

## BEHAVIOURAL FINANCE: THEORY AND SURVEY

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**Abstract.** The paper analyses the importance of behavioural finance theories in household decision-making process. Behavioural finance theories investigate emotional characteristics to explain subjective factors and irrational anomalies in financial markets. In this regard, behavioural theories and behavioural anomalies in the decision-making process are examined; the application opportunities in the financial market are described. The aim of investigation is to determine the basic features and slopes of behavioural finance in concordance with financial decisions of a household. The survey method was applied to ascertain financial behaviour of literate households.

**Keywords:** behavioural finance, rational finance paradigm, cognitive biases, homo economicus, financial decisions.

### Introduction

Similar to corporate finance, household finance explains how to manage financial decisions to ensure financial security and growth of wealth of a household. Growing interest of Lithuanian households in personal finance management has been prompted by the complexity of financial products.

Behavioural finance admits that psychological characteristics (such as risk aversion, regret, overconfidence) play an important role in financial management of a household; consequently, financial weaknesses could be ascertained which could lead to improvements in financial decision-making and growth of wealth of a household. Education in this area is slow and should be popularized in the future, as only a small percentage of households are knowledgeable and can effectively use available financial information.

Data, provided by the Statistics Lithuania (2012), show that in comparison with income of five last years, living costs of Lithuanian households increased as well as the consumption expenditure; therefore, 59% of households do not have enough money to save and invest, meanwhile 73% of households have saving deposits as well as have been attempting to chaotically buy and sell shares on a stock exchange (Statistics Lithuania... 2012). Thus, Lithuanian households have both short-term and long-term financial difficulties and find it impossible to ensure their financial security in a long-run. With this in mind, it can be stated that financial behaviour of Lithuanian households is only partially rational as they do not always choose the best financial decision in terms of uncertainty and risk.

This article identifies behavioural finance theories, their need and possibilities for use in the financial decision-making process of a household. The aim of the article is to establish the dependence between behavioural finance theories and financial decisions of a household. The paper briefly summarises basic ideas related to the traditional and behavioural finance. To reveal the behaviour of respondents, data from the questionnaire survey is described and concluding remarks are presented using the modelling method, summarising theoretical and empirical results.

### Rational Finance Paradigm

The science of personal finance management is presented through rational and behavioural finance paradigms (Fig. 1). The rational finance (inherent for financial markets of the XVIII–XX centuries) paradigm is based on the notion that investors act rationally and consider all available information in the decision-making process, while investment markets are efficient and reflect all available information in the price of securities. In light of this fact, the role of the term *homo economicus*, which was proposed by economic liberalist Adam Smith (2004), is significant in classical finance theories. According to A. Smith, an economic human being serves the interests of the entire society pursuing personal benefit, i.e. self-interested rational human being is encouraged to meet such needs of the society as trade and truck without any instructions (Čiegis 2006).

M. Friedman (1966) emphasizes the particular importance of such feature of human behaviour as economic rationality. Rationality was a supporting foundation in mathematical calculations that allowed interpreting and predicting real-life situations in the market.

The rational finance paradigm covers a number of theories defining the sequence of economic decisions by a human being, on the basis of which the following theories of rational finances were formed: *Expected Utility Hypothesis* by Neumann-Morgenstern (1944), *Portfolio Theory* by Markowitz (1952), *Life Cycle Hypothesis* by Modigliani and Brumberg (1954), *Permanent Income Hypothesis* by Friedman (1957), *Efficient Market Hypothesis* by Fama (1991) (Fig. 1).

The key assumption of all these theories is that activities of an economic human being are rational and his/her main target is profit maximization. The Expected Utility Hypothesis of Neumann and Morgenstern (1944) is based on Bernoulli's (1954) expected utility theory and states that a rational market participant chooses one alternative from a number of risky ones (e.g., lottery, where probabilities on how to be in the money are predicted), this way trying to maximise his/her expected benefit of utility. Expected utility hypothesis is often used to solve uncertain degree problems.

Markowitz (1952) stated that an investor has to make a decision being in ignorance of which of the alternative investment portfolios would give more income.

The basic idea of Modigliani and Brumberg (1954) states that a person tries to lower his/her consumption to ensure approximately the same level of consumption throughout his/her entire life. The main conclusion is that

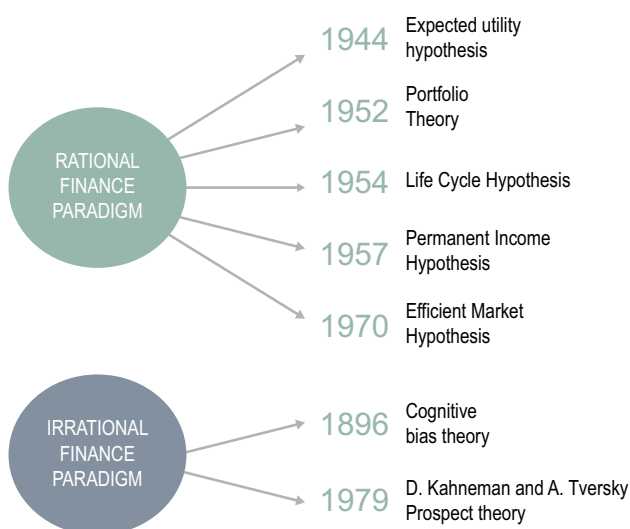


Fig. 1. Two basic paradigms in finance management (Jurevičienė, Ivanova 2012)

consumption of a householder is not only related to his/her present but also to the future income, i.e. to the average income receivable now and in the future.

Developing this theory, Friedman (1957) expounded the permanent income theory. His starting point was the statement that consumers seek to maintain more or less the same level of consumption throughout the entire life.

Efficient market hypothesis is one of the most important financial theories. Fama (1991) analysed a number of share prices in exchange and concluded that the market is efficient and market participants hold all necessary information required for decision making.

Investigators of individual behavioural finances Le Bon (1896), Raiffa, Raiffa (1968), Kahneman and Tversky (1979) noticed that in theory, behaviour of an individual differs from that in practice and classical financial models could not explain and predict all financial decisions. Criticism was mainly centred on the fact, that profit maximization criteria could be less significant for an economic human being as he/she wants to gain sufficient profit to satisfy personal demands (Ващенко 2007).

Although, as presented above, rational financial theories define the theoretically optimal choice of an economic individual, they do not impart his/her real choice.

### Behavioural Theories and Models

Behavioural finance emerged in 1980s as a response to emerged failures of the core economic models that explain anomalies in financial markets. This approach is based on the concept of explaining behavior through biases of belief information and non-standard preferences to make an argument for irrational behaviour among agents that can explain persistent mispricing of assets and other anomalies (Baker 2010).

French sociologist Le Bon was the first who noticed features of irrational behaviour, i.e. described the impact of the market on the decision-making process of an individual and divided it into categories. The first category includes accidental, instantaneous solutions, and the second – solutions that are regulated by law and supported by the public opinion, with other people's will reputed to be above own concerns (Le Bon 1896).

According to Langer (1975) irrational decisions are influenced by so called illusion of control, i.e. individuals overestimate their ability to control events, for example, they feel that they control outcomes of an event, although actually they have neither the control, nor the impact. However, this explains the reason individuals are able to take higher level of risk.

Allais (1953) has denied this statement and concluded that individuals are irrational when evaluating possible alternatives as the lack of information and assessment stereotypes impede on rational choices.

Summarizing financial behavioural researches, subjective irrational behaviour hypothesis could be divided into two groups: theory of cognitive deviations and prospect theory. The basic idea of cognitive theory is that behaviour of an individual is determined by his/her own mind, i.e. contemplation and self-perception determines both behaviour and emotions (Beck 2008). For easier description of cognitive deviations, they could be grouped into: heuristic, framing, emotions, and market influence (Fig. 2).

On the other hand, the prospect theory describes how investors perceive profit and loss. Making experiments and empirical investigations, Kahneman and Tversky (1979) stated that people view gains and losses differently and loss makes a greater emotional impact on investors than gain.

The strongest critic of behavioural finance theories is E. Fama, a founder of the Efficient Market Hypothesis. Fama (1998) criticized the behavioural finance theories for obscurity, the cognitive deviation of which is mostly suitable to explain financial behaviour of individuals in certain situations. In addition, Fama (1998) stated that discrepancies in traditional theories could be very rare; while applying behavioural finance theories, some factors could be underestimated basing on one frame and overestimated basing on another. Notwithstanding, certain market fluctuations were defined and explained with the help of the behavioural finance theory. In addition, Friedman's (1966) statement – that irrational investors lose their income promptly due to their irrational decisions – can be argued

today. Earlier, it was supposed that the reasons of irrational decisions of market participants are outside the financial market. However, these reasons – intuition and emotions of investors – belong to the financial market and not only help irrational investors to occasionally win, but also – survive especially during crises.

### Financial Behaviour of Financially Literate Households

A number of empirical investigations in behavioural finance are focusing on foreign markets (Polak 2012) with their pattern for investor's psychology and biases (Muradoglu, Harvey 2008). These interpretations may vary depending on differences in culture and mentality of citizens.

Since behavioural finance is not based on mathematical models, it is crucial to define emotional characteristics of market participants, because peculiarities of financial decision-making depend on them.

This survey was made to define the basic features and tendencies of behavioural finance. Peculiarities pertaining to behaviour of financially literate households are determined using various factors such as activities in finance, sufficient financial sophistication, mentality of inhabitants and habits. The aim of the investigation is to determine the basic features and slopes of behavioural finance in concordance with financial decisions of a household. The survey method was applied to ascertain the financial behaviour of a particular group under certain circumstances. Selection of respondents is undenominational. To obtain presentable results with 99% probability and 10% bias, 171 respondents were interviewed, namely, 148 women and 23 men.

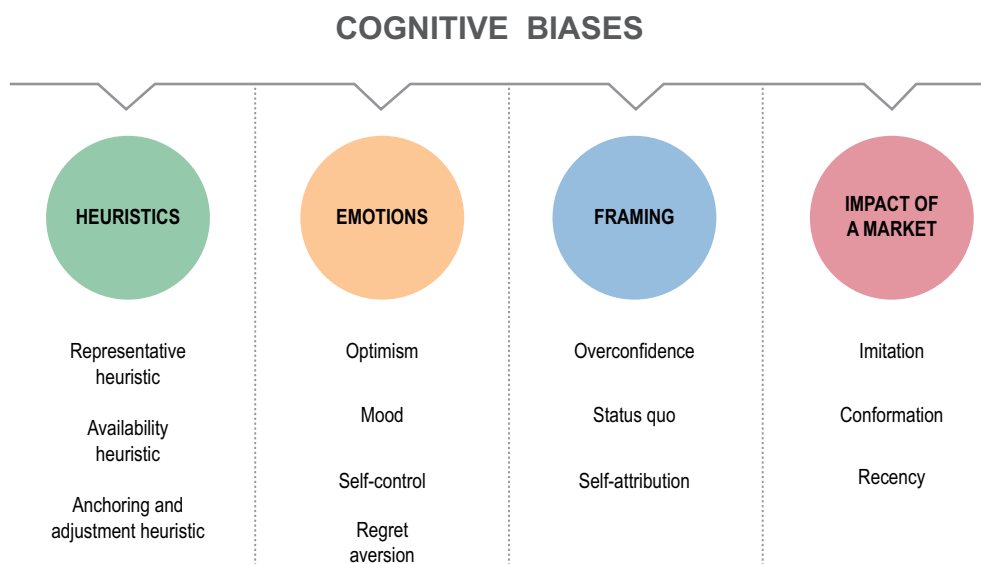


Fig. 2. Pattern of cognitive biases (Baker 2010; Jurevičienė, Gausienė 2010)

The first group of questions was tasked to reveal weaknesses in personal finance management and the second one – to define psychological and emotional factors that fate financial decision making of a household. One of the most important facts is that respondents have a high level of financial literacy (86%) and medium or low arithmetic capabilities (46%). Although respondents have a high level of financial literacy or experience in financial sector, more than half (54%) of them have difficulties calculating the inflation rate. However, the majority (91%) of respondents consider that financial calculations are important before making financial decisions.

Assessment of the respondent behaviour related to savings and investments shows disposition to behavioural finance theories, i.e. loss aversion (which explains the preference for savings (72%) rather than investments (21%) to protect funds). The issue of conscious and non-conscious risk biases showed that in terms of financial decisions, the majority of respondents (60%) are non-conscious and 27% are conscious risk takers.

Such behavioural finance deviation shows that respondents fail to explain the financial motives and make inconsistent decisions.

Similarly to the experiment by Samuelson and Bazerman, the majority of respondents (67%) demonstrated the winner's curse effect, when individuals with necessary information non-consciously overestimated the price of securities (Рудык 2004).

The trap effect experiments, taken from the study by Arkes and Blumer (1985) on anomalies in behavioural finance, demonstrated that respondents with already invested funds (77%) were inclined to assume this financial obligation and subjectively evaluated possible financial return. This was compared to the situation, where respondents had no financial obligations.

Contrary to the research by Kahneman and Tversky's (1979), there is no market impact on Lithuanian households in personal finance management, as only 35% of respondents could possibly imitate the behaviour of other market participants.

## Analysis of Dependence between Behavioural Factors and Financial Decisions

Qualitative assessment method is insufficient to forecast the future activities of financial decisions made by households. The correlation analysis helps to determine the interrelation between various factors and is often used to ascertain complicated appearances.

Based on survey data, quantity of each behavioural bias was found to establish the linkage between irrational behaviour and financial decisions (Table 1). Case of one of the most frequent behavioural trends – non-conscious risk – is showed as example.

Variable factors reflect individualistic financial management features and are as follow:

- X1 – the desire to make decision by light of nature,
- X2 – high (>LTL 3000) income.
- X3 – the desire to frequently change the portfolio structure,
- X4 – conscious risk,
- X5 – decision to invest into an unprofitable project,
- X6 – low (<LTL 1500) income.

Correlation coefficients that represent the strength of relationships, allow providing information on the way each of six independent variables affect non-conscious risk trend. Summarizing the obtained results (Table 2), we could state that the stochastic relationship between the dependent variable Y and all independent variables X is strong. The strongest relationships have been found between non-conscious risk and the desire to make decision by light of nature (X1), non-conscious risk and decision to invest into unprofitable projects (X5). Dependency between non-conscious risk and high income (X2) is equal to 0.26 and is very weak. Thus, all selected factors are statistically significant for the dependent variable Y.

If the stochastic relationship between variables exists, it is possible to find out the direction of change of the dependent variable Y – increase or decrease – depending on the sign of the coefficient. In this case, the coefficients are

Table 1. Behavioural bias (Y) and possible influencing variables (X1–X6) (compiled by authors)

	Y	X1	X2	X3	X4	X5	X6
No.	Non-conscious risk	Decisions based on intuition	High (>LTL 3000) income	Desire to frequently change the portfolio structure	Conscious risk	Investment into an unprofitable project	Low (<LTL 1500) income
1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1
...	...	...	...	...	...	...	...
171	0	0	0	0	0	0	0

Table 2. Correlation between the trend of irrational behavioural by an individual and financial decisions (compiled by authors)

Relation	Y to X1	Y to X2	Y to X3	Y to X4	Y to X5	Y to X6
CORREL	0.52	0.26	0.51	0.49	0.68	0.57
T value	7.96	3.51	7.80	7.36	12.0	9.12
T statistic	1.97					

positive numbers, which means that the dependent variable moves in the same direction as the independent variable: if the number of decisions based on intuition increase, level of non-conscious risk will increase as well, and so on.

Regression analysis shows linear relationship between the analyzed irrational behavioral trend and variables, i.e. estimates  $y$  average value for particular  $x$  value. After inserting the planned frequency of conscious risk bias  $x$ , expected average frequency of non-conscious risk  $y$  is identified. After calculating coefficients of regression, the following equations are found (Table 3).

Table 3. Linear relationship of non-conscious risk and strongest independent variables (compiled by authors)

Relationship of variables	Equations
Non-conscious risk and desire to make decision by light of nature	$Y1 = 0.43 + 0.56 * X1$
Non-conscious risk and desire to frequently change the portfolio structure	$Y3 = 0.44 + 0.55 * X3$
Dependency of non-conscious and conscious risks	$Y4 = 0.45 + 0.54 * X4$
Dependency of a non-conscious risk and the trap effect	$Y5 = 0.11 + 0.78 * X5$
Dependency of a non-conscious risk and low income	$Y6 = 0.40 + 0.59 * X6$

The results of the survey proved that decision making of Lithuanian households is hardly random as it is based on strong stochastic dependencies of financial management features.

Thus, behavioral anomalies could be identified basing on individual answers of a comprehensive questionnaire as it was proved by regression correlation analysis.

## Conclusions

1. The rational finance paradigm combines a number of financial theories that illustrate the sequence of financial decisions by assumption that an economic human being is a rational and motivated financial market participant with profit maximization as his/her main goal. This paradigm does not take into account psychological motives, expectations or selective reception of information. Thus, the rational finance paradigm defines that a

financial decision is theoretically optimal and does not reflect the real choice of a market participant.

2. The reviewed theories of behavioural finances have a large practical value as they allow explaining the events in the market and predicting the behaviour of investors in different situations as well as developing efficient market strategies.
3. In financial management science, there is no precise definition of an irrational economic human being. The survey of literate household revealed features of irrational behaviour. Some characteristics (such as the winner's curse effect or loss aversion) are similar to those established by scientists of behavioural economics and some characteristics (absence of the market impact) are recognised as unique and based on Lithuanian mentality.
4. Financially literate citizens of Lithuania are attempting to be successful in the financial market. They could be non-conscious of their financial decisions, as they can't always justify the financial motives, and, with a degree of uncertainty, their behaviour is irrational in terms of a certain risk level.
5. The identified behaviour features of literate households confirm the necessity to consider behavioural factors in managing financial decisions of an individual.

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## FINANSINĖ ELGSENA: TEORIJA IR TYRIMAS

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### Santrauka

Straipsnyje nagrinėjama finansinės gyventojų elgsenos teorijų svarba priimant namų ūkių finansinius sprendimus. Finansinės gyventojų elgsenos teorijos tyrinėja rinkos dalyvių emocines charakteristikas, siekiant paaiškinti subjektyvias iracionalias anomalijas finansų rinkose. Straipsnyje išnagrinėtos gyventojų elgsenos teorijos, suklasifikuoti pagrindiniai elgsenos nukrypimai, priimant finansinius sprendimus, ir aprašytos jų pritaikymo finansų rinkoje galimybės. Tyrimo tikslas – nustatyti pagrindinius finansinės elgsenos bruožus ir polinkius sąsajoje su namų ūkių finansiniais sprendimais. Siekiant nustatyti namų ūkių finansinę elgseną buvo atlikta finansškai išprususių individų apklausa.

**Reikšminiai žodžiai:** finansinė elgsena, racionalių finansų paradigma, kognityviniai nukrypimai, ekonominis žmogus, finansiniai sprendimai.