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Inconsistency in Consumer Preferences: Some Interesting Insights

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Abstract

Traditional theory of preferences assumes that a consumer should be able to rank different alternatives according to the satisfaction or utility they provide. However, empirical findings originated by psychologists in 1970s and later reevaluated by economists show some controversial results. A phenomenon that occurs when individual's choice (as a direct indicator of individual's preferences) between two alternatives is inconsistent with the way an individual ranks "selling" price of these alternatives (where price serves as an indirect indicator of his preferences) becomes known as a preference reversals. This research aims to shed a new light on the respective subject by revealing potential differences among individuals' choice depending on their characteristics. In that manner the research provides an insight into individuals' preferences depending on their gender and household income. Furthermore, in this experiment individuals were asked to express their attitude toward risk, hence it was considered interesting to confront the way the individuals perceive themselves with the way they actually act.

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1. Introduction

More than four decades ago cognitive psychologists (Lichtenstein & Slovic, 1971; Lindman, 1971) perceived inconsistency in decision making, i.e. preferences that subjects revealed varied with the response mode (choice or valuation) that was used to elicit the preferences. Since this behavioural anomaly, called preference reversals, is directly relevant not only to the empirical validity of economic theories of decision-making under uncertainty but also to situations when decision makers are confronted with claims of different maturity (Tversky, Slovic &

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Kahneman, 1990), it has intrigued experimental economists ever since it has been perceived. Finding explanation for such subjects' behaviour is of both theoretical and practical significance since there are many important areas of political economy (e.g. health, safety and environment) where policy decision may be strongly influenced by stated preference measures of value elicited from the public (Butler & Loomes, 2007; Tversky & Thaler, 1990). Therefore future research on this subject should not be perceived as redundant.

The classic case of preference reversals is related to decision involving pair of simple monetary gamble where the gamble has one bet (usually referred to as P-bet) which offers a relatively large chance of a modest prize while the other (often referred to as \$-bet) offers a smaller chance of a larger prize. Subjects are asked first to choose one of two bets and then to state a monetary valuation for each of them. Cubitt, Munro & Starmer (2004) classified individual subject's behaviour into one of the following four categories:

- consistent preference for P (P chosen and valued at least as highly as \$);
- consistent preference for \$ (\$ chosen and valued at least as highly as P);
- standard reversal (P chosen, \$ valued more highly); and
- counter reversal (\$ chosen, P valued more highly; Butler and Loomes (2007) refer to this reversal as nonstandard).

Beside preference reversals in money, it is possible to consider preference reversals in probability where subjects instead of stating a monetary value for each bet are asked to consider a third "yardstick" lottery that offers some given payoff x , but leaves unspecified the probability q of receiving that payoff. Respondents are then required to separately set the levels of probability which will make them indifferent between that lottery and the P-bet and the \$-bet (MacCrimmon & Smith, 1986; Cubitt, Munro & Starmer, 2004).

A fundamental assumption in conventional economic theory is that preferences are independent of the tasks that an agent faces, i.e. preferences are context-free (while psychologists propose the alternative i.e. context-sensitivity). However, it is not indisputable and one of the most troubling challenges to this assumption is posed by observations of preference reversals (Cubitt, Munro & Starmer, 2004). Since this phenomenon has both economic and a cognitive aspect, there are several possible explanations for the existence of inconsistency in preferences observed from both psychological and economic perspective. Studies on respective subject vary in explanation of causes of preference reversals but they often have certain common explanation that they agree about. In that manner, Tversky, Slovic and Kahneman (1990) assessed whether preference reversals are a result of a violation of following economic theories: a) transitivity, b) procedure invariance and c) independence axiom of expected utility theory (the anchoring phenomenon in this context, stating that person's judgments or decisions are affected by some reference level of income or wealth, is a principal explanation for violations of the independence axiom). Amiel et al. (2008) listed variety of reasons from both economics and psychology literature:

- possible mis-specification of incentives where real money is involved;
- the endowment effect which explains that people may require more to give up an object than they are willing to pay to acquire it;
- regret theory according to which preference reversals exist because of systematic intransitivity in preferences;
- the prospect theory view of the framing effect explaining that people can and do make inconsistent choices under uncertainty and may be sensitive to the way a problem is presented;
- method of elicitation of preferences emphasizing that in *bidding* the decision-maker starts with a specific amount to win and adjusts it downward to account for other attributes of the bet while in the *choice problem* there is no natural starting point, therefore the amount to win dominates the bid decision but not the choice decision.

Regarding possible psychological explanations, both Alarie and Dionne (2005) and Cubitt, Munro and Starmer (2004) state three important psychological explanations (the prominence, task goal and scale compatibility hypotheses) and the latter authors stated that all of them have an important element of bounded rationality.

Schmeltzer, Caverni and Warglien (2004) aimed to find out whether preference reversals occur with the construction of individual preferences or do they reflect the use of different information in the response processing. Their research followed the idea presented by Goldstein and Einhorn (1987) (and further developed by Hsee et al., 1999) who proposed distinguishing between two dimensions of the procedures involved in classic decision-making

tasks: a) the response method which reflects a choice or a judgment and b) the worth scale which reflects the attractiveness or minimum selling price. Hsee et al. (1999) however showed that a shift from joint evaluation (options are presented simultaneously and they are easily compared) to a separate evaluation (options are presented and evaluated one after the other) is sufficient to induce preference reversals, with the constant worth scale.

Bohm (2008), on the other hand, states that inconsistencies in preferences exist only for trivial objects which are normally transacted at posted prices, so that the individual seller/buyer does not have to calculate any reservation prices, i.e. there is little or no evidence of preference reversals for objects of significant value. Schmidt and Hey (2004) investigated whether some part of the preference reversals phenomenon can be attributed to errors in the responses of subjects in experiments. They tested for both minimal selling prices and maximal buying prices and found out that preference reversals phenomenon is evident for selling prices, while for buying prices there was no systematic pattern. Interesting hypothesis regarding the influence of the risk that others face on individuals' risk attitudes was tested by Rohde and Rohde (2011). However, their results showed that risk attitudes appear to be less affected by others' risks than expected, even though the same individuals showed concern for inequality in a riskless setting.

There are many studies of the respective subject that try to explain the existence i.e. causes of preference reversals. However, the focus of this research is different since it is, to the authors' best knowledge, the only paper that has two following distinctive features: a) it connects individuals' self-perception (risk loving/averse/neutral person) with stated preferences while choosing and pricing bets and b) it provides an insight into possible connection between individuals' characteristics (gender and income) and the existence of preference reversals. Furthermore, as far as authors know, it is the only empirical research on this subject in Croatia.

The paper proceeds as follows: sample, procedure description and main findings of the study are described in Section 2 while the conclusion is presented in Section 3. The reference list is provided at the end of the paper.

2. Sample, procedure description and main findings

In order to accomplish main objectives of this research, a sample consisting of 92 respondents was created. All of these respondents were students at Faculty of economics in Split (Croatia) and have *voluntarily* agreed to participate in the experiment. At the beginning of the experiment, students were given general instructions (both *verbally* and in *written* form) about the nature of the gambles. These instructions included a *sample* gamble and *explanations/demonstrations* of how gambles work. In order to control for *Misspecified Incentives*, as proposed by Grether and Plott (1979), a real cash bets were used instead of "imaginary money". Also, for each pair of gambles students had an opportunity to indicate which bet they preferred or if they were *indifferent* between these bets. After they have made decision on each gamble, the experiment has entered the second phase in which students had to state their reservation price for each bet. The students were explained that it was in their best interest to reveal their true reservation prices since the offer price (randomly generated by a bingo cage) will be compared with their reservation price and if the latter exceeded the offer price, they would play the gamble. Alternatively, they would be paid the offer price. The gamble that was played was also randomly selected. In short, it can be stated that the nature of the experiment was quite similar to the experiment conducted by Grether and Plott (1979). However, the aim of this research was quite different, and due to that students were asked some addition questions about their gender, income status, their attitude toward risk (risk loving/averse/neutral person) etc.

In this research, following pairs of gambles were used:

- A) Pbet: 35/36 chances to win \$1 and 1/36 chances to win \$0 (expected value \$0,97)
- A) \$bet: 9/36 chances to win \$4 and 27/36 chances to win \$0 (expected value \$1)
- B) Pbet: 28/36 chances to win \$1 and 8/36 chances to win \$0 (expected value \$0,77)
- B) \$bet: 7/36 chances to win \$4 and 27/36 chances to win \$0 (expected value \$0,77).

After the results of experiments were processed, it was possible to classify each student into one of the five categories depending on their selection between Pbet, \$bet or indifference, and depending on the monetary value (i.e. reservation price) they placed on each of the bet. These categories are as follows:

- Category 1. Consistent preference for Pbet (student chose Pbet and valued it at least as highly as \$bet);

- Category 2. Consistent preference for \$bet (student chose \$bet and valued it at least as highly as Pbet);
- Category 3. Standard (predicted) reversal (student chose Pbet but \$bet valued more highly);
- Category 4. Nonstandard (unpredicted) reversal (student chose \$bet but Pbet valued more highly);
- Category 5. Indifference occur (student stated that he/she is indifferent i.e. doesn't care which bet will be played).

Figure 1 shows the number of students belonging to the particular (previously presented) category. It is clear from the Figure 1 that students' behaviour doesn't vary significantly regarding the choices they made between bets in different gambles.

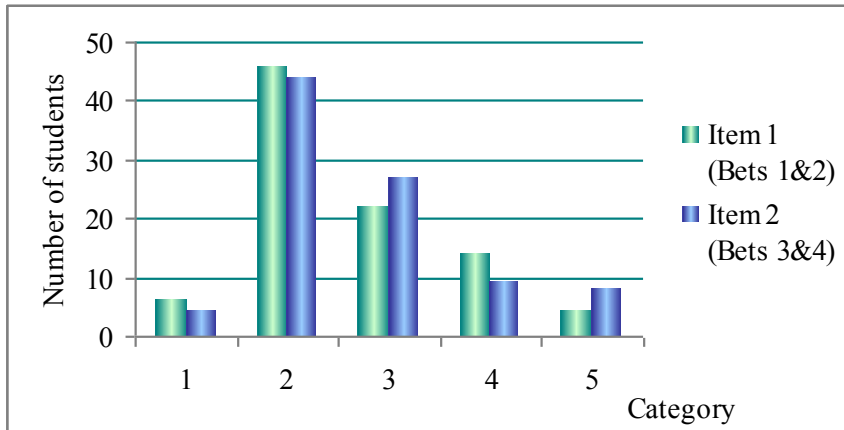


Fig. 1. Distribution of students according to the category (1-5)

Based on the data obtained from the conducted experiment, it was possible to calculate the percentage of choices of Pbets for which students indicated lower reservation price than on the paired \$bet (standard reversal i.e. category 3); as well as the percentage of choices of \$bets for which students indicated lower reservation price than on the paired Pbet (nonstandard reversal i.e. category 4). These values are presented in Table 1, from which it is clear that 49 out of the 59 choices of Pbets (83.05%) were inconsistent with the stated reservation prices. On the other hand, 23 (20.35%) of the 113 choices of \$bets were in contradiction with the announced reservation prices.

Table 1. Frequencies of reversals

| Bet | Choices | Reservation prices | | Percentage | |
|-------------|---------|--------------------|--------------|------------|--------------|
| | | Consistent | Inconsistent | Consistent | Inconsistent |
| P | 59 | 10 | 49 | 16.95% | 83.05% |
| \$ | 113 | 90 | 23 | 79.65% | 20.35% |
| Indifferent | 12 | | | | |

Source: Compiled by authors

It is obvious that the results in Table 1 present further confirmation of the existence of preference reversals phenomenon. These results are in accordance with those obtained by Lichtenstein and Slovic (1971, 1973), Grether and Plott (1979) and many other researchers that later on followed these pioneers.

Since one of the aims of this research was to provide an insight into possible connection between individuals' characteristics and the existence of preference reversals, Figure 2 is created in order to distinguish among students' gender and the way they preferred and priced bets. According to Figure 2, it seems that men are more likely to choose Pbet (bet with high probability of winning a modest sum of money) but assign a larger reservation price to

the \$bet. This means that men contribute to the appearance of the standard preference reversal in a higher proportion than women. On the other hand, when it comes to the nonstandard reversal, there is no difference in percentage in which this phenomenon occurs between men and women. It is equally likely that either men or women will cause appearance of nonstandard reversal.

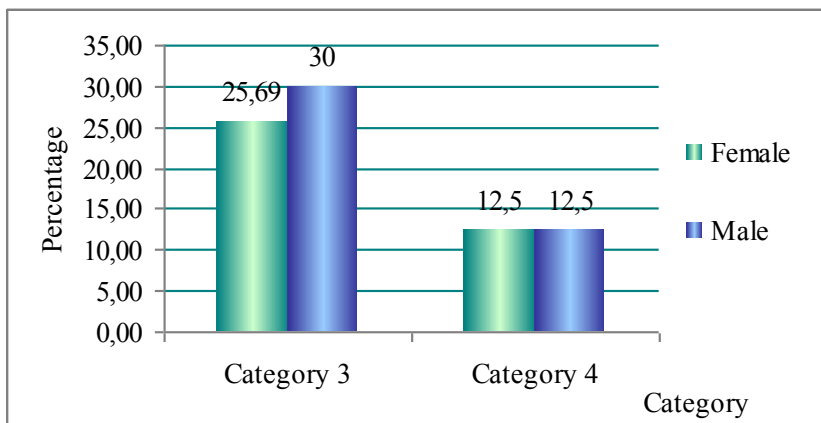


Fig. 2. Relationship between students' gender and preference reversals

Additional objective of the research was to investigate whether there is any relationship between student's family income and the inconsistency in preferences observed in this study. Since the authors wanted to test a possible influence of income in determining a reservation price, it was necessary to obtain information regarding the level of student's family income. In that sense, students were asked to choose one out of five categories describing a different level of their family income. These categories were: I.< \$540; II. \$541-\$900; III. \$901-\$1260; IV. \$1261-\$1620; V.> \$1621. Categories were formulated with respect to the average monthly salary in Croatia which was \$990 in 2013. Confrontation of different levels of income with the standard and nonstandard preference reversal is presented in Figure 3. Although deeper analysis showed that risk aversion decreased with income growth (i.e. parallel with income growth a difference between number of students choosing \$bet over Pbet became larger) no similar pattern can be observed when it comes to standard or nonstandard reversal. It seems that both standard and nonstandard reversal occurs most commonly within students with average level of income, suggesting a concave (rather than linear) relationship between preference reversals and student's family income.

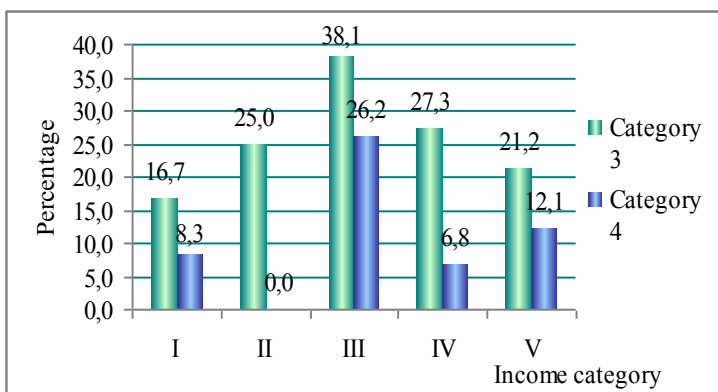


Fig. 3. Relationship between family income and the inconsistency in preferences

Final part of the research was dedicated to the confrontation of the way the students perceive themselves with the way they actually act. At the beginning of the experiment students were asked to declare themselves as: 1. risk loving; 2. risk averse or 3. risk neutral person. These categories were then related to their behaviour. The results presented in Table 2 indicate that in 75.68% (56 of the 74) of cases, students made a decision in accordance with the way they perceive themselves - as a risk loving persons. This means that quarter of students perceive themselves as a risk loving, but don't act like that (since they choose Pbet instead of \$bet). Furthermore, only half of the students (31 of the 62 cases) that perceive themselves as risk averse persons actually act like that and choose Pbet over \$bet. Finally, 58.33% of students (28 of the 48 cases) that think of themselves as a risk neutral person are prone to choose \$bet over Pbet.

Table 2. Self-perception vs. behaviour in reality

| Self perception | Pbet | \$bet | Don't care | Total |
|-----------------|------|-------|------------|-------|
| Risk loving | 16 | 56 | 2 | 74 |
| Risk averse | 31 | 29 | 2 | 62 |
| Risk neutral | 12 | 28 | 8 | 48 |
| Total | 59 | 113 | 12 | 184 |

Source: Compiled by authors

3. Conclusion

Preference reversals occur when individuals indicate a preference for Pbet (bet with very high probability of winning a modest level of money) over \$bet (bet with a small probability of winning a high level of money), but place a higher value (reservation price) on the other bet, the \$bet. Different authors tried to investigate preference reversals phenomena from different aspect while accounting for various factors that might be responsible for appearance of standard and non-standard preference reversal. In this article, preference reversals were perceived from several different aspects and the results of the analysis showed that: 1.) men contribute to the appearance of the standard preference reversal in a higher proportion than women; 2.) both standard and nonstandard reversal occur most commonly among individuals with average level of income, suggesting a concave relationship between preference reversals and student's family income; 3.) a quarter of sample students perceive themselves as a risk loving, but don't act like that; at the same time only half of the students that perceive themselves as risk averse persons actually act like that. Presented results provide a fruitful path for further research on the respective subject especially regarding the connection between individuals' characteristics and the existence of preference reversals.

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