Mental Accounting: The Framing of (Ir)Rational Economic Decisions

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Abstract

Predicting the behaviour of market participants is one of the main goals of standard economic theory which rely on the assumption that people are rational. As market participants do not always behave in accordance with these theoretical assumptions, a new approach to this goal was offered by behavioural economics. This discipline recognizes human flaws, shortcomings and limited rationality. The growing importance of this discipline, recently awarded with Nobel Prize, provided the motivation for writing this paper, which focuses on a specific area of behavioural economics known as mental accounting. Mental accounting studies economic decision-making, the perception of gains and losses, spending and saving preferences and risk aversion, from the perspective of human irrationality. The purpose of this paper is to gather information on the mentioned aspects of mental accounting. Hypothetical scenarios in a highly structured questionnaire were presented to 290 respondents from five Slavonian counties in Eastern Croatia. The survey sample comprised mainly students and young employed individuals pursuing studies/career in economics or other professions. The results are analysed using a basic statistical analysis and a comparative analysis to compare the results to those obtained in major past studies such as the ones conducted by the Nobel laureate Thaler. The results of the survey are largely consistent with previous findings. No significant differences were found between sample subgroups, i.e. students compared to employed individuals and economic professions compared to other professions. The existence and application of mental accounting in everyday economic decision-making have been confirmed. Interestingly, a strong tendency towards irrational behaviour was found in economists as well.

Keywords: behavioural economics, mental accounting, (ir) rationality, economic decision-making

Introduction

The issue of (ir)rational behaviour of individuals is a common topic of research that is interesting and relevant in the fields of psychology and economics alike. The link between these two disciplines is man as a living, cognitive being. This paper explores the issue of human (ir)rationality because one of the key goals of economics is to predict human decisions and behaviour - rational or irrational - in business and other economic activities. Economics has been concerned with human (ir)rationality since its inception, and the economic concept of rationality was shaped by the rational choice theory developed by von Neumann and Morgenstern. According to them, rationality can be modelled to maximize the expected profit, and people, when presented with various options, will always choose the option that maximizes their individual satisfaction (Polšek and Bokulić, 2014). Daniel Kahneman and Amos Tversky developed a new alternative theory termed expected utility theory (1992) stating that each decision-making situation is an independent event in terms of gains or losses relative to a situational reference point (Vojinić, 2010). The expected utility theory assumes possession of complete information making possible to make a rational decision. Given the complexity of this procedure, it has become obvious that this concept of rationality is not realistic (Polšek and Bokulić, 2014). Problems, phenomena and uncertainty are caused by the very nature of human beings, who do not behave as predicted by a

specific theory which ignore the psychological insights and facts and recognize only the mathematical ones.

Theoretical Background

The economic crises are just one of the situations where the market and its participants no longer behave according to the theoretical assumptions but radically differently. Thus, in studying this behaviour, economists started to give special consideration to the different aspects of individuals, in particular the psychological factors that have a powerful impact. The economic psychology has developed as part of the social psychology that seeks to understand the behaviour of an individual/group and the behaviour of an individual in a group (Ivanov, 2008). The discipline that combines two seemingly incompatible disciplines, i.e. economics and psychology, is termed behavioural economics and, according to Polšek and Bovan (2014), it studies behavioural irrationality as departures from the rational behaviour model, and uses social, cognitive and emotional factors to understand the economic decisions of individuals and institutions. Market anomalies play a key role in behavioural economics. They are caused by factors primarily associated with human perception of money, gains and losses and natural risk aversion. A set of such anomalies was summarised by economist Richard Thaler, who was awarded the Nobel Prize for his contributions to behavioural economics, known as the phenomenon of mental accounting, i.e. the subjective attitude of individuals towards money and a set of principles that describe how people treat money. Thaler's central insight was that very often people do not maximize their utility but rather act irrationally and make economic decisions based on different trivialities. Mental accounting is a set of findings and theoretical concepts that describe how individuals treat money and keep track of their expenses and gains (Bokulić and Bovan, 2014). Individuals and households behave like personal accountants who open and close various mental accounts every day, record income and expenses, and set budgets. Examples of mental accounting can be found in everyday life - it is more likely that people will spend windfall gains on luxuries, not hesitate to sell their losing shares, and sell those that are making profit too early (Mušura, 2014). The three main ideas underlying the principles of mental accounting are coding, categorizing and evaluating. Coding captures how decisions are made, and how outcomes (gains or losses) are perceived and experienced, mainly in the context of purchasing (Fennema & Koonce, 2010). Categorizing implies the use of specific mental accounts (budgeting) to which gains and losses are assigned (such as investment accounts). Evaluating concerns the way accounts are subsequently valued, and includes the consideration of the frequency with which accounts are evaluated (daily, monthly or yearly).

As a starting point in the coding process, Thaler (1999) uses Kahneman and Tversky's value function, highlighting several aspects: gains and losses are not defined in relation to the overall wealth, but relative to a reference point; the gain function is concave while the loss function is convex; people are risk averse. According to Thaler (1999) there are three types of mental account frames: a minimal account, a topical account and a comprehensive account. To explain multiple gains and losses within a single account, Thaler (1999) introduced the principles of hedonic framing, that is, the way of evaluating joint outcomes to maximize utility (theoretically): (1) Segregate gains; (2) Integrate losses; (3) Integrate smaller losses with larger gains; (4) Segregate small gains from larger losses. However, the hypothesis of segregating gains was confirmed (Thaler, 1999) but, on the other side, people prefer not to integrate losses, which proves a much stronger aversion to loss than assumed in the theory. When making economic decisions, the concept of sunk cost effect also emerges, which in economic literature refers to the unrecoverable investment (Bokulić & Bovan, 2013). Given this effect, people will not want to close accounts that are in the red. Thaler (1999) also points out that the importance and value of money spent decrease over time. Another component of mental accounting is categorization or labelling. Money is commonly labelled at three levels (Thaler, 1999): expenditures are grouped into budgets (food, housing); wealth is allocated to accounts (checking, pension); and income is divided into categories (regular, windfall). Wealth is allocated to specific accounts in a hierarchical order. The most tempting class of accounts is in the 'current assets' category and the least tempting lies in the 'future income' account (retirement savings and the like). The final categorization of funds refers to the way they were

earned; the more 'serious' the source of income and the way of earning it, the more 'serious' its use. Evaluation of pre-coded and categorized accounts refers to choice bracketing, i.e. it determines whether the outcomes of a decision are perceived in isolation or taken together. This idea suggests that prior outcomes affect risky decisions. Thaler (1999) claims that past winnings can encourage people to participate in risky bets.

Previous Research

Mental accounting is a vibrant area of research that focuses on theoretical, practical and interdisciplinary aspects of the subject. The basis for this research is the extensive body of work produced by the mentioned American economist and Nobel laureate, Richard Thaler. As the founder of the theory, Thaler (1985) developed new concepts for coding gains and losses. By studying the impact of recent gains and losses, he concluded that previous experience complicates loss function judgment. He also concluded that his theoretical considerations are a hybrid of economics and psychology and that their development could be useful in marketing. In his later work, Thaler (1999) contemplated whether the existence of mental accounting is good for humans as this phenomenon emerged due to the need to economize time and the process of making decisions. Thaler (1999) concluded that it is impossible to consider the entire system faulty if no one has proposed a way to repair it. Since he believes that people are consistent in being irrational, he believes that erroneous behaviour can be predicted, modelled and thus corrected. Therefore, Thaler and Benartzi (2004) used the insights from mental accounting and devised a concrete plan termed "Save More Tomorrow" to encourage poorer households to invest larger amounts into their retirement fund. The successful implementation of this plan has shown how insights from behavioural economics can be applied in practice. Among other authors, Jones and Cullis (2003) mention various experiments conducted by Tversky, Kahneman, Winnett, Lewis, Shefrin and Thaler. Koch and Nafziger (2016) developed the theory of endogenous categorization of mental health outcomes where people set goals to attenuate the self-control problem. Gilboa, Postlewaite and Schmeidler (2010) concluded that the problem of planning one's spending is too complex to be optimally solved by a human. People simply divide their budget into main categories and sub-categories, which supports the mental accounting theory. Relying on Thaler's findings, Baucells and Hwang (2013) developed a new model of mental accounting termed MARA (Mental Accounting Reference Price Adaptation) that explains a series of anomalies related to spending and payment decisions. Based on several experiments, White (2008) came to the conclusion that people value and spend differently a monetary gift received in the form of a gift card from the one received in the form of cash.

In terms of practical research, special mention should be made of research on financial markets. For instance, Maciejovski, Kirchler and Schwarzenberger (2001) found that traders on an experimental asset market form different and separate mental accounts for sale revenues and for dividend earnings. Barberis and Huang (2001) studied the differences between investors who are loss averse over the fluctuations of their stock portfolio, and those who are loss averse over the fluctuations of individual stocks that they own. Grinblatt and Han (2005) examined how stock prices are affected by the tendency of some investors to hold on to their losing shares, driven by mental accounting. Rockenbach (2004) explored the pricing of financial options and noticed that investors associate the risky assets to the same mental account, while the bond is treated separately. A similar conclusion was made by Broihanne, Merli and Roger (2008), who showed that behavioural approaches can give a new insight into old financial conundrums.

Papers not dealing with financial markets are much more common. Reinholtz, Bartels and Parker (2015) concluded that after establishing mental accounts, people are not inclined to make a purchase using money from a particular account for a purpose that is not strongly associated with the purpose of that account. In her research, Jha-Dang (2004) concluded that consumers perceive promotions as a profit, which increased their propensity towards purchasing products at regular prices. Davies, Easaw and Ghoshray (2006) used a behavioural approach in studying household consumption behaviour in Malawi.

Fennema and Koonce (2010) describe the impact of mental accounting on decision making by individuals involved in financial reporting and voluntary disclosure. Chen, Kök and Tong (2013) explored the effect of payment schemes on inventory decisions of newsvendors. Kivetz, R. (1999) studied the impact of mental accounting and rational choice on consumer preferences while Cherry (2001) considered the determinants of behaviour towards others.

Research on children and adolescents is also interesting. Webley and Plaisier (1998) studied the development of mental accounts and concluded that only the 11–12-year-olds responded in a similar fashion to adults, while no evidence was found for mental accounting in younger children. Friedline, Elliott and Nam (2012) explored the presence of mental accounting in adolescents. Finally, there are just a few authors in Croatia who have studied mental accounting. The studies undertaken by Mušura & Kamenov (2007) involving students mainly confirm previous findings and point to the universality of the use of schemas and heuristics in financial decision-making. Bokulić and Bovan (2014) gave a detailed overview of key determinants and provided examples of mental accounting. In Serbia, Kapor (2014) conducted several surveys on students similar to those undertaken by Kahneman and Tversky. Stajkić and Gvozdenović (2014) focused their research on the impact of previous gains on future choices. The works of Levav and Mcgraw (2009), exploring complementary approach of emotional accounting, and those by Rajagopal and Rha (2009), who found that people also establish mental accounts for time, fall into the interdisciplinary field.

Data and Methodology

Given the lack of current research into mental accounting in Croatian literature, and the fact that the existing studies are mainly theoretical, the authors found that it would be useful to undertake research similar to that conducted by Thaler, Kahneman and Tversky. Thus, a survey was carried out in the early 2018 of 301 individuals. Eleven (11) of them submitted incomplete questionnaires, which led to the final sample size of 290 persons from five Slavonian counties in Eastern Croatia. In terms of the employment status of the respondents, the sample comprised mainly students (153), as they were an easily accessible group of subjects. The second largest group of respondents were employed persons (118), while the smallest group were unemployed persons (19). In terms of gender, more women (177) than men participated in the survey, while in terms of age, the majority of the respondents were under the age of 25 (142), which is consistent with the employment structure of the sample. The vast majority of the respondents were either employed in professions related to the field of economics or were students of the subject (227). This sample structure enables the analysis and identification of possible differences in the approach to and use of mental accounting among the different subgroups of respondents, the most significant differences being those between students and employed individuals and between those pursuing studies or a career in economics versus other professions.

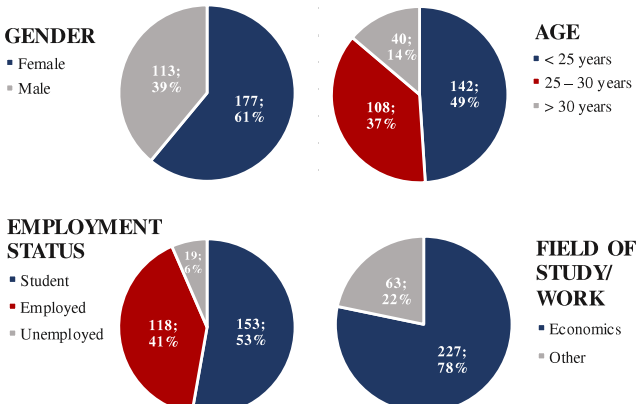

Figure 1: Demographic characteristics; authors' calculation

The questionnaire was administered both online and on paper to increase the size of the sample as much as possible. The majority of the respondents, i.e. 268 of them, filled in the questionnaire online, while only 33 students filled in the paper version. However, due to the inability to make all questions and respondent data fields required, the paper survey had to be abandoned after the first group of students (the group included 33 respondents, of which 11 submitted incomplete questionnaires). The needed sample size was achieved in a relatively short period of time. The respondents' feedback was extremely positive, which greatly facilitated the implementation of the research and confirmed the potential of behavioural approach to economic issues. In the demographic section of the questionnaire, the respondents were asked to indicate the demographic group to which they belong (in terms of gender, age, employment status, and field of study/profession) by selecting one item from the list provided. The topical section of the questionnaire comprised 14 questions. The respondents were asked to choose an item from the list offered or write an answer in a specified place. The questions mainly related to the hypothetical situations the respondents were put in to learn more about their attitudes towards and perceptions of gains/losses, their preferences in terms of handling their money, and their behaviour in situations involving risk. The collected data were processed using descriptive statistics. The obtained results were then compared against the findings of previous research through comparative analysis.

Results and Discussion

The survey questionnaire comprised 14 topical questions. The results of the most interesting ones are presented below. First, the respondents were asked to consider two scenarios. In the first scenario, they were asked to choose a better option between a guaranteed win of 240 kuna, and on the other hand a 25% chance of winning 1,000 kuna and a 75% chance of winning nothing. In the second scenario, they were asked to choose between a guaranteed loss of 750 kuna versus a 75% chance of losing 1,000 kuna and a 25% chance of losing nothing. In the first scenario, 70.34% of the respondents chose option A, while in the second scenario 62.41% of them chose option B. There were no significant differences in responses between students and employed individuals in the first scenario, while in the second scenario, 66.42% of employed individuals chose option B compared to 58.82% of students. No significant differences were found between economists and other professions. The results of this survey are similar to those found by Kahneman and Tverski (e.g. 84% chose option A in the first scenario). However, Kapor (2014), who also conducted two surveys similar to the ones conducted by Kahneman and Tversky, involving 143 and 21 students, found large deviations in the results of the two surveys.

Next, the respondents were asked to calculate the price of a tennis ball if the price of a tennis racquet and the tennis ball together is 1,030 kuna, considering that the tennis racket costs 1,000 kuna more than the ball. 66.55% of the respondents gave an incorrect answer - 30 kuna, 27.24% gave the correct answer - 15 kuna, while the remaining 6.21% gave some other incorrect answer. The differences in the percentage of correct and incorrect answers between students and employed individuals and between economists and other professions are insignificant. In Kapor's survey of 143 students (2014), only 15.8% of them gave a correct answer, while in the original survey carried out by Kahneman and Tversky, an overwhelming majority of the respondents gave an incorrect answer; however, the exact number was not specified. Thus, the results of this survey are consistent with the past findings.

Following this, the respondents were again presented with two alternative scenarios and invited to indicate which option they would be more likely to choose. In the first scenario they were presented with a choice between a guaranteed win of 900 kuna versus a 95% chance of winning 1,000 kuna and a 5% chance of not winning anything. The second scenario presented them with a choice between a guaranteed loss of 900 kuna versus a 95% chance of losing 1,000 kuna and a 5% chance of losing nothing. In the first scenario, 58.97% of the respondents chose option A, and in the second scenario, 60.69% chose option B. The percentage of students who chose option A in the first scenario was slightly smaller (56.21%) than the percentage of employed persons choosing the same option (62.04%), while no significant difference between the two subgroups was found in the second scenario. In both

scenarios, no significant difference was found between economists and other professions. A comparable survey of 22 students conducted by Kapor (2014) yielded similar results, with slightly higher percentages of preferred options in both scenarios (77% and 64%, respectively).

The respondents were then asked to imagine the following scenario: "You have won a trip to Las Vegas. Once there, you decide to try your luck by playing roulette at a casino. You only have 30 dollars, but after a while, you win 3,250,000 dollars. Unfortunately, by the end of the evening, you lose all." When asked how much they would say they had lost if someone asked them the following morning, as much as 56.89% of them would say they had lost only the 30 dollars they had come with, while 35.52% would report the economic loss of both the money they came with and their winnings. The remaining 7.58% gave some other answer. The percentage of those who reported they had lost 30 dollars was higher among employed persons than among students (59.85% and 54.25%, respectively), and higher among economists than among other professions (57.71% and 53.97%, respectively). This result was not expected considering the irrationality of such an attitude.

After that, the respondents were asked to imagine the following scenario: "You have saved 200,000 kuna which you intend to use for purchasing an apartment in five years time. The yield on your savings is 3%. Unfortunately, your car broke down and you have decided to buy a new one that costs 150,000 kuna. You have been offered a 3-year loan with a 9% interest." When asked how they would pay for the car, 51.72% of the respondents said they would take the money from their savings for the apartment, while the rest would take out the loan even though it is an irrational choice from an economic point of view. Students in general and individuals pursuing a career or studies in fields other than economics preferred the loan (50.98% and 50.79%, respectively), while employed individuals and individuals pursuing a career or studies in the field of economics preferred to use their savings (54.74% and 52.42%, respectively). Thaler (1985) finds that the reluctance to change the intended purpose of money despite extra costs is due to self-control problems where households worry they will not replace the money spent but are certain to pay back the loan to the bank in regular instalments.

The answers to the following set of questions are interesting. The subjects were presented with three scenarios involving imaginary persons, Mr A and Mr B, in different situations, and the respondents were then asked to assess which of the two gentlemen was luckier or more upset, or which of the two they would prefer to be. In the first scenario, Mr A received two lottery tickets from his colleague. The first ticket won him 300 kuna, and the second 150 kuna. Mr B got one lottery ticket from his colleague, which won him 450 kuna. A large share of the respondents, i.e. 42.41% of them, claimed that there was no difference between the two situations, while 38.97% of the respondents thought that Mr A was luckier. The difference in the responses of students and employed persons was insignificant. However, it is interesting that economists slightly preferred the answer that Mr A was luckier (40.96%), whereas the respondents pursuing careers or studies in other fields predominantly thought that there was no difference (49.21%) between the two situations. In the second scenario, Mr A has received a tax decision informing him that he still owes 400 kuna in taxes. On the same day, he has received a notice that he has to pay 200 kuna for failing to pay his phone bill. Mr B has received a tax decision according to which he owes 600 kuna in taxes. As much as 58.97% of the respondents said that Mr A's situation was more upsetting, while 22.41% claimed there was no difference between the two situations. Students and employees gave very similar answers, as did economists compared to individuals pursuing a career or studies in other fields. Finally, in the third scenario, Mr A played the lottery for the first time in his life and won 1,000 kuna. Unfortunately, he had a car accident that same day costing 850 kuna. Mr B played lottery for the first time in his life and won 150 kuna. The overwhelming majority thought that Mr B was luckier (77.24%). Similar results were obtained in all subgroups of the sample. These results are consistent with Thaler's findings (1985) and his four principles of evaluating gains and losses, which he tested on a sample of 87 students thereby confirming his theory. In addition to the size of the sample, the results of this survey compared to the one conducted by Thaler are different in that a larger percentage of respondents in Thaler's survey chose option A (64.37%) in the first scenario.

The next question was similar to the one used by Thaler in his survey (1999). The respondents were asked to imagine the following scenario: "Suppose that a few years ago you bought a bottle of high-quality wine for 100 kuna. This bottle is now worth 500 kuna. You have decided to drink it." When asked which of the following best captures their feeling of the cost of drinking the bottle, the answers were equally distributed among these options in kuna: '0' (25.52%), '500' (25.86%) and '-400' (25.52%; I get to drink a bottle that is worth 500 kuna that I only paid 100 kuna for). The percentages of those who chose options '100' and '100 plus interest' were lower (16.9% and 6.21%, respectively). Responses by students are very similar in structure, while employed persons chose mainly '0' (29.2%), followed by '500' (26.28%). Economists favoured options '-400' and '500' (28.19% and 26.87%, respectively), while other professions chose mainly '0' (34.92%). Similar results were obtained by Thaler (1999), i.e. 30% of the respondents chose an option corresponding to '0'; 20% chose an option corresponding to '500' and 25% chose an option corresponding to '-400'. Thaler noticed that it was mostly the economists who gave the correct answer from an economic point of view, which was not the case in our survey.

The last set of questions presented the respondents with two choices in three different scenarios. The first situation involved a lottery win of 200 kuna. The respondents were asked to indicate which of the following they would prefer: continue to play with a 50% chance of winning 50 kuna and a 50% chance of losing 50 kuna, or stop playing, i.e. no chance of winning or losing. The vast majority (77.24%) of the respondents chose to stop playing, with almost the same percentage in all subgroups. The second scenario involved a lottery loss of 200 kuna. The respondents were asked to choose between a 50% chance of winning 50 kuna and a 50% chance of losing 50 kuna, or a decision to stop playing without any further gains and losses. Again, the majority (80.69%) chose to stop playing, with similar percentages in all subgroups. The last scenario involved a lottery loss of 200 kuna. The respondents had to choose between playing another game with a 33% chance of winning 200 kuna and a 67% chance of winning nothing versus a guaranteed win of 75 kuna. The majority chose the safe option (77.93%), i.e. to stop playing, with no significant difference between individual subgroups. This result is not entirely consistent with Thaler's findings (1999), who gave students participating in his survey real money to play with. Thaler also noticed the impact of previous outcomes on choices involving risk. However, he concluded that previous winnings encourage risky behaviour (70% chose option A in the first scenario). Moreover, according to the results of his research, previous losses also encourage risky behaviour if a new bet allows for the possibility to break even (60% chose option A in the third scenario). A possible explanation for these differences could be the fact that Thaler conducted his experiment using real money, while this survey used questionnaire which is naturally unable to fully replicate Thaler's experiment.

Conclusion and limitations

The results of the survey verify the existence and application of mental accounting in everyday economic decision-making of individuals and households, and are largely consistent with previous findings in this field. One of the unexpected conclusions is that there was virtually no difference with regard to this irrational behaviour between students and employed persons, although their income status differs considerably. Moreover, no significant differences were found in the behaviour of economists/business graduates in relation to individuals pursuing studies or a career in other fields. Even though one may have expected that economists would be able to make more rational economic decisions, the results show that in some cases the economists behaved more irrationally than individuals pursuing careers or studies in other fields. Although the results have largely confirmed most of the previous findings, some limitations of this research have probably reduced the extent to which its results are consistent with previous findings. For instance, some of the original research was conducted as a real experiment with real stakes, while this research was based on a survey questionnaire with hypothetical situations, which allowed for the possibility that the respondents might not have responded to a situation

in the same way they would have in real life. Furthermore, given the lack of current research on mental accounting in Croatian literature, the authors intended to give a detailed literature review. However, due to paper length constraints, they were unable to present research results in full detail and have therefore decided to focus on the most relevant and interesting parts. The extremely positive feedback from the respondents as well as the fact that the authors were able to recruit a large sample in a short period of time provide a good basis and an indication of the direction for future research on the phenomenon of mental accounting. The authors plan to analyse the results of this research in more detail and undertake new studies similar to the ones carried out by Thaler, Kahneman and Tversky, using an even larger sample. The focus of future research will be on areas of employment/studies other than economics, with the intention to better compare and verify the differences between the respondents in terms of their approach to economic decision-making. Moreover, having a control group in addition to the experimental group would have given a better insight into the phenomenon observed in at least several of the questions asked. Thus, future research will include the use of a control group.

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