HOW MENTAL ACCOUNTING, LOSS AVERSION AND COGNITIVE BIASES EXPLAIN HUMAN BEHAVIOR

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Ako mentálne účtovníctvo, averzia k strate a kognitívna zaujatosť vysvetľujú ľudské správanie

Abstract: *Behavioral economics, which incorporates insights from other social sciences as psychology into standard economics, has been facing significant achievements and has generated interest beyond academia, among policy makers and the public. This article is dedicated to the contributions of Richard H. Thaler, to behavioral economics. By exploring the consequences of human limited rationality and self-control, Thaler defined numerous biases such as status quo bias, endowment effect, myopic loss aversion and established new models based on more psychologically realistic assumptions which have affected the development of behavioral economics in general.*

Keywords: *behavioral economics, biases, mental accounting, myopic loss aversion, R. H. Thaler*

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1. Introduction

Standard economics differs from other social sciences by the assumption that agents (people in general) behave rationally and have specific preferences. Behavioral economics in contrast to standard economics defines the common decision mistakes that people make in real life. Because those decisions do not lead to maximization of their utility, behavioral economists try to understand why humans make those decisions.

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Richard H. Thaler, as a leading behavioral economist is one of the academicians, whose thoughts are directly used in the field. Through his lifelong research, he explains the biases that influence human behavior e.g. endowment effect, myopic loss aversion, status quo bias, anchoring, and mental accounting. Another contribution relates to his findings in the area of self-control problems called planner-doer model.

Richard H. Thaler as a representative of behavioral economics incorporated psychological realistic assumptions into the analysis of economic decision making. Richard H. Thaler significantly contributed to the development of behavioral economics as such, as mentioned Per Strömberg, chair of the committee for the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. By exploring the human limited rationality, their social preferences, and lack of self-control, he has explained how the human decisions can be affected as well as their market outcomes [1, 15]. Since 2016, he has been Professor of the University of Chicago at the department called "Nudge Unit" which was established by the Government of the United Kingdom for public good improvement by helping citizens to make better decisions by, for example, saving for their retirement today. The department is named after the book Nudge, which is one of the best selling books explaining the biases in decision making [13]. This article is dedicated to the contributions of Richard H. Thaler, to behavioral economics, and the biases that influence human behavior, e.g. endowment effect, myopic loss aversion, status quo bias, anchoring, and mental accounting, while these concepts are explained in the paper.

2. Behavioral Economics and Behavioral Life Cycle Hypothesis

Behavioral economics incorporates psychologically realistic considerations into economic decision-making analyses. It is trying to explain human decisions based on psychological motives. Representatives of behavioral economics claim that people do not necessarily decide on material or rational moves, but often follow traditions, try to avoid the risk or are influenced by other biases. By this understanding of the past actions of the agent, behavioral economists try to better explain and predict the latter. Richard H. Thaler, D. Kahneman, A. Tversky, V. Smith, and others belong to the most important researches who were at the beginning of the establishment of behavioral economics as a science. Therefore, behavioral decision making is understood as a cognitive revolution as it incorporates judgment, memory biases, and limitations which help to produce behavior as detectable. As Slovic,

Lichtenstein, and Fischoff examined in their research, the main questions behavioral economists ask [1, 6] are:

- Do economic agents perform the way classical economists claim they should?
- If they do not, how can people be helped to improve their performance?

Kahneman and Tversky in their research "Judgment under Uncertainty: Heuristics and Biases" clarify how people rely on a limited number of heuristic principles "which decrease the complex tasks of assessing probabilities and predicting values to simpler judgmental operations" [14]. These heuristics are valuable for the subject; however, they usually lead to severe systemic errors (connected with perception of size and distance) in decision making. Heuristics, such as availability, including representativeness, anchoring, and judgment occur under certain conditions which can be conditions of uncertainty.

Since 1970 Thaler cooperated with Kahneman, Tversky, Slovic, and Fischhoff who helped him better understand and explain for mainstream economists the anomalies in human behavior he observed. Thaler significantly contributed to the establishment of behavioral economics by arguing that economists make systematic predictable errors in predicting and defining consumer choices [7]. These errors can be classified and Thaler presented examples of situations in which these errors occur.

Modigliani's Life-Cycle Hypothesis is an example of rational theory based on the presumption that individuals consume according to constant percentage of their lifetime income. The theory has not been accommodated in real life successfully because of different empirical evidence on consumption. That might be caused by the fact of consumption sensitivity on income, and numerous forms of wealth turned out not to be close substitutes as the theory suggests. In fact, the marginal propensity to consume (pension and home equity compared to other assets) numerous households was low, probably because of the inability to correctly compute the present values, annuity payments, etcetera. The theory was modified by Shefrin and Thaler [5] to make it more realistic. The Behavioral Life Cycle hypothesis is an enriched Life-cycle model, which includes self-control, mental-accounting, and framing. The idea of the theory is that households consider the segments of their prosperity as non-fungible even though the credit rationing is missing. Wealth is assumed to be divided into three mental accounts: current income, current assets, and future income.

3. Decision Making Biases

By offering an improvement or advice, which can be applicable in the real life, the behavioral life cycle theory can become prescriptive. Some of the improvements that can help, for example, increase retirement savings are: better financial education, stronger self-control, and procrastination elimination. In this chapter of the paper, some of the anomalies that Thaler identified will be illustrated and defined.

Many households use the *system of mental accounting* for the decomposition of household wealth, which assumes current account (current spendable income), asset account, and future income account (future income) as substantial. Individuals in general group their personal income into different imaginary accounts, e.g. housing, clothes, food, transportation, entertainment, etc. By assigning various values to these mental accounts, consumers assign to them personal preferences as well [9]. They do it according to miscellaneous subjective criteria and therefore they are not making rational decisions in case of spending, investing as the fungibility is limiting. These various mental accounts reflect how tempting the specific accounts are and present the example of framing. The theory could be applied to investment behavior when investors, for example, divide potential investments into two categories: risky (speculative portfolios) and less risky. Risky investments relate to higher yields, but investors are likely to ensure potential losses from these speculative transactions by keeping a portion of the investment safe. Inconsistency occurs when investors focus preponderantly on separating these accounts which involves time and effort. Consumption is highly sensitive to current income and therefore the life-cycle hypothesis is not applicable in consistency with the lifetime conception of permanent income. Two types of decisions are listed to support the theory: the low-frequency decisions (the frame of life-time consumption) and the high-frequency decisions (year-to-year consumption smoothing of permanent income). Low frequency-decision framework illustrates what the savings preferences in relation to age are. The first group usually borrows to finance its consumption (income lower than permanent income); the second group saves for retirement; the third group does not save. There are several sources of income as bonuses and windfalls (unrealized capital gains, sale of securities etc). Unlike traditional life-cycle hypothesis, where the implicit is prerequisite for embedding the framework, the behavioral model aspects frame reliance [10, 11].

Myopic loss aversion theory established by Thaler and Bernatzi explains how loss–averse decision makers react to short term losses. It combines the loss aversion theory and mental

accounting. Theory of loss aversion states, which changes that make things worse (losses) loom larger than gains, therefore this factor seriously affects the saving amounts. Decision makers prefer immediate returns over long term returns as they react sensitively to the price volatility on the financial markets (in the case of investors). If decision makers are loss averse, they will be more willing to take risks if they evaluate their performance infrequently [2].

Status quo bias is one of the implications of loss aversion – when an individual tends to sustain at the status quo because the disadvantages of leaving are much higher than the advantages. In the studies, when the subject is given a hypothetical choice in neutral form versus status quo option, they remain in the status quo [4].

Home equity theory (as another substitution for other forms of wealth) expects to have fewer savings in other assets, because of the mortgage payments. House owners in the times of house price increase would save more to provide the same opportunity for their children, and therefore they have higher savings in comparison with those households whose does not own an accommodation [10].

A lack of personal self-control occurs when the discount rate is higher than the interest rate especially in the short run and leads individuals to use sources as pension plans to deal with difficulties of holding up a part of consumption till retirement. The *planner-doer model* relates to the problem of self-control, which is linked with certain habits, long-term planning, will power and temptation to finance immediate consumption for example with retirement savings. The individual is, therefore, a planner who evaluates options only according to their current utility and doer who sees also lifetime utility [8]. The behavioral life cycle theory incorporates all these features and uses dual preference structure for projection the inner conflict of personal emotional and rational side. Dual preference structure operates with two incompatible choices, the doer responsible for current self-controlled consumption and the planner responsible for emotions, maximizing doer utilities. *Procrastination* occurs when individuals wrongly assume that the activity they perform now is more important that the activity they presume to do later. The more naïve the individuals are the tendency to procrastinate is increasing.

Endowment effect explains how an individual is willing to give away what is received as a gift. Once an individual is endowed with a gift that can be traded later (e.g. lottery ticked be traded for money), very few of them decide to trade [4]. There is a tendency to value more items that are owned than those that can be owned. Individuals tend to consider out-of-pocket costs as losses and opportunity costs as gains. Inertia and status quo bias play a significant role in the

case of reciprocal paycheck raise and contribution rate increase. This effect is explaining the enormous differences between the willingness to accept and the willingness to pay.

3.1. Scientific impact of Richard H. Thaler

Richard H. Thaler's significantly contributed to the development of behavioral economics and proved that by modifying Modigliani's Life-cycle Model (including self-control, mental-accounting, and framing) the rational theory can be accommodated into real life. Conforming to his research and findings, the field of economics and psychology could be integrated for a better explanation of biases which individuals usually make in their decision making. According to The Royal Swedish Academy of Sciences, his work has had a significant cumulative impact on the economics profession; it has inspired a large number of researchers to develop formal theories and empirical tests, which helped to turn a somewhat controversial, fringe field into a mainstream area of contemporary economic research [13]. In Table 1 there are listed his ten most cited articles to demonstrate the impact he made in academia.

Table 1

The most cited publications of Richard H. Thaler and co-authors

Authors	Title	Year of publication	Journal / book	No of Citations
De Bondt W.F.M, Richard H. Thaler	Does the stock market overreact?	1985	The Journal of Finance	8,496
Richard H. Thaler	Toward a positive theory of consumer choice.	1980	Journal of Economic Behavior &Organization	6,106
Richard H. Thaler	Mental accounting and consumer choice.	1985	Marketing science	6,334
Kahneman Daniel, Jack L. Knetsch, Richard H. Thaler	Anomalies: The endowment effect, loss aversion, and status quo bias.	1991	Journal of Economic Perspectives	5,074

Kahneman, Daniel, Jack L. Knetsch, Richard H. Thaler	Experimental tests of the endowment effect and theCoase theorem.	1990	Journal of Political Economy	4,580
Kahneman, Daniel, Jack L. Knetsch, Richard H. Thaler	Fairness as a constraint on profit seeking: Entitlements in the market.	1986	The American Economic Review	3 969
Barberis, Nicholas, Richard H. Thaler	A survey of behavioral finance.	2003	Handbook of the Economics of Finance 1	3 828
Jolls, Christine, Cass R. Sunstein, Richard H. Thaler	A behavioral approach to law and economics.	1997	Stan. L. Review	3 221
Richard H. Thaler	Mental accounting matters.	1999	Journal of Behavioral Decision Making	3 199
Benartzi Shlomo, Richard H. Thaler	Myopic loss aversion and the equity premium puzzle.	1995	The Quarterly Journal of Economics	3 134

Source: Own research according to Google Scholar.

Thaler provided both conceptual and empirical foundations for the field. His most cited articles are co-authored with psychologist Daniel Kahneman, economist Warner De Bondt, Jack L. Knetsch, behavioral economist Nicholas Barberis, and Shlomo Benartzi, and Professor of law Christine M. Jolls.

3.2. Implementation of Richard H. Thaler's thoughts into public policy

Pension wealth is not treated as a substitution for other types of wealth. A rational agent would act consistently with self-control and mental accounting factors when saving for retirement from the earliest possible date. When money is put into pension saving account, they become less liquid and less tempting. Several assumptions made by Thaler and Shefr into the increase of saving into pensions are based on the Behavioral life cycle theory, analyzed earlier, as consumption smoothing. The reduction in income would be considered as present costs for future pension contribution; the interest of retirement savings increases by its change in discretionary savings via recognition effect. Retirement consumption then preretirement consumption is decreasing in the absence of large social and pension programs, while the saving rate increases with the permanent income. [5]

To avoid procrastination and improve self-control the theory offers a solution through automatic enrolment into the pension plan system. While in the former plans where the default is not to join, the new system with automatic enrolment considers as default joining. Therefore, each employee who takes no action is automatically enrolled in the pension savings plan with a low saving rate of 3%. A significant change occurred when employees actively joined defined–contribution plans where a selection of own saving rates is required. Saving rates were lower for employees who joined only defined–contribution plan by low amount, this is expressed as low-saving behavior. To increase savings the program called Save More Tomorrow (SMarT) has been invented [12]. The idea of the program is simplicity and by joining the program now, save for retirement and possibly adjust the saving amount each time when it is necessary. Procrastination and inertia are extremely helpful in this case because employees should remain in the program until they choose to leave or reach some maximum. Hyperbolic discounting presupposes that convenience of savings increase in the future would be more attractive than present saving opportunity. The model of Save More Tomorrow includes the following features. There is a considerable amount of time between the announcement of saving rates increase and the real payment scheduled time.

The loss aversion factor mitigates according to first payment deduction into the plan after a raise. The employee can leave the plan at any time which acts in favor of joining up. The Save More Tomorrow program was first implemented at an anonymous midsize manufacturing company, where from 207 participants 162 agreed to join the plan. After a certain amount of time and several pay rises, 80% of participants have remained in the program. Therefore, it is

possible to state that because participants were saving very little or nothing before, after joining the program their taste for saving had been newly acquired and their saving rates quadrupled. The second implementation took place at Ispat Inland, a large steel company where the program became popular with employees who already joined another saving plan before and decided to change their plan to Save More Tomorrow, specifically 18.1%. The percentage of employees who decided to participate and enroll for the first time is 8.2%. Philips Electronics is the third company which implemented the program and performed educational seminar about pension savings for employees. The program was successfully implemented and 55.2% of employees actively joined the SMarT plan and remained after pay rises. Majority of the people joined remain as a member of a saving plan. This intervention is called as one of the forms of nudging people to make better decisions [12, 3].

Although some economists criticized the program because of automatic enrolment and paternalistic approach, authors define the program as libertarian paternalistic. That means even though the program is not meant to be complimentary, it serves for users to make better decisions. The United Kingdom is from 2012 using the system enriched by automatic enrolment into pension saving. The agent is automatically signed into the pension saving program until he/she decided not to be and requires pension saving to be cancelled. The requirement not to be automatically signed into the program had been requested only by 10% of the population of the United Kingdom. Since 2012 this type of pension saving increased from 2.7 to 7.7 million in 2016. Besides the UK citizens, 25 million citizens of the United States were involved into the program based on support from Barack Obama, their former president.

According to Thaler (1990), almost every policy problem has multiple causes. Policy makers should incorporate every tool that can help because big problems cannot be solved with one intervention. Thus, more complex issues such as climate change or health care would necessarily need to incorporate not only the standard economic approach but also sundry interventions at the same time. Automatic enrolment is applied in Spain and France in the Organ donation sphere, where the principle is similar to the pension savings or the quick choice system is used. Quick choice system is offering the public to be signed into a list of organ donors while their new driving license is issuing. The program was launched in the United States, Illinois and contributed to duplicate the number of organ donors.

4. Conclusions

Thaler's findings are widely used in economy, marketing, psychology, healthcare, public sector, etc. However, some of the framing techniques like nudging tend to be less effective in the real world as they are statistically significant in the laboratory environment, but the intervention's effects are too small. By finding the most critical decisions and levers, which are necessary for each problem, the resolution of the outcome can be proved. Some authors claim that removing individual choice can produce superior outcomes. Another question is the option to borrow or withdraw money from retirement savings, unlike the United States. With everything mentioned above, it is necessary to ask how well the system in countries matches the needs of decision makers if they have the time, attention, expertise and self-control to make the best reasonable decision.

To sum up, the findings of behavioral economics, more precisely Dr. Thaler' findings have significantly contributed to a better understanding of every decision we make in our everyday life.

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