Preferences and Knowledge Survey for Different Trader Types: Pre-Registration

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1 Overview

We will run internet experiments to understand traders' preferences, knowledge, and investment behavior. One survey will be posted on binary options discussion forums ('binary options survey'), and one survey will be posted on crypto discussion forums ('crypto survey'). The two surveys will be similar except that investment and trading questions will focus more on binary options for the binary traders, and crypto questions for the crypto traders.

This pre-registration includes several preference tests, which we describe in turn in Section 2:

1. Event splitting questions
2. Dominance questions
3. Rank dependence questions

Cumulatively, these allow us to test for the presence or absence of the following in traders' preferences:

1. Simplicity preferences (Puri, 2020, 2022)
2. Cumulative Prospect Theory preferences (Kahneman and Tversky, 1992)
3. Prospect Theory preferences (Kahneman and Tversky, 1979)

In addition, in Section 3, we discuss knowledge and cognitive ability questions we intend to ask. In Section 4, we pre-register sample size and methods of data cleaning. In Section 5, we further pre-register (exploratory) correlational analyses.

Table 1: Preference Tests

	Test 1	Test 2
Simplicity (Strong)	Event splitting in favor of fewer outcomes	Violates dominance in favor of fewer outcomes
CPT	Displays rank dependence	Respects dominance
PT	Event splitting in favor of more outcomes	–

2 Preference Tests

In this section we describe the design of our preference-elicitation tests. We include questions that directly test the predictions of simplicity theory, prospect theory, cumulative prospect theory, and ambiguity aversion. For each lottery described below, we will elicit certainty equivalents using the standard multiple price list procedure. We then compare these certainty equivalents to understand preferences, in the manner described below.

2.1 Event Splitting

Event splitting refers, in this case, to the agent's preference between lotteries ($2, 60%; $3, 40%) and ($1.50, 30%; $2.50, 30%; $3, 40%). Prospect theory and simplicity theory make opposite predictions. A simplicity agent assigns a weakly positive utility premium to fewer outcomes, and therefore weakly prefers the first lottery. Under prospect theory, the S-shaped weighting function implies that more weight is given to the 60% outcome than to the two 30% outcomes combined. A PT agent therefore prefers the second lottery.

This test thus provides a non-parametric way of rejecting both theories. If the agent strictly prefers the three outcome lottery, then simplicity is rejected; if the agent weakly prefers the two outcome lottery, then prospect theory is rejected.

2.2 Violations of Dominance

We introduce a third set of tests on dominance violations. Cumulative prospect theory predicts no violations of dominance. A simplicity agent with sufficiently strong complexity aversion may violate dominance in favor of lotteries with fewer outcomes. This set of questions compares a dominating five-outcome lottery to a dominated three-outcome lottery. A CPT agent will prefer the dominating, while a simplicity agent may not respect dominance.

The second test for CPT and simplicity theory thus compares the equalizing payoffs chosen for these two questions: CPT predicts a strictly higher equalizing payoff in the dominating lottery, while simplicity theory permits a weakly lower equalizing payoff in the dominating lottery. Note that this set of questions allows us to reject not only CPT, but also any decision theory that respects dominance. Conversely, this test cannot reject simplicity (as a simplicity agent may but does not have to violate dominance), but it can detect strong simplicity preferences, if the agent violates dominance towards fewer outcomes.

2.3 Rank Dependence

Cumulative prospect theory assigns different probability weighting functions to the best and second-best outcomes. A standard test for CPT is therefore whether this rank dependent probability weighting holds. Each of Questions R and R' elicits an equalizing payoff, that is, r_1 and r_2 satisfying the following indifference conditions:

$$\text{R: } (\$8.50, 40\%; \$9, 30\%; \$1.50, 30\%) \sim (\$8.50, 40\%; \$9.50, 30\%; \$r_1, 30\%)$$
$$\text{R': } (\$10, 40\%; \$9, 30\%; \$1.50, 30\%) \sim (\$10, 40\%; \$9.50, 30\%; \$r_2, 30\%)$$

In words, in each row, what is the amount of money that would make the subject indifferent to increasing outcome \$9 to \$9.50?

The rank dependence feature of CPT implies that this amount of money should be different in each question (e.g. $r_1 \neq r_2$). This is because, in Q3, \$9 is originally the best outcome, while in Q4 it is the second-best outcome. In fact, for canonical CPT,[1] $r_1 < r_2$ (Bernheim and Sprenger, 2020).

3 Knowledge Questions

We intend to ask traders about their access to standard brokers, and their ability to trade standard financial products (like options) on their brokerage account, should they have one. We will also ask them about their trading activity, the extent to which they are invested in different kinds of products, and demographic and financial literacy questions.

[1]Canonical CPT refers to the commonly used formulation of Kahneman and Tversky (1992), who use the probability weighing function $w(p) = \frac{p^\gamma}{(p^\gamma+(1-p)^\gamma)^{1/\gamma}}$ and the utility function $u(x) = x^\alpha$. They identify parameter values $\gamma = 0.61$ and $\alpha = 0.88$.

4 Data Cleaning and Sample Restrictions

We intend to clean data by dropping those who say they have never heard of binary options (if coming from a binary options discussion forum) and those who say they have never heard of crypto (if coming from a crypto discussion forum). In addition, we will implement comprehension checks and drop individuals who do not answer these correctly.

Since we elicit certainty equivalents using MPLs, there are multiple ways to clean including: (1) dropping anyone who displays at least one instance of multiple switching, (2) dropping those who violate monotonicity (ex. report preferring a lottery to $2 but also preferring $1.50 to the lottery), (3) dropping responses (not individuals) with multiple switching, (4) dropping individuals who multiple switch for the majority of their answers. Our preferred specifications are (2) and (4) combined, and (1) and (2) combined. As robustness checks, we may analyze preferences with each of these methods.

We will continue to collect responses until: we obtain 300 superclean responses for each survey, where superclean means satisfy criteria above and MPL criteria (1) and (2), the surveys have been up for one month, or we run out of funding, whichever occurs first. Note that (unlike posting on dedicated survey platforms like Amazon mTurk) here we post the survey on discussion forums, so the number of survey respondents is inherently stochastic; our stopping rule is the aforementioned criteria.

5 Correlational Analyses

We may also conduct exploratory analysis of preference results by demographic type or by investment answers (however, we do not consider this exploratory analysis a primary outcome).

References

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