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T4ID Final Project Report

'Georgian Wine': a risk preference eliciting tool

1. Literature Review

Before discussing a system of risk preference eliciting what follows in this section is a brief literature review of current risk preference eliciting techniques.

1.1 Summary

The concept of risk adjusted utility curves is important to development economics. The two main theories of Expected Utility Theory and Prospect Theory are being used to help economists try to figure out how certain demographics view risk because in the end, views on risk have serious impacts on quality of life. The majority of data comes from lottery systems. Due to differences in methodologies, much of the data is not comparable and thus large data sets regarding risk preferences across cultures are rare.

1.2 Trends

Several trends became apparent from the review. Each will be addressed individually

1.2.1 Expected Utility Theory and Prospect Theory

Every article mentioned the difference between the von-Neumann Morgenstern Expected Utility Theory, EUT, and the Kahneman and Taversky Prospect Theory, PT. These two major paradigms are how every one these papers viewed risk, along with a small mention of the 'Safety-First' theory.

The system to test these assumptions should involve: (Liu 2008)
1. Risk Aversion
2. Risk Loss
3. Non-Linear Probability Weighting

An interesting side issue in the EUT and PT debate was a discussion on whether or not a single agency model even made sense. As the field works now a 'winner takes all' approach is used for deciding whether data is best described by EUT or PT, meaning that if 55% of the data supports EUT, then all of the data gets interpreted as EUT. However, it was suggested that not only could one data set be described by two agency models, but also that each individual person could make decisions using both models in a context dependent way.

1.2.2 Testing Methods

With very little deviation the testing methodology used a series of lotteries played for real money. Although five types of tests were mentioned only one seemed to be considered important by all authors, the MPL or Multiple Price List. The MPL uses a series of lotteries where the player chooses between the lottery on the left and the lottery on the right. Implementation of the lottery is easy to

1.2.3 Repeated Calls for Better Data

Most of the papers called for better data, although that term shifted from case to case. In some instances the desire for better data was intended to help answer the question of whether EUT or PT represents a better risk model. In other instances the desire for better data

1.2.4 Physical Probability Devices

In order to show players that the probability system used to determine lottery outcomes is fair, several papers discussed the need to use physical objects like coins, dice, and different colored balls drawn from a bag. It was strongly cautioned that the use of digital probability generation should be avoided.

2. Problem Statement

Given the currently poor data sets and expensive and non-comparable methodologies for collecting data a better system needs to be developed. Development Economics needs a system that is easy to use, tests for the current paradigm of expected utility theory, EUT, and prospect theory, PT, and creates comparable longitudinal data sets.

The current continued misunderstanding of risk preferences for farmers worldwide on the part of agricultural extension NGOs must be corrected.

Republic of Georgia Farmers

3. Solution Approach

By taking some prior research into developing board games that teach economics, lessons learned from a literature review on risk preference eliciting techniques and adding three technologies I intend to build a full solution to collecting useful risk preference data sets. I intend to use this tool in the Republic of Georgia to gather risk preference data on grape farmers who traditionally sell their entire crop to local wineries (despite wage disparities and price setting).

3.1 Fox and Lion Games

Fox and Lion Games is a project to develop a series of board games that teach civics; starting with economics. The reasoning behind Fox and Lion Games is that if the USA desires citizen government then it will need citizen analysis.

The 'Farm' game was originally developed as part of a series of games intended linked to an educational component on learning about risk. As the game progresses in difficulty more educational material is provided.

The innovation lies in changing the concept from teaching risk to Americans into using the same basic structure to elicit risk preferences from farmers in developing countries.

3.2 Adding Three Technologies

Smart Tags

The game itself contains smart tags to allow the extension worker a simple system for pulling up the appropriate interview sheets at different parts of the game.

GIS Mapping

The interviews and data collected from games will be automatically time-stamped and GPS coordinates will be noted. This means that all data collected can be referenced in time and space for later analysis. As the data-set grows it could become very valuable to policy makers and economic development agencies.

iPad

Using the format of a traditional two-dimensional board game built into an iPad application, it will be possible to collect much more nuanced data while having participants play the same game. The physical game board version has interview questions and these interview responses have value, but when the same game is played on an iPad application information on decision making will improve. It will be possible to know how long each decision took the participant. It will be possible to alter framing effects to see if players will change their preferences when information is presented as losses instead of gains. It will be possible for players to create an account, which allows the collection of data for an individual over time.

3.3 The Local Solution

By using the well-known crop of wine grapes it may be possible to collect better risk preference data for the Republic of Georgia. A colleague of mine from Peace Corps married a Georgian woman and lives in Tbilisi, the capital of Georgia. The plan is to send him a prototype and a sales pitch power point slide deck so that he can approach small agricultural NGOs with the product. Once partnered with a local NGO the collection of data should be easy. Once enough data is collected a possible policy prescription may come from it.

The game itself is called 'Georgian Wine'. In the game players start with three vineyards and may choose to grow three types of grapes. The grape varieties differ in payouts like a series of lotteries that also mirror risk preferences. One variety of grapes pays out in a risk-averse way, a second variety of grapes pays-out in a risk neutral way and a third variety pays-out in a risk-preferring way. The game involves making choices under uncertainty, but the point of the game is actually to engage the player in a conversation about risk and not to determine risk preferences; at first.

If the player enjoys the first game they will be offered the chance to play the digital version on an iPad. The iPad version of the game can simultaneously run the game and collect sufficient data to check risk preferences, inter-temporal choice and stamp the data with time and gps coordinates.

4. Document Outcomes

The outcomes of this project are: this paper, a PowerPoint presentation, and a working prototype of 'Georgian Wine' the game. Only the physical prototype is completed. The digital interview forms have not been made. I intend to see if anyone from the HCII, Human-Computer Interaction Institute, will be interested enough in the project to become a business partner and develop the iPad game component of the system.

The most important outcome from the project is a list of recommendations derived from the literature review.

4.1 Literature Review Recommendations

Literacy / Numeracy

An interesting confound in the data is whether or not the participants were literate or numerate. This leads to a valuable design feature in the iPad app by adding a short math and reading comprehension quiz.

Social Networking

Information from the literature review also suggests that one of the most powerful indicators of risk attitudes is the subject's social network. The digital version of the game can easily incorporate a social network feature.

Framing

To test for loss aversion and perhaps preference reversal certain sections of the digital game can involve loss lotteries.

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