there is no relevant information, its price should not react. In an efficient market no investor is able to generate consistently abnormal returns in a systematic way, as only new information concerning the fundamental value has an influence on pricing. The theoretical case for the EMH rests on three arguments: First of all, a fraction of investors is assumed to be fully rational. Those arbitrageurs value each asset for its fundamental value which is the net present value of future cash flows discounted by risk characteristics. Secondly, the existence of retail investors in the market does not lead to inefficiencies in every case, since their trades are random and cancel each other out without moving prices. Finally, even if retail investors trade in similar ways, deep-pocketed arbitrageurs step in to limit their impact in terms of length of time and magnitude on asset prices.

## 2.1 Empirical challenges

The benchmark null hypothesis of the EMH posits that investors are not able to predict asset returns with anything else than measures of risk. Any other form of predictability would present a profitable trading strategy and thus a free lunch (Hong and Stein 2007). There are, however, measures with no apparent connection to risk which are able to forecast asset returns. DeBondt and Thaler (1985) form portfolios of the best and worst performing companies over the past three years and compute the corresponding returns over the following five years: Past losers have high future returns, whereas past winners have relatively low future returns. While long-term trends tend to reverse, short-term trends tend to continue. In Jegadeesh and Titman (1993) price movements over the past six to twelve months predict price movements in the same direction over the following six to twelve months (momentum effect).<sup>3</sup> Both studies imply that there is under- and overreaction in financial markets. In the meantime, several other studies confirmed their early findings (DeBondt and Thaler 1987; Zarowin 1989; Cutler et al. 1991; Bernhard 1993; Chan et al. 1996; LaPorta 1996; LaPorta et al. 1997; Daniel et al. 1998; Barberis et al. 1998; Hong and Stein 1999; Barberis and Shleifer 2003; Kadiyala and Rau 2004; Zhang 2006; Moskowitz et al. 2012; Stambaugh et al. 2012). As individuals modify their beliefs about asset values only slowly in the light of new information, they underreact. Underreaction may result from slow diffusion of news (Hong and Stein 1999), investors' conservatism and anchoring biases (Edwards 1968; Barberis et al. 1998), and the disposition to sell winners too early and hold on to losers too long (Shefrin and Statman 1985; Odean 1998; Frazzini 2006; Barberis and Xiong 2009). Overreaction due to stable patterns of news may result from positive feedback trading (DeLong et al. 1990b; Hong and Stein 1999), investors' overconfidence and self-attribution confirmation biases (Daniel et al. 1998), representativeness heuristics (Tversky and Kahneman 1974; Barberis et al. 1998), and herding behaviour (Bikhchandani et al. 1992). However, Fama (1998) argues that the regularities tend to vanish with changes in measurement, i.e. an overreaction is as likely as an underreaction. Especially the long-term overreaction seems to be explained by the 3-factor-model of Fama and French (1993). See also Ross (2004) for a critical evaluation of the regularities.

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<sup>3</sup> There are many theories that generate exotic time varying risk premia (for example habit persistence preferences) which lead to predictable returns and momentum effects in stock prices. For a recent survey see Lim and Brooks (2010).

## 2.2 Theoretical challenges

Miller (1977, p. 1151) argues that ‘it is implausible to assume that although the future is very uncertain, and forecasts are very difficult to make, that somehow everyone makes identical estimates of the return and risk from every security. In practice, the very concept of uncertainty implies that reasonable men may differ in their forecasts’. Individuals deviate from the neo-classical decision making theory in various aspects: First of all, they do not value risky gambles following the principles of von Neumann-Morgenstern rationality. Individuals rather look at gains and losses relative to some benchmark instead of the final wealth they can achieve. Secondly, they systematically make mistakes in predicting uncertain events by violating Bayes’ rule and other maxims of probability theory. Finally, individuals make different decisions depending on how a certain problem is presented to them. Therefore, (some) investors form their beliefs about asset values rather on rules of thumb than on maxims of economic rationality (Tversky and Kahneman 1974; Kahneman and Tversky 1979).

Investor sentiment by itself does not lead automatically to mispricing, as arbitrageurs may eliminate its influence on prices. However, arbitrageurs face two types of risk in real-world financial markets: Substitutes may not be perfect and mispricing may become worse before it disappears. As most arbitrageurs, for example fund managers, are agents for other investors and evaluated frequently, their investment horizons are short; causing them to worry about liquidating investments in mispriced assets before the mispricing may disappear (Shleifer and Vishny 1997). Arbitrageurs may prevent assets from a substantial undervaluation, but not from becoming considerably overvalued. Short sales constraints limit their possibilities to reflect their (rational) beliefs in the market (Brunnermeier and Pederson 2009). Several studies document the virtual absence of short sales in the mutual fund sector (Koski and Pontiff 1999; Diether et al. 2002; Almazan et al. 2004; Hong and Stein 2007). Retail investors may also refrain from going short, as they rather trade in times of rising asset valuations; in times of falling asset valuations, short sales constraints keep them out of the market (Miller 1977; Harris and Raviv 1993; Daniel et al. 1998; Duffie et al. 2002). There are considerable doubts in the literature whether the arguments of the EMH can always endure in real-world financial markets, as investor sentiment in the presence of limited arbitrage may result in mispricing persisting over longer time horizons (Shleifer and Summers 1990; Houge et al. 2001; Chen et al. 2002; Scheinkman and Xiong 2003; Hong et al. 2006).

The possibly occurring mispricing due to sentiment in the presence of limited arbitrage is considered as a systematic and priced risk factor in the behavioural finance literature (Merton 1987; Lee et al. 2002; Goyal and Santa-Clara 2003). Behavioural finance, the study of human fallibility in competitive markets, emerged as an alternative view of financial markets. Several theoretical behavioural finance papers model the empirically observed short-term underreaction and long-term overreaction patterns. DeLong et al. (1990b) model three types of investors: Positive feedback traders behave pro-cyclic, uninformed traders behave anti-cyclic, and arbitrageurs are informed. Under certain circumstances, arbitrageurs have a perfect rational incentive not to eliminate but to increase an occurring mispricing, i.e. arbitrageurs behave pro-cyclic and exploit the trading behaviour of positive feedback traders. Barberis et al. (1998) model risk-neutral investors who do not expect future asset values to follow a random walk, but to be either mean-reverting or to follow a trend. Investors' psychological biased expectations are based on conservatism and representativeness heuristic, respectively. The model of Daniel et al. (1998) is based on investor overconfidence and biased self-attribution, and comprises informed risk-neutral and uninformed risk-averse investors. Overconfidence about the precision of private information implies negative long-term autocorrelation; biased self-attribution implies positive short-term autocorrelation, i.e. momentum. Hong and Stein (1999) assume bounded rationality across investors. Bounded rationality across so-called newswatchers leads to a short-term underreaction. Momentum traders profit by trend-chasing, leading to a long-term overreaction. Barberis et al. (1999) model investors which are much more sensitive to reductions in wealth than to increases, i.e. known as loss aversion. Investors' loss aversion changes over time as a function of their investment performance, leading to negative long-term autocorrelations. While the models of Barberis et al. (1998), Daniel et al. (1998), and Barberis et al. (1999) rely on psychological biases, DeLong et al. (1990b) and Hong and Stein (1999) assume bounded rationality across investors. The models are able to explain over- and underreaction patterns theoretically.

### **3 Sentiment as an Explanation for Certain Puzzles**

Shleifer and Summers (1990, p. 26) state that 'just as entrepreneurs spend resources to build casinos to take advantage of gamblers, arbitrageurs build investment banks and brokerage firms to predict and feed noise trader demand'. Empirical and theoretical evidence suggests

that the key to success for an investor is not only the ability to calculate an asset's fundamental value, but also to forecast actions of other investors. As observing and forecasting sentiment shifts does pay off in real-world financial markets, arbitrageurs track price trends, trading volumes, volatility indices, investor surveys and other gauges indicating sentiment shifts.<sup>4</sup> This leads researchers from the behaviouralist side of the fence to make the claim that the impact of sentiment on asset values is an irrefutable fact of life. The only issue remaining is how to measure it (Baker and Wurgler 2007). Such strong statements seem to be exaggerated, as sentiment is only one of a list of possible explanations for various puzzles observed in the literature. Moreover, just as there are different ways to measure the efficiency of a market, there are various – admittedly not uncontroversial – ways to measure sentiment. Sentiment related proxies are discussed based on two key puzzles observed in the literature.

### 3.1 The Closed End Fund Puzzle

The puzzle describes the empirical finding that closed end fund shares commonly sell at prices not equal to the per share market value of assets the fund is holding. A closed end fund is a mutual fund holding a portfolio of other publicly traded assets. These funds issue a fixed number of shares that are traded on the stock market. Investors liquidate holdings in a fund by selling their shares to other investors. They cannot redeem them for the net asset value with the fund itself, as they would do with an open end fund. Agency costs, tax liabilities, and illiquidity of assets are cited in the neoclassical literature as explanations for closed end fund discounts (Malkiel 1977; Brauer 1984; Brickley and Schallheim 1985; Ross 2002). However, these explanations fail to explain why funds sometimes sell at premia, particularly at the beginning (Lee et al. 1990).

Zweig (1973) suggests that *discounts on closed end funds* reflect expectations of retail investors. DeLong et al. (1990a) show that changing retail investor expectations result in demand changes for closed end funds, leading to closed end fund discount changes. Lee et al. (1991) find that discount changes are due to changes in retail investors' sentiment. Moreover, closed end fund discounts correlate with other asset classes affected by sentiment, like small stocks, and predict subsequent excess returns of these stocks (Swaminathan 1996; Neal and Wheatley 1998). Kumar and Lee (2006) find trades of retail investors to be correlated with

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<sup>4</sup> For a recent study see Stambaugh et al. (2012) who explored the role of sentiment in a set of 11 anomalies – like financial distress, momentum, asset growth, and investment-to-assets – in cross-sectional stock returns. Long-short strategies exploiting these anomalies exhibit profits in markets with limited arbitrage and sentiment.

each other, but also correlated with closed end fund discount changes. However, some studies do not find support for closed end fund discounts being correlated with small stock returns (Elton et al. 1998; Gemmill and Thomas 2002; Doukas and Milonas 2004).

As closed end fund discounts may reflect expectations of retail investors, *trades of retail investors* may be regarded as another proxy for sentiment (Baker and Wurgler 2007). The relationship between retail investor trading and stock returns is examined extensively (Kaniel et al. 2008). Retail investor trades explain return co-movements of stocks with high retail concentration, like small-cap, value, low institutional ownership, and lower-priced stocks.<sup>5</sup> Retail investor trades result in an overvaluation of these stocks in the short run and an underperformance in the long run (Hvidkjaer 2008). Stocks bought by retail investors in month  $t$  are also more likely to be bought in the following months than stocks sold in month  $t$ . Herding behaviour can be observed across retail investors (Lee and Swaminathan 2000; Dorn et al. 2008; Barber et al. 2009) and across mutual fund managers (Smith et al. 1988; Lakonishok et al. 1991; Wermers 1999; Ben-Rephael et al. 2012). The findings indicate that (retail) investors tend to buy/sell similar assets at roughly the same time.

Within this context, Baker and Stein (2004) state that (retail) investors are more likely to trade when they are optimistic. Indeed, *trading volume* is higher in times of rising asset valuations and may disclose differences of opinion among investors (Miller 1977; Harrison and Kreps 1978; Scheinkman and Xiong 2003; Hong and Stein 2007; Stein 1995; Statman et al. 2006). Griffin et al. (2007) document a positive relationship between trading volume and past returns in 46 countries around the globe. The relation is stronger among retail investors and markets with low correlation with the world market, short sales constraints, and high market volatility.

*Market volatility* is often cited as ‘investor fear gauge’ by practitioners, i.e. periods of extreme fear in the market provide excellent buying opportunities (Simon and Wiggins III 2001). Indeed, financial markets react stronger to a rise in volatility than to a fall, implying an asymmetric relation and indicating higher volatilities in bear than bull markets (Whaley 2000; Low 2004; Giot 2005; Hameed et al. 2010).

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<sup>5</sup> This corresponds to Baker and Wurgler (2006) who show that a sentiment index consisting of six different sentiment measures explains subsequent high (low) returns of small, young, high volatility, unprofitable, non-dividend paying, extreme growth and distressed stocks in times of low (high) sentiment. For further studies on sentiment indices see for example Brown and Cliff (2004), Finter et al. (2012), and Baker et al. (2012).



### 3.2 The IPO Underpricing Puzzle

*IPO first-day returns* show peaks and troughs over time. Peaks are also referred to as ‘hot issue markets’ and known as IPO underpricing puzzle (Loughran et al. 1994). Neoclassical economists argue in favour of adverse selection and signalling problems as possible explanation for this puzzle (Morris 1996). However, IPOs sometimes earn first-day returns which are so outstanding high that they are hard to explain without the consideration of sentiment, leading Ritter and Welch (2002) to support the argument of over-optimism across (retail) investors. Empirical findings seem to support their argument: In times of enthusiasm about the investing environment, investors’ demand is high and pushes IPO prices above fundamental values. This is accompanied by high IPO first-day returns (Cornelli et al. 2006; Baker and Wurgler 2007; Ljungqvist et al. 2006; Dorn 2009) and lower returns of these assets in the long-run (Purnanandam and Swaminathan 2004).

Large fluctuations over time occur also across *IPO volume* and *equity issues* (Ritter 1984; Ljungqvist and Wilhelm 2003). As IPO volume seems to be related to market conditions, managers may take advantage of ‘windows of opportunity’ when going public (Ritter 1991; Baker and Wurgler 2000). This may also be supported by underwriters encouraging companies to go public when valuations are higher than expected (Lowry 2003; Cornelli et al. 2006). Indeed, more companies go public in times of optimism in the market. This is accompanied by an increase in IPO volume and IPO registration as well as a fast completion of companies already registered for an IPO (Lucas and McDonald 1990; Loughran et al. 1994; Loughran and Ritter 1995; Lowry and Schwert 2002). Lee et al. (1991) find evidence for (retail) investor sentiment affecting the timing of IPOs; Ljungqvist et al. (2006) for an increasing number of IPOs in times of high investor enthusiasm in the market. This holds also for equity issues, as companies issue more equities after years of high equity market performance and right before years of low equity market performance. Companies issuing equity during hot issue markets have poor returns over the five consecutive years following the offering date (Loughran and Ritter 1995). Companies profit by issuing new stocks in times of high equity prices; in times of low equity prices, issuing debt seems more profitable. This finding corresponds to the timing hypothesis (Ritter 1991) but does not imply that managers are able to forecast stock market prices. Baker and Wurgler (2007, p. 138) state that ‘correlated mispricings across firms may lead to correlated managerial actions, which may then forecast correlated corrections of mispricings – that is, forecast market returns’.

Although managers are probably not able to forecast stock market prices, the *volume of insider trading* is often cited as another sentiment proxy. As insiders are best informed about the value of their companies, they may follow an anti-cyclical trading strategy and may exploit shifts in sentiment by taking advantage of the difference between an asset's price and its fundamental value (Seyhun 1992). Indeed, stock market returns tend to rise following increases in aggregate insider trades and vice versa (Seyhun 1988; Iqbal and Shetty 2002; Jiang and Zaman 2010).

## **4 Sentiment as an Explanation for Asset Valuations**

Studies from the behaviouralist side of the fence argue that sentiment proxies may be candidate explanations for various puzzles discussed in the literature. As these proxies are all somehow related to the exploitation of a fraction of investors, sentiment may also be a candidate explanation for different asset valuations across investors (Lee et al. 1991). By asking investors about their beliefs, researchers may get a sense of the enthusiasm in the market. Solt and Statman (1988) use the Bearish Sentiment Index published by Investor Intelligence. It reflects the ratio of bearish to the total number of investment advisors. Advisors become more bearish after a DJIA decrease over the past four weeks and vice versa. Brown and Cliff (2005) find that the bull-bear spread from Investor Intelligence predicts stock market returns over the next one to three years. DeBondt (1991) uses data from the Livingston survey which summarizes the expectations of economists. Economists tend to overreact, make forecasting errors, and show behaviour identical to the one of retail investors. DeBondt (1993) studies retail investors' sentiment. Their sentiment moves with the market, i.e. recent past returns affect sentiment more than longer past returns. Clarke and Statman (1998) show as well a movement in investor enthusiasm with the market: high returns in the short run are associated with a move from bearishness to bullishness; high returns in the long run are related to 'nervous' bullishness. A movement to more bullishness leads to lower conditional volatility and higher future stock returns. This holds also vice versa (Lee et al. 2002). Hence, not all investors seem to be alike. Fisher and Statman (2000) find that the sentiment of newsletter writers and retail investors is positively related, but not related to the one of Wall Street strategists. While retail investor sentiment and newsletter writer sentiment are affected by previous returns, this does not hold for the sentiment of Wall Street strategists. Schmeling

(2007) finds that arbitrageurs are able to predict long run stock returns right, whereas retail investors are not able to do so. Brown and Cliff (2005) show that arbitrageurs also adjust their sentiment downwards when they expect retail investor sentiment to be high and vice versa. Retail investors do not consider the sentiment of arbitrageurs. Hence, surveying investors may reveal their beliefs about asset values and thereby shedding light on their sentiment.

## 5 Directions for Future Research

The theoretical and empirical literature on investor sentiment is basically based on two different types of investors. While retail investors tend to be prone to sentiment, arbitrageurs profit by exploiting the behaviour of retail investors. Arbitrageurs may track sentiment indicators in order to predict retail investors' sentiment. The applied proxies are therefore all somehow related to the exploitation of retail investors. Although there is a large body of literature on this issue, the literature hardly reveals factors influencing investors' individual evaluation of asset characteristics. There is nothing wrong with asking investors about their beliefs or explaining certain puzzles with proxies related to sentiment, *but* it might also be of interest to analyse factors influencing investors' individual evaluation of asset characteristics. This is an important issue, since investors constantly have to process and interpret information which provides the basis for their actions. Therefore, future research should focus on possible symptoms of investor sentiment, i.e. what makes investors become prone to sentiment.

### 5.1 Sentiment and Culture

People's behaviour depends to a large extent on their cultural background (Douglas and Wildavsky 1982; Greif 1994; Guiso et al. 2006). Individuals cannot alter their ethnicity, race or family history, and only with difficulty can they change their country or religion (Becker 1996). Because of these difficulties and a low depreciation rate, culture is largely a 'given' to individuals throughout their lifetimes.<sup>6</sup> Until recently, culture played a minor part as possible explanation for economic phenomena (Guiso et al. 2006). Beckmann et al. (2008) document an impact of asset managers' cultural background on their trading behaviour which is related

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<sup>6</sup> For definitions of culture see Hofstede (2001), Guiso et al. (2006), and Siegel et al. (2011). For distinctions between cultures see Hall (1985), Hall and Hall (1990), Trompenaars (1993), Schwartz (1994), Hofstede (2001), and House et al. (2004).

to the herding behaviour (Coval and Moskowitz 1999; Hong et al. 2004) and the home bias effect (Grinblatt and Keloharju 2001; Pirinsky and Wang 2006; Bae et al. 2008; Brown et al. 2008). The home bias effect describes the propensity to overweight local companies in a portfolio and is documented for arbitrageurs as well as for retail investors (Coval and Moskowitz 1999; Ivkovic and Weisbenner 2004). Physical proximity within a certain geographic area allows social interaction transmitting information and sentiment (Kaustia and Knüpfer 2012). Chui et al. (2010) are the first analysing the impact of culture on stock returns, albeit they do not link culture to sentiment. Hofstede's individualism index serves as a measure for cross-country cultural differences. It reflects the extent to which people focus on their own abilities and is related to overconfidence and self-attribution biases (Markus and Kitayama 1991; Yates et al. 1996; Daniel et al. 1998; Heine et al. 1999; Van den Steen 2004). Chui et al. (2010) find a positive impact of individualism on the magnitude of momentum profits and a positive relation between individualism and both trading volume and volatility, leading them to argue that cultural differences are the reason why momentum strategies are not profitable in Asia (Chui et al. 2003) but throughout the world (Griffin et al. 2003). The findings correspond to models in which overconfident investors trade more (Odean 1998; Scheinkman and Xiong 2003), and to studies in which investors with distinct cultural backgrounds interpret information differently (Otoo 1999). Little work has been done in the literature on this issue. We believe that research focusing on culture and sentiment will be promising, as investors' cultural background might influence the individual proneness to sentiment and evaluation of asset characteristics, respectively. For example, it might be interesting to analyse the influence of culture on different sentiment proxies around the globe. Moreover, as financial markets have become more international over time, it might be interesting to investigate the influence of culture on sentiment proxies over time.

## **5.2 Sentiment and Experience**

The literature on investor sentiment distinguishes between investors due to their profession: Professionals (arbitrageurs) tend not to be prone to sentiment, whereas amateurs (retail investors) tend to be prone to sentiment (Zweig 1973; Lee et al. 1991; Kaniel et al. 2008). Since investors are not born as professionals, a distinction between investors due to their experience might be more appropriate when it comes to investor sentiment. Younger managers' behaviour tends to be similar to the one of inexperienced investors (Smith et al.

1988). Young and inexperienced investors had higher stock market expectations than old and experienced investors in the late 1990s (Vissing-Jorgensen 2003). Younger mutual fund managers, compared to their elderly counterparts, exhibited trend-chasing behaviour during the dotcom bubble and tended to buy overpriced stocks (Greenwood and Nagel 2009). Seru et al. (2010) document that trading performance, measured by the number of trades, improves as investors get more experienced. Although feedback on financial markets is noisy, experience might influence investment decisions (Camerer and Hogarth 1999), reduce herding behaviour (Chevalier and Ellison 1999; Beckmann et al. 2008), and dilute overconfidence to some degree (Gervais and Odean 2001). Thus, investors are probably able to learn and improve their trading skills over time, thereby become less prone to sentiment (Arrow 1962; Grossman et al. 1977). As experience might have an influence on the individual proneness to sentiment, a distinction between investors due to their experience might be more appropriate than due to their profession in the context of sentiment. Although this thought is theoretically motivated, it would be interesting to empirically analyse the influence of experience on sentiment. For example, inexperienced investors might have more influence on financial markets in times of optimism rather than pessimism, and well-established stock markets and indices might be less influenced by sentiment than recently established ones.

### **5.3 Sentiment and Laboratory Settings**

Next to empirical studies, personality characteristics influencing the individual proneness to sentiment might be analysed in laboratory settings in a market environment. As sentiment is regarded as the not (entirely) rational evaluation of asset characteristics, we suggest the following – admittedly broadly defined – setting with two different treatments: At the beginning, participants receive identical background information about a hypothetical company and its current asset price. Background information enables participants to calculate the fundamental value which is equal to the current asset price, but not stated. Before trading in the asset, participants are asked to state the asset's fundamental value. This allows distinguishing between rational and irrational participants, respectively. In the following, participants receive an announcement about the company, for example a quarterly report, which does not result in a different fundamental value. Participants are again asked to state the asset's fundamental value. Differences in treatments occur as a newsletter service reports on the announcement in one treatment, whereas there is no newsletter service in the other

treatment. From a neoclassical perspective, the newsletter service should not influence participants' asset valuation, as there is no new information concerning the fundamental value the service can report on. From a behavioural perspective, however, the newsletter service might influence participants' asset valuation, as it may induce sentiment by generating different beliefs about the fundamental value among the participants. Participants might be controlled for cultural background, experience, and other personality characteristics. The setting is theoretically motivated and related to various models (Miller 1977; Harrison and Kreps 1978; Scheinkman and Xiong 2003; Hong and Stein 2007). For related studies on this issue see Grether (1980), DeBondt (1993), Ackert et al. (2002), Henrich et al., (2004), Haruvy and Noussair (2006), Fellner and Theissen (2011), and Harding and He (2012).

## **6 Conclusion**

This paper reviews the literature in finance and economics on the theory and evidence relating to investor sentiment. Sentiment may influence financial markets in the presence of limited arbitrage. This makes it one candidate explanations for different asset valuations across investors and for certain puzzles discussed in the literature. The literature on investor sentiment is basically based on two different types of investors. While retail investors tend to be prone to sentiment, arbitrageurs profit by exploiting the behaviour of retail investors. Arbitrageurs may track sentiment indicators in order to predict retail investors' sentiment. Several proxies, which are all somehow related to the exploitation of retail investors, are applied to capture sentiment. Although there is a large body of literature on this issue, current research focuses on the measurement of sentiment and its implications for asset valuations. It hardly reveals factors influencing investors' individual evaluation of asset characteristics. We argue that it might be interesting to see behind the curtain, i.e. to get a sense of what makes investors become for example overconfident. Therefore, future research should focus on possible symptoms of investor sentiment that make investors prone to sentiment. This is an important issue, since investors constantly have to process and interpret information which provides the basis for their actions. We argue that investors' personality might have an influence on their individual proneness to sentiment and thus on their evaluation of asset characteristics. A consideration of these issues could release new impulses and bring new insights. This paper shows that sentiment will remain an interesting playing field.

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