The Wroclaw School of Banking
Research Journal
ISSN 1643-7772 I eISSN 2392-1153
Vol. 15 I No. 5
Zeszyty Naukowe Wyższej Szkoły
Bankowej we Wrocławiu
ISSN 1643-7772 I eISSN 2392-1153
R. 15 I Nr 5

Wyższa Szkoła Bankowa
we Wrocławiu

The Wroclaw School of Banking
RESEARCH
JOURNAL

Selected factors affecting decisions undertaken under risky circumstances

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Abstract

When making decisions about voluntary insurance or about taking part in a lottery, people should consider possible states of nature and a probability of their occurrence. Classical economics assumes that decisions of people acting in risky circumstances are compliant with the expected utility hypothesis. However theories based on human behaviour (in particular the cumulative prospect theory) claim that the process of decision making involves anomalies resulting from perception of reality e.g. the sign effect, peanuts effect and others. The paper aims to verify the impact of selected factors on decisions made by people in circumstances of profits and losses. This aim was achieved by means of consecutive experiments carried out. Factors like the amount of win/loss, the probability of winning/losing were examined on the sample of over 600 people and decisions taken by them. The results indicate that assumptions made by classical economics are not always met. In the experiments conducted, the attitude towards risks was affected by the amount of bet (with lower values there was a tendency to act safely), the probability of winning, a reference point and whether results of gaming were described as profits or losses.

Keywords: preferences, utility, expected utility theory, a probability, a cumulative prospect theory, decision making, taking risk.
JEL: D110; D810

Introduction

Introducing a behavioural element into economics took place in 1950s thanks to scientists such as Herbert Simon or Maurice Allais. It is only in 2002 when the Nobel Prize in economics was awarded to two psychologists: Daniel Kahneman and Amos Tversky, the research was intensified and the interest in behavioural finance was aroused among numerous scientists all over the world (Cieślak, 2003).

Behavioural finance, as the name suggests, combines psychology and finance. It focuses on analysing human behaviour of individuals in view of making economic decisions. It is a new approach to the world of economics seen not from the point of view of homo oeconomicus but a real human being.

Behavioural finance is a controversial subject of research as it questions the classical finance science as well as its achievements from the past century.

Making a decision is related to risk. Classical economics assumes that all decisions are taken in a rational way which also concerns investment decisions (connected with generating a profit) as well as decisions that are supposed to protect against a loss (e.g. insurance decisions). It also assumes that risky decisions (whether they are made under circumstance of profits or losses) are "symmetric". However behavioural theories present a different view (e.g. cumulative perspective theory) as they assume "asymmetric" decision making depending whether it is about profits or losses.

The paper aims to verify the impact of selected factors on decisions made under risk by people in circumstances of profits and losses. After literature review we found that there is still no clear answer to some important

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questions regarding choice-making under risk. That is why we decide to try to find out answers to the following research questions:
1) does the amount of stake influence the willingness to take risk?
2) does a change to probability with unchanged proportion of a certainty equivalent in relation to the expected value affect the tendency to make decisions involving more or less risk?
3) does the amount of the certainty equivalent influence the amount of insurance premium declared that a person is willing to pay to secure against the loss of all points?
In accordance to the research questions we will try to verify the following hypotheses:
H1: The bigger is the stake the bigger is willingness to take risk
H2: Higher probability of positive result (with unchanged proportion of a certainty equivalent in relation to the expected value) makes people more risk-loving.
H3: The higher the certainty equivalent the more people are willing to play safe
To answer research questions and to verify posed hypotheses we conducted experimental research involving real payoffs (non-pecuniary). What makes our research different and we hope more truthful than other research described in the next section is that our subjects (because of the importance of proposed gains) were really keen on winning.
Further parts of the paper characterize the classical approach to taking risks as well as some behavioural theories (e.g. a behavioural theory of insurance, a cumulative perspective theory, the aspiration theory). The last part of the paper describes results of experiments involving real payoffs (although non-pecuniary also significant for the surveyed people) conducted among students.

Review of the literature. Classical and behavioural theories

Decision making under risk

A mathematically correct way of defining a certainty equivalent of a lottery is to calculate an expected value. For example a person deciding to buy a lottery ticket should check if the price of the ticket is lower, equal or greater than the expected value of win. The person should purchase the ticket when its price is lower or equal to the expected value of the prize. Moreover, the price of the ticket which is equal to the expected reward should make the person indifferent to two options to buy or not to buy. Nevertheless, people often make decisions not compliant with the mathematical justification which they disregard as they may be other factors determining attractiveness of the game for particular individuals.
In 1738 Daniel Bernoulli described a theoretical situation leading to the so called St. Petersburg Paradox[1]. He noticed that people who are offered participation in the lottery with an infinite (positive) expected value are not willing to pay huge amounts of money for joining the game if the rules are as follows:

1. A coin is flipped so many times until it comes up tails,
2. The player's pay-off depends on the number of heads before the coin comes up tails.
3. If the coin comes up tails first time, the player wins a unit of money. If tails is flipped the second time, the player wins two units of money. If the coins comes tails third time, the player wins four units of money- the prize is doubled with each consecutive throw when heads comes up (as of the coin comes up tails for the first time).

Bernouli (1738) claimed that the expected utility of the game is more important than the expected win. According to Bernoulli the same game may have different values for different players (Dohmen [2005] empirically showed it based on the research of 22,000 Germans. He found that there is a significant relation between taking risk and age, gender and education level) because the utility function of wealth is not linear but logarithmic, people are unwilling to take risk (however Rabin and Thaler [2001] claim that this fear of taking risks in some cases may not be explained by a concave utility function of wealth). Bernoulli's theory was called the Expected Utility Theory (EUT) many years later and was formalised by von Neumann and Morgenstern (1944). Since then theories about decision making under uncertainty assumes that people try to maximize the expected utility and not the expected value. Nevertheless many scientists reject EUT as a proper theory explaining decision making under risk (see e.g. Markowitz, 1052).

Insurance as a special case of making decisions under risk and uncertainty

When making a decision about concluding an insurance agreement, a natural person must

[1] His work "Specumen theoriae novae de monsura sortis" was translated in 1954 and published in Econometrica with the title Exposition of a New Theory on the Measurement of Risk"

decide whether the price he/she is going to pay is adequate to the value of the insurance product that is transferring the risk onto the insurance company. The basis for analysing whether the purchase of the insurance is justified for an individual is constituted by the value of an insurance subject (it is the only value he/she knows and has to compare it with the price of the insurance), a subjectively assessed probability of occurring a damage (or the frequency of damage occurring in the past) or the amount of damage in the past (if any).

An insurance company calculates an insurance premium so that a pure premium is enough to cover losses namely it should be equal to the amounts of expected claims, additional elements are to secure a gain and coverage of operations costs. So in order to conclude an insurance agreement, individuals should accept the insurance price which exceeds the expected value of damage (calculated as a value of insurance subject multiplied by a probability of damage occurring or approximated mean value of the loss in the past).

In the traditional approach to the choice theory under risk - the expected utility theory, human behaviour is rational (in accordance with the definition of a rational individual - homo economicus) which means that people are consistent in their actions and they aim to maximize wealth (Cieślak, 2003).

Assuming that for the purposes of judging if people use the theory of probability and statistics and they can automatically update information about the probability as well as get information, this should result in choosing an option with the highest expected utility (assuming only a linear utility function of money). That is why when the price of insurance exceeds the expected value of the loss, people should not insure, however they often do that. This can be explained by the fact that they want to maximize the expected utility and not the expected value. As people are risk averse, they are willing to pay for the insurance more than the value of expected losses. Moreover, the fact that certain actions deviate from those ones maximizing the expected value can be justified to a certain extent by H. Simon's (1957) who claims that people are only characterised by bounded rationality. He explained its occurrence by limited timeframe and technology. He also believed that people are not optimizers but satisfiers, they do not aim to optimize decision making when they can enough satisfaction from decision taken with less effort.

Similarly D.Kahneman and A. Tversky (1974) do not agree with the traditional approach to rationality and on the basis of research they claim that limited rationality results from time pressure and complexity of information. According to them, people intuitively evaluate reality instead of applying complex processes of estimating probability and forecasting.

Anomalies in making decision under risk

Apart from factors considered objective when evaluating a situation, scientists also distinguished subjective factors. A "peanuts effect" should be mentioned here – according to diverse research people are willing to take risk when they risk lower stakes however when it comes to bigger stakes they are not willing to take risk. It is worthwhile mentioning that this hypothesis is fully confirmed for gains only (see Mitchel and Wilson [2010], Hogarth and Einhorn [1990]). Dependency between the tendency to take risk and the level of probability was ascertained as with the level of probability risk aversion also grows when it comes to gains and in case of losses the tendency to take risk is enhanced (Kühberger et al. [1999]). Taking risky decisions is also affected by the state of mind of a decision maker (Isen, Patrick [1983]; Yuen, Lee [2002]), a level of regret perceived (Landers [2008]) or stress (Pabst et al.[2013]). It is interesting that people tend to underestimate risk which they seem to control (Nordgren et al., [2007]).

Hoffmann et al.(2013) show that decision making is based on two important elements. The first one is the level of wealth (occurring at different life stages) understood as something gained by the moment the decision is made. The second one involves aspirations meaning minimum results that a particular person must achieve. Research of Sołowska et al. also confirms it. (2006, 2012) She showed that together with a change to the aspiration level, many people alter their preferences regarding which lottery they would like to take part in, however this change does not affect risk evaluation. Kahneman and Tversky (1979) claimed that changes to wealth, namely deviations from a reference point, are more significant with regard to risk rather than only the level of wealth. Many scientists notice an asymmetry between decision making related to games with a positive or negative effect (e.g. Pachur, Kellen, 2013, Bilgin, 2012). According to the cumulative prospect theory proposed by Kahneman and Tversky which opposes the expected utility theory as a dominant theory in decision making under risk, the majority of people prefer a higher but uncertain loss than a certain one with

the same expected value[2] which might be connected to aversion to risk. On the other hand, people choose a smaller but certain gain rather than a bigger one with the same excepted value. Bilgin (2012) described research results showing that people perceive the probability of loss as higher than (symmetrical) gains which may be a reason for risk aversion.

According to EUT the growth in the probability of event from 0.01 to 0.02 should have the same effect as the growth of the probability from 0.88 to 0.89. However as Allais (1953) shows people's decisions are more affected by changes in the probability from 0.99 to 1 than from 0.1 to 0.11. Some scientists claim that risk evaluation is misperceived by people due to the wrongly perceived probability. People are observed to underestimate a "high" probability and overestimate a "small" probability. When people expect an event with 80% probability, they consider it almost certain, however when the likelihood is e.g. 20%, they think it is impossible (Fischoff et al, 1977). Moreover, other research carried out by R. Gonzalez and G. Wu (1999) shows that people are more sensitive to changes to a borderline probability rather than to the middle one which may be connected to perception of changes to the probability. Individual differences in risk evaluation were observed which is significant to behaviour connected to risky choices (Donkers et al.,2001).

Experimental research

Participants

The research was carried out on 607 people for the purposes of checking whether certain factors, which according to economics classicists should not affect decisions taken under risk, influence these decisions. These were students of the Wrocław University of Economics and Wrocław School of Banking. We know that research conducted among students is by some considered as worse than on a more diversified sample but the work of P. J. H. Schoemaker and H. C. Kunreuther (1979) provides positive information that despite minor differences in answers, we cannot consider results obtained from the sample of students different from the results achieved from a group more experienced in money management namely customers of insurance companies. Druckman and Kam (2009) "argue that student subjects are not an inherent problem to experimental research". We may assume that students' behaviour with regard to risky decisions to a certain degree is representative for the entire population.

The research was carried out during classes in econometrics, statistics and financial mathematics at the beginning of the winter semester when on one hand the students did not know how they would be doing in these courses and on the other, they were aware that receiving a credit was not easy. It is important to notice that the students scored points that could affect their final grade. Awareness of the difficulty in getting a positive grade should motivate the students to make decisions compliant with real preferences and to treat the problem seriously.

Among all groups where the research was conducted, credit conditions were the same. The maximum number of points to score in a particular semester amounted to 40 and the credit was given for over 20 points. The participation was voluntary and dependent on solving a few-minute task unconnected with the subject matter. In return students got a possibility of winning additional points.

2.2. Experimental design

Two types of questions were asked. Some students were assigned to the "scenario" called "Gain" whereas others were assigned to the "scenario" called "Loss". Scenario "Gain" presents the following problem:

"Dear Student,

You score 4.5 points in return for completing a task. You can choose 3 options:

1. You keep the 4.5 points and do nothing else,
2. You can give back those 4.5 points and get a possibility of taking part in a lottery with 5/6 probability to score 9 points (1/6 probability to "win" 0 points),
3. You can propose the number of points out of the points you could win in the lottery that you can give away to keep the remaining points for sure. If you offer a satisfactory number of points, you can keep the remaining points. If you offer not enough points, you will be automatically transferred to the lottery described in point 2".

Scenario "Loss" provided students with a higher number of points at the beginning:

"Dear Student,

You score 9 points in return for completing a task. However there is a possibility you will

[2] similar results were obtained by P.J.H. Schoemaker and H.C. Kunreuther [Schoemaker P.J.H., Kunreuther H.C., "An Experimental Study of Insurance Decisions", The JJournal of Risk and Insurance, Vol. 46 4 (Dec., 1979), pp. 603-618]

Table 1. The number of people assigned to a particular scenario

	Winning probability 5/6	Winning probability 2/3
Maximum 9 points to win (4.5 for sure)	n (Gain) = 89 n (Loss) = 81	n (Gain) = 61 n (Loss) = 58
Maximum 6 points to win (3 for sure)	n (Gain) = 64 n (Loss) = 65	unresearched
Maximum 9 points to win (3.6 for sure)	unresearched	n (Gain) =104 n (Loss) = 75

Source: Elaboration of one's own

lose them. The probability you keep the points is 5/6 (1/6 that you will lose them). You can choose 1 of 3 options:

1. You can insure against the loss by paying 4.5 points (then 4.5 points remain for sure),
2. You do not have to insure and count you will keep 9 points (there is 5/6 probability that you will keep them and 1/6 probability that you will lose them),
3. You can suggest a different price for the insurance (from 0 to 4.5 points). If the price expressed in points is high enough, we will insure you and you will keep the remaining points. If the price is too small, we will not insure you and you will be in situation described in point 2."

Apart from assigning students to two different scenarios , other factors were tampered such as the number of points to score, the probability of winning as well as the amount of the certain equivalent (the number of points offered to win for sure in point 1). Detailed information about the size of manipulated factors and the number of students assigned to a particular option is included in Table 1.

Results

There were 10 people out of 607 who did not understand the problem thus the total number of observations to analyse is 597.

Firstly, we decided to check whether the approach towards risk was affected by the amount at stake. The structure of answers to the questions was compared where students could score 9 and 6 points the most. Choosing point 1 denoted a "safe" option, point 2 was considered a "risky" option, point 3 (offering the number of points to give away in order to keep the remaining ones) was called a "middle" option. Table 2 presents the percentage of people choosing a particular option in groups playing at different stakes and assigned to the scenarios Gain or Loss.

As we can notice there are considerable differences in the percentage of people who chose a safe option when playing for 9 and 6 points, for both scenarios Gain and Loss (22.22% vs 42.19%; 12.33% vs 36.92%). However there are no such significant differences in the percentage of people selecting a risky option. A chi-square test has shown that distributions of answers with maximum winnings of 9 and 6 points differ on the significant level of 0.005771 with regard to gains and 0.000023 with regard to losses. As mentioned previously, the tendency to act risky did not alter with changing conditions (58.73% vs 50.00% concerning gains, 52.05% vs 52.31 % concerning losses). However more people decided to act safely when they could gain fewer (maximum 6) points. When more points could be won (maximum 9), more people chose a middle option. Maybe the students were more willing to consider this solution in case of the maximum number of points as they saw the point in dividing the value whereas with 6 points they did not bother to assess how many

Table 2. The percentage of people choosing a particular option under specific conditions A comparison of various stakes

Condition (min, max, p)	Safe option	Risky option	Middle option
Gain (4,5;9;5/6)	22.22%	58.73%	19.05%
Loss (4,5;9;5/6)	12.33%	52.05%	35.62%
Gain (3;6;5/6)	42.19%	50.00%	7.81%
Loss (3;6;5/6)	36.92%	52.31%	10.77%

Source: Elaboration of one's own based on research of one's own

Table 3. The percentage of people choosing a particular option under specific conditions A comparison of various probabilities of winning

Condition (min, max, p)	Safe option	Risky option	Middle option
Gain (4,5;9;5/6)	**22.22%**	**58.73%**	**19.05%**
Loss (4,5;9;5/6)	**12.33%**	**52.05%**	**35.62%**
Gain (3.6;9;2/3)	**22.12%**	**17.31%**	**60.58%**
Loss (3.6;9;2/3)	**13.33%**	**37.33%**	**49.33%**

Source: Elaboration of one's own based on research of one's own

points they could give away and they considered the difference between what they could get when choosing point 1 and point 3 as insignificant. Before conducting the research, the researchers intended to examine differences in the number of points that the students would be willing to give away in point 3. Nevertheless, with maximum 6 points possible to win, so few people chose this option (5 in case of gains, 7 in case of losses) that any statistical analyses were pointless.

The second factor whose impact on risky decisions was to be examined was the probability of winning. For these purposes choices of maximum 9 points with the probability of 5/6 or 2/3 were compared. Values of the proposed certain equivalents amounted respectively 4.5 and 3.6 points which constituted the same percent of the expected value ($\frac{4.5}{7.5} = \frac{3.6}{6} = 0{,}6$). With the expected values and proposed certainty equivalents established this way, a change to the probability should not influence a change to preferences between options. Table 3 presents what the distribution of answers looked like. It seems that a change to the probability does not affect the choice of a safe option. This time there was a change to the percentage of people choosing a risky option. More people decided to risk everything when winning was more probable (58.73% vs 17.31% for gains and 52.05% vs 37.33%for losses). The percentage of selecting the middle option changed as it grew when the probability of winning decreased (from 19.05% to 60.58% for gains and from 35.62% to 49.33% for losses). A chi-square test has shown that distributions of answers differ on the significant level of 0.0000022 with regard to gains and 0.000023 with regard to losses (p=0.4688).

Additionally for the purposes of checking the impact of change to the probability of winning on risky behaviour, a comparison was made of how many points the students choosing the middle option were willing to give away. Table 4 contains the specification of the number of points given away whereas Table 5 presents information about the percent of points wanted to keep with regard to the expected value in a particular game having given away some points.

Table 4. Number of points the students choosing the middle options that they were willing to give away

Condition (min, max, p)	Mean	Median	Mode
Gain (4,5;9;5/6)	2.85	3	3
Loss (4,5;9;5/6)	2.69	3	3
Gain (3.6;9;2/3)	3.77	4	4
Loss (3.6;9;2/3)	3.48	4	4

Source: Elaboration of one's own based on research of one's own

Table 5. Number of points the students choosing the middle options that they were willing to keep expressed as a fraction of the expected value in a particular game

Condition (min, max, p)	Mean	Median	Mode
Gain (4,5;9;5/6)	84.17%	80.00%	80.00%
Loss (4,5;9;5/6)	81.98%	80.00%	80.00%
Gain (3.6;9;2/3)	87.12%	83.33%	83.33%
Loss (3.6;9;2/3)	91.94%	83.33%	83.33%

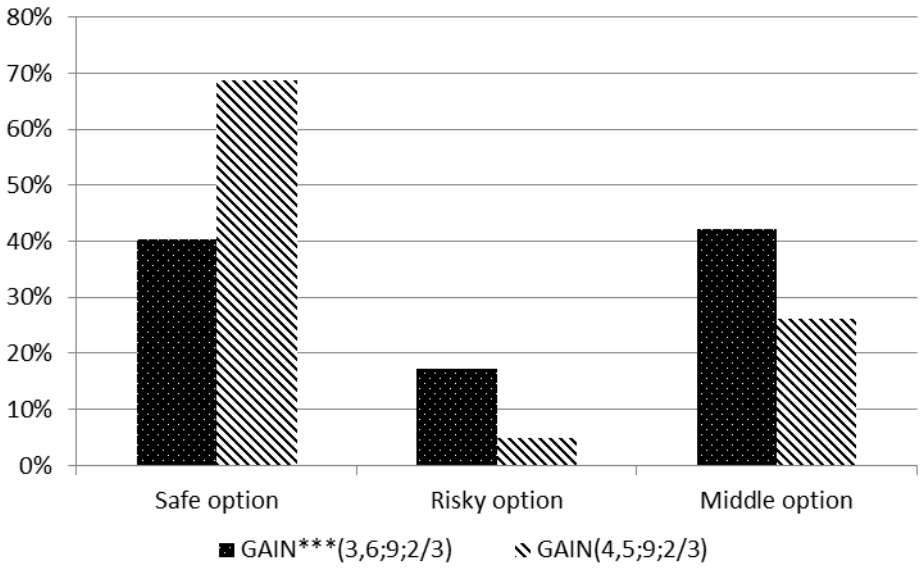
Source: Elaboration of one's own based on research of one's own

People who decided to give away some points, on average, gave more of them when the probability of winning was smaller which is in line with the statistical logic. Nevertheless, after calculating the relation of number of points subjects wanted to keep to the expected value in a particular scenario, it turned out that they wanted to keep more of them when the chances of winning were smaller (the difference is statistically important on the level of p=0.006236 for gains and not significant in case of losses). Such deviation should not occur with a stable level of aversion/tendency to risk. Moreover, with regard to a lower probability of winning, about 65% of people (68% for gains and 62% for losses) were willing to give such a number of points which would leave them with the number of points lower than the expected value of the game. Among people assigned to a higher probability group, there were about 90% of them (88% for gains and 91% for losses). On one hand, an actual decrease of the probability of winning made fewer people choose the risky option and on the other people who instead of playing risky decided to insure partially were not willing to pay more than people in the lower probability group. To sum up, on one hand a decrease in the probability of winning lowered the percentage of people willing to risk all points, on the other hand among people wanting to give some points away their number (considering the expected value) was lower than in case of a higher probability of winning.

The last element researched is whether the amount of the proposed certainty equivalent can affect the actual preference distribution.

Let us remind that the research where one couldwin 9 points with $\frac{2}{3}$ probability was carried out on the number of points possible to win for sure 3.6 and 4.5 points. Obviously in the last case more choices of the safe option were expected and the results like that were achieved. An additional analysis was conducted. We counted people who, having opportunity to keep for sure 3.6 points, have chosen option 3 and were willing to give away at least 4.5 points and added obtained number to the number of subjects who chose the safe option. This should constitute the same percentage of people assigned to this particular scenario as the percentage of people choosing option 1 in the group where people could get 4.5 points for sure (people selecting option 1 agreed to give away 4.5 points at the most out of the maximum number of points to score i.e. 9). After appropriate calculations distributions of answers modified this way were compared (see Fig.1 and 2). Despite treating part of choices of the middle option as a choice of a safe option (if 4.5 points were guaranteed), the percentage of people choosing the safe option turned out to be greater when 4.5 points were guaranteed.

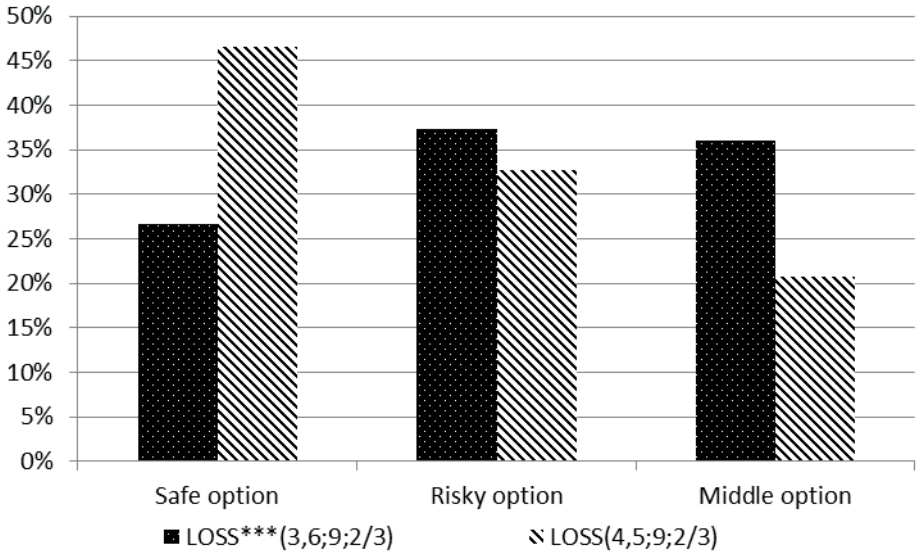
Figure 1. Distribution of answers for the "gain" scenario when 3.6 or 4.5 points were guaranteed after treating some choices of the middle option as a safe option.



REMARK! With conditions (3.6;9;2/3) answers of people who in option 3 gave a greater value or equal to 4.5 points, were counted as option 1.!!!

Source: Elaboration of one's own based on research of one's own

Figure 2. Distribution of answers for the "loss" scenario when 3.6 or 4.5 points were guaranteed after some choices of the middle options were treated as a safe option.



REMARK! With conditions (3.6;9;2/3) answers of people who in option 3 gave a greater value or equal to 4.5 points, were counted as option 1.!!!

Source: Elaboration of one's own based on research of one's own

The above distributions of answers differ with regard to gains at the significance level of 0.001176, and for losses 0.039401. We keep wondering what determined the difference in answers. Preferences should be the same. If someone from the group that could get 4.5 points for sure was willing to keep this number of points and did not want to have more than in the group that could get 3.6 points for sure the person should also be willing to keep 4.5 points for sure and should not demand more. According to the research the situation would look differently - in the "gain" scenario 40% of people in the group of the lower certainty value were willing to give away 4.5 points and in the group with a higher certainty value the percent was 69%. Maybe people from the group playing at the higher certainty value evaluated the safe option adding a bonus for the certainty of the result whereas people from the group playing at the lower certainty value and giving 4.5 points could not add such a bonus - they had to wait another week for the notification of the number of points to give away for the proposal to be accepted and they were unsure that their offer would be accepted.

Conclusion

This paper presented the analysis of selected research results aiming to check the impact of certain factors on the approach towards risk. It turned out that the amount of stake was important with decisions concerning the number of points to give away in order to keep the remaining points for sure. Hypothesis 1 that the bigger is the stake the bigger is willingness to take risk was confirmed. As far lower stakes were concerned, more people were willing to give away at least 50% of points than in case of the higher stakes. These findings stand in contradiction to described earlier "peanuts effect". It is possible that the "peanuts effect" found in other experiments was observed only because the gains proposed were really irrelevant to players and in our experiment smaller stakes could also have great meaning to subjects. Moreover it is possible that students did not bother to divide 6 points in other way than half whereas with 9 points they made the effort. Another explanation is that the utility function for the points is concave (in accordance with the classical assumption of economics saying that in case of most goods the marginal utility is decreasing - see e.g. Stigler [1950]). That is why the utility of additional 4.5 points did not constitute 150% utility of additional 3 points. Thus there were fewer people willing to choose the safe option at a higher stake.

Also the change in the probability of winning somehow altered students' behaviour. With various probabilities of winning the same

percentage of people chose the safe option (as expected, as the proposed certainty equivalent constituted in both cases the same fraction of the expected value of the game). However more people were willing to risk all points to get 9 points when the probability of winning amounted 5/6 rather than 2/3 what confirms Hypothesis 2 that higher probability of positive result makes people more risk-loving. On the other hand, people assigned to the group with the higher probability of winning were willing to give away more percent points than people assigned to the group with the lower probability of winning (what contradicts Hypothesis 2). This is an obvious infringement of one of the assumptions of the expected utility theory (this assumption was also criticized by Machina [1987]) claiming that an expected utility function is linear in the probabilities. We can conclude that an answer to our second research question is positive, there is an impact of changed probabilities on decision-making although we can not say exactly what is the direction of this impact.

We also observed an impact of the number of points possible to get for sure on the tendency of the students to give away some points from the potential reward. That makes us answer positively to our last research question. The students surveyed were more willing to give away at least 4.5 points when the number of points possible to get for sure was higher (what proves Hypothesis 3). This may be caused by instant information about getting the remaining point (4.5) as the students did not have to wait to get acceptance of their proposed number of points. According to Rock (2008) „uncertainty can fire up errors in [humans'] orbital frontal cortex. This is like having a flashing printer icon on your desktop when paper is jammed – the flashing cannot be ignored, and until it is resolved it is difficult to focus on other things".

Once again we remind that our experiment was conducted among students and although there are scientists that claim that there is no difference between results obtained from students' groups and representative samples, we think it would be opportune to repeat our research using a representative sample.

It seems that in line with behavioural scientists' theories in economic deliberations, not only objective factors should be taken into account but also other variables resulting from certain psychological determinants should be considered with regard to human preferences.

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Abstrakt

Przy podejmowaniu decyzji o dobrowolnym ubezpieczeniu lub o udziale w loterii, ludzie powinni wziąć pod uwagę możliwe stany natury i prawdopodobieństwo ich wystąpienia. Ekonomia klasyczna zakłada, że decyzje osób podejmujących decyzje w warunkach ryzyka są zgodne z teorią użyteczności. Jednak teorie oparte na zachowaniach ludzi (w szczególności teoria perspektywy) mówią, że proces podejmowania decyzji wiąże się anomaliami wynikającymi z postrzegania rzeczywistości, np efekt znaku, efekt orzeszków ziemnych i innych. Badanie ma na celu sprawdzenie wpływu wybranych czynników na decyzje podejmowane przez ludzi w warunkach zysków i strat. Cel ten został osiągnięty przy pomocy przeprowadzanych kolejnych eksperymentów. Wpływ czynników takich jak kwoty wygranej/przegranej, prawdopodobieństwo wygranej/przegranej na podejmowane decyzje weryfikowano na próbie ponad 600 osób. Wyniki wskazują, że założenia przyjęte w ekonomii klasycznej nie zawsze są spełnione. W przeprowadzonych eksperymentach stosunek do ryzyka zmieniał się w zależności od wysokości zakładu (przy niższych wartościach zakładów występowała tendencja do działań bezpiecznych), prawdopodobieństwa wygranej, punktu odniesienia oraz tego czy wyniki gier były przedstawione jako zyski lub straty.

Słowa kluczowe: preferencje, użyteczność, teoria oczekiwanej użyteczności, prawdopodobieństwo, teoria perspektywy, podejmowanie decyzji, podejmowanie ryzyka.