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Using involvement to reduce inconsistencies in risk preference elicitation

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ABSTRACT

Empirical research aiming to elicit risk attitudes faces problems of within- and between-method inconsistencies, which reduce the explanatory and predictive power of risk research. In this paper, we investigate the relevance of context and task involvement on these inconsistencies. Our analysis is based on a sample of 244 German agricultural sciences students, which were performing an iterative multiple price list (iMPL) and a simple self-assessment question on risk preferences. We find that using a real life and subject context specific (here, agricultural) framing of the iMPL is leading to fewer within- and between-method inconsistencies. This is due to the fact that contextual framing has an increasing effect on task involvement (proxied with the time spent in the iMPL). Additionally, we find that contextual framing triggers the role of subjects' context involvement (proxied using an indicator for students' involvement in the agricultural domain). More specifically, both higher task and context involvement are found to decrease within-method inconsistency in the iMPL task. While also between-method inconsistency is decreasing in subjects' task involvement, we found no effect of context involvement. In conclusion, our results suggest that by framing a risk elicitation method according to the subjects' specific context, involvement can be triggered and inconsistencies and misspecifications can be reduced.

1. Introduction

The extent to which people are willing to take on risk constitutes their risk attitudes, which in turn plays a major role in explaining their behavior. Consequentially risk attitudes are of high importance for decisions in many contexts. Understanding individual attitudes towards risk is closely linked to the goal of understanding and predicting economic behavior and giving policy advice.

There is a large and growing body of literature on how to measure risk attitudes and accordingly a particular focus was on the selection of the `right' elicitation method (for an extensive overview see Charness et al., 2013). Many of these methods are based on the same theoretical foundation of expected utility theory (EUT) and thus claim to measure the subjects' `true' risk preference. Consequently, risk preferences elicited using different methods should be comparable and accurate. However, because of inconsistencies (i.e. errors) in the individuals' responses these criteria are often not met in empirical work by the participants (Csermely and Rabas, 2017). More specifically, three ways of consistency are distinguished in the literature i) between-method consistency of several elicitation methods (Crosetto and Filippin, 2013; Dohmen et al., 2011; Eckel and Grossman, 2002), ii) within-method consistency of the same elicitation method at one point in time (Holt and Laury, 2002; Jacobson and Petrie, 2009), and iii) within-method consistency of the same elicitation method over two points in time (Andersen et al., 2008; Harrison and Rutström, 2008). Inconsistencies lead to biases in the interpretation of the decision makers' risk preferences and consequently biased inferences on human behavior and policy recommendations. In order to overcome these inconsistency problems, past research has frequently reached out to new methods to elicit risk preferences (Charness et al., 2013). This did not necessarily result in lower inconsistencies but contributed to increasing problems of comparability of the different studies. Furthermore, a large body of literature seeks to identify the correct assumptions about the nature of the data gathered and thus 'errors' made by the subjects in the experiments generating the data under analysis (Carbone and Hey, 2000; Wilcox, 2008).

Based on the seminal work of Kahneman and Tversky (1979), numerous studies have shown that decision making is strongly influenced by the decision frame, i.e. decision makers respond differently to different but objectively equivalent descriptions of the same problem. Furthermore, Kahneman (2003) defined two different ways of processing information applied in different contexts of decision making depending on the motivation and capability of the decision maker. The motivation of subjects is expected to be dependent on the subject-

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specific relevance of the task, or, in other words, the subjects' involvement with it. The subject-specific relevance is expected to be influenced by the decision frame, so that framing can trigger task involvement.

And indeed, there is evidence in different experimental settings that the application of context is enhancing understanding of experimental tasks, reduces mistakes and increases quality of results (see Alekseev et al., 2017 for an extensive overview). However, there is evidence of heterogeneity with respect to how people respond to contextual changes. Alatas et al. (2009) find that expert subjects relate better to contextual framing than students. However, using student subject pools has a long tradition in experimental economics, due to amongst other reasons, the possibility of cost saving and convenience/availability of students. Thus, we focus on framing effects targeting the students and include the students' specific involvement with the contextualization.

We aim to close the gap in the literature and to reduce inconsistencies by including contextual framing and personal involvement in the risk elicitation research design. More specifically, we show in this paper that risk preference elicitation methods evoke fewer between-method and within-method inconsistencies when specific task and context involvement is included in the analysis. In our analysis, task involvement is determined by the decision makers' task related effort. In contrast, context involvement is defined by the personal relevance of the task for the decision maker.

The remainder of this paper is organized as follows. First, we give an overview on the existing literature concerning risk preference elicitation and inconsistencies. Next, an introduction to the experimental design and methodology used in this analysis is presented. The subsequent description of the data sample and results of this research is followed by the conclusion.

2. Literature background

Over the last decade approximately 20 new methods to elicit risk preferences have been published (for a detailed overview on the most established ones see Charness et al., 2013). Along these lines, there is growing literature on comparing experimental methods to measure risk preferences (e.g. Coppola, 2014; Csermely and Rabas, 2017; Crosetto and Filippin, 2013).

A very popular method to elicit risk preferences is via a Multiple Price List (MPL), where subjects are presented with a series of choices between gambles. This approach allows to estimate intervals for the curvature parameters of a utility function for each subject. However, since the inference of risk preferences, (and in turn parameter estimation) requires a unique switching point, respondents with more than one switching point are not behaving consistently under standard EUT assumptions on preferences (Charness et al., 2013). The problem of inconsistencies in MPL tasks is highly relevant in empirical research on experimental risk preference elicitation methods. For instance, Charness and Viceisza (2016) found that 75% of Senegalese farmers made inconsistent choices, Hirschauer et al. (2014) found 57% inconsistent answers amongst Kazakh farmers, and, using a sample of adults in Ruanda, Jacobson and Petrie (2009) found an inconsistency rate of 55%. High inconsistency rates are also observed in developed countries: e.g. Lévy-Garboua et al. (2012) find that on average around 36% of French students behave inconsistently in different MPL settings, Holt and Laury (2002) find 13% inconsistent answers amongst students in the USA and Dave et al. (2010) find 8.5% of participants answering inconsistently in a sample of Canadian citizens. The main problem of data containing inconsistencies is related to the different ways of dealing with inconsistencies to interpret risk preferences. Most researchers choose to either ignore subjects with inconsistent choices or to make specialized assumptions on the nature of stochastic errors and estimate the parameters of interest (Jacobson and Petrie, 2009). Excluding inconsistently behaving subjects, results in a biased sample since systematic differences may exist in the risk preferences of consistent and inconsistent participants (see Jacobson and Petrie, 2009 for more details on behavioral patterns of subjects making mistakes). When including inconsistently responding subjects in the estimation of the risk aversion parameter, a stochastic error term (i.e. `structural noise') parameter is often included in the estimation (see e.g. Harrison and Rutström, 2008; Carbone and Hey, 2000).

Three driving factors explaining between- and within-method instability of risk preference elicitation have been identified in the literature: i) differences in the cognitive ability of subjects and task complexity (Lévy-Garboua et al., 2012; Anderson and Mellor, 2009; Dave et al., 2010), ii) misspecification of individual preferences (Harrison et al., 2007; Starmer, 2000) and iii) context-dependence of risk preferences (Holt and Laury, 2005,2002; Deck et al., 2014).

One way to overcome problems with inconsistencies stemming from the subject pools cognitive abilities or complexity of the task is to use simpler risk preference elicitation methods. Dave et al. (2010) perform experiments on subjects with different mathematical ability. They conclude that a simpler elicitation method results in higher within-method consistency for subjects with lower mathematical ability. However, simpler alternative risk elicitation methods imply a loss of comparability and accuracy. Furthermore, Bruner (2009) and Lévy-Garboua et al. (2012) explore how different ways of displaying the choice sets affect inconsistency rates. Bruner (2009) finds less within-method inconsistencies for a menu displayed lottery frame with increasing probabilities vs. increasing reward. Lévy-Garboua et al. (2012) find more inconsistent behavior with a sequential presentation of decisions compared to a simultaneous presentation of all ten decisions and increasing presentation of probabilities Based on these results, Lévy-Garboua et al. (2012) conclude that inconsistencies with a bad frame, in terms of visual presentation of the MPL, are driven by a lack of information. In a similar vein, Andersen et al. (2008) find cognitively more challenging tasks (risk preference vs. time preference elicitation), to induce more noise in the estimated parameter.

To overcome inconsistencies, due to misspecifications in the underlying theoretical model. Some include elements of prospect theory e.g. loss aversion and probability weighting to characterize risk attitudes (for a detailed comparison of different underlying theoretical concepts see Abdellaoui et al., 2011). Other authors interpret inconsistencies as indifferences and hence adapt the original design of the MPL i) by including a third choice in each row indicating indifference in preference between both lotteries (Andersen et al., 2008) or ii) by enforcing a unique switching point (see Harrison et al., 2007; Andersen et al., 2006). The latter imposes strict monotonicity on revealed preferences and enforces transitivity. As there is no further control mechanism to ascertain whether all participants understood the task, this might cause biases of the results and, in turn, biases of the estimated preferences.

Moreover, inconsistencies have been found to be context and stake dependent. For instance, Holt and Laury (2002,2005) find that inconsistencies can be reduced by increasing the payoff level. The importance of the effect of decision frames on risk preferences has been widely recognized in the literature on decision making analysis (Levin et al., 1998; Tversky and Kahneman, 1986). Specifically, Deck et al. (2014) find that fewer inconsistencies occur if the MPL is framed as financial investment task compared to a lottery task. They, however, used a very general setting without accounting for the specific background of the participants. Thus, we aim to extend the existing literature by focusing on the role of the subjects' contextual and task involvement when analyzing inconsistencies and the effects of different decision frames.

Based on McElroy and Seta (2003), we define task involvement as the personal effort, motivation and capacity to perform the task at hand (we use the time spent on a specific task as proxy). Context involvement is defined as the personal relevance of the task for the decision maker (we use an involvement score based on the student's involvement with the agricultural domain to measure context involvement). McElroy and