

**Dina Liović, M.A., PhD candidate**  
J.J.Strossmayer University of Osijek  
Faculty of Economics in Osijek  
Trg Ljudevita Gaja 7  
31 000 Osijek  
Phone: +385(0)31 22 44 64  
E-mail address: dinali@efos.hr

**Dražen Novaković, M.A., PhD candidate**  
J.J.Strossmayer University of Osijek  
Faculty of Economics in Osijek  
Trg Ljudevita Gaja 7  
31 000 Osijek  
Phone: +385(0)31 22 44 64  
E-mail address: dnovakov@efos.hr

## **THE (IR)RATIONALITY OF MARKET PARTICIPANTS – BEHAVIORAL FINANCE PERSPECTIVE**

### **(I)RACIONALNOST TRŽIŠNIH SUDIONIKA – POGLED BIHEVIORALNIH FINANCIJA**

#### ***ABSTRACT***

*Per behaviorism, as a primary psychological approach, human behaviour deserves to be the subject of scientific research. Behaviorism is a science studying and analysing the people's behaviour which seeks to explain, describe, and predict certain human behaviour, what people do and how they work, think, and why certain behaving decisions are made.*

*Behaviorism finds its place in various areas, including the economy, because it deals with the issue how psychology impacts the individuals (market participants in the economic context) - from individual to institutional investors, on the economic decision-making, as well as the price movements.*

*The theme of this paper is the specific research area studying different effects on the behaviour and decisions of market participants which is the area of behavioral finance. Although seemingly incompatible, the economy, especially financial one, can be put in the context of psychology through behaviour of market participants and their decision-making. Erroneous, irrational financial decisions are the result of different unpredictable reactions of individuals faced with losses and high market risks. Therefore, for decision-making it is essential to consider all the factors in the market, which creates place for behavioral finance.*

*As a new approach to the field of finance, when studying market participants' behaviour, behavioral finance considers different aspects of individuals (market participants), with psychological factors as extremely influential ones. Behavioral finance focuses on determining how and why market participants make certain decisions in a specific way, or how they respond to and interpret information from the environment. Therefore, the task of behavioral finance, and at the same time the main objective of this paper, is to explore the ways and the extent to which human behaviour can affect financial decisions of individuals and institutions, price trends, as well as the results it can have.*

**Key words:** behavioral finance, (ir)rationality of market participants, market risk, psychological factors, market deviations, decision-making

## SAŽETAK

Prema biheviorizmu, kao primarno psihološkom pristupu, ljudsko ponašanje zaslužuje biti predmetom znanstvenog istraživanja. Biheviorizam se kao znanost bavi proučavanjem i analiziranjem ponašanja ljudi te nastoji objasniti, opisati i predvidjeti određeno ljudsko ponašanje, odnosno što i kako ljudi rade, misle, kao i zašto se odlučuju na određena ponašanja. Biheviorizam nalazi svoje mjesto u različitim područjima, pa tako i u ekonomiji, jer se bavi pitanjem utjecaja psihologije pojedinaca, odnosno u ekonomskom kontekstu tržišnih sudionika - od pojedinaca do institucionalnih investitora, na ekonomsko odlučivanje, kao i kretanje cijena. Temu ovoga rada čini zasebno područje istraživanja utjecaja različitih učinaka na ponašanje i odlučivanje tržišnih sudionika, a to je područje bihevioralnih financija. Premda naizgled nespojivo, ekonomiju je, posebice financijsku, moguće dovesti u kontekst sa psihologijom - promatrajući aspekt ponašanja tržišnih sudionika te donošenja odluka od strane istih. Pogrešne, iracionalne financijske odluke rezultat su različitih i nepredvidivih reakcija pojedinaca na gubitke te prisutnost visokih tržišnih rizika. Stoga, nužno je pri odlučivanju uzeti u obzir sve čimbenike prisutne na tržištu, u čemu svoje mjesto pronalazi područje bihevioralnih financija. Kao novi pristup području financija, bihevioralne financije u proučavanju ponašanja sudionika na tržištu uzimaju u obzir različite aspekte pojedinaca (tržišnih sudionika), između kojih su iznimno utjecajni psihološki faktori. Glavna usmjerenost bihevioralnih financija jest utvrditi kako i zašto tržišni sudionici donose određene odluke na baš određeni način, odnosno kako reagiraju na informacije iz okoline i na koji ih način interpretiraju. Dakle, zadatak je bihevioralnih financija, a ujedno i glavni cilj ovoga rada istražiti na koje načine i u kojoj mjeri ljudsko ponašanje može utjecati na financijske odluke pojedinaca i institucija, kretanje cijena, kao i čime sve ono može rezultirati.

**Ključne riječi:** bihevioralne financije, (i)racionalnost tržišnih sudionika, tržišni rizik, psihološki faktori, tržišna odstupanja, donošenje odluka

## 1. Introduction

If stock prices and stock market indices are observed, in the both more developed markets or those less developed like the Croatian one, it could be noticed that occasional sudden ups and downs of the observed variables occur. These occurrences can hardly be considered as a result of the market participants' rational decisions. One such sudden decline of the stocks value at the Zagreb Stock Exchange occurred before the writing of this paper and thus became one of the motives for its creation. Namely, the sudden drop in the value of a few stocks followed by their equally rapid recovery points to the conclusion that market participants did not cause such movements by rational choices but rather emotional reactions. Their influence on financial trends is analysed by the behavioral finance. Therefore, this paper sought to explore advances of these economic researches incorporating human behavior, how they explain financial phenomena by psychological factors, and to what extent are they spread in Croatia. Since behavioral finance is part of a broader behavioral economics, the review will begin with this topic.

## 2. Behavioral economics

According to the usual definition of behavioral economics, it is a discipline that enhances the exploratory power of the economics by combining it with more realistic psychological settings (Camerer, Loewenstein, 2002, 1-2), using social, cognitive, and emotional factors to understand the economic decisions of individuals and institutions. Behavioral economics is not considered as a special branch of the economics, but a modelling style that uses evidence from psychology and other sciences to assess the human rationality, the willpower and his personal interests in answering fundamental economic questions. It explores the limits of people's rationality, and the results do not only relate to market decisions but to almost all areas of human decision-making. At the core of the behavioral economics there is a belief that the economic theory based on the psychological foundations will create theoretical insights and better predictions in this area as well as suggest better policies. This conviction does not suggest complete rejection of the neoclassical approach to economics based on utility maximization, equilibrium, and efficiency. According to Camerer and Loewenstein (2002, 1-2), this approach is useful for providing economists with a theoretical framework that can be applied to almost any form of economic behavior. It is common in behavioral economics' papers to modify one or two assumptions in standard theory to make it psychologically more realistic. These modifications are usually not radical as they relax simplifying assumptions that are not central to the economic approach. For example, it is not in core neoclassical theory that people should weight risky outcomes in a linear fashion, or that they have to discount the future exponentially at a constant rate. (Camerer, Loewenstein, 2002, 1-2) Other assumptions simply acknowledge human limits on computational power, willpower, and self-interest.

Many ideas of the behavioral economics are not new at all and they are just returning to the roots of the neoclassical economics. Psychology has not been a separate discipline for a long time, and economists usually did not accept it. Therefore, one part of the traditional economic literature (Adam Smith, John Maynard Keynes, Irving Fisher, Jeremy Bentham, Vilfredo Pareto and others) that was rich in psychological insights about the decision-making was long ignored. (Camerer, Loewenstein, 2002, 3) Those insights were left behind in the development of mathematical tools of economic analysis, consumer theory and general equilibrium. For example, Adam Smith believed there was a disproportionate aversion to losses which is a central feature of Kahneman and Tversky's prospect theory. (Camerer, 2005, 4) Adam Smith also wrote a less well-known book *The Theory of Moral Sentiments*, which laid out psychological principles of individual behavior as profound as his economic observations. It gives insights about human psychology, many of which presage current developments in behavioral economics. (Camerer, Loewenstein, 2002, 3) Adam Smith's world is not inhabited by dispassionate rational purely self-interested agents, but rather by multidimensional and realistic human beings. (Ashraf, Camerer, Loewenstein, 2005, 142) In the 1970s, cognitive psychology begins to study decision-making in economics. The dominant interest of cognitive psychology are psychological phenomena such as sensation and perception, attention, creation of concepts, and information processing. In this area, psychologists Daniel Kahneman, Amos Tversky, Paul Slovic, Ward Edwards and others compared the cognitive decision-making models in terms of risk and uncertainty with economic models of rational behavior. Psychologist Daniel Kahneman and economist Vernon Lomax-Smith, who won the Nobel Prize for Economics in 2002, significantly influenced the development of behavioral economics. Daniel Kahneman got it for inclusion of the psychological research in economics, especially in the field of human decision-making and decision-making in terms of risk.

Typically, modern economics has not engaged in the analysis of sociological and psychological factors and has focused on narrow behavioral assumptions in which expectations are formed by mathematical algorithms. Such behavioral approach adopted in most economic analysis, neglecting sociological and psychological forces and simplistically categorizing behaviour as either rational or not rational, is too narrow. Behaviour may reflect an interaction of cognitive and emotional factors. (Baddeley, 2010, 281) Some of these emotional factors are taking their place in some recent economic analyses. Akerlof and Shiller developed Keynes's insights about animal spirits which he analysed just in the context of entrepreneurship, stating that uncertainty about the future prevents entrepreneurs from properly calculating the future benefits of their business decisions. If there is no basis for rational calculation, entrepreneurs' decisions will be propelled by animal spirits which he described as a spontaneous urge to action. Akerlof and Shiller extend Keynes's animal spirits on socio-psychological, noneconomic motivations affecting macro-economic phenomena, including herding and speculation. They define five animal spirits: confidence, fairness, corruption, money illusion and storytelling. In the context of herding behaviour, confidence and storytelling will be the most crucial. Namely, Keynes argued that if the state of confidence is strong and people are optimistic, then the macro-economy will be vulnerable to waves of euphoria, optimism and overconfidence, precipitating herding, and speculative bubbles. But when the state of confidence is weak and people are pessimistic, then the macro-economy will be prone to slumps and financial crises. These forces will spread via storytelling, word of mouth and false intuitions that prices cannot fall, feeding herding and contagion. In this way, Akerlof and Shiller's animal spirits can explain market trends. (Baddeley, 2010, 284) Pech and Milan (2009, 891) found that recent empirical evidence suggested that many of the Keynes's psychological ideas have a defensible behavioral foundation and fit broadly the real behavior of economic agents. Therefore, they argued that Keynesian economics can benefit from issues related to judgment under uncertainty and building solid micro foundations for macroeconomics. Akerlof and Shiller (2009) reinforced this claim that macroeconomics can indeed be based on behavioral foundations.

### **3. Behavioral finance**

Behavioral finance, as a new approach to financial markets, emerged partly in response to the difficulties faced by the traditional paradigm. It argues that some financial phenomena can be better understood using models in which some agents are not fully rational from the financial point of view. (Barberis, Thaler, 2001, 4) Academic finance has evolved from the time when the efficient markets theory was widely considered to be proved beyond doubt. (Shiller, 2003, 83) Shiller argued empirically that stock price swings are too volatile to reflect only news, and DeBondt and Thaler discovered an important overreaction effect based on the psychology of representativeness. However, statistical work of these first behavioral economists was simply ignored. (Camerer, Loewenstein, 2002, 42) Behavioral finance looks at finance from a broader social science perspective including psychology and sociology. It is now one of the most vital research programs, and it stands in sharp contradiction to much of efficient markets theory. (Shiller, 2003, 83) Indeed, it is necessary to distance oneself from the presumption that financial markets always work well and that price changes always reflect genuine information. Behavioral finance gives evidence that the recent worldwide stock market booms and then crashes had their origins in human foibles and arbitrary feedback relations. Therefore, they must have generated a real and substantial misallocation of resources. According to Shiller (2003, 102), the challenge for economists is to make this reality a better part of their models. There are two groups of serious scientific research in behavioral finance. According to Šonje (2014, 16), the first one is the analysis of the momentum - inertia in the movement of the securities' prices. These surveys are the beginnings of behavioral finance. The inertia of prices adjusting to new information and

market circumstances has suggested a correlation between the behavior of actual traders with a psychological phenomenon of slow reaction to new information. The second group of serious research studies are those analysing use of a technical analysis which attempts to recognize trends and other visual patterns (such as Fibonacci series) in graphs of price movements that could serve to predict future price movements.

In Croatia, there are only few papers considering behavioral finance. Brajković and Radman Peša (2015, 65-66) presented behavioral finance through the term of Black Swan defining it as an unpredictable event with serious consequences although people tend to give explanations to make it predictable and explainable. Good example is the recent global financial crisis which is largely caused by the implementation of faulty mathematical models relying on risk assessments as a stable tool in banking systems. However, mathematical, and statistical models can only be one part of a crisis forecasting system and risk management that should be based on human experience of the observations and predictions of (non) rational people's behaviour and the (non) stability of the system as a whole. (Brajković, Radman Peša, 2015, 89) In addition, Ivanov (2008, 17) examined anomalies and phenomena on financial markets. The analysis of the irrationality on the financial market was explored on the case of Croatian stock market. In the period before the crisis, the Croatian stock exchange has seen a drastic boom in activity, making it one of the fastest growing markets in the world. However, the Croatia's stock market index CROBEX has plunged around 50 percent during the 2008. Instead of the former euphoria of optimism, a today human behavior on financial market reflects the strong euphoria of pessimism. (Ivanov, 2008, 17) This idea that the business cycle is driven by waves of optimism and pessimism has a long tradition. It was made popular by Keynes who called these waves animal spirits. According to De Grauwe (2008, 35) this idea is still widely accepted in explaining movements in economic activity.

Behavioral finance, as a financial discipline, has been affirmed over the past thirty years as a descriptive theory of financial decision making and functioning of financial markets. (Šonje, 2014, 2) Behavioral finance does not deny the existence of standard financial theories. They merely complement the deficiencies that cannot be explained with rationality. (Brajković, Radman Peša, 2015, 89) The specificity of financial markets is that decisions on purchasing financial assets are more complicated than decisions on purchasing ordinary goods. The reason lies in the expectations. They play a key role in assessing the value of an investment. The reason why the risks (price fluctuations) are more noticeable with financial assets than with ordinary goods, lies in the wavering of market participants' expectations. According to Šonje (2014, 3), the three main factors affect the estimation of financial assets value - estimating (expecting) the amount of future cash flows that one expects to realize as securities holder, the risk assessment of future cash payments and time preference of money which is a compensation for the fact that one cash unit today is worth more than one cash unit tomorrow.

The economic conception of human behavior assumes that a person has a single set of well-defined goals, and that the person's behavior is chosen to best achieve those goals. (Loewenstein, O'Donoghue, 2005, 1) Those goals are different as market participants differ based on the time preferences, estimates (expectations) of the future cash flows and the risk perception. Everyone assesses subjectively these elements. Therefore, there may exist thousands of buyers and sellers with different subjective estimates of the value for each security. Such variety is logical if people have different information. However, the variety of subjective estimates occurs even when people have the same information. One of the reasons behind is selective perception - people often see the same things differently. There is a need for a social mechanism enabling communication and convergence between different attitudes about values. A market is such a

mechanism that enables different individual valuations to face each other freely to the extent that everyone has the right not to buy or sell goods, services, or capital. Therefore, at any moment, hundreds of prices (and the amounts) at which someone is willing to buy or sell a security are pointed out. Individual expectations thus obtain a collective dimension that can be statistically described by the distribution of supply and demand prices. (Šonje, 2014, 4) Such a financial market enables filtering of individual differences (and eliminating errors) in estimates of value, which ultimately leads to the exposure of the representative value by which the largest number of transactions on the market is performed.

The previously mentioned behavioral principles examine the validity of the efficient markets hypothesis assuming that people behave rationally, can process all available information, financial prices efficiently incorporate all public information and prices can always be regarded as optimal estimates of true investment value. (Ivanov, 2008, 17) The efficient markets hypothesis is a financial theory that starts from the assumptions of the rationality of the participants which are in mutual competition and the availability of information relevant to trading. If rational participants have relevant information and compete with each other, the market prices of the financial assets will equal their fair value. Such efficient market will fulfil its social role of optimal allocation of economic resources. However, there is almost no peace in real stock exchanges. (Šonje, 2014, 8-9) Moreover, if the market is more liquid and the number of market participants is greater, trading will be livelier. This deviation of the real market behavior from theoretical prediction is based on the fact that the actual markets are immersed in political, historical, institutional, informational and sociopsychological circumstances that significantly complicate the achievement of the market equilibrium. According to Šonje (2014, 10), in the efficient markets hypothesis many of the features of the real world remain unrecognised and in descriptive terms it is not adequate.

Another important feature in finance is discount rate. It is generally assumed that the discount rate does not change in time (time preference does not change shape over time) and the discount factor has a classic exponential form. But in many cases, the reality might be different. Research in the field of behavioral finance has shown that many people have so-called hyperbolic rather than exponential time preferences. This means that the time preference is expressed towards the immediate future (when the gain is at hand) and is relatively weak in relation to the further future, although one expects it to be more profitable. Hyperbolic time preferences lead to time inconsistent choices that are highly represented in addicts. Psychologists have concluded that hyperbolic time preferences are associated with a psychological self-control problem, leading to irrationality in some people in the sense of insufficient self-control. (Šonje, 2014, 20) When studying market bubble causes (unjustifiable sudden growth in stock market or real estate prices), Kahneman had been exploring the influence of psychological factors on making decisions in unpredictable situations. In cases where safe gain cannot be predicted, an individual will avoid the risk although risk is giving the possibility of higher profit. However, in the case where individual moves from a sure loss, the risk becomes more attractive, though it could bring a more pronounced loss. (Ivanov, 2008, 10) Keynes also gives subtle messages about the relationship between financial markets, the formation of expectations and human rationality. (Šonje, 2014, 10) His perhaps most important message is extremely modern: at a time when there is no risk in the future (the possibility of calculating the probability of events ceases), uncertainty begins. (Šonje, 2014, 14) Due to the lack of information on which a sensible decision could be based, uncertainty opens the way to act based on the impulse.

Keynes had accurately identified the importance of imitation and strategic behavior in financial markets already in 1936. Later, these ideas could be associated with the psychological effect of



conformism which was proven in experiments. Regardless of being act of free will (autonomous and deliberate decision) or being act of obedience, imitation and subordination to force are well-known in psychology and occur in conditions of uncertainty. Most people in such situations, especially if uncertainty causes fear and panic, has the tendency to assume the wisdom of the mass and take the decision of the majority. A mass imitation or stampede sometimes affects financial markets. Moving of the S&P500 index in the days surrounding the downfall of the Lehman Brothers investment bank (September 15, 2008) is a good example. At the beginning of August, the index went around 1300 points, but at the beginning of October the index fell below 900. Most of the total loss was concentrated in a few days around the bankruptcy of the bank. For each market participant at that time, it was rational to smell the danger and follow the crowd. In such strategies, it is very difficult to find something that could be labelled as individually irrational. Under uncertainty conditions, the herd is driven by fear when the future becomes completely darkened. Fear is not always irrational. It can be a matter of rational action in the context of waves of emotions and forcible decision-making, when the uncertainty moves the decision-making process from the path of reason to the path of impulse. In other words, it was rational to fear and run away from the market in September and October 2008. (Šonje, 2014, 22-23) In any case, average investors often make incorrect investment decisions, which can be determined by reasons such as lack of investment knowledge and skills, inconsistency in investment decisions, irrational behavior of individuals and groups, the desire for quick earning, excessive self-confidence and propensity to speculation, imperfection of information in the market or simply as a result of inexplicable aimless stock or other assets price movements. (Ivanov, 2008, 12) An important factor in this process is the willingness of the investor to accept the risk in relation to the expected yield.

After three decades of development, behavioral finance met three important limitations. Firstly, psychological theories are no longer used merely as an explanation of market anomalies because some psychological explanations (models with varying risk aversion) support the efficient markets hypothesis. Secondly, it is accepted today that the evidence of so-called market anomalies is not a proof that the efficient markets hypothesis does not hold. Thirdly, proof of so-called market anomalies is not a proof that market participants are not rational because financial economists have not yet designed the appropriate empirical test of market participants' rationality. Reasons may lie in a lack of clear distinction between individual and collective rationality or insufficiently clear differentiation of causes and mechanisms of market anomalies, which, besides (ir)rationality, may involve poor regulation and institutions, insufficient competition, poor information structure and the problem of learning speed. (Šonje, 2014, 25-26) If there are a lot of compelling explanations of anomalies, with the irrationality of participants being only one, one cannot ignore the fact that there is no reliable empirical test that would identify the ultimate cause of market anomaly. Therefore, a large market oscillation cannot be interpreted as an automatic confirmation of the existence of individual irrationality. (Šonje, 2014, 15-16) Financial economists are far from developing empirical tests good enough to clearly distinguish the effects of some potential explanations and thus isolate the effect of (ir)rationality. (Šonje, 2014, 25-26) If anything can distinguish rational from irrational actors, then it is the ability and speed of learning. Gamblers and addicts thrive on emotions so they are constantly driven by impulse, and regardless of feedback (losses), continue with the same behavioral strategy even after they lose everything. Learning in order to adapt to changing circumstances could be at the very core of the concept of rationality that would apply to realistic historical situations. The real rationality of participants and market outcomes should be judged on how fast and reliable learning takes place. (Šonje, 2014, 27) It is irrational when learning is lacking or when it is so slow that most people are unable to respond to changed circumstances.

Roa Garcia (2011, 16) also emphasised the role of information in financial decision-making. She finds that both the behavioral finance and financial-education literature reach the same conclusion that there are various important psychological aspects that determine individuals' behavior regarding the use and acquisition of information. Two dominant aspects in financial decision-making are overconfidence and limited cognitive capabilities. Individual and group overconfidence leads individuals to reject important signals from the market. Empirical evidence shows that the effect of overconfidence is especially important in investment decisions. Many authors argue that this may be one of the factors underlying the current global financial crisis. On the matter of cognitive capabilities, according to Roa Garcia (2011, 16) the empirical results provide clear examples of individuals' limited capacity to process a large and complex body of information.

#### **4. Implications and conclusion**

Research in the field of behavioral finance has deepened the knowledge of how and why the differences occur between behavior and outcomes in real markets when compared with the predictions of standard theory. Their contribution in linking psychological theories with so-called anomalies in the financial markets is also important. (Šonje, 2014, 25-26) Critics of behavioral economics usually point out the rationality of economic entities. They argue that experimentally observed behavior has only limited applications in market conditions, as learning opportunities and competition generally ensure convergence to an ideal type of rational behavior. They say that behavioral economics can contribute to strengthening of the existing economic theory, but offers no realistic prospect of replacing it. Certain types of behavioral models are already important in mainstream economics like models of learning, models of habit formation and models of the related phenomenon of consumer locking. However, those behavioral models that ignore the great increase in the scope and accuracy of classic theory miss the mark entirely. (Levine, 2009, 16) On the other hand, behavioral economists note that their models achieve the same exact predictions as traditional models. In addition, they correctly predict some outcomes in situations where traditional models produce inaccurate predictions.

However, economics, especially financial economics, and psychology, are in touch when it comes to assumptions about people's behavior on the markets. However, within the mainstream of the financial economic thought, there was no readiness to review the behavioral settings of rational economic man *homo economicus*. Since the end of the 1970s, two types of change have started. On the one hand, the development of behavioral finance has opened room for the interpretation of market anomalies by psychological bias, such as risk aversion, excessive self-confidence, acclimatization, etc. The most important consequence of the development of behavioral finance was finding that the market also includes people whose preferences may be irrational. However, the results of behavioral finance were not enough to abandon the efficient markets hypothesis. Classical models have been parallelly improved, so it has been shown that introducing variations in risk aversion can explain large fluctuations in market prices. When changes in the risk preferences are allowed, it is no longer possible to determine which part of the price fluctuation is rational (the fluctuation of the fair value) and which is irrational (the deviation of the current market price from the fair value). This case illustrates a deeper problem mentioned before. So far, it was not possible to create an empirical test that would adequately control the parameters of the market context (information, intensity of competition, regulation) and psychological variables such as change of preferences and learning speed. (Šonje, 2014, 29) Therefore, it was not possible to deny the efficient markets hypothesis.



To conclude, it is obvious that an interdisciplinary approach is needed to understand the mechanisms that affect economic and financial decision-making. This approach should combine ideas from many disciplines like sociology, economic psychology, evolutionary biology and neuroeconomics. (Baddeley, 2010, 281) Such approach should be backed up with empirical tests as the only one scientific way to compare behavioral and rational theories. According to Barberis and Thaler (2001, 55), there are two outcomes of those tests – one is that most of the current theories, both rational and behavioral, are wrong, and the second one is assurance that better theories will be produced.

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