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## Conference Title

# Sensitivity of trading intensity to optimistic and pessimistic beliefs: Evidence from the French stock market

Abderrazak Dhaoui <sup>a\*</sup>, Naceur Khraief <sup>b</sup>

<sup>a</sup>University of Sousse, Erriadh City 4023, Tunisia

<sup>b</sup>University of Sousse, Erriadh City 4023, Tunisia

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## ABSTRACT

In this paper, we will offer some evidence indicating that investor sentiment plays a central role in explaining trading intensity and market trend changes. Based on both econometric and fuzzy logic approaches, the empirical findings show that pessimistic sentiment has a particularly significant impact on the French financial market trend. Moreover, the results suggest that the impact of pessimism on asset returns exceeds that of optimism as a direct indicator of investor's beliefs. Indirect indicators of agent sentiment present more smoothed effects on these two market components. Our results indicate that incorporating psychological factors in macro-financial models leads to better supervision and control of the main drivers of the markets.

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## 1. Introduction

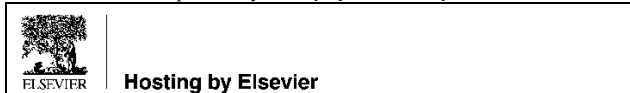
Although there are many studies supporting the Rational Expectations Hypothesis in financial markets, the incorporation of psychology to financial theory stills relatively a new area of research. Baker and Nofsinger (2002) note “*proponents of behavioral finance contend that people may not always be ‘rational’, but they are always ‘human’.* Thus,

*behavioral finance exposes the irrationality of investors in general and shows human fallibility in competitive markets*”. Recently however, psychological components have come to the forefront of academic research, and this probably because of the financial crises and recessions that emerged and for which the hypothesis of rationality failed to find convincing evidence. The evidence in fact suggests that behavioral factors always play a central role in financial markets. Over the last two decades many recent studies such as Haruvy et al., (1999), Barberis et al., (1998),

\* Corresponding author. Tel.: +216-73-301-808; fax: +216-73-301-888.

E-mail address: [abderrazak.dhaoui@fsegs.mu.tn](mailto:abderrazak.dhaoui@fsegs.mu.tn)

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Akerlof (2009), Guldberg and Shiller (2010), emphasize psychological factors in explaining financial crisis.

Not all the investors are rational and their demand for risky assets is influenced by their beliefs or sentiments. Optimism, pessimism and overconfidence help determine how in-depth the decision-making process can be changed over the time. Baker and Wurgler (2006) show that when agent sentiment is high (low) for stocks that are hard to value or arbitrage; they tend to earn relatively low (high) subsequent returns. The aim of this paper is to examine the relationship between investor sentiment on one hand, and the trend of trade and its intensity on the other hand. One of the most important issues investigated is the sensitivity of investors' behavior to their feelings and beliefs. In other words: *How do investors' sentiments and beliefs influence their investment strategies?* We aim to analyze how the investors' belief impacts the trading behavior in financial markets and in what degree the market trade and the trading intensity are sensitive to investors' beliefs and sentiments.

We use econometric and fuzzy logic approaches to investigate the sensitivity of both market trend and trading intensity on the investors' beliefs. The use of the fuzzy logic approach is motivated by the need for supervising of the investors' sentiments and beliefs evolution. The optimism as a positive sentiment can be built over the time, but can be broken after a single shock. Since sentiments are not explicitly supervised due to their fuzzy nature, classical econometric models are not suitable for a good prevision. Fuzzy logic approach is oppositely more appropriate to predict the relationship type between unobservable variables. This technique was been used in Hachicha et al. (2011) to control the fuzzy complementarity between the fundamentalists and the behaviourists in the explanation of financial market dynamics. The authors attribute the use of this approach to the difficulty of prediction due to the complexity and the behavior of traders. In the same way, Bekiros (2009) used a fuzzy approach to investigate the decision making of rational investors in speculative stock markets and the trading strategies with behavioral approach. Dhaoui et al. (2013) used the same approach to investigate how human psychology drive economies and markets. They document that the fuzzy logic controller constitutes one of the most effective methodology that allows controlling the sensitivity financial market component (trading volume and stock returns) to behavioral variables such the investors' feelings and sentiments.

Earlier studies have predicted the sentiments and beliefs impacts only theoretically. We believe our work is an important first step to an empirical validation of the behavioral macroeconomic model with non-observable investors' characteristics.

This paper contributes to the behavioral financial literature on how investor sentiments (optimism, pessimism, overconfidence) impact stock price movements, and it does so using French data and fuzzy logic techniques. Our results seem to confirm a fuzzy relationship between these variables. The remainder of this paper is organized as follows: Section 2 presents a literature overview on investors' sentiments and beliefs. Section 3 deals with the description of data and the new fuzzy methodology implemented. In section 4 we present and discuss the major results, while section 5 concludes.

## 2. Literature Review

The Efficient Market Hypothesis assumes that there is perfect information in the stock market and that the investors are rational decision makers. However, by the start of the twenty-first century a new stream of financial literature emerged advocating that stock prices depend on psychological and behavioral factors. In that, the *behavioral finance* approach has quickly become the dominant model for understanding the variation of stock prices.

Behavioral finance incorporates psychological components to counteract the widely advocated rationality in conventional finance. Investor sentiment was introduced as a relevant factor that significantly influences the financial market behavior. The basic idea behind this approach is that human nature includes both rationality and animality and the latter has more significant effect on investor behavior than the former. Keynes was the first to suggest that emotions can influence human behavior instead of rational processes. In his book "*The General Theory of Employment, Interest, and Money*", Keynes introduced the term "animal spirits" as "*a spontaneous urge to action rather than inaction*" to explain the economic realities. He states specifically that "*most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the results of animal spirits [...] and not at the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities*".

In the same way as Keynes (1936), Akerlof and Shiller (2009) suggested the incorporation of "animal spirits" to macroeconomic models. They argue that "*it is necessary to incorporate animal spirits into macroeconomic theory in order to know how the economy really works. In this respect the macroeconomics of the past thirty years has gone in the wrong direction. In their attempts to clean up macroeconomics and make it more scientific, the standard macroeconomists have imposed research structure and discipline by focusing on how the economy would behave if people had only economic motives and if they were also fully rational.*"

Akerlof and Shiller (2009) describe different aspects of "animal spirits" such as corruption, money illusion, stories, exuberance and overconfidence (Akerlof and Shiller (2009), Guldberg (2010). Moreover, other authors suggest that there exist additional factors in order to better explain the behavioral and psychological bias on the decision-making process in financial markets. In particular, optimism (Haruvy et al., (1999), Weinstein (1989), Otten (1989), pessimism (De Bondt and Thaler (1987), Barberis et al., (1998), or overconfidence (Daniel, (1998), Hirshleifer and Subrahmanyam (1998) have been shown to affect the financial investment decisions.

Undoubtedly, differences in preferences and beliefs lead to differences in investors' behaviors. Optimistic as well as pessimistic

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