Risk vs. Ambiguity:

Reducing Hedging by Changing Payment Structure

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Background

- Risk-ambiguity experiments are done to see how people react to clear vs. unknown probabilities.
- **Ambiguity aversion** (AA) is when people avoid ambiguous decisions, breaking one of the two following axioms:
  - **Consequentialism**: The requirement that preferences only depend on outcomes (in) states that are still possible.
  - **Dynamic Consistency**: The requirement that decision makers stick to their optimal contingent plans.
- Previous research found that the most common payment structure for ambiguity experiments with multiple questions, paying for one random question answered, disguises ambiguity aversion (Baillon 2022).
- This experiment attempts to adjust the payment structure to generate accurate results without sacrificing observations per participant.
- Our hypothesis is that our new payment structure, RSP, will give more accurate results on ambiguity aversion.

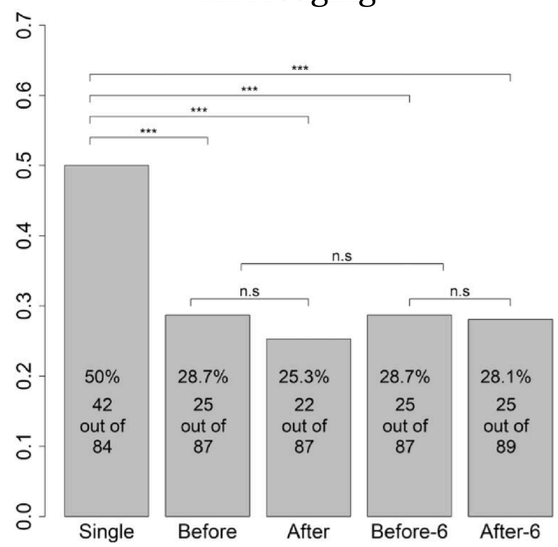
Methodology

The basic set-up for each treatment is that there are two bags, A and B. A has one red and one blue chip. B has an unknown amount of red and blue chips. Participants win if their color chip is drawn from the bag they chose, $10.00 for Bag A and $10.20 for Bag B; this is to ensure that a subject who makes the most optimal decision as per Subjective Expected Utility chooses Bag B. The treatments observed are as follows:-

- **Play-One-Pay-One (POPO)**: Participants choose if they want to win for red or blue and then if they want Bag A or Bag B. They are paid for their choice.
- **Pay-One-Random (POR)**: Participants choose Bag A or Bag B for both colors. A coin is flipped to determine which color they are paid for.
- **Random-Stopping-Point (RSP)**: Participants pick Bag A or B for (Blue). A coin is flipped for each. If heads, they are paid for their choice in (Blue). If tails, they choose A or B for (Red) and are paid for their choice.

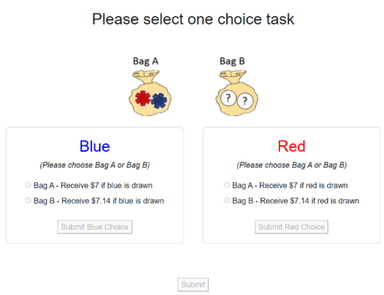
The draws from the bags and coin flips are done by random participants to ensure fairness. For each treatment, choosing only Bag A is assumed to reflect ambiguity aversion. Rates of AA will be compared between each treatment.

Ambiguity Aversion Rates with Hedging

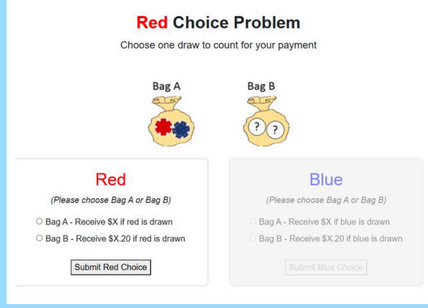


(Taken from Baillon, Halevy, and Li, 2022 – Econometrica)

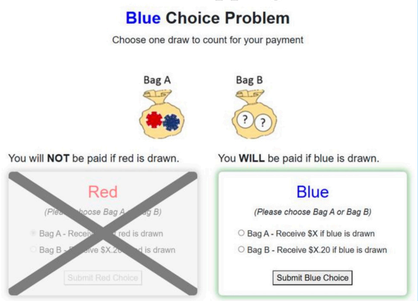
Play-One-Pay-One



Pay-One-Random



Random-Stopping-Point



References

Ambiguity Models

$$MEU(f) = \min_{p \in C} U_p(f),$$

$$VP(f) = \min_{p \in \Delta(S)} \{U_p(f) + c(p)\},$$

$$\alpha\mathrm{M}(f) = \alpha \min_{p \in C} U_p(f) + (1 - \alpha) \max_{p \in C} U_p(f).$$

$$KMM(f) = \int_{\Delta(S)} \phi(U_p(f))\, d\mu(p),$$

Expected Results

- For POPO, we expect to find similar ambiguity aversion rates to those found in other one-question experiments.
- For POR, we expect to find lower AA rates than POPO as have been found in other multi-question AA experiments using random payment structures.
- For RSP, we expect to find similar AA rates to those found with POPO.

Conclusions

- Since POPO acts as a control treatment, we would conclude that POR is biased due to induced hedging, while RSP more accurately reflects AA rates.
- Therefore, experimental economists could switch their payment structure from ones more resembling POR to RSP for unbiased data.

Future Research

- Future experiments could check whether an approach with a wider set of choice tasks for RSP still maintains accuracy relative to AA rates from POPO.
- Experiments that had been doubted due to POR induced hedging can be re-examined through an RSP setup.