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THE ANOMALIES OF INTERTEMPORAL CHOICE ON SMALL AND MEDIUM SIZE ENTERPRISES : AN EXPERIMENTAL SURVEY ANALYSIS

A MASTER'S THESIS

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ABSTRACT

The thesis questions the methodology of economics and psycholgy through running a survey by using different types of subjects, small and medium size of enterprises. Using same types of questions which we reveal time and amount inconsistent preferences, I realized that different subjects can reveal completely different results, Samuelson's type, than the usual subjects, mostly students, in experimental economics. Furthermore, the results show that loss aversion is still a strong phenomena and time inconsistent preferences help us to reveal loss aversion. The thesis concludes that different types of subjects, ceteris paribus, can give different results in the area of ''economics and psychology'' on the case of amount and time inconsistencies.

ÖZET

Tez, ekonomi ve psikoloji alanının metodolojisini, değişik bir örnekleme grubuyla, kobilerle, anket yaparak sorgular. Normalde deneysel iktisatta kullanılan, miktar ve zaman tutarsızlıklarını ortaya çıkaran soruları kullanarak ve sadece anketi yaptığım kişileri değiştirerek yaptığım ankette tamamen farklı sonuçların ortaya çıktığını farkettim. Buna ek olarak, sonuçlar kaybetme korkusunun hala çok güçlü bir olgu olduğunu gösterdi. Sonuç olarak, tez, herşeyi sabit kırakıp sadece anket yaptığımız kişileri değiştirsek dahi , ekonomi ve psikoloji alanında, miktar ve zaman tutarsızlıkları durumunda , sonucun tamamen farklı çıkabileceğini göstermiş oldu.

CHAPTER 1: INTRODUCTION

My interest in this thesis is to test different types of anomalies in intertemporal choice on small and medium size enterprises (SME). I will focus more on discounting anomalies. Discounted utility (DU) model introduced in 1937 by Samuelson and it is the most common discounting model in the economic literature. It has been applied to many different topics such as savings behaviour, labor supply and asset pricing.

But, starting from Strotz(1956), where DU could not express myopia and time inconsistency, it has been criticized. It has been tried to replace with some new discounting utility function. Loewenstein and Prelec (1992) offered a new approach to solve four anomalies: the common difference effect, the absolute magnitude effect, the gain-loss asymmetry and delay-speedup asymmetry, with $U(x1,t1;\ldots..;xn,tn)= \sum i\, v(xi)\phi(ti)$ where v(xi) is the value function of Prospect Theory of Kahneman and Tversky (1979) and $\phi(ti)$ is the discount function that have the form of generalized hyperbola where the rate of substitution between today and tomorrow is smaller than that the rate between any other pair of successive periods. . Laibson(1996,1997) tried to explain undersaving issue and how financial market innovation may reduce welfare by providing too much liqudity, using hyperbolic discounting utility functions (HDUF). Following Laibson, HDUF has been used in the context of of a wide range of issues: growth, job search, choice of retirement age, procrastination, addiction, investment in human capital etc…

Then Rubinstein(2003) criticized the abandonment of constant DU and adoption of HDUF, offered evidence using some experimental results which reject DU can also easily rejects HDUF as well. That is my motivation for this thesis to question SMEs.

I wondered what are the answers of SMEs when I try to reveal their inconsistent preferences.

The rest of the thesis is structured as follows: Section 2 presents three different anomalies of Loewenstein and Prelec (1992) that create difficulty for DU and motivate us to use HDUF. Section 3 describes the selection of subjects , survey design and its results. Section 4 concludes, providing possible explanations and some limitations of the thesis.

CHAPTER 2: THREE ANOMALIES TO TEST

I will present three anomalies that Loewenstein and Prelec (1992) presented before offering a new discounting utility model that solves them.

2.1. The Common Difference Effect

Preferences between two delayed outcomes often switch when both delays are incremented by a given constant amount. An example of Thaler (1981) describes it: a person might prefer one apple today to two apple tomorrow, but at the same time prefer two apples in 51 days to one apple in 50 days. Horowitz(1988) used a second price sealed bit auction to estimated discount rates for $50 bonds of varying maturity. Implicit discount rates were a declining function of time to bond maturity.

I replaced this term with time inconsistent preferences in my analysis.

2.2. The Absolute Magnitude Effect

Empirical studies of time preference have also found that large amounts suffer less proportional discounting than do small ones. Thaler(1981), for example, reported that subjects who were on average indifferent between receiving $15 immediately and $60 in a year, were also indifferent between an immediate $250 and $350 in a year, as well as between $3000 now and $4000 in a year. Instead of using this term, I will use amount inconsistency in my analysis.

2.3. The Gain-Loss Asymmetry

Losses are discounted at a lower rate than gains are. Lowenstein (1988c), reported that subjects were , on average indifferent between receiving $10 now and receiving $21 in one year, and indifferent between loosing $10 now and loosing $15 in one year. The corresponding figures for $100 were $157 in gain $133 in losses. I will use the term loss aversion of Kahmenan and Tversky (1979) in my analysis.

CHAPTER 3: SURVEY DESIGN

3.1. Selection of the subjects

We started the survey in May 2014 and finished in April 2015. 30 SME's are interviewed once during this time. We selected our businessmen from different sectors including textile, construction, computer and printing etc… We interviewed them in person and we asked their names, phone numbers and ID numbers. They are either owners of the SME or workers who have the authority for financial decisions. Most of the SMEs are buying goods, calculating their expenses and setting prices sufficiently high to make profits. Our selection criteria for the subjects were: Being in the sector at least for five years so we can judge them as successful businessmen; dealing with financial transactions whose values are high enough to exceed the amounts we use in our study. Our subjects experience our questions in their daily business transactions Subjects were required to make a choice between two options in each of the twelve questions we asked.

3.2. Survey Questions

Q1. You have to choose between the following two options:

A1) Receiving 1000 tl today

A2) Receiving 1030 tl in one week

Q2.

A3) Receiving 1000 tl in three month

A4) Receiving 1030 tl in three months and one week

Q3.

A1') Loosing 1000 tl today

A2') Loosing 1030 tl in one week

Q4.

A3') Loosing 1000 tl in three months

A4') Loosing 1030 tl in three months and one week

Q5.

B1) Receiving 10000 tl today

B2) Receiving 10300 tl in one month

Q6.

B3) Receiving 10000 tl in one year

B4) Receiving 10300 tl in 13 months

Q7.

B1') Loosing 10000 tl today

B2') Loosing 10300 tl in one month

Q8.

B3') Loosing 10000 tl in one year

B4') Loosing 10300 tl in 13 months

Q9.

C1) Receiving 100000 tl today

C2) Receiving 103000 tl in two months

Q10.

C3) Receiving 100000 in two years

C4) Receiving 103000 in 26 months

Q11.

C1') Loosing 100000 today

C2') Loosing 103000 in two months

Q12.

C3') Loosing 100000 in two years

C4') Loosing 103000 in 26 months

We told our subjects that we assumed that the risk free market interest rate is 3% in each question

CHAPTER 4: RESULTS

4.1. Findings for time inconsistent preferences

Even numbered questions are the delayed versions of odd numbered questions. We have 30 subjects and we have 6 questions with gains and 6 questions for losses for each subject. These 6 questions for gains and losses are considered as 3 sets of questions where each set is composed of a delayed and an undelayed version of the same amounts. Therefore we have 3 sets of gain questions and 3 sets of loss questions. Since we focus on preference reversal within the sets, we have a total of 180 observations for this purpose. What we call preference reversal is , without loss of generality, to choose A1 in Q1 and A4 in Q2, meaning that they prefer less amount more urgent in the first question and more amount less urgent in the second question and vice versa. We observed a preference reversal in 28 out of of 180 observations. That implies 15.5% of the answers were dynamically inconsistent. If we look at the decomposition of the reversals among gains and losses we observe that when subjects are receiving payments, 24 of 90 which is 26% of the answers are dynamically inconsistent whereas only 4 of 90 which is 4,4% of the answers are inconsistent for the loss side So, we observe that SMEs are mostly consistent with the predictions of the constant discounted utility model. The results show that there is no strong tendency to

change the preference when payments are delayed and time consistency of preference over loosing is stronger than receiving.

4.2. Findings for Amount Inconsistency

The aim to use different amounts is to span subjects sensitivity. We wanted to see if they change their preferences when we change the amount to receive or loose. We used three different amounts: 1000tl , 10000tl and 100000tl. We have two possible inconsistencies: passing from 1000 to 10000 and from 10000 to 100000 so we totally have 240 observations. For the gain area, from Q1 to Q5, Q2 to Q6, Q5 to Q9 and Q6 to Q10 , rates of changing preferences are respectively 7/30(23%), 4/30(13%), 3/30(10%) and 6/30(20%) ,its percentages are in brackets . For the loss area, from Q3 to Q7, Q4 to Q8, Q7 to Q11 and Q8 to Q12, rates are 3/30(10%), 6/30(20%), 5/30(17%) and 4/30(13%). Being in the receiving or loosing end does not matter in terms of amount inconsistency: When they receive, they change 20/120 of their preferences, when they loose they change at the rate 18/120. When we change the amount from 1000 to 10000, they change 20/120 , from 10000 to 100000, they change 18/120 of their decisions. In total, they change 38 in 240 of their preferences which is 15.8%. For this level, we can not state that our subjects are inconsistent with their preferences over amounts. They are 84.2% consistent with their preferences over amounts. Utility of the extra amount does not match the time difference effect on utility , increasing the amount does not change this behavior of SMEs.

4.3. Findings for Loss Aversion

To see the effects of loss aversion in our survey questions, we have 6 possible cases: After choosing A2, A4, B2, B4, C2, C4 respectively in questions Q1, Q2 ,Q5, Q6, Q9, Q10 he should choose A'1, A'3, B'1, B'3, C'1, C'3 in questions Q3, Q4, Q7, Q8, Q11, A12. For example, he should choose 1030 tl in Q1 and he should choose -1000 in Q3, if he chooses both 1000 and -1000 we can not be sure if he is impatient or loss averse but if he chooses 1030 in the receiving area and -1000 in the loss area, we can surely say that he is loss averse. In the first question, 10 SMEs have choosen A2 and all of these SMEs changed their preferences to A'1 which means that those who are not impatient for the amount 1000tl, are all loss averse. We can undoubtly say that we have 10 SMEs that are loss averse . About the questions Q2 and Q4, 16 SMEs have choosen A4 and 14 of 16 have choosen A'3. This means that 14 of 16 are loss averse when we delay the decision, 10 of these 14 SMEs are those from the previous case meaning Q1 and Q3 , and the other 4 are time inconsistent on the receiving area.

About decisions for 10000 tl , we have only 5 observations that choose B2 in Q5 and all of these 5 opt B'1 in Q7. But we have 5 SMEs which choose B'2 in Q7 and this means that 5 of 30 are not loss averse and 5 of 30 are loss averse for sure, the remaining 20 SME choose B'1 , this decision can be called as loss aversion or impatience because they prefer not to delay loosing 10000 or they prefer not to loose extra amount. In Q6, 14 of 30 prefer to receive 10300 in 13 months but in Q8 ,12 of these 14 prefer to loose 10000 in 12 months. We observe 7 more SMEs who choose to

loose less when we delay the question for one year, this excess is coming from time inconsistent preferences. We detect a loss averse behaviour for the amount 10000.

Finally we analyse 100000 tl decisions. We have 5 observations of loss aversion in the non-delayed and 9 in the delayed version. Again we have plus 4 from time inconsistent decisions. In delayed versions of questions we detect more loss averse preferences so we can conclude that time inconsistent decisions reveal loss averse preferences. We have totally 36/180 which is 20% of all observations that are willing to pay more. But , in more than half amount of observations, we can not measure about their loss aversion. I believe that with those we can measure their loss aversion we have a rate that is enough to call our subjects as loss averse.

CONCLUSION

So, do we have inconsistent preferences on intertemporal choices of SMEs? We questioned them in order to find some inconsistency in their monetary decisions. The results show that SMEs are higly consistent even facing situations that can reveal their inconsistent behaviors. First, they came out time consistent which means they use Samuelson's(1937) DU model in their mind. Second, they are amount consistent; changing amounts with the same questions do not affect their behaviour. Last case is that they are being loss averse allow as that we can conclude that they are using value function of Prospect Theory. To sum up , we can say that they are using constant discounting value function in their monetary decisions.

The evidence also suggests that SMEs are not like the other subjects used in economic experiments. Psychological factor in their decision making process is lesser than rest of the society. They are not affected by the nature of the questions like other subjects (mostly university students). We also see that they do not calculate discounted values of amounts , consider only the signs plus or minus ahead of amounts, that is why they do not want to loose extra amounts. They have a business plan in their mind and they are processing it consistently and they think that it is this business that it keep them successful in the long run.

This study has a number of limitations which should be taken into accounts when interpreting results. We have a relatively small size, thus replication with large number should be useful. But even with this small size, results are robust.

This research increases our knowledge about monetary decisions of SMEs which create a big part of Turkey's GDP.

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