Journal of Research in Business : 4 (1), 1-17 June • Haziran: 2019 • ISSN: 2636-8331
DOI: 10.23892/JRB.201945329l

RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

BIDDING BEHAVIOR IN A NATURAL EXPERIMENT: TV GAME SHOW "I DON'T KNOW, MY SPOUSE KNOWS"

DOĞAL DENEY ORTAMINDA PEY SÜRME DAVRANIŞI: "BEN BİLMEM EŞİM BİLİR" ADLI TV YARIŞMASI

Jale ORAN[*]
E. Serra YURTKORU[**]

Abstract

Behavioral finance deals with the financial decision-making that violates the classical finance and economic theories, and underlying reasons for such anomalous behavior by economic actors. There are several environments in which financial decisions are made. Financial markets are the most popular one; but auction markets are somehow neglected by behavioral finance researchers. We examine bidding behavior in a TV game show, broadcasted first in Germany with the name "Mein Mann Kann", and later adopted by a TV channel in Turkey as "I Don't Know, My Spouse Knows". It mimics an actual sequential open-outcry auction as a natural experiment. To our knowledge, this study will be the first one made regarding this show. Results indicate no age, marital status difference in risk aversion, but significant difference between winners' and losers' bids where losers' bids were higher, which is possible indication of loss aversion. Women and men are taking risks equally, contrary to the majority of research findings. The results expected to contribute to the behavioral finance and auction literature and may illuminate further research in both fields.

Keywords: Behavioral finance, auctions, bidder behavior, risk aversion, loss aversion

JEL Classification: C93, G4, D9, D81

Öz

Davranışçı finans klasik finans ve ekonomi teorilerinin aksine bulgular ve ekonomik aktörlerin bu normal dışı davranışlarını açıklamayla ilgilidir. Finansal kararların verildiği çeşitli ortamlar vardır. Finans

* Prof. Dr., Marmara University, Faculty of Business Administration, jaleoran@marmara.edu.tr, ORCID: 0000-0001-8976-2893.

** Prof. Dr., Marmara University, Faculty of Business Administration, syurtkoru@marmara.edu.tr, ORCID: 0000-0002-9476-8445.

To cite this article: Oran, J. & Yurtkoru, E. S. (2019). Bidding Behavior in a Natural Experiment: TV Game Show "I Don't Know, My Spouse Knows". Journal of Research in Business, 4(1), 1-17. DOI: 10.23892/JRB.2019453291

Submitted/Başvuru: 15.02.2019
Accepted/Kabul: 25.03.2019

piyasaları en popüler alandır. Ancak müzayede piyasaları davranışçı finans araştırmacıları tarafından ihmal edilmiştir. Daha önce Almanya'da "Mein Mann Kann" adıyla, daha sonra bir Türk TV kanalı tarafından adapte edilip "Ben Bilmem Eşim Bilir" adıyla yayınlanan yarışma programındaki pey sürme davranışı incelenmiştir. Doğal bir deney olarak aşamalı, açık katılımlı bir müzayedeyi taklit eden bu yarışma için bilindiği kadarıyla yapılan ilk araştırmadır. Riskten kaçma ile ilgili cinsiyet, yaş, medeni durum açısından bir fark gözlenmemiştir. Ancak kazanan ve kaybedenler arasında verdikleri teklif açısından istatistiki olarak önemli fark vardır ve kayıptan kaçmanın bir işareti olarak kabul edilmiştir. Önceki araştırmaların çoğunun aksine kadın ve erkeklerin eşit risk aldıkları görülmüştür. Sonuçların hem davranışçı finans hem de müzayede literatürüne katkıda bulunması ve bundan sonraki araştırmalara ışık tutması beklenmektedir.
Anahtar Kelimeler: Davranışçı finans, müzayedeler, pey sürme davranışı, riskten kaçma, kayıptan kaçma
JEL Classification: C93, G4, D9, D81

1. Introduction

Behavioral finance deals with the financial decision-making that violates the classical finance and economic theories, and underlying reasons for such anomalous behavior by economic actors. Human behavior, psychology, and even physiology have been investigated to find out the roots of such irrational behavior.

There are several environments in which financial decisions are made. Financial markets are among the most popular ones; but auction markets are somehow neglected by behavioral finance researchers. Especially bidder behavior requires more attention, regarding the economic activity centered on auction methodology.

The importance attributed to auctions has three main reasons: The magnitude of transactions based on auctions, the benefits to the national economy through better pricing of government borrowing instruments and effective price mechanisms provided to financial markets (Sözer-Oran, 2010). Gode and Sunder (1993) and Tseng, Lin, Lin, Wang and Li (2010) found out in their separate experimental studies that auction mechanism contribute to the allocational efficiency of stock markets even when the virtual subjects were zero-intelligence ones, and making arbitrary transactions.

Behavioral finance research is usually non-parametric, survey or experiment based. There is vast amount of experimental research in behavioral finance and in other fields where analyzing individual or mass behavior is indispensable. Attitude towards risk is frequently investigated, because it will in the end be the basis for many financial/economic decisions. Bidding in an auction or in a TV game show with a considerable prize can be assumed as comparable and the latter could be assumed as laboratory of the former. The advantage of such a game setting would be that subjects are acting naturally since the game data collected ex-post.

The context of the show can best be described as decision making under uncertainty, while the bids of the rivals, the ability of both rival player and spouse cannot be known prior to the round. There are classical and behavioral views explaining the decision dynamics of individuals, where behavioral approaches are gaining popularity mostly are evidence-based. Classical theories are normative while behavioral theories are rather descriptive and take their support from research findings.

2. Uncertainty, Risk, Risk Aversion

Uncertainty is the real life case where the probable outcomes and their likelihood are not known. Risk is sometimes the situation where the outcomes and their probability are known, that is there is a probability distribution. However, risk and uncertainty in this study is used interchangeably to mean real life situation with unknown outcomes and probabilities.

Measuring risk was first mentioned by Bernoulli (1954), by saying that valid measurement of risk would be possible by incorporating utility function, which is in essence concave, to imply diminishing marginal utility and risk aversion. Risk aversion is someone`s dislike towards risk, if risk is to be taken, there must be a compensation offered.

Since then, two landmark theories emerged. First expected utility theory offered by Von Neumann and Morgenstern (1944), criticized by Kahneman and Tversky (1979), for its treatment of risk aversion. They argued that risk attitudes of individuals are different when they face gains or losses. In the domain of gains, they are risk averse, while in the case of losses they are risk seeking, which is in line with the behavior that underlies prospect theory by Kahneman and Tversky (1979, 1992).

In 1960s Pratt-Arrow measure of absolute and relative risk aversion were the important developments for understanding risk taking behavior (Pratt, 1964). Eisenhauer (2006) criticizes Pratt-Arrow risk measure because it requires wealth levels to be known and size of the stakes. If stakes are infinitesimal, theory is working. However, it may not accurately capture the sizeable stakes, which would be the cases in real life.

When risks are small, behavior is approximately risk-neutral; individuals manifest aversion only towards larger risks (Eisenhouer, 2006; Holt & Laury, 2002). Significant risk aversion is observed in Binswanger's (1980) research even though the monetary incentives were not high enough compared to their monthly income. Actual high level monetary prizes cause increased risk-averse behavior relative to the prize (Kachelmeier & Shehata, 1992).

In a game show or an actual auction, an evaluation period given to subjects between the rounds to look at their losses/gains in an aggregated way, so possibility of losses is not deterring them (Gneezy & Potters, 1997). This could be a factor regarding relatively low or no risk aversion.

Some studies demonstrated lower or no risk aversion at lab while a similar scenario in real life would produce rather moderate or high risk aversion (Rabin, 2000). Post et al., (2008) argued that standard expected utility theory cannot explain the preferences of individuals at all times, because they are assumed to make the same preferences for a given choice set. They further state that since expected utility theory is unable to explain the different decisions of winners and losers in the same context; a utility function with convex parts and depending on prior outcomes could be an explanation. Also reference and path dependence are not factors considered in expected utility theory, rather the case seems to be appropriate for prospect theory. Gertner (1993) in TV game show Card Sharks found out those prior winnings had negligible effect on contestants' willingness to take risks in later rounds,

which contradicts with above argument. Auction literature often assumes constant risk aversion for computational convenience (Holt & Laury, 2002; Schneider, Day, & Garfinkel, 2015).

2.1. Risk Aversion and Gender

There are gender differences regarding risk attitude in the majority of the studies under investigation. Eckel and Grossman (2002), Johnson and Powell (1994), Agnew et al., (2008), Ertaç & Gurdal (2010), Hibbert (2008) found out in their experiments that women are more risk averse than men. However some studies have different findings than majority of the work that is presented below.

Women do not prefer competition, and less likely to enter into competition. Fear might be the reason being deterred from competition (Croson & Gneezy, 2009). When both genders are in a competitive environment, men are slightly performing better. When they are paid, men's performance increased significantly, while women's performance is not affected (Gneezy, Niederle, & Rustichini, 2003; Gneezy & Rustichini, 2004). Cultural differences might have an effect on women's competition. In Africa Maasai women were reluctant to enter into competition compared to man. However, Khasi women were more eager for competition (Gneezy, Leonard, & List, 2009).

Women consider being in a TV show as personally risky, bad performance in public would bring shame and not to prefer to disclose their names in public (Larkin & Pines, 2003).

A survey based on PAD (Pleasure Arousal Dominance) demonstrated that trait dominance significantly predicted increased risk taking, while no gender difference is observed (Demaree et al., 2009). Vlaev et al., (2010) found out that risk attitudes depend on the context, not on gender difference.

Attitude towards risk differs depending on the social role and education of women. Women in managerial positions tend to take equal risks compared to men, and have the decision of equal quality. Non managerial positions however have a different picture; women are less prone to risk than men (Johnson & Powell, 1994). Women entrepreneurs are taking risks equally compared to men (Birley, 1989; Master & Meier, 1988).

According to Scheel and Nagelschneider (2015), women and men are not different in terms of risk taking, but contestants that dare to show up on TV are probably more confident, extravert and risk loving (or at least risk neutral) individuals in the general population.

Köbberling and Wakker (2005) argue that risk aversion is actually caused by loss aversion to a considerable degree. They propose that attitude towards risk has three parts: basic utility, probability weighting and loss aversion.

According to Schubert et al., (1999), there is no difference with respect to genders, it rather depends on the context. Abstract gambles may give rise to gender specific risk taking attitudes, where men seek risk in case of gains while women seek risk in case of losses.

Harris, Jenkins and Glaser (2006) bring another perspective to gender differences. As far as their role in human evolution is concerned, men try to disperse their offspring as much as possible and take risks, while women tend to protect their offspring, because of scarcity and more investment they make. This would be reflected in other contexts.

Harbaugh, Krause and Vesterlund (2002) demonstrated that there is no gender difference in their lottery choice, however, for high probability gains, and small probability losses they are risk seeking while for low probability gains and high probability losses they are risk averse, which support prospect theory.

Holt and Laury (2002) found out that in their lottery choice experiment that women are slightly more risk averse in low payoff lotteries while there is no gender difference in high payoff lotteries where both genders are equally risk averse.

Wieland et al., (2014) argue that women are not risk averse, but gambling averse. If the context of the task is changed from gamble to other, risk aversion declines for women.

2.2. Loss Aversion

Suggested by Prospect Theory`s fathers Kahneman and Tversky (1979), individual utility function is concave over gains and convex over losses, that is a gain contributes less to the utility than equal dollar loss subtracts from utility. Individuals try to protect or guarantee sure gains, and take risks if there is probable loss, which may lead to suboptimal financial decisions.

Loss aversion is one of the controversial issues in behavioral finance; there are several arguments, sometimes contradictory. Risk aversion of women might be the outcome of protective role in the family, especially towards children, starting from the early ages.

According to Eckel and Grossman (2002), women are risk averse, but no indication that they are also loss averse. Novemsky and Kahneman (2005) argue that, loss aversion provides complete explanation about risk aversion in cases there is equal probability to win and lose. However, when buying something, price is not considered as a loss.

The divergence between willingness-to-accept (WTA) and willingness-to-pay (WTP) for the same good is an indication of loss aversion, called as endowment effect (Kahneman, Knetch & Thaler, 1990). When judging an outcome, people consider similar cases for comparison; compare losses with other losses, which lead to separation of losses and gains. Such separation would make scaling losses and gains with different magnitude, and losses loom larger than gains (McGraw et al., 2010).

Individuals perceive the choices and options as gains or losses compared to a reference point, which in essence is the current wealth or situation of the individual (Tversky & Kahneman, 1991). People whose aspirations exceed their income are less risk and loss-averse. More competitive and

status-seeking people are less risk and loss-averse (Koedijk, Pownall & Statman, 2012). Loss averse contestants compete less aggressively in an experimental contest (Cornes & Hartley, 2012).

Emotions about outcomes are stronger among women, (Eriksson & Simpson 2010) feel more discomfort with the likely losses. The format of the survey also affects loss aversion. In a coin-toss experiment, subjects were more loss-averse when they are filling the results on loss side that gain side (Harink et al., 2012).

3. Experimental Studies

Experiments are useful in finance because they allow researchers to isolate and manipulate one variable at a time, thereby illustrating its causal effects without using complex econometric techniques to filter out effects of other variables (Bloomfield & Anderson, 2010). They are also replicable, you can repeat several times to test learning (Croson & Gneezy, 2009).

Non experimental research has the shortcoming of joint hypothesis problem. In the case of investment experiment, investors may not take into account quantitative data and analysis, however, other events that influence their behavior would not be known for sure, therefore it is hard to infer precise probabilities (Post et al., 2008).

In experimental design, two important criteria must be balanced. First, correct statistical inference together with internal validity and informativeness, second, generalizability (external validity) (Czibor et al., 2019). There is an ongoing debate about how the experiments must be designed so that they are fruitful for scientific inference, and really resembling the real life. Al-Ubaydli and List (2012) concluded that more field experiments must be conducted so that a bridge between lab and natural experiments can be maintained and thus derive stronger results about real phenomena.

Experimental studies range from closely controlled variables and subjects in lab settings to natural (field) experiments, where the real life is imitated, or a real life case can be observed. There are different characteristics of experiments, each of which with different advantages and disadvantages. The generally accepted taxonomy classifies them into 4 groups (Harrison & List 2004):

1. Conventional lab experiment – with standard subject pool, framed and predetermined rules.
2. Artefactual field experiment – only the subject pool is not standard.
3. Framed field experiment – in the field context but a task, commodity or information set that is used by the subjects
4. Natural field experiment is the same as framed field experiment, but subjects are doing the tasks without knowing that they are in an experiment.

The research covered in this paper is a natural field experiment.

3.1. Natural (Field) Experiments

Natural experiments are the real world cases and environments in which people behave as if they are in an established experiment or lab and do things that are asked from them. The main attraction of natural experiments is that they reflect the choices of individuals in a natural setting, facing natural consequences that are typically substantial (Harrison & List, 2004). The characteristics of natural experiments provide us chance of randomization and realism (Czibor, Jimenez-Gomez, & List, 2019).

TV game shows with prizes offered can be considered as natural experiments.

3.2. Some Experimental Studies and Bidder Behavior

A study by Shogren et al. (1999) compared the preferences of people in hypothetical survey about retail experience, at a lab and finally in a retail store. Differences of choices in three settings were significant, although there are advantages and disadvantages of each.

Lusk and Fox (2003) directly tested whether auction bids elicited in a laboratory setting were equal to those elicited in a retail setting. After controlling for zero bidders, they found that bids were significantly higher in the store setting than in the lab; about 30% higher after controlling for other exogenous factors.

Augenblick (2011) worked with penny auction data and found out that bidders are having naïve sunk cost fallacy that is they cannot sacrifice whatever they have invested earlier and continue even if it is not profitable. Bidders however, learn to make higher profits, but in a slower fashion. Berk et al., (1996) come to conclusion that participants are not fully rational.

Blavatskyy and Pogrebna (2006) analyzed actual data from DOND's Italian version, Affari Tuoi, and found out that 46% of the contestants accept the exchange offer which violates prospect theory's prediction of always rejecting the offer due to loss aversion. Anderson et al., (2006) also worked on UK's actual DOND data and found out that expected utility theory's predictions were not proven. Increasing risk aversion, not incorporating personal wealth into their decision and some probability weighting by contestants were observed.

Ariely and Simonson (2003) investigated bidder behavior in online auctions with multiple sequential decisions. Some anchoring to initial price is detected. If there was adequate bidders attracted to the auction, then there would be a bidding war, which can be described as herding.

Above mentioned studies elicit that findings under different settings may vary significantly, thus a natural environment may generate more representative results, although they have the control problems inherent.

3.3. TV Game Shows

TV game shows are very popular for investigating individual behavior and decision making in certain contexts. They are usually the natural (field) experiments, where the data are collected ex-post. Some studies involve the imitation of an actual game show in lab/class environment (Botti et al., 2009).

Majority of the previous studies on game shows investigated loss aversion, risk aversion and gender differences, which are also covered by this study. Additionally they also try to investigate the rationality (Berk et al., 1996), learning (Augenblick, 2011), and other decision phenomena.

Some previous research on game shows:

- "Lingo" (Beetsma & Schotman, 2001)
- "Deal or No Deal-DOND" (Post et al., 2008; Blavatskyy & Pogrebna, 2008; De Roos & Sarafidis, 2006; Mulino et al., 2006; Brook et al., 2009)
- "Price is Right" (Bennett & Hickman, 1993; Berk et al., 1996; Healy & Noussir, 2004)
- "Who Wants to Be a Millionaire?" (Daghofer, 2007; Johnson & Gleason, 2009)
- "Affari Tuoi" Italian version of DOND (Botti et al., 2009)
- "The Weakest Link" (Levitt, 2004; Antonovics et al., 2005)
- "Card Sharks" (Gertner, 1993)
- "Jeopardy" (Metrick, 1995)
- "Will (s)he Share or Not" (Belot, Bhaskar, & vandeVan, 2010)
- "Friend or Foe"(List, 2006)
- Million pound drop (Sheel & Nagelschneider, 2015)

3.4. Aim

The aim of this study is to analyze the bidding behavior in a game show with various aspects of bidding behavior, such as gender differences, risk aversion, and loss aversion.

The advantage is that the setting of the game show is almost exactly the same as a real open outcry ascending /descending auction. However, there is nothing for which is a price is paid, but bidding is on spouse's ability to achieve a game. The budget or cost constraint in a real auction is represented in the game show by the ability of the spouse. In this paper, we examined bidding behavior in a TV game show "I Don't Know, My Spouse Knows." To our knowledge, any game show based on this

original format is not broadcasted in any other country, and no research is made regarding the show yet. Hence, we collected data for and analyze the Turkish version only.

The game setting is actually mimicking an auction environment. Open competition of ascending or descending sequential bids by participants is exactly the same as in an auction. They try to give their best bids, and also try to guess their spouses' ability to achieve. In real life auctions, participants have budget and cost constraints, which could be parallel to ability to achieve. They raise the bids to the level that they believe their spouse could succeed.

4. Method

4.1. The Game

The aim of this study is to analyze the bidding behavior in the game show, " I don't know, my spouse knows." This game show is broadcasted first in Germany with the name "Mein Mann Kann (My Husband Can)", and later adopted by a Turkish TV channel as "Ben Bilmem Eşim Bilir (I Don't Know, My Spouse Knows)". The show is broadcasted between July 2012 – May 2014 with host İlker Ayrık, later the host and the format was changed. Now the show is on air in another TV channel with another show name and with the host İlker Ayrık, however the number of games with bidding is less in this program.

To collect the data from a standard game show we selected our sample from the first broadcasted version with host İlker Ayrık.

In the game show four couples compete for a prize of brand new car. Men/women bid on what his/her spouse can achieve in specific games, which are not known until the bidding starts. There is a wide variety of games, and in each game, bidding is either ascending or descending, about in how many seconds or at a fixed time his/her spouse can eat, do, and score in the game. The couple, who has the highest achieved bid wins, and gets 1000 – 5000 points. After few rounds, couples with lowest or no points are eliminated one by one until two couples remain. They play the final game, which requires no bidding to get the prize.

4.2. Data Collection and Sample

A total of 212 programs are broadcasted between July 2012 – May 2014. Videos of the shows broadcasted are downloaded from the Internet. A group of assistant students from MU Business Administration Department are trained to watch the videos and fill data collection sheets. A sample of 160 programs is watched (75 %). Data are then inputted to Microsoft excel. After cleansing, data are transported to statistical package for analyses. Each program has approximately 4 rounds therefore in total 578 games are evaluated. Four couples compete for the prize in each program consequently 578 * 4 couples=12312 bids are examined.

Demographical information about the couples are given in Table 1. As can be seen from the Table 58.10 % of the bidder's gender is female and 41.90 % is male. Majority of the players are married (75.10 %) and again majority of the players are young (85.50 %).

Table 1: Bidder's Demographic Information

Bidder's Gender	Bidder's Marital Status	Bidder's Age
Female 58.10 %	Married 75.10 %	Young 85.50 %
Male 41.90 %	Engaged 10.50 %	Old 14.50 %
	Partners 14.40 %	

4.3. Findings

Prior to analyzing data we examined the distribution of the bidding types. As explained before bidding is either ascending or descending depending on the game played. But when we studied we realized most of the games played were ascending in nature (See Table 2).

Table 2: Distribution of Bidding Types

Bidding Type
Ascending 83.20 %
Descending 16.80 %

Initial findings indicate 53.2 % of the ascending bids 71.9 % of the descending bids are accomplished (See Table 3).

Table 3: Initial Findings

	Bid Accomplished	Bid Unaccomplished	Total
Ascending Bid	1024 (53.2 %)	900 (46.8 %)	1924
Descending Bid	279 (71.9 %)	109 (28.1 %)	388
Total	1303	1009	2312

Since one of the purposes of this study is to explore risk taking behavior associated with bidding behavior, we calculated the risk for bids. Risk is defined as the difference between accomplished score and bid divided by bid. In ascending bid games, men/women bid on what his/her spouse can achieve in specific games and they try to increase the number of times their spouse can do/complete the concerned game; e.g. number of balls one throws to a basket jumping up and down, how many hot chili peppers one can eat. Hence the formula (1) is used to measure risk for ascending games.

Risk for Ascending Bids is: Risk = (Accomplishment – Bid) / Bid < 0 (1)

In descending bid games, men/women bid on the shortest time his/her spouse can achieve in specific games and they try to decrease time their spouse can do/complete the concerned game; e.g. complete

a track running with high heeled shoes, drills three holes on a wooden surface with blind eyes with the spouse' guidance. Hence the formula (2) is used to measure risk for descending games.

Risk for Descending Bids is: Risk = (Accomplishment – Bid) / Bid > 0 (2)

Seeing that the ascending bids are accomplished more compared to descending bids, we wanted to test if risk-taking associated with descending bids are more than ascending bid.

Table 4: Independent Samples t-test Result of Risk by Game Type

		N	M	SD	t	df	p
Risk	Ascending	1149	.39	.43	-1.43	661.30	.15
	Descending	331	.43	.37			

*p< .05, **p< .01, ***<.001

As can be seen from Table 5 the independent samples t-test result indicated there was no difference in risk-taking behavior with respect to game type.

To find out the difference between risk taking behavior of females and males an independent samples t-test is conducted. The result revealed that there was no difference in risk taking behavior with respect to gender (See Table 5).

Table 5: Independent Samples t-test Result of Risk by Gender Difference

		N	M	SD	t	df	p
Risk	Females' Bid	884	.40	.34	-.34	1478	.73
	Males' Bid	596	.41	.51			

*p< .05, **p< .01, ***<.001

During the game show the ages of the participants are not asked and most of the couples are young, still some participants are old relatively. Games mainly require physical stamina therefore we also tested if the risk taking behavior of young and old are different or not. As can be seen from Table 6 the independent samples t-test result indicated there was no difference in risk-taking behavior with respect to age.

Table 6: Independent Samples t-test Result of Risk by Age

		N	M	SD	t	df	p
Risk	Young' Bid	1218	.39	.36	-1.58	1422	.11
	Old' Bid	206	.44	.68			

*p< .05, **p< .01, ***<.001

Participants of the game show can be married couples, engaged couples or partners, as the last demographic variable marital status is taken and the differences in risk taking behavior with respect to marital status is tested by one way ANOVA test. Like the other demographical variable here again we found no difference (See Table 7).

Table 7: ANOVA Result of Risk by Marital Status

		N	M	SD	SS	df	F	p
Risk	Married	1093	.40	.44	.21	2	.58	.56
	Engaged	147	.44	.43	258.23	1449		
	Partners	212	.40	.33	258.4	1451		

*p< .05, **p< .01, ***<.001

During game show bidding the highest score (or lowest in descending) does not secure the accomplishment. One can win if he/she accomplishes the score bid by his/her spouse and the bid is the highest (or lowest in descending) of the accomplished bids. Therefore to find out if there is a difference in the risk taking behavior of winners and losers (to find out if the ones who bid with higher risk wins or loses) we conducted independent sample t-test. The results revealed that there is significant difference (t=-9.61; df=424.37; p=.00; M_{winner}=.23; M_{loser}=.43). The winners have bid with lower risk then losers which indicate that there might be loss aversion (See Table 8).

Table 8: Independent Samples t-test Result of Risk by Winner or Loser

		N	M	SD	t	df	p
Risk	Winner' Bid	200	.23	.24	-9.61	424.37	.00***
	Loser' Bid	1280	.43	.43			

*p< .05, **p< .01, ***<.001

To test if there is difference in the amount of risk taken with respect to the number of rounds game played ANOVA tests are conducted separately for females and males. Usually females bid first rounds than males bid for the last games. Therefore we have compared first 3 rounds for females and last 3 rounds for males.

Table 9: ANOVA Result of Risk by Rounds for Females

		N	M	SD	SS	df	F	p
Risk	Round 1	374	.34	.35	1.836	2	7.87	.00***
	Round 2	212	.44	.32	102.79	881		
	Round 3	298	.43	.34	104.63	883		

*p< .05, **p< .01, ***<.001

Table 10: ANOVA Result of Risk by Rounds for Males

		N	M	SD	SS	df	F	p
Risk	Round 2	252	.40	.61	.03	2	.05	.95
	Round 3	140	.41	.53	155.78	593		
	Round 4	204	.41	.33	155.81	595		

*p< .05, **p< .01, ***<.001

To find out if there is a difference in the risk taking behavior between rounds (as more rounds played the probability of being eliminated increases for the ones who have not accomplished their bids) we conducted one-way ANOVA test (See Table 9 and 10). The results revealed that there is significant difference for female players (F=7.87; p=.00; M_{round1} =.34; M_{round2} =.44; M_{round3} =.43). The risk taken in the first round is less than 2nd and 3rd round. There is no difference between 2nd and 3rd. This may be due the fact females bid the first rounds. So they may bid without taking risk believing there is more games to play if they lose the first round. Yet as more rounds played the chance of being eliminated increases. However there is no significant difference for male players. When we look at the means we see males bids are same over rounds and around .40 which is a higher value compared to females first round bids risk value (.34). Most likely that there is loss aversion, meaning couples take more risks when they are in vulnerable position. They have either no or relatively low points in later rounds, than they tend to take more risks, in order to make up for the lost points in earlier rounds.

5. Conclusion

Present study investigated risk taking behavior by gender, type of bids (ascending/descending, winners/losers), age group and marital status and rounds game played.

Finds reveal that on the overall, the amount of risk taken does not show significant difference with respect to gender. However, when we analyze further, the rounds played we found out that females take fewer risks in earlier rounds, whereas we could not find a similar result for males. Loss aversion can be thought for women.

Findings of previous research regarding gender differences are rather mixed. Lingo by Beetsma and Shotman (2001), Affori Tuoi by Botti et al. (2009), DOND by Blavatskyy & Pogrebna (2008), Balthussen et al. (2008), Larkin and Pines (2003), Friend and Foe by List (2006), Million Pound Drop by Sheel and Nagelschneider (2015) found no gender difference regarding risk taking; while DOND by Mulino et al. (2006), Brooks et al. (2009) Who Wants to be Millionaire by Johnson and Gleason (2009), Daghofer (2007) found gender differences in risk taking.

In other experimental studies, Johnson and Powell (1994), Agnew et al. (2008), Eckel and Grossman (2002), Charness and Gneezy (2012), Ertaç and Gürdal (2012), regarding risk taking and Gneezy et al. (2003) regarding performance in games, Hardies et al. (2013) regarding gender risk taking and

overconfidence found gender differences. Harbaugh, Krause and Vesterlund (2002), Schubert et al. (1999), Harris et al. (2006) and Demaree (2009) found no gender difference in their experiments.

According to Larkin and Pine (2003), women are more concerned about how they appear in public and consider participating in the game shows as personally risky. Women who are courageous enough to be in a game show may be quite different than their peers staying home. So it would be natural to expect women contestants are equal risk-takers as men.

Findings also demonstrated that losers take more risk compared to winners, which would be an indication of loss aversion; nevertheless, further clarification is needed. Post et al. (2008) also found out that losers have increased risk aversion. According to them, intention would be to make up for the losses (break-even effect), and low risk aversion for winners is because of incomplete adaptation to prior gains (house-money effect).

Other than these, types of games played, age, marital status, did not have significant effect on risk taking behavior.

We plan to investigate further learning, whether there is predatory and jump bidding, and the risk taking behavior regarding different games.

References

Agnew, J.R., Anderson, L.R., Gerlach, J.R., & Szykman, L.R. (2008). Who chooses annuities? An experimental investigation of the role of gender, framing and defaults. *The American Economic Review, Papers and Proceedings, 98*(2), 418-422.

Al-Ubaydli, O., & List, J.A. (2012). On the generalizability of experimental results in economics, *National Bureau of Economic Research Paper Series* No:17957, 24 pages.

Andersen, S., Harrison, G.W., Lau, M.I., & Rutström, E.E. (2006). Dynamic choice behavior in a natural experiment, *Copenhagen Business School Working Paper*., 54pages.

Antonovics, K., Arcidiancono P., Walsch R. (2005). Games and discrimination: Lessons from The Weakest Link. *Journal of Human Resources, 40*(4), 918-947.

Ariely, D., & Simonson, I. (2003). Buying, bidding, playing, or competing? Value assessment and decision dynamics in online auctions. *Journal of Consumer Psychology, 13*(1-2), 113-123.

Augenblick, N. (2011). *Consumer and producer behavior in the market for penny auctions: A theoretical and empirical analysis*. Unpublished dissertation, University of Berkeley.

Beetsma, R.M.W.J., Schotman, P.C. (2001). Measuring risk attitudes in a natural experiment: Data from the television game show Lingo". *The Economic Journal, 111*(October), 821-848.

Bennett R.W., Hickman K.A (1993). Rationality and "The Price is Right". *Journal of Economic Behavior and Organization, 2*1(1), 99-105.

Berk J.B., Hughson E., Vandezande K. (1996). The Price is Right. But are the bids? An investigation of rational decision theory. A*merican Economic Review, 86*(4), 954-970.

Bernoulli, D. (1954). Exposition of a new theory on the measurement of risk (Translated from Latin into English by Dr. Louise Sommers 1738). *Econometrica, 22*(1), 23-36.

Binswanger, H.P. (1980). Attitudes toward risk: Experimental measurement in rural India. *American Journal of Agricultural Economics, 62*(3), 395-407.

Birley, S. (1989). Female entrepreneurs: Are they really any different?. *Journal of Small Business Management, 27*(1), 32-37.

Blavatskyy P., & Pogrebna G. (2008). Risk aversion when gains are likely and unlikely: Evidence from a natural experiment with large stakes. Retrieved from http://www.zora.uzh.ch.

Bloomfield, R., & Anderson, A. (2010). Experimental finance. *Cornell University Johnson School Research Paper Series* #23-2010, 22 pages.

Botti, F., Conte A., DiCagno D., D'Ippoliti C. (2009). Lab and framed lab versus natural experiments: Evidence from risky choice experiment. Re*search in Economics, 63*, 282-295.

Brooks, R., Faff R., Mulino, D., & Scheelings, R. (2009). Deal or no deal that is the question: The impact of increasing stakes and framing effects on decision-making under risk. *International Review of Finance, 9*(1), 27-50.

Cornes, R., & Hartley, R. (2012). Loss aversion in contests. *The University of Manchester Discussion Paper Series*, EDP-1204, 28 pages.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature, 47*(2), 448-474.

Daghofer F. (2007). Financial risk-taking in "Who Wants to Be a Millionaire": A comparison between Austria, Germany and Slovenia. Inter*national Journal of Psychology, 42*(5), 317-330.

De Roos N., & Sarafidis Y. (2006). Decision making under risk in Deal or No Deal. Retrieved from http://ssrn.com/abstract=881129.

Demaree, H.A., DeDonno, M.A., Burns, K.J., Feldman, P., & Everhart, D.E. (2009). Trait dominance predicts risk-taking. *Personality and Individual Differences, 47*(5), 419-422.

Eckel, C.C., & Grossman, P.J. (2002). Sex differences and statistical stereotyping in attitudes toward financial risk. *Evolution and Human Behavior, 23*(4), 281-295.

Eisenhauer, J.G. (2006). Risk aversion and prudence in the large. *Research in Economics, 60*, 179-187.

Eriksson, K., & Simpson B. (2010). Emotional reactions to losing explain gender differences in entering a risky lottery. *Judgment and Decision Making, 5*(3), 159-163.

Ertaç, S., & Gürdal, M.Y. (2010). Deciding to decide: Gender, leadership and risk-taking in groups. *Tusiad-Koç University Economic Research Forum Working Paper Series*, WP1028.

Gertner, R. (1993). Game shows and economic behavior: Risk-taking on "Card Sharks". *Quarterly Journal of Economics, 108*, 507-521.

Gneezy, U., & Potters, J. (1997). An experiment on risk taking and the evaluation periods. *The Quarterly Journal of Economics, 112*(2), 631-645.

Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in competitive environments. *The Quarterly Journal of Economics, 118*(3), 1049-1074.

Gode, D.K., & Sunder, S. (1993). Allocative efficiency of markets with zero-intelligence traders: Market as a substitute for individual rationality. *Journal of Political Economy, 101*(1), 119-137.

Harbaugh, W.T., Krause, K., & Vesterlund, L. (2002). Risk attitudes of children and adults: Choices over small and large probability gains and losses. *Experimental Economics, 5*(1), 53-84.

Harink, F., Beest, I.V., Dijk, E.V., & Van Zeeland, M. (2012). Measurement – induced focusing and the magnitude of loss aversion: The difference between comparing gains to losses and losses to gains. *Judgment and Decision Making, 7*(4), 462-471.

Harris, C.R., Jenkins, M., & Glaser, D. (2006). Gender differences in risk assessment: Why do women take fewer risks than men?, *Judgement and Decision Making Journal, 1*(1), 48-63.

Healy, P., & Noussir, C. (2004). Bidding behavior in the price is right game: An experimental study. *Journal of Economic Behavior and Organization, 54*(2), 231-247.

Hibbert, A.M. (2008). *Essays on risk aversion, diversification and participation*, Unpublished dissertation, Florida International University.

Holt, C.A., & Laury, S.K. (2002). Risk aversion and incentive effects. *The American Economic Review, 92*(5), 1644-1655.

Johnson D.K.N., & Gleason T.R. (2009). Who really wants to be a millionaire? Gender differences in a game show contestant behavior under risk. *Social Science Quarterly, 90*(2), 243-262.

Johnson, J.E.V., & Powell, P.L. (1994). Decision making, risk and gender: Are managers different?. *British Journal of Management, 5*(2), 123-138.

Kachelmeier, S.J., & Shehata, M. (1992). Examining risk preferences under high monetary incentives: Experimental evidence from the People's Republic of China. *The American Economic Review, 82*(5), 1120-1141.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263-291.

Kahneman, D., Knetch, J.L., & Thaler, R.H. (1990). Experimental tests of the endowment effect and the coase theorem. *Journal of Political Economy, 98*(6), 1325-1348.

Köbberling, V., & Wakker, P.P. (2005). An index of loss aversion. *Journal of Economic Theory, 122*(1), 119-131.

Koedijk, K., Pownall, R.A., & Statman, M. (2012). Aspirations, well-being, risk-aversion and loss-aversion, retrieved from http://ssrn.com/abstract=2021007.

Larkin, J.E., & Pines, H.A. (2003). Gender and risk in public performance. *Sex Roles, 49*(5-6), 197-210.

Levitt S.D. (2004). Testing theories of discrimination: Evidence from Weakest Link. J*ournal of Law and Economics, 47*(2), 431-452.

Master, R., & Meier, R. (1988). Sex differences and risk taking propensity of entrepreneurs. *Journal of Small Business Management, 26*(1), 31-35.

McGraw, A.P., Larsen, J.T., Kahneman, D., & Schkade, D. (2010). Comparing gains and losses. *Psychological Science, 21*(10), 1438-1445.

Metrick A. (1995). A natural experiment in Jeopardy!. Am*erican Economic Review, 85*(1), 240-253.

Mulino D., Scheelings R., Brooks R.D., & Faff R.W. (2006). An empirical investigation of risk aversion and framing effects in the Australian version of Deal or No Deal. Retrieved from http://ssrn.com/abstract=926040.

Novemsky, N., & Kahneman, D. (2005). The boundries of loss aversion. *Journal of Marketing Research, 42*(2), 119-128.

Post T., Van den Assem M., Baltussen G., & Thaler R. (2008). Deal or No Deal? Decision making under risk in a large payoff game show. *American Economic Review, 98*(1), 38-71. DOI: 10.1257/aer.98.1.38

Pratt, J.W. (1964). Risk aversion in the small and in the large. *Econometrica, 32*(1-2), 122-136.

Rabin, M. (2000). Risk aversion and expected-utility: A calibration theorem. *Econometrica, 68*(5), 1281-1292.

Scheel, F., & Nagelschneider, J. (2015). Gender differences in decision making under risk. Evidence from TV game show. *Die Betriebswirtschaft*, 25-43.

Schneider, M., Day, R., & Garfinkel, R. (2015) Risk aversion and loss aversion in core-selecting auctions. *Decision Support Systems, 79*(Nov.), 161-170. DOI: 10.1016/j.dss.2015.09.007.

Schubert, R., Brown, M., Gysler, M., & Brachinger, H.W. (1999). Financial decision-making: Are women really more risk-averse?. *AEA Papers and Proceedings, 89*(2), 381-385.

Sözer-Oran, J. (2010). *Teoride ve Pratikte Müzayede (Auction in Theory and Practise),* Marmara University, Nihat Sayar Foundation Publications, İstanbul.

Tseng, J.J., Lin, C.H., Lin, C.T., Wang, S.C., & Li, S.P. (2010) Statistical properties of agent-based models in markets with continuous double-auction mechanism. *Physica A, 389*(8), 1699-1707.

Tversky, A., & Kahneman, D. (1991). Loss aversion in riskless choice: A reference-dependent model. *The Quarterly Journal of Economics, 106*(4), 1039-1061.

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty, 5*(4), 297-323.

Von Neumann, J., & Morgenstern, O. (1944) *Theory of Games and Economic Behavior*, Princeton, N.J., Princeton University Press.

Wieland, A., Sundali, J., Kemmelmeier, M., & Sarin, R. (2014). Gender differences in the endowment effect: Women pay less, but won't accept less. *Judgment and Decision Making, 9*(6), 558-571.