The Index Fund Rationality Paradox and Categorical Thinking

Evgeni Tarassov

Head of Wealth Management Institute,
10/19, office 9, Engelsa ul., Khimki, Moscow region, 141400, Russian Federation.
E-mail: tarassov.evgeni@gmail.com

During the last twenty years, literature has emerged exploring why individuals invest in high-fee index Mutual Funds (MF) while there are funds tracking the same index and charging remarkably lower commissions. This paper puts forward the individuals' tendency to categorical thinking as one of the driving forces of this 'index fund rationality paradox'. The main hypothesis is that individual investors do not recognize the difference between active and passive (index) funds and presume that relatively high fees, adequate for heterogeneous and costly active funds, are also acceptable for low-cost homogeneous index funds. I test this hypothesis using a survey-based experiment, conducted among the first-generation High Net Worth Individuals (HNWI) and economics and finance students from leading universities. The obtained results show that, indeed, the vast majority of respondents fail to distinguish clearly the active and the index funds: they confuse their objectives and activities, misperceive the skills and efforts required to manage different types of funds. On the other hand, the average answers reveal that some comprehension of the difference between various types of funds is present: on average, the participants attribute higher skills and efforts to the managers of active funds, and are ready to pay higher fees to them. Based on these findings, I formulate basic problems that should be addressed by new policies aiming to minimize the negative effect of categorical thinking on investment in mutual funds.

*Key words***:** index mutual funds; ETF; non-optimal index investing; HNWI; categorization.

JEL Classification: G02, G 11, G23.

1. Introduction

Paradoxically, investors often choose high-fee index Mutual Funds (MFs) while there are funds tracking the same index and charging much lower commissions for essentially the same

job. During the last twenty years, the literature investigating this phenomenon has emerged. Hortaçsu and Syverson (2004) suggest that an important reason of price dispersion in this relatively homogenous and quite competitive market may be the existence of search costs, even small. However, they show that search costs per se are not sufficient to explain the observable price patterns and market shares; some differentiation between funds and/or their perception by investors is necessary. Collins (2005) concurs that index funds are not commodity products as they provide various additional services to the investors. On the other hand, Choi et al. (2010) demonstrate that investors do not make a rational choice in favor of the lowest-fee fund even in a sterile experimental environment, where any search costs and additional services, as well as the direct influence of sales persons are all excluded. Boldin and Cici (2010) argue that there is no rational motivation for an investor to choose high-fee index funds. They call this behavior the Index Fund Rationality Paradox and conclude that this paradox exists thanks to a group of naïve individual investors who are influenced by brokers and financial advisors. Recently Tarassov (2017) documented a related 'Russian ETF puzzle': individuals often invest in a western ETF using a Russian mutual fund instead of doing it directly, thus overpaying up to 36% of the invested capital on a ten-year horizon.

This paper contributes to this strand of literature on irrational investment in high-fee mutual funds by asking whether investors fully realize the core difference between index funds and actively managed funds. Indeed, if investors expect the best index fund managers to outperform their peers as the best active fund managers do, paying extra commission to them may be warranted. This broad categorization and failure to discriminate actively managed and index funds would explain investment in high-fee index funds by the irrational hope to reap higher returns. To the best of my knowledge, this is the first study to pose and investigate this question.

Categorization is an unconscious information simplification process that exists due to the cognitive resources limitation and helps their optimization [Rosch, Mervis, 1975][1]. This process leads to human's bounded rationality [Simon, 1955]. The problem of simplification and cognitive limitations during financial decision-making is well discussed by many authors[2]. Ackert et al. (2010) demonstrate through experiment that an unconscious information simplification process is typical for all kinds of investors, and does not depend on their professional level in finance or on their declared level of risk acceptance. Hedesstrom et al. (2004) and Bailey et al. (2011) describe the most widespread heuristics and biases, and how they influence investment in mutual funds. Bajeux-Besnainou and Ogunk (2003) argue that the asset allocation process of institutional investors is strongly influenced by categorical thinking which leads to inconsistency. Gupta-Mukherjee (2013), having measured categorical thinking levels among fund managers, demonstrates that those with lower level achieve better results. Mullainathan et al. (2008) show in a theoretical model how persuaders (e.g., fund managers in the context of this paper) can take advantage of the individuals' predisposition to coarse thinking.

This paper reports a survey-based experiment I conducted to test whether people discriminate between index and active funds. There were three large groups of respondents: first-

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[1] To get a modern multidisciplinary perspective on categorization, one can look to the introductory article [Cohen, Lefebvre, 2017] and other articles in the Handbook of Categorization in Social Sciences.

[2] Another reason for the constant automatic categorization process is the people's need for a constantly well-structured picture of the environment [Rosch, Mervis, 1975]. First reaction of any stimulus of our organism is its categorization [Bruner, 1957]. The categorization may go several ways; however, the main principles are similarity and consistency [Rosch, Mervis, 1975; Medin, Murphy, 1985].

generation High Net Worth Individuals (HNWI) holding more than one million USD of investible assets; graduate students and undergraduate students, both from the top Russian programs in finance and economics at the two leading schools, National Research University Higher School of Economics (HSE) and New Economic School (NES). Most undergraduates do not make any personal investment. Yet, having been exposed to financial courses in the curriculum, these students are sufficiently 'sophisticated' for the results to have reasonable external validity. The graduate students were part-time masters in finance and financial engineering, the majority of them working in the financial industry.

In the experiment each participant observed a list of 7 mutual funds (all belonging to well-known financial groups), some of which were actively managed funds and some index funds. For each fund, the participants knew its name and a brief description, taken from the official website, reflecting its goal and the nature of activities. Then, participants were asked a series of questions to test whether they place the funds in different categories, in accordance with the important objective difference in their nature. In particular, they had to estimate the management's *level of effort and skill* (*LES*) needed to operate the fund and the level of commission they would be prepared to pay for investing in the fund. In addition, they were asked to select the fund's goal and its core activity from a suggested list.

Results show that very few participants make a clear-cut distinction between the actively and passively managed funds, thus confirming my hypothesis that they are prone to consider different types of funds as pertaining to the same category. Besides, most participants demonstrated relatively low comprehension of the objectives of different types of funds and of the nature of their core activities. However, once we look at average responses, a significant difference appears between opinions about the actively managed and about the passive funds: on average, participants tend to suggest significantly higher commissions to the active funds, as well as they tend to attribute significantly higher levels of skill and effort to managers of these funds; their average judgement about goals and activities of different types of funds again differs. Given that all participants can be considered sophisticated, these findings are in line with Miller and Weber's (2010) observation that general financial sophistication does not imply full understanding of the core difference between passively and actively managed funds. Moreover, the marketing practice related to index funds is established in a way that many people, consciously or unconsciously, do not consider index funds as pure commodity products, having an explicit or implicit feeling that fund managers play an active role.

The paper is divided into four sections. The second section describes the experiment set up and the hypotheses. The third section reports the results. The concluding section discusses the results and suggests some basic policy principles that could help to mitigate the negative effects of the predisposition to categorical thinking on the quality of investment decisions and, ultimately, the efficiency of financial markets.

2. Experimental setup and the hypotheses

2.1. Experimental design

In the experiment that lasted around 30–40 minutes, the participants received four pages of instructions in Russian, their native language[3].

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[3] The full set of instructions (translated into English) is given in the Appendix.

On the *front page,* in order to check the overall financial literacy and to warm up the participants, I suggested a standard five-question survey, the Standard & Poor's ratings services global financial literacy survey[4]. In that global survey conducted in 2014, only 38% of Russians gave three or more correct answers; for comparison, in the USA, this number was 57%[5].

The goal of *page one* was to provide (indirectly) to the participants information they might need to answer the questions on the next page. On this page participants were asked to give their personal estimation of the potential risk and return of ten financial products on the list, including five funds. For each of the two S&P 500 index funds in this list (one MF and one ETF), I added a brief description of their goal and how they pursue it: these funds promise to reflect the S&P 500 index, and their goal is to have in their portfolios the shares of companies in the same proportion, as these companies were included in index. On this page, the participants met twice the phrase that shares of an ETF are traded on the stock exchange and anyone can buy them as any other shares.

There were two versions of the main*, second page* both consisting of a list of seven investment funds: funds investing in one of the ETFs: SPDR S&P 500 ETF TRUST or PowerShare DB Gold ETF (below I call this *Type-1* funds), index funds (reflecting MICEX index) (*Type-2* funds), and actively managed funds (*Type-3* funds). The brief descriptions of the funds were copied from their websites. The funds were chosen randomly from highly reputable and well-known financial institutions, in some cases from one organization. I informed the participants that I randomly took a page with the list of funds from a fund rating service and excluded several funds till I constructed a one-page test. There were two experimental conditions. In Variant A the funds in the list on the second page were placed in decreasing order of their previous year (that is, 2015) return. In Variant B the funds were ranked by their net asset value (NAV), again in decreasing order.

The participants had to answer four questions for each fund on page two. First, they had to indicate the main objective of each fund. *Page three*, the last page of the instructions, had 5 suggested answers to this question and a possibility to formulate an alternative answer. The second question was about the core activity of each fund. Again, there were 5 suggested answers on page three and the possibility to formulate an alternative answer. In the third question the participants had to estimate the *level of effort and skill* (LES) needed to manage successfully each fund; the answer was qualitative, on the scale from 1 (minimum) to 10 (maximum). Finally, for each fund participants had to indicate the level of annual management fee they consider adequate to pay for investing in this fund.

2.2. Participants and details of implementation

There were six experimental sessions, with 151[6] participants in total: 27 part-time master students (23–35 years old; with work experience in financial markets); 92 third year bachelor students (19–20 years old; typically, no experience) and a group of 32 *high net worth individuals* (HNWI), who have more than one million USD of investable assets (35–65 years old; all

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[4] http://gflec.org/sp-global-finlit-survey-methodology/

[5] http://gflec.org/wp-content/uploads/2015/11/Finlit_paper_16_F2_singles.pdf

[6] In total, there were 162 participants, but 11 respondents failed to answer several questions and their answers are excluded from the data analysis.

with some experience of investment into MFs). Students were from HSE and NES, the two leading Russian Universities in the field of financial economics.

The students demonstrated high motivation for the assignment. Among the undergraduate students, the experiment was conducted during the elective course in finance. I was invited as a guest speaker to talk about mutual funds. For one master's group, I organized a seminar about private wealth management. For another, it was a seminar on critical thinking and career development. The students knew about my visit in advance and those who were not interested were not obliged to attend. At the beginning of the seminars, I suggested the questionnaire described in 2.1 as a warm-up/revision test to introduce the topic to be discussed. The students were informed that the test did not require any special knowledge and could be completed by reading all the materials attentively. With agreement from the professors, I announced that outstanding results could give a bonus to their final grade of the course but, in order to prevent a stressful environment, any poor results would be disregarded. According to my experience with students of Russian leading universities, this way can increase the response level better than the possibility to gain a minor material compensation.

In addition to the students, 32 first generation HNWIs of Russian origin agreed to meet me to go through the experiment and the subsequent discussion. All of them have experience investing in MFs, however, only via private banking departments of various Russian and foreign banks. None of them is involved in financial services.

2.3. Experimental design: comment

To ensure external validity, I tried to create a realistic environment that would induce participants to reflect well on their choice. The challenge was to avoid both the influence of the known factors on the participants' responses and the experimenter demand effects.

All participants had a high level of financial literacy and theoretical or practical proficiency in the fields of economics or finance. The products on the list were standard and had simple brief descriptions. None of the products promised (or implied) to provide any services which might differ from other funds. In this way, the factors like 'obfuscation' (unnecessary product complexity [Carlin, 2009]), 'tricky framing' and 'fine print' were almost eliminated. The potential lack of trust was minimized as all the listed products were proposed by well-known and highly reputable financial institutions. By design, the participants did not experience any legal limitations, or a sales pitch; the search costs were zero. In one of the two experimental conditions (described in more detail below) participants did not get any information regarding the funds' previous performance.

Besides the control function, the main page, i.e. page two, provided additional support for the participants' decision making. Choosing from the corresponding lists one main objective (O) and one core activity (AC) for a particular fund should incite the participants to reflect upon the nature of this fund and be helpful for producing a sound judgment. The lists contained the correct answers for the objective and activity of the index funds and a correct answer for the objective of active funds: O5 ('to provide the client with an easy way to invest in the broad market in the same proportion as the companies are included in the index that tracks this market') and AC1 ('constantly follow the companies which are included in the index and balance the portfolio (buying or selling the shares of those companies) so that the price changes of the fund's unit (shares) mirrors exactly the changes of the index'); O1 ('to achieve the best possible return with a

high level of diversification inside a declared risk frame'). As for the funds investing in a single foreign ETF (Type-1), none of the suggested answers was correct and participants had to come up with their own answers to give a good response.

2.4. The hypotheses

The first hypothesis tests whether participants comprehend the nature of activities of index and active funds, their core goals and missions.

Hypothesis 1. Participants fully comprehend the main goals of different categories of funds. In particular,

1a. Participants choose '*to achieve the best possible return with a high level of diversification inside a declared risk frame*' (O*1*) as the main objective of the active (type-3) funds and '*to provide client with easy way to invest in broad market in the same proportion as the companies are included in the index that tracks this market*' (*O5*) for the index (type-2) funds.

1b. Participants choose '*constantly follow the companies which are included in the index and balance the portfolio (buying or selling the shares of those companies) so that the price changes of the fund's unit (shares) mirror exactly the changes of the index*' (*AC1*) as the core activity of the active (type-3) funds.

Next comes the main question: do subjects place active funds, index funds and funds investing in a single foreign security in the same mental category or not? To avoid experimenter demand effects (see [Zizzo, 2010] for a discussion) I could not ask this question directly. Therefore, I suggest a series of indirect tests based of two numeric variables I created: the size of commission a participant is ready to pay to the fund's management and the estimated level of effort and skill (LES) required to manage the fund. I presume that if subjects place actively managed funds and index funds in different categories, this must be reflected in the commissions and LES they attribute to different funds.

If categories that include actively managed funds, index funds and funds investing in a single foreign security are sufficiently different and participants comprehend the nature of funds' activities and the underlying costs well enough, then they should attribute higher commissions and LES to all actively managed funds than to index funds, and the lowest commissions and LES to the funds investing in a single security. An underlying assumption is that there are low entry barriers and high degree of homogeneity between index funds; therefore, strong competition must bring commissions roughly to the level of their (low) costs; the same logic is even more valid for funds investing each in a particular foreign liquid security (ETF). In contrast, actively managed funds are both horizontally and vertically differentiated and have higher costs (of attracting the best professionals, designing and implementing sophisticated strategies aiming to beat the market); therefore, their commissions must be higher. While these assumptions neglect the demand side and can be, potentially, criticized for this, the same ordering of types of funds in terms of LES is immune to this critique.

Hypothesis 2.

2a. Participants attribute higher commissions to all actively managed (type-3) funds than to index (type-2) funds, and the lowest commissions to the funds investing in a single foreign security (type-1).

2b. Participants attribute higher LES to all actively managed (type-3) funds than to index (type-2) funds, and the lowest LES to the funds investing in a single foreign security (type-1).

The next step is to apply the same logic, but make a less stringent requirement: participants may not fully comprehend the nature of activities of different funds, and sometimes suggest higher commissions to index funds, but the distributions of their answers regarding commissions and LES of the three categories of funds should be systematically different.

Hypothesis 3.

3a. *On average*, participants attribute higher commissions to actively managed (type-3) funds than to index (type-2) funds, and, *on average*, the lowest commissions to the funds investing in a single foreign security (type-1).

3b. *On average*, participants attribute higher LES to actively managed (type-3) funds than to index (type-2) funds, and, *on average*, the lowest LES to the funds investing in a single foreign security (type-1).

If hypotheses 2 or 3 are rejected, we get reasons to claim that people with financial education and/or investment experience, even in an artificially environment that motivates them to reflect on the nature of funds' activities, still place all investment funds in one category.

Besides these hypotheses I will investigate the impact of gender and type of respondent (HNWI, bachelor or master student) on her predisposition to discriminate different types of funds.

2.5. Experiment preparation and design check

Before coming up with the current design, I conducted a series of in-depth interviews with 142 HNWI when I was helping them to review their personal financial strategies. The interviews took place between 2006 and 2010 when I was the Head of Wealth Management of the Russian subsidiary of a West-European bank. These interviews demonstrated that none of these 142 individuals understood the core difference between passively and actively managed funds. According to them, equity funds may differ in the targets they invest in (classified by industries and geography, or in a risk (aggressive or conservative), in style (how intensive they trade: frequent or buy and hold (they call it active and passive strategies)), in the quality of the management teams and in the financial institutions behind the funds. All funds strive to deliver a maximum return constantly searching for the best opportunities. During the 2006–2007 real estate boom, most of the clients compared stock exchange returns with returns from real estate speculation which most of them considered safer. Later on, the benchmark that these investors wanted to outperform was bank deposits. These views inspired me to conduct a structured experiment that I report in this paper.

When I have developed the current experiment, I decided to check its design before suggesting it to multiple participants. Three faculty members (all holding PhD in Finance), who went through the experiment together with their students estimated in both variants the LES the funds corresponding to the way described above, and used both O5 for the goal and AC1 for the core activity descriptions of the index funds, while using O1 for objective description of the actively managed funds. Apparently, their deeper knowledge and the expectation that it would be a test about index funds and not simply a guest-speaker lecture helped them to overcome the predisposition for categorical thinking.

3. Results

3.1. Financial literacy

All participants correctly answered all five questions in the financial literacy survey. This is not surprising given that the survey tests very basic knowledge and participants come from the best finance and economics bachelor and master programs or are successful businessmen.

3.2. Comprehension of the funds' objectives

Figure 1 reflects the distribution of answers regarding the objectives aggregated by the three fund types. Type-1 funds include A3, B2 and B5 (here the letter is the name of the treatment and the number is the order of the fund in the corresponding list given in the Appendix; for instance, A3 is Sberbank USA). Type-2 funds include A2, A5, A7 and B1. Type-3 funds are A1, A4, A6, B3, B4, B6 and B7.

Figure 1 shows that the majority of responses about the objective of active funds (type-3) correctly identify O1 as the main objective (54% or responses), even though other answers are also present. For funds of types 1 and 2 – index funds and those investing in a foreign ETF – answer O5 is the most popular (32% and 40% respectively). Again, this answer is definitely true for type-2 funds and it is also correct for a type-1 fund, Sberbank USA, that invests in ETF SPDR S&P 500.
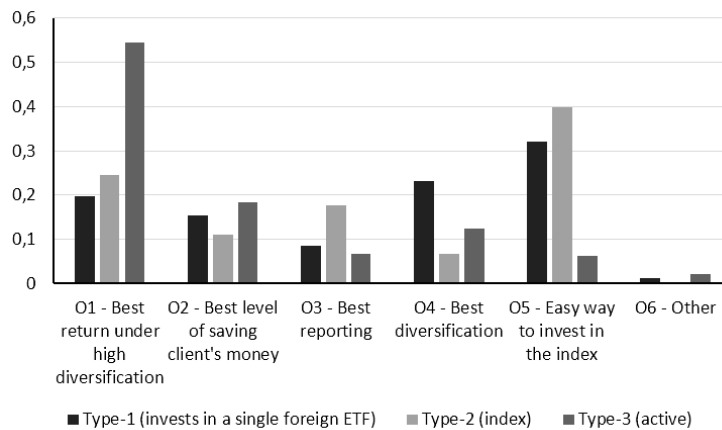

Fig. 1. Distribution of answers on main objectives (O) of the different types of funds
(shortened answers; full answers in the Appendix)

Heterogeneity of answers within groups is quite large. Figure 2 demonstrates that for type-1 funds answers for Sberbank USA are similar in both treatments (A3 and B2), investing in an index (O5) being the most popular answer. Answers for Raiffeisen Gold (B5) are, expectedly, quite different: a very general and thus uninformative answer 'to achieve the best level of saving client's money' (O2) is chosen most often.
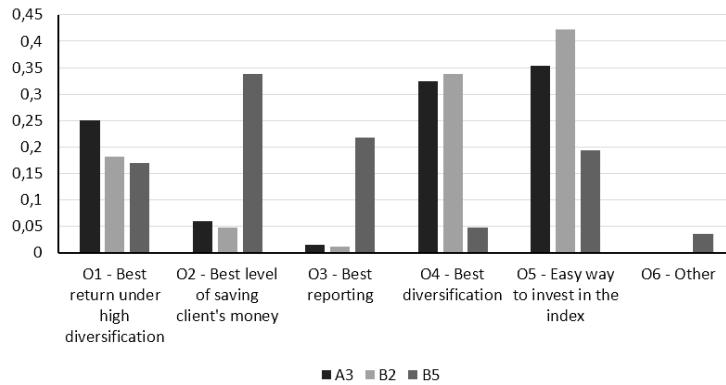
Fig. 2. Distribution of answers on main objectives of type-1 funds
(shortened answers; full answers in the Appendix)

For the index, type-2, funds there is again significant heterogeneity (see Fig. 3). The correct answer O5 is chosen most often for the fund VTB – MICEX Index (A2 and B1). The figure clearly demonstrates that participants were strongly influenced by the short descriptions of the funds, framing[7] matters: the word transparency in the description of fund A5 (BKS – MICEX index) resulted in O3 ('to support clients with the best possible reporting') becoming the most popular answer (56%), even though the best possible reporting sounds strange as the *main* objective. Similarly, an epithet 'aggressive' in the description of the index fund A7 (Ingostrach – MICEX index) made respondents choose O1 as the main objective, the answer that is an adequate description of the main objective of an active, not an index fund.
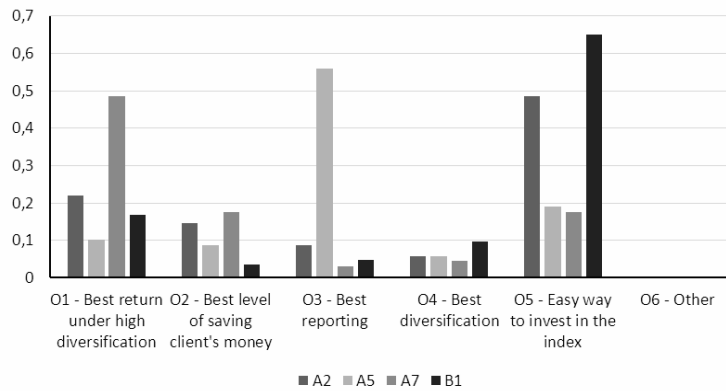

Fig. 3. Distribution of answers on main objectives of type-2 funds
(shortened answers; full answers in the Appendix)

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[7] See [Tversky, Kahneman, 1981] and subsequent literature.

Figure 4 shows that the correct answer O1 was the most popular answer for all active funds. Uninformative, too general answer O2 was relatively popular for several funds. Also, for the fund 6 the answer P4 emphasizing diversification was very popular (41).
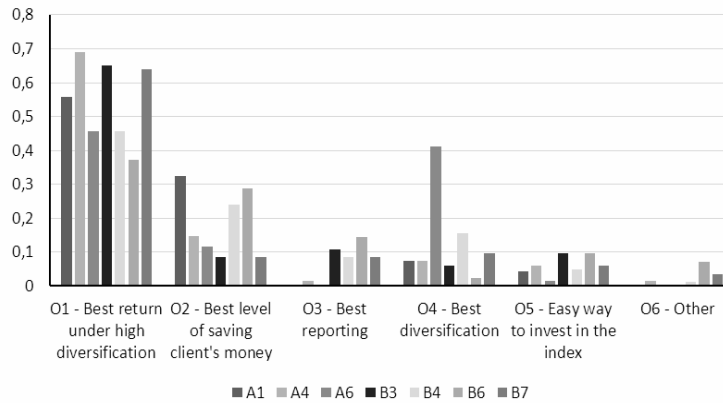

Fig. 4. Distribution of answers on main objectives of type-3 funds
(shortened answers; full answers in the Appendix)

Finally, I calculated the number of participants that attributed goal O1 to funds of type 3 (A1, A4, A6, B3, B4, B6 and B7) and goal O5 to type-2 funds (A2, A5, A7 and B1). It turned out that only 13 participants out of 151 gave correct answers, all from Treatment B.

Therefore, *the evidence in favor of **Hypothesis 1a** is mixed*: on average, participants tend to attribute correct goals to different types of funds, but mistakes are frequent: less than 8,6% of respondents correctly identify the goals of all type-1 and type-2 funds. Later on I evaluate the influence of observable characteristics of respondents on their propensity to give the correct answer.

3.3. Comprehension of the funds' activities

Participants identify AC2 as the core activity of the active, type-3, funds in 59% of the cases, and this is a reasonable answer. On the other hand, from Fig. 5 it is very clear that they fail to understand the essence of the index (type-2) funds activities. The correct answer, AC1, is second by popularity (38%). Instead, most often (in 44% of the answers) they specify AC4 ('constantly search for the most/least potentially profitable companies that are included in MICEX index and the best moment to buy / to sell their shares') as the core activity. For the type-3 funds the post popular answer (AC5) is again clearly incorrect: it suggests that participants mix them up with the funds that play actively with shares of companies from S&P 500. This pattern of answers supports the claim that many participants clearly confuse the active and the index funds.
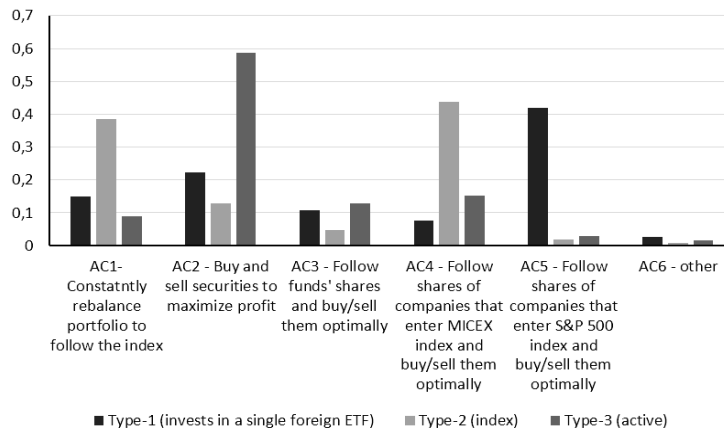
Fig. 5. Distribution of answers on core activities (AC) of the different types of funds
(shortened answers; full answers in the Appendix)

Again, as with answers regarding the main objectives of the funds, there is visible hete-rogeneity in answers (see Fig. 6–8).
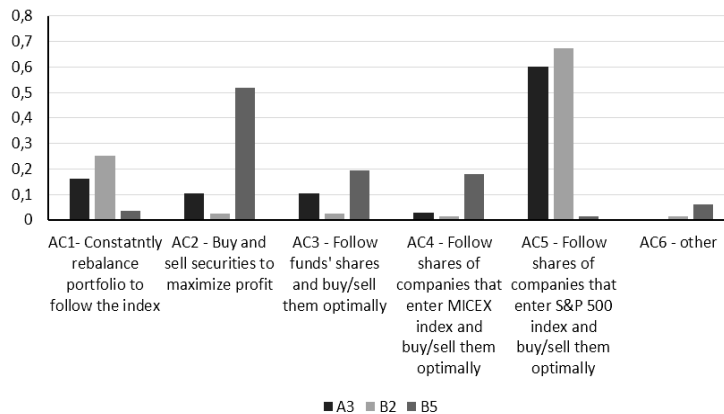

Fig.6. Distribution of answers on core activities of type-1 funds
(shortened answers; full answers in the Appendix)

Answers on activities of the same fund VTB – MICEX Index present in both treatments (A2 and B1) are again similar in both treatments (see Fig. 6): the choice of AC5 ('constantly search for the most/least potentially profitable companies that are included in S&P 500 index shares and the best moment to buy/to sell them') is most popular in both treatments A and B (60% and 67% respectively) which clearly demonstrates that the majority of participants do not understand how such a fund, investing in one foreign security (ETF shares) chosen once and for all, operates. The answers regarding Raiffeisen Gold (B5) are predictably different: re-

spondents choose AC2 (the core activity is to 'constantly search for the most/least potentially profitable securities and the best moment to buy/to sell them'), which is by no means an adequate answer, again demonstrating strong misunderstanding.

As for the index funds, Fig. 7 demonstrates that for three of them – A2, A5 and B1 – respondents choose the correct answer, AC1, most often (47, 44 and 48% respectively), even though for none of them the frequency of the correct answer reaches even 50%. The most frequent incorrect answer, AC4 ('constantly search for the most/least potentially profitable com') demonstrates that participants confuse index funds with active funds that invest in the shares of companies entering the corresponding index. Fund A7, for which this incorrect answer is more popular (65%) than the correct answer AC1 (9% only) stands out. Again, this is probably explained by the epithet 'aggressive' that is put into the fund's description for marketing objectives and misleads the participants (as well as, probably, the real investors.
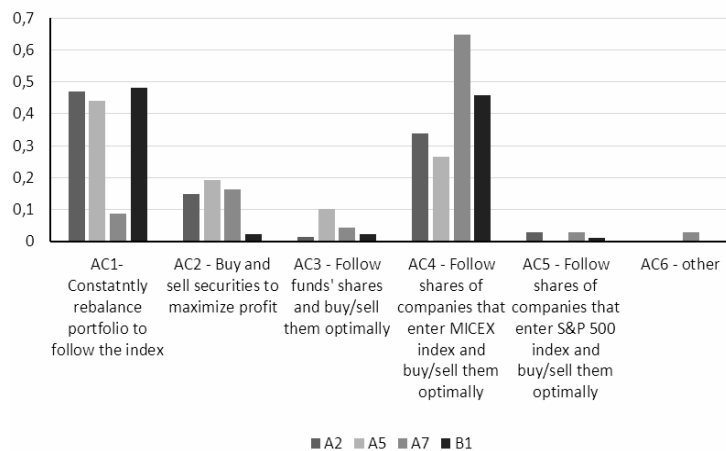

Fig. 7. Distribution of answers on core activities of type-2 funds
(shortened answers; full answers in the Appendix)

Finally, Fig. 8 gives the distribution of answers for the active, type-3, funds. A reasonable answer AC2 is most popular for all funds except A6 (MDM – world of funds), for which answer AC3 ('constantly search for the most/least potentially profitable funds and the best moment to buy/to sell their units') is more adequate and is correctly chosen by 46% of participants.

Assuming that activity AC1 is unambiguously correct answer for type-2 (index) funds, and different answers are possible for other two types of funds (given that participants had an option to formulate their own description of the core activity), I take a conservative approach to analyzing Hypothesis 1b: I calculate the number of participants that give answer AC1 for each index fund. In treatment A none of the participants identified AC1 as the core activity of all index funds (A2, A5 and A7). Not surprisingly, the situation in treatment B, where there is a single index fund (B1), 40 participants (48%) correctly identified its core activity. Given that the description of the index fund A7 was misleading, I also calculated how many respondents in treatment A identified AC1 as the core activity of the remaining two funds, A2 and A5. It turned out that 31% of respondents gave correct answers.
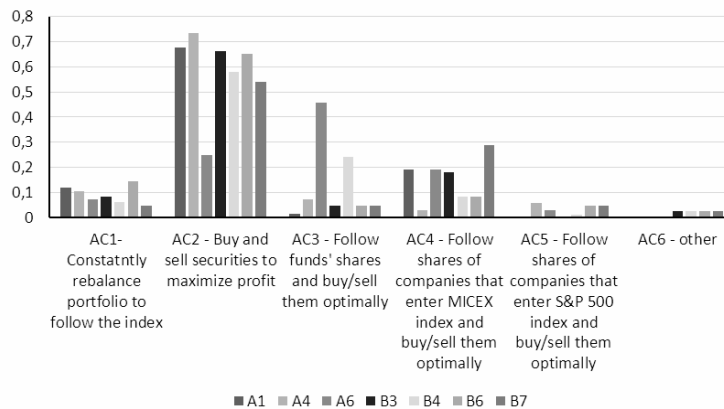
Fig. 8. Distribution of answers on core activities of type-3 funds
(shortened answers; full answers in the Appendix)

To conclude, we can confidently claim that a big majority of participants misunderstands the core activities of funds, in particular, of the passive, type-2 and type-3 funds, confusing them with the active funds. Judging by their beliefs about the core activities of different funds, most participants respond as if they do place the funds in one mental category.

3.4. Analysis of commissions for different types of funds

According to Hypothesis 2a, participants are ready to pay a higher commission to any type-3 fund than to any fund of another type, and a lower commission to any type-2 fund than to any fund of another category. It turned out that answers of only 2 participants out of 151 (that is, 1%) satisfy these conditions if they are understood as strict inequalities. If the conditions in Hypothesis 2a are interpreted as weak inequalities, answers of 34 respondent (23%) satisfy them.

To test Hypothesis 3a, I created for each participant 3 variables, f_t1, f_t2 and f_t3. These variables reflect commissions (fees) the participant deems adequate for each of the three types of funds averaged by the corresponding fund type. For instance, in Treatment A variable f_t1 equals f_3, the commission indicated for fund A3; in Treatment B variable f_t1 equals the average of f_2 and f_5, the commissions indicated for funds B2 and B5.

Figure 9 presents kernel density estimates for variables f_t1, f_t2 and f_t3[8]. The figure suggests that participants assign the lowest commissions to type-2 (index) funds, followed by type-1 (funds investing in one ETF) and type-3 (active) funds. Table 1 presents summary statistics for the average responses on commissions. Let us test if there is a significant difference between these commissions. I ran nonparametric Wilcoxon signed-rank matched-pairs test for three pairs of variables (f_t1 vs. f_t2, f_t1 vs. f_t3, f_t2 vs. f_t3). All three null hypotheses about equality of means are rejected: the second at 5% level, the first and the third ones at 1% level.

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[8] I use Epanechnikov kernel density. The upper bound of the range of fees is set to 16% to exclude outliers; for all the three variables 95% of observations are below this value.
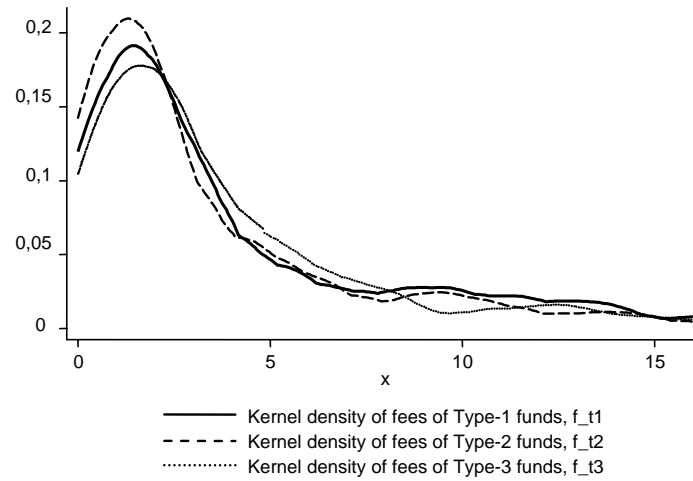
Fig. 9. Kernel densities for the average commissions of the three types of funds

Table 1.

Summary statistics for the average fees of the three types of funds

Variable	Obs	Mean	Std. Dev.	Min	Max
Average fee for Type-1 funds, f_t1	151	4,13	5,31	0,01	40
Average fee for Type-2 funds, f_t2	151	3,80	5,42	0	30
Average fee for Type-3 funds, f_t3	151	4,56	6,13	0,01	53,33

Thus, the evidence is mixed. Data do not support Hypothesis 2a understood strictly, but a weaker Hypothesis 3a finds partial support: suggested commissions of active funds are, on average, significantly higher than for the other two categories.

3.5. Analysis of LES for different types of funds

Hypothesis 2b states that participants estimate LES of any type-3 fund higher than LES of any fund of another type, and LES of any type-1 fund lower than LES of any fund of another category. Answers of only 3 participants out of 151 (that is, 2%) satisfy these conditions if they are understood as strict inequalities. If the conditions in Hypothesis 2b are interpreted as weak inequalities, answers of 29 respondents (19%) satisfy them.

If Hypotheses 2a and 2b are combined, then answers of only 2 participant satisfy the strict version and answers of 19 participants (13%). This suggests that discrimination of different types of funds is far from being perfect.

To test Hypothesis 3b, I created for each participant 3 variables, l_t1, l_t2 and l_t3. These variables reflect LES the participant deems necessary for a manager of each of the three types

of funds averaged across the corresponding fund type. For instance, in Treatment A variable l_t1 equals l_3, the LES indicated for fund A3; in Treatment B variable l_t1 equals the average of l_2 and l_5, the LES indicated for funds B2 and B5.

Figure 10 presents (Epanechnikov) kernel density estimates for variables l_t1, l_t2 and l_t3. The figure suggests that participants assign the lowest LES to type-2 (index) funds, followed by type-1 (funds investing in one ETF) and type-3 (active) funds. Table 2 presents summary statistics for the average responses on LES. To test if there is a significant difference between these commissions I ran nonparametric Wilcoxon signed-rank matched-pairs test for three pairs of variables (l_t1 vs. l_t2, l_t1 vs. l_t3, l_t2 vs. l_t3). All three null hypotheses about equality of means are rejected at 1% level.
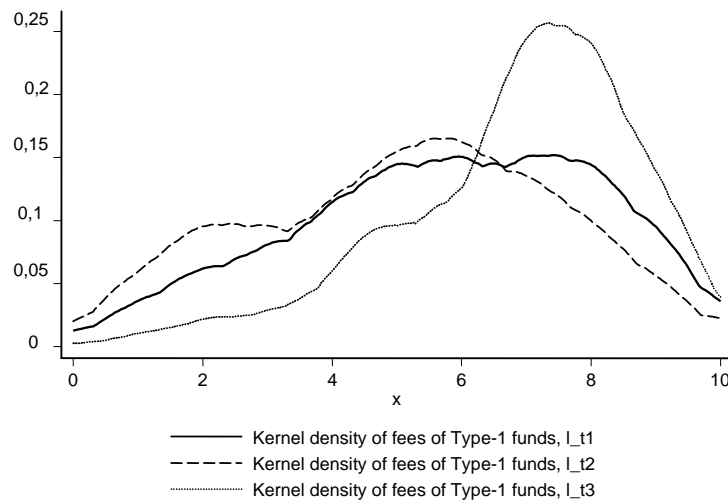
Fig. 10. Kernel densities for the average LES of the three types of funds

Table 2.

Summary statistics for the average LES (level of effort and skill) of the three types of funds

Variable	Obs	Mean	Std. Dev.	Min	Max
Average LES for Type-1 funds, *l_t1*	151	5,82	2,27	1	10
Average LES for Type-2 funds, *l_t2*	151	5,18	2,31	1	10
Average LES for Type-3 funds, *l_t3*	151	6,91	1,77	1,33	10

Again, as with commissions, the evidence is mixed. While few participants fully discriminate the funds, their average responses clearly show that they do not treat funds as homogeneous and tend to understand that active management requires higher level of effort and skills.

3.6. The effects of socio-demographic characteristics

Finally, I study the effect of demographic characteristics – gender and age group (bachelor student, master student or HNWI) – on participants' responses. In Table 3 I report probit regressions of correct answers on Hypotheses 1a, 1b, 1a and b, 2a, 2b and 2 a and b, respectively. Master students tend to give correct answers more frequently than bachelor students. As for HNWI, they better discriminate funds in terms of commissions but understand worse the nature of the funds' activities. Female participants if anything discriminate different fund categories better than male participants (in regressions (2) and (3)).

Table 3.

**Probit regressions for socio-demographic determinants
of correct responses**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	hyp1a	hyp1b	hyp1	hyp2a	hyp2b	hyp2
Sex	−0,511 (0,363)	−0,471** (0,229)	−1,156** (0,524)	−0,404 (0,251)	−0,0929 (0,253)	−0,314 (0,294)
Master	0,903** (0,398)	0,509* (0,297)	1,529*** (0,536)	−0,0910 (0,324)	−0,259 (0,361)	−0,811 (0,496)
HNWI	0,370 (0,437)	−0,779*** (0,300)	0,651 (0,610)	0,421 (0,287)	0,194 (0,294)	0,528* (0,314)
Constant	−1,212*** (0,290)	−0,738** (0,363)	−1,662*** (0,464)	−1,041*** (0,213)	−1,046*** (0,207)	−1,513*** (0,233)
Observations	83	151	83	151	151	151

Notes: Treatment dummy included. Robust standard errors in parentheses.
*** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$.

4. Conclusions

Participants of this experiment, all sufficiently sophisticated, demonstrate the lack of clear understanding of the difference between active and passive funds. They do differentiate the funds, as revealed by the average answers, but only partially. Clearly, many real-world individual investors have even less financial education and experience and, presumably, do even worse in discriminating active and passive funds. Moreover, wording (framing), as could be expected, casts important influence: an index fund describing itself as 'aggressive index fund' is perceived by many participants as an active one. As many people believe that managing passive funds does not substantially differ from managing active ones, they are prepared to pay higher fees to some index funds in a futile attempt to achieve better performance.

Given that participants of this experiment are already highly educated (and the informational environment of the experiment was friendly), investing in mere investor education or increasing transparency requirements may be insufficient to overcome the tendency to categori-

cal thinking and the negative effects on investor welfare it implies. Therefore, deeper policy measures might be warranted. One approach would have the regulator insist on clear separation of index and active funds to minimize direct comparison and break the perception by investors of these, so different, investment vehicles as pertaining to the same broad category. Indeed, as long as index funds and active funds share the key word 'fund' in their titles, there is a large risk that many investors will put them in the same broad mental category and experience the negative consequences of such coarse thinking, be it mistakes in assets allocation or paying extra commissions for overpriced index funds because of the lack of understanding of their nature. Currently, many information providers, such as Morningstar or Thomson Reuters, do not separate index mutual funds, as they do with ETFs, and continue including them into the MF category. Many investors may fail to realize that index mutual fund are much more closer to other type of index funds – ETFs [Tarassov, 2016], than to active mutual funds. Besides, the term 'management fee' that is shared by index and active funds may also mislead the investors. Finally, as index funds do not have standard names and descriptions, there will always be space for marketing specialists to produce a particular fund description that provokes the majority of people to perceive this fund as actively managed (recall 'aggressive index fund' example above).

However, despite of the urgent call for new policy measures, they should be based on sound theoretical and empirical knowledge. In particular, in future work I plan to explore experimentally how different ways of presenting information about MFs affect the quality of investor's decisions.

Appendix

The experiment

Page 1. *Please estimate (in your opinion) the risk level and potential return on each financial instrument below (from 1 to 10). Risk (RS): 1 = the lowest level; 10 = the highest level. Return (RT) potential: 1 = the minimum return; 10 = the maximum possible return.*

	Financial instument	RS	RT
1	Bank deposit in Switzerland		
2	An apartment in Paris with guaranteed rental return (guaranteed by insurance company with the highest rating)		
3	Bank deposit in Moscow. Guaranteed by the government		
4	A fund that invests in biotechnology in the USA		
5	A fund that invests in consumer goods sector in the USA		
6	A fund that promises to reflect the American stock index, S&P 500. It means that the fund's goal is to have in its portfolio the shares of companies in the same proportion as these companies are included in index. This is an index mutual fund. You may buy or sell its units once a day		
7	A fund that promises to reflect the American stock index, S&P 500. It means that the fund's goal is to have in its portfolio the shares of companies in the same proportion, as these companies are included in index. This is an index exchange-traded fund (ETF). Everybody can buy or sell the shares of the fund in the same manner as she buys or sell shares of any other companies		
8	A fund that invests in gold futures in such a way that changes in its share price reflect changes in the price gold. This is an exchange-traded fund (ETF) (synthetic, as the fund does not buy the product in a physical sense). Everybody can buy or sell the shares of such funds in the same manner as she buys or sell shares of any other companies		
9	Shares of a large corporation, (e.g. Apple)		
10	Own business		

Page 2.

Variant A. Please, as stated in the detailed instruction on the NEXT PAGE, chose ONE CORE OBJECTIVE and ONE CORE ACTIVITY for each fund from the list on the next page.

In column 3 please put your personal estimation of the **level of the fund's management skills and effort** needed in order to execute their goals (please use the numbers **from 1 to 10** (minimum = 1, maximum = 10)).
In column 4 please put the share (*%)* of invested capital which you would be ready to pay every year.
The list of the funds is created based on the mutual fund return rating of the National Asset Management League.

Mutual fund	Return 2015, %	Fund description as that on the first page on the fund's website or on investfunds.ru (Cbonds) where company has opportunity to describe their funds	1. Core objective of the fund	2. Core activity	3. The level of skills and effort needed (1–10)	4. Mana-gement fees (%)
1. Aton – active man-agement	9,04	Fund strives to invest in the strongest shares in economic growth period and government bonds during the period of stagnation				
2. VTB – MICEX index	8,62	The goal of the investing is to obtain the finan-cial result most closely to the performance/ return on the MICEX index at any given moment				
3. Sberbank USA	8,39	Investors have the opportunity to diversify and to gain with the possible growth of American stocks. Fund invests in ETF SPDR S&P 500 that tracks the dynamic of the S&P 500 index				
4. MDM – world of shares	7,48	Achieving the best long-term return by ac-cepting the risks of short-terms share price changes				
5. BKS – MICEX index	7,10	Transparency – Maintaining the funds struc-ture that corresponds to the MICEX index structure				
6. MDM – world of funds	6,81	Achieving the best return thanks to the risks diversification among the most reliable and most performing management teams/funds				
7. Ingostrach – MICEX index	6,00	Aggressive index fund strives to make long-term investment in companies that form CIMEX index				

Variant B. Please, as stated in the detailed instruction on the NEXT PAGE, chose ONE CORE OBJECTIVE and ONE CORE ACTIVITY for each fund from the list on the next page.

In column 3 please put your personal estimation of the **level of the fund's management effort and skills** needed in order to execute their goals (please use the numbers **from 1 to 10** (minimum = 1, maximum = 10)).

In column 4 please put the share (*%)* of invested capital which you would be ready to pay every year.

The list of the funds is created based on the mutual fund NAV rating of the National Asset Management League.

Mutual fund	NAV, mln rubles	Fund description as that on the first page on the fund's website or on investfunds.ru (Cbonds) where company has opportunity to describe their funds	1. Core objective of the fund	2. Core activity	3. The level of skills and effort needed (1–10)	4. Management fees (%)
1. VTB – MICEX index	657,6	The goal of the investing is to obtain the financial result most closely to the performance/ return on the MICEX index at any given moment				
2. Sberbank USA	651,5	Investors have the opportunity to diversify and to gain with the possible growth of American stocks. Fund invests in ETF SPDR S&P 500 that tracks the dynamic of the S&P 500 index				
3. Raiffeisen consumer goods	559,7	The fund's strategy is to invest in companies that focus on the fast growing domestic demand				
4. Sberbank active management	540,3	The fund's goal is long-term return by active portfolio management. The funds invests mostly in domestic shares and derivatives				
5. Raiffeisen gold	522,1	The portfolio of fund includes ETF* units, that focus on dynamic of the index that is calculated based on the gold price futures with various durations. *PowerShare DB Gold (DB – Deutsche Bank: added by the author)*				
6. Sberbank energy	519,5	The fund focuses on long-term return thanks to investing in companies of energy and infrastructure sectors				
7. VTB shares	380,9	The fund focuses on long-term return thanks to investing in Russian companies with the highest growth potential				

Page 3.

Please choose ONE answer which best describes the MAIN OBJECTIVE of each fund that it less possible to achieve by using other financial tools. If you believe, there is no phrase in the list that best corresponds to the major objective of a particular fund please write down your suggestion under number 6 and put the number in the corresponding field for each fund on the previous page.

1 – To achieve the best possible return with a high level of diversification inside a declared risk frame.
2 – To achieve the best level of saving client's money.
3 – To support clients with the best possible reporting.
4 – To provide clients with the best possible diversification.
5 – To provide client with easy way to invest in broad market in the same proportion as the companies are included in the index that tracks this market.
6 –

Please choose ONE answer which best describes the CORE activity for each fund which assists best to pursue its goal. If you believe, there is no phrase in the list that best corresponds to the major activity of a particular fund please write down your suggestion under number 6 and put the number in the corresponding field of each fund on the previous page.

1 – Constantly follow the companies which are included in the index and balance the portfolio (buying or selling the shares of those companies) so that the price changes of the fund's unit (shares) mirror exactly the changes of the index.
2 – Constantly search for the most/least potentially profitable securities and the best moment to buy/to sell them.
3 – Constantly search for the most/least potentially profitable funds and the best moment to buy/to sell their units.
4 – Constantly search for the most/least potentially profitable companies that are included in MICEX index and the best moment to buy/to sell their shares.
5 – Constantly search for the most/least potentially profitable companies that are included in S&P 500 index shares and the best moment to buy/to sell them.
6 –

* *

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