

**Lyutyy I.**

*PhD, Professor, Head of the Department of Finance, Faculty of Economics,  
Taras Shevchenko National University of Kyiv, Ukraine*

[ig.lyutyy@gmail.com](mailto:ig.lyutyy@gmail.com)

ORCID: 0000-0002-3249-002X

**Knir M.**

*PhD, Associate Professor of the Department of Finance, Faculty of Economics,  
Taras Shevchenko National University of Kyiv, Ukraine*

[mariya.knir@gmail.com](mailto:mariya.knir@gmail.com)

ORCID: 0000-0001-5591-2814

**Plieshakova N.**

*PhD, Associate Professor of the Department of Finance, Faculty of Economics,  
Taras Shevchenko National University of Kyiv, Ukraine*

[Pleshakova@knu.ua](mailto:Pleshakova@knu.ua)

ORCID: 0000-0002-0381-067X

**Plieshakova O.**

*PhD, Assistant Professor  
of the Department of the Department of economic theory,  
macro- and microeconomics,; Faculty of Economics,  
Taras Shevchenko National University of Kyiv, Ukraine*

[Pleshakova.ua@gmail.com](mailto:Pleshakova.ua@gmail.com)

ORCID: 0000000151439564

## **BEHAVIORAL FINANCE: THEORETICAL BACKGROUND AND EMPIRICAL EVIDENCE**

**Abstract.** The purpose of this paper is to provide insights into achievements of scientific studies in various fields which have been reflected in modern finance, particularly in behavioral finance, as well as to consider some patterns of individual behavior which influence the effectiveness of investments in the financial market. The paper is based on the review of the existing theoretical in different fields of study. The necessity of studying behavioral finance as an important direction of modern financial science is considered. The main theories from different fields of studies which influence the formation of behavioral finance as a scientific direction are highlighted. The empirical evidence of some aspects of the irrational behavior and its influence on the effectiveness of the financial processes. The findings are likely to be useful for practitioners and researchers to gain knowledge about the background of behavioral finance. From a practical point of view, the possibility of synthesizing various approaches to people's behavior allows us to use the obtained results in building more efficient processes in the financial environment. The paper contributes to the discussion about the rational and irrational behavior and its influence on the processes in finance.

**Keywords:** behavioral finance, irrational behavior, Crowd effect, Allais paradox, Ellsberg paradox, prospect theory.

**JEL Classification** G02

Formulas: 0; fig.: 3; tabl.: 1; bibl.: 14.

**Лютый І.О.**

*Д.е.н., професор, завідувач кафедри фінансів, Економічний факультет,  
Київський національний університет імені Тараса Шевченка, Україна*

[ig.lyutyy@gmail.com](mailto:ig.lyutyy@gmail.com)

**Кнір М.О.**

*К.е.н., доцент кафедри фінансів, Економічний факультет,  
Київський національний університет імені Тараса Шевченка, Україна*

[mariya.knir@gmail.com](mailto:mariya.knir@gmail.com)

**Плешакова Н.А.**

*К.е.н., доцент кафедри фінансів, Економічний факультет,  
Київський національний університет імені Тараса Шевченка, Україна*

[Pleshakova@knu.ua](mailto:Pleshakova@knu.ua)

**Плешакова О.А.**  
*К.е.н., асистент кафедри економічної теорії,  
макро- та мікроекономіки; Економічний факультет,  
Київський національний університет імені Тараса Шевченка, Україна  
Pleshakova.ua@gmail.com*

### **ПОВЕДІНКОВІ ФІНАНСИ: ТЕОРЕТИЧНІ ОСНОВИ ТА ЕМПІРИЧНІ ОЗНАКИ**

**Анотація.** Метою даної статті є розуміння досягнень наукових досліджень у різних галузях, що знайшли відображення в сучасних фінансах, зокрема у поведінкових фінансах, а також деяких закономірностей поведінки людей, які впливають на ефективність інвестицій фінансового ринку. Розглянуто необхідність вивчення поведінкових фінансів як важливого напрямку сучасної фінансової науки. Висвітлено основні теорії різних галузей досліджень, які впливають на формування поведінкових фінансів як наукового напрямку. Наведені емпіричні докази деяких аспектів ірраціональної поведінки та її впливу на ефективність фінансових процесів. Отримані результати, можуть бути корисними практикам та дослідникам для отримання знань про поведінкові фінанси. З практичної точки зору можливість синтезу різних підходів до поведінки людей дозволяє використовувати отримані результати для побудови більш ефективних процесів у фінансовому середовищі. Стаття сприяє дискусії про раціональну та ірраціональну поведінку та її вплив на процеси у фінансах.

**Ключові слова:** поведінкові фінанси, ірраціональна поведінка, ефект натовпу, парадокс Алле, парадокс Еллісберга, теорія перспектив.

Формул: 0; рис.: 2; табл.: 1; бібл.: 14.

**Лютый И.А.**  
*Д.э.н., профессор, заведующий кафедрой финансов, Экономический факультет,  
Киевский национальный университет имени Тараса Шевченко, Украина  
ig.lyutyu@gmail.com*

**Книр М.А.**  
*К.э.н., доцент кафедры финансов, Экономический факультет,  
Киевский национальный университет имени Тараса Шевченко, Украина  
mariya.knir@gmail.com*

**Плешакова Н.А.**  
*К.э.н., доцент кафедры финансов, Экономический факультет,  
Киевский национальный университет имени Тараса Шевченко, Украина  
Pleshakova@knu.ua*

**Плешакова Е.А.**  
*К.э.н., ассистент кафедры экономической теории,  
макро- и микроэкономики; Экономический факультет,  
Киевский национальный университет имени Тараса Шевченко, Украина  
Pleshakova.ua@gmail.com*

### **ПОВЕДЕНЧЕСКИЕ ФИНАНСЫ: ТЕОРЕТИЧЕСКИЕ ОСНОВЫ И ЭМПИРИЧЕСКИЕ ПРИЗНАКИ**

**Аннотация.** Целью статьи является понимание достижений научных исследований в различных областях, нашедших отражение в современных финансах, в частности в поведенческих финансах, а также некоторых закономерностей поведения людей, которые влияют на эффективность инвестиций рынка. Рассмотрена необходимость изучения поведенческих финансов как важного направления современной финансовой науки. Освещены основные теории различных областей исследований, которые влияют на формирование поведенческих финансов как научного направления. Приведенные эмпирические доказательства некоторых аспектов иррационального поведения и ее влияния на эффективность финансовых процессов.

**Ключевые слова:** поведенческие финансы, иррациональное поведение, эффект толпы, парадокс Алле, парадокс Эллисберг, теория перспектив.

Формул: 0; рис.: 2; табл.: 1; библи.: 14.

**Introduction.** In the past decades, economic thought has shaped new approaches to defining the essence of economic processes and mechanisms for their implementation, where the current task is to bring together separate concepts of cognitive and group behavior in a single field, which leads to the development of a new discourse and ideology of economic processes.

Modern financial architecture is largely based on financial institutions. The financial market is part of the modern economy in which it performs a number of key functions. The ability of the economy to distribute and transform risks depends on the level of its institutional development of the stock market. Violation of these processes can seriously limit the development of the economy both domestically and globally.

At the same time, the issue of modernizing approaches to determining the principles of its functioning and the formation of institutional dynamics is being actualized. Modern ideas about the limited rationality of financial market participants require more active research on their behavioral patterns. Development of approaches to build up the rationalization of market participants is the most promising direction and the cutting edge of finance.

Structurally, the work consists of two parts. The first part reveals the main theories, research and findings in such scientific fields as psychology, sociology and philosophy, which are actively applied in the field of behavioral finance (*Fig. 1*): Le Bon's The Crowd effect, Gabriel Tarde and Sigmund Freud's findings about how crowd influence the individual, Allais Paradox and Ellsberg paradox, Kahneman and Tversky perspectives theory, Ellen Langer's «Illusion of control» and also Black's noise theory. The scientific achievements are presented in a chronological way from the oldest to the modern ones.

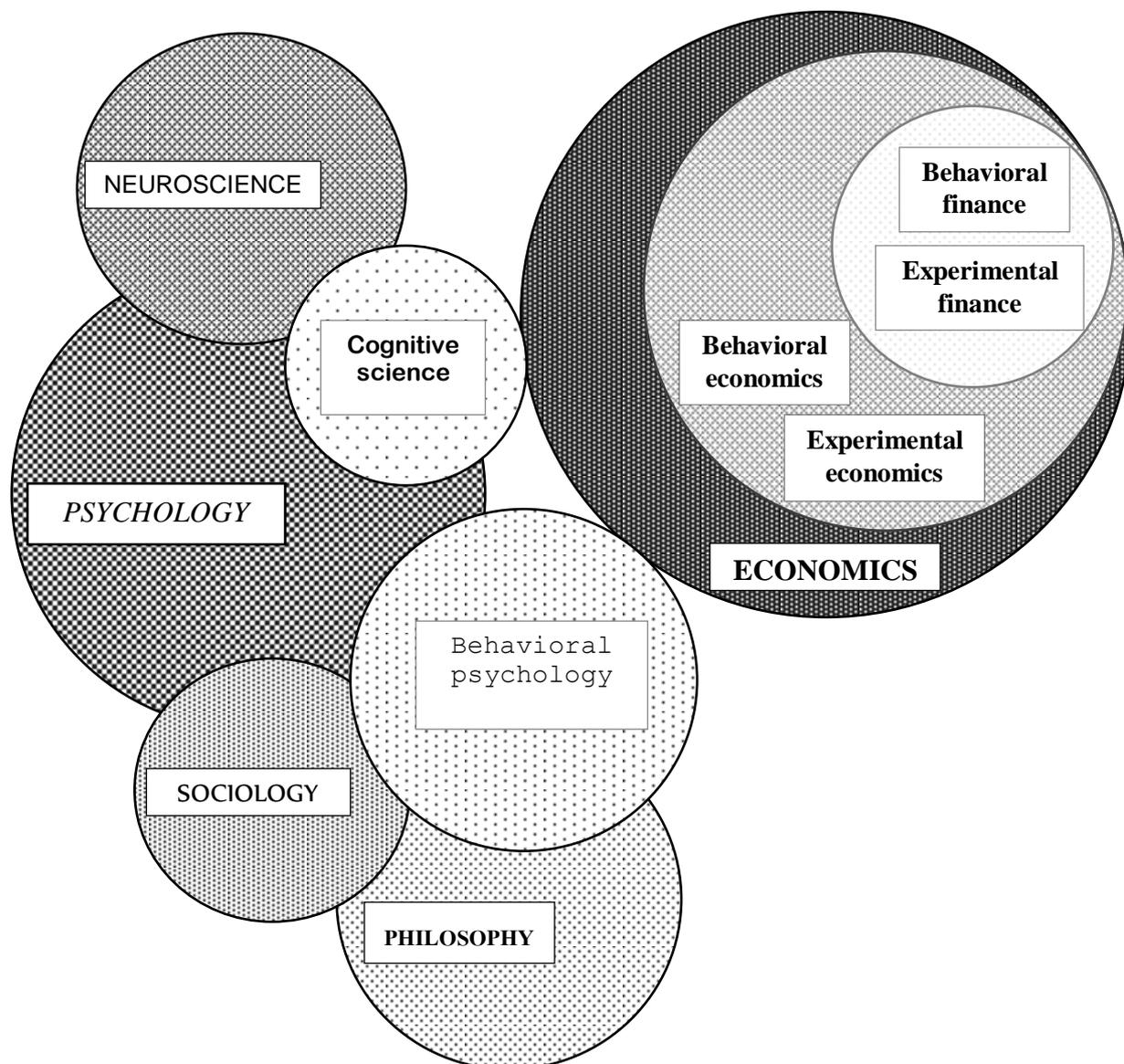


Fig. 1. The fundamental fields of science in connection with behavioral finance

Source: according to [1].

The second part examines the empirical examples of the irrationality of the participants of the financial market. Some typical irrational patterns in the activity of individual investors are revealed as a proof the existing theoretical research.

### **Theoretical background of behavioral finance of individuals in chronology.**

According to many experts, financial science is a set of theories that are not confirmed in practice. The main problem of these theories is that they are all based on the assumption of rational behavior of market participants, which is unlikely in essence. Theories of behavioral finance are based on the irrational behavior of market participants. This is an attempt to «correct» the foundation, to modify the traditional finance. Prerequisites for the emergence of behavioral finance were the numerous studies of scientists that in conditions of uncertainty and risk, people act under the influence of emotions, erroneous perception of information, illusions and other «irrational» factors.

Let us highlight the following achievements and findings in various fields of science, which are reflected in the behavioral finance direction.

1. 1895. *Psychology of Crowds* is a book authored by French sociologist Gustave Le Bon that was first published in 1895. He described the term crowd effect and the impact that a crowd has on its constituent people [1]. Le Bon says that by acting in a group, people turn into unified actor, possessing a collective consciousness, and this consciousness forces the members of the group to behave in a completely different way than they would behave if they act alone. The feeling of the crowd is extremely contagious and often causes people to sacrifice their personal interests to the collective interest.

In the mass, personal qualities of individuals are erased, and in return, they obtain new qualities that they did not previously possess. There are several reasons for this:

1. In the mass, a person experiences a feeling of tremendous power, the responsibility that restrains people in their actions disappears.

2. In a crowd, a person very easily «becomes infected» with a general attitude, which sacrifices a personal interest in favor of the common.

3. A person loses the will and ability to distinguish, all feelings and thoughts are oriented only in the direction indicated by the crowd.

Following this idea, an important contribution is the research of French sociologist and social psychologist Gabriel Tarde, namely his definition of the term «public» in 1901 in his work «Opinion and the crowd» («L'opinion et la foule») [2]. He gives the following definition of the public — it is «a purely spiritual collective mind, in which individuals are not gathered together as in a crowd, but are physically separated from each other, connected together by a spiritual connection, namely a community of beliefs and passions». He believes that the emergence of the public involves a more significant mental and social development than the formation of the crowd and highlights the following differences of the public from the crowd:

- the crowd captures the whole person, it is more emotional and intolerant than the public;
- the crowd is unchanged, the public is amenable to change;
- the public is less blind and more durable than the crowd;
- the crowd is easier to deceive.

Speaking about the relationship between the individual and the crowd, we cannot elude from Sigmund Freud's position on the behavior of a person in a crowd and how he explains the reasons for it. A person absorbed by the crowd allows himself to be influenced by others, because he feels the need to agree with other members of the crowd more than to disagree with them [3].

In the work «*Group Psychology and the Analysis of the Ego*» (1921) of Austrian neurologist and the founder of psychoanalysis Sigmund Freud is stated that an individual who has been in a zone of active crowd for some time falls into a special mood, very close to «fascination» and is no longer conscious of his actions. Under the influence of the crowd, he begins to perform certain actions. And this crowd influence increases due to the interaction of individuals.

For almost a century, the ideas of crowd influence based on the research of Le Bon, Tarde and Freud were dominant stating the fact that the crowd necessarily has a negative impact on

individuals. However, in 1985, Stephen Riker and Jonathan Potter were the first to objectively criticize these ideas and proved the following errors [4].

1. Lack of social context in justifying theories of crowd behavior.
  2. Lack of political and ideological motives of crowd behavior. Until the mid-1980s, no one considered crowd behavior as aimed at supporting the interests of the group and the social identity of its members.
  3. The incorrect statement that anonymity is one of the reasons for the antisocial behavior of a person in a crowd. It was found that many people in a crowd often know each other.
  4. The motives of the individual in the crowd. Reducing them to irrational instincts as a phenomenon beyond a rational explanation.
  - V. Emphasizing the negative aspect of crowd behavior and exaggerated destructiveness.
2. 1952 г. Maurice Allais, an outstanding physicist and Nobel Prize winner in economics, conducted an experiment and proved that an investor who behaves rationally prefers not to obtain the maximum expected utility, but to achieve absolute reliability [5].

Professor Allais showed that a person in the conditions of risk and uncertainty behaves differently than neoclassical economic theory believed. In 1952, he conducted a series of surveys, the results of which were published in the article «The Behavior of the Rational Man in the Face of Risk: Critical of Postulates and Axioms of the American School». The paradox was as follows. The people were asked to choose from a pair of risky decisions (*Tabl.*).

Table

Terms of experiment							
<i>Experiment 1</i>				<i>Experiment 2</i>			
Gamble A		Gamble B		Gamble C		Gamble D	
Outcome	Chance of outcome	Outcome	Chance of outcome	Outcome	Chance of outcome	Outcome	Chance of outcome
1 million	100%	1 million	89%	0	89%	0	90%
		0	1%	1 million	11%	5 million	10%
		5 million	10%				

Source: according to [5].

In the first case, in gamble A there is a confidence in receiving a return of 1 million francs, and in gamble B there is a 10 percent chance of return of 5 million francs, 89% — 1 million francs and 1% — no return at all. In the second case, the same individuals are invited to choose between gambles C and D. In game C there is a 10% probability of return 5 million francs and 90% of zero return, while in gamble D 11% is the probability of return 1 million francs and 89% — no return. Allais found that a significant majority of the individuals in these conditions preferred the choice of gamble A in the first pair and gamble D in the second. This result was contrary to the theory of expected utility. The person who preferred the choice of A in the first pair should choose situation C in the second pair, and who chose B should prefer the choice of D in the second pair.

The famous Allais paradox, as well as the Ellsberg paradox, formed the basis for the development of the Prospect Theory by Kahneman and Tversky.

3. 1961. Another controversial issue of the Expected Utility Theory was the paradox of making a decision by a person under uncertainty, which was described by Daniel Ellsberg (Ellsberg paradox) [6].

Ellsberg conducted following experiment the inputs of which is given in the *Fig. 2*.

Experiments have shown that people clearly prefer to pull, for example, a red ball from a container 1 (thinking that the probability of pulling a red ball out of a container 2 is less likely to pull a red ball out of a container 1). But the same people also clearly prefer to pull the black ball from a container 1 too (meaning that the probability of pulling the black ball out of a container 2 is also less likely to pull the black ball out of the container 1).

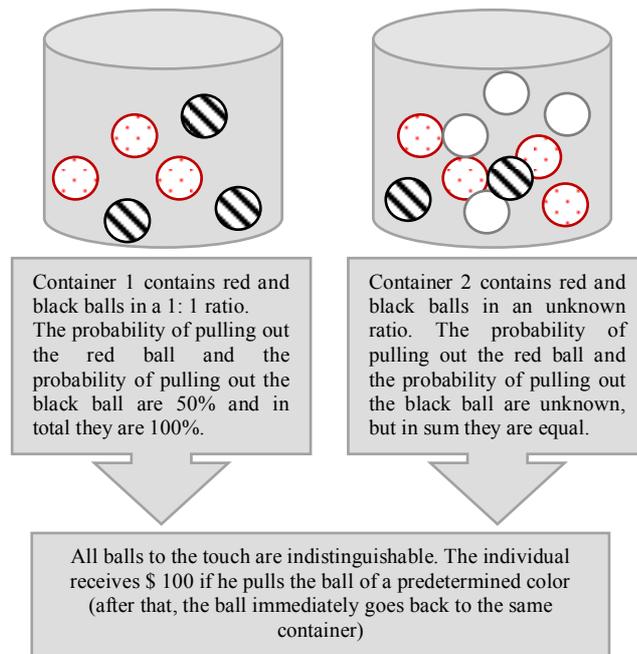


Fig. 2. The inputs of the Ellsberg experiment

Source: according to [6].

Thus, people assume that the probability of pulling both the black and the red ball out of a container 2 is at the same time less than 50%. That is, the sum of the probabilities (the probability of pulling out either 1 black or 1 red ball) is less than 100%.

Daniel Ellsberg showed with his experiment that people prefer a known, although greater, risk to an unknown risk, which contradicts the theory of expected utility.

4. 1975 r. Ellen Langer, an American professor of psychology in her work «The Illusion of Control» showed that people tend to take random events as controlled processes and highlighted the factors that form the illusion of control [7]. She also gave the explanation to the term «illusion of control,» which implies one of cognitive distortions, expressed in the tendency of people to believe that they can in some way affect events that objectively do not depend on them or depend to a much lesser extent.

Ellen Langer conducted a series of observations on the participants in gambling and concluded that the main factor was to make the participant understand that some skill was required of him in the game. If there is an opportunity to identify any patterns, get closer acquainted with the rules of the game, if there is a choice of strategy, then an illusion of control arises and the person begins to think that he can trick randomness and the theory of probability. This behavior is inherent to financial market participants. An investor can make irrational decisions, for example, in a situation where it seems to him that he possesses not only a sufficient portion of knowledge and experience, but also any specific, unique knowledge and / or intuitive skills, so-called «flair». Then he becomes confident that he can influence the course of events and, accordingly, the result of financial transactions. Investors tend to take random events for controlled processes in the financial market, and therefore they are often become the victims of «illusion of control» factor.

5. 1979. Israeli-American psychologists Daniel Kahneman and Amos Tversky published results of their studies in the work «Prospect theory: An analysis of decision under risk» that stated that absolutely identical prospects, with identical outcomes and probabilities, may have different values for different people depending on the explanation or the «framing» of these prospects [8].

The authors presented the results of an impressive amount of experiments in which people were asked to make a choice between different alternatives. These experiments proved that people cannot rationally estimate neither the magnitude of the expected gains or losses, nor their probabilities. This theory was the beginning of a multi-year study of heuristics and biases of individual judgments and observed behavior relative to the normative standard adopted in economic theory. The work of Kahneman and Tversky was a real breakthrough in the field of neoclassical decision-making theory.

First, it was found that people react differently to equivalent situations (in terms of the ratio of benefits and losses), depending on whether they lose or win and the way the information is presented. Based on the survey results, it was discovered that investors behave differently in relation to risk in case of possible profits and losses: they are willing to take more risks in order to avoid losses than to earn profit. This phenomenon is called an asymmetric attitude towards risk.

Secondly, experiments have shown that people are prone to make mistakes when assessing probability: they underestimate the likelihood of events that are likely to occur, and overestimate much less likely events.

Thus, it follows that D. Kahneman and A. Tversky, were empirically able to prove that the classical theory of decision making is not applicable in many cases of uncertainty. Also, scientists have identified a number of anomalies that were successfully able to systematize. These anomalies lead to the fact that the initial prospect, depending on the method of editing, is either roughly generalized or is incorrectly divided into components, and, ultimately, the decision of the individual becomes irrational. The main result of the research of Kahneman and Tversky was the proof that different people have unequal value of absolutely identical prospects with identical outcomes and probabilities, depending on the formulation of these prospects.

6. 1986. The American economist Fisher Black published his work describing his «noise» theory. The new concept got its name due to the emergence of the term «noise trade», first proposed in the work of F. Black with the aim of creating a theory that, unlike the concept of an efficient market, could more accurately explain the real processes in stock markets [9].

The idea is that the majority of stock market participants use not real information, but rumors, their feelings and emotions, that is called «noise». Black defined noise trading as a trade in noise, assuming that the noise is information. People who trade in noise will trade even when they objectively need to stop trading. They believe that the noise on the basis of which they trade is real information.

Later in the early 1990s four American professors, J. Bradford De Long, Andrei Shleifer, Lawrence H. Summers and Robert J. Waldmann, discovered the term «noise traders», which is used to describe traders who pay more attention to pseudo-signals during trading with securities [10].

They investigated that stock prices change not only as a result of fundamental information, but also under the influence of noise traders demand. The theory which claims that stock market demand is influenced not only by information, but also by the irrationality of traders, seems to be a reasonable alternative to the theory of an efficient market. Examples that confirm the validity of the theory of noise trading are response strategies for positive risk, overreaction and under reaction hypotheses, and information cascade theory.

The scientific views and findings discussed above are of great academic and practical value, since they prove that psychological, social and cognitive factors can have a significant impact on the investment process. Some of them have been already proved by time to be a deserving basis for further innovative research and some of them are young enough but not less significant. Achievements in various scientific fields allow not only to explain many events occurring in financial markets, but also to predict the behavior of investors in various situations and subsequently develop effective market strategies.

### **Empirical aspects of irrational behavior of individuals in finance**

In this part, we highlight the situations related to the empirical research of decision-making process by participants of financial markets, the rationality of investment decisions and the role of behavior and character in these processes. These behavioral patterns indicate difficulties to make optimal investment decisions for individual actors in financial market.

*Investor and dividend policy.* World practice shows that changes in the dividend policy immediately affect the price of stocks of a public company. The increase in dividends is a good signal for investor and is accompanied by an increase in the market price of stocks. The announcement of a reduction in dividends tends to lower prices. Therefore, public companies usually do not increase dividend payments if they are not sure that they will be able to maintain their level in the future. The asymmetrical effect on information about raising and lowering dividend payments is one of the examples of investors' irrationality [11].

Behavioral approach in finance also presumes that there are special periods of time when demand for stocks that pay dividends is rising among investors and they are ready to overpay for them. As a result, a dividend premium appears, i.e. the excess in the price of stocks over their fundamental value due to the increased demand for the company's stocks. At other time period, investor sentiment is changing, they start to prefer stocks of companies that have growth potential and demand for value stocks is falling. As a result, the dividend premium falls, even a dividend discount appears. Supporters of the behavioral approach consider it necessary to predict investor sentiment in order to take them into account when managing the dividend policy.

#### *Investor and investment manager relationships.*

The decision to invest capital in the stock market is made by the investor. For this purpose, the investment is being selected, which is the result of processing a large amount of information and requires the investor to have special knowledge and skills in the field of investments. Investors who are trying to make a rational choice when investing, understand that investment consultant is a necessary element, and needs to be compensated by appropriate remuneration.

The main problematic issue with this is the system of relations between private investor and investment manager, which sometimes is formed due to negative factors and the low level of ethics and financial literacy, leading to poor portfolio management quality and lack of efficiency of the investment process.

The difficulty of understanding the specifics of investing for some part of the population often leads to false investment ideas, exaggerated expectations. As a result, the investment behavior of clients may be distorted, they substitute the perception of risk with greed, believe in a myth about ease and accessibility of stock speculations. These picture forms a number of negative investment skills and creates wrong behavioral patterns. At the same time, the boundary between good quality and substandard investment services and products may be erased. Thus, financial decisions are affected by two individuals — an irrational investor and an irrational investment manager.

#### *Crowds of traders at Stock Exchange.*

Many researchers in the field of finance believe that the crowd effect works in financial markets, and price changes in the market are often connected with the behavior of the crowd. In financial markets, this effect is called the «information cascade». The investor makes a decision, observing the actions of most market participants and imitating them. In conditions of limited opportunities for timely receipt and processing of a huge amount of information, following the crowd behavior can sometimes be the only way to solve the problem of choice in a situation of uncertainty. At the same time, investors no longer follow their own strategy and allow the crowd to influence their thoughts and actions. For example, at the peak of the Japanese stock market, only 14% of respondents assumed a collapse, but immediately after the collapse, 32% were sure of a further collapse.

When we talk about crowds in the stock exchange, we mean the crowd of brokers and traders «on the floor», where they execute orders from customers. All other participants of the stock exchange are the public. Uncertainty in the stock market pushes the traders to search for like-minded people. Having joined them, people dull the sense of responsibility for making own decisions and their behavior changes. At the same time, it is obvious that it is also impossible to go against the crowd in the stock market, since it forms a market movement. But, on the other hand, it is also impossible to mindlessly follow the opinion of the crowd, because the probability of mistake is high. The famous Russian stock trader Eric Newman in his book «Small encyclopedia of trader» says that it is vital to be with the winners and to leave the losers without any kind of psychological affection to them [12].

Thinking over all the pros and cons of following the crowd, the trader still has the opportunity to independently make his decision. There is always risk that under the influence of the crowd a trader may start to act illogically and stop to use mathematical calculations of probability and independent analysis of information, start to use heuristics, that is, simplified strategies for solving complex problems with limited information.

**Conclusion.** Behavioral finance views a person as an irrational creature. Moreover, it is assumed that rational person does not exist in the nature, and most likely never will appear. However, the survey of the results of many years of research given in this paper allow us to make a positive conclusion — this

irrationality is not accidental and not meaningless. On the contrary, it is quite systematic and predictable, which gives reason to hope for its successful application.

Effectiveness and stability on financial market are largely determined by the behavior of its participants, their individual and collective actions. Therefore, the study of financial processes from the behavioral perspective must be important area of interest from both scientific and practical sides. At the same time, it is important to understand the nature of this phenomena, and not just state irrational features on the basis of observations, otherwise the meaningful, predictive sense of research vanishes.

Considering the achievements and findings in the field of behavioral finance and comprehensively studying the peculiarities of individuals' behavior, it is possible to rethink the processes in the financial markets and integrate this knowledge into development of more effective financial environment.

The direction of behavioral finance at this stage of the development can provide an explanation to some patterns of behavior of people in the financial market and can be an important asset to the economic theory. In this sense, behavioral finance does not disclaim, but, on the contrary, is a continuation and natural development of the theory of expected utility, considering the factor of incompleteness of information due to objective and subjective reasons.

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Стаття рекомендована до друку 22.11.2019 © Лютий І.О., Кнір М.О., Плішакова Н.А., Плішакова О.А.

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