Problem Set-1

Aravind Mannarswamy

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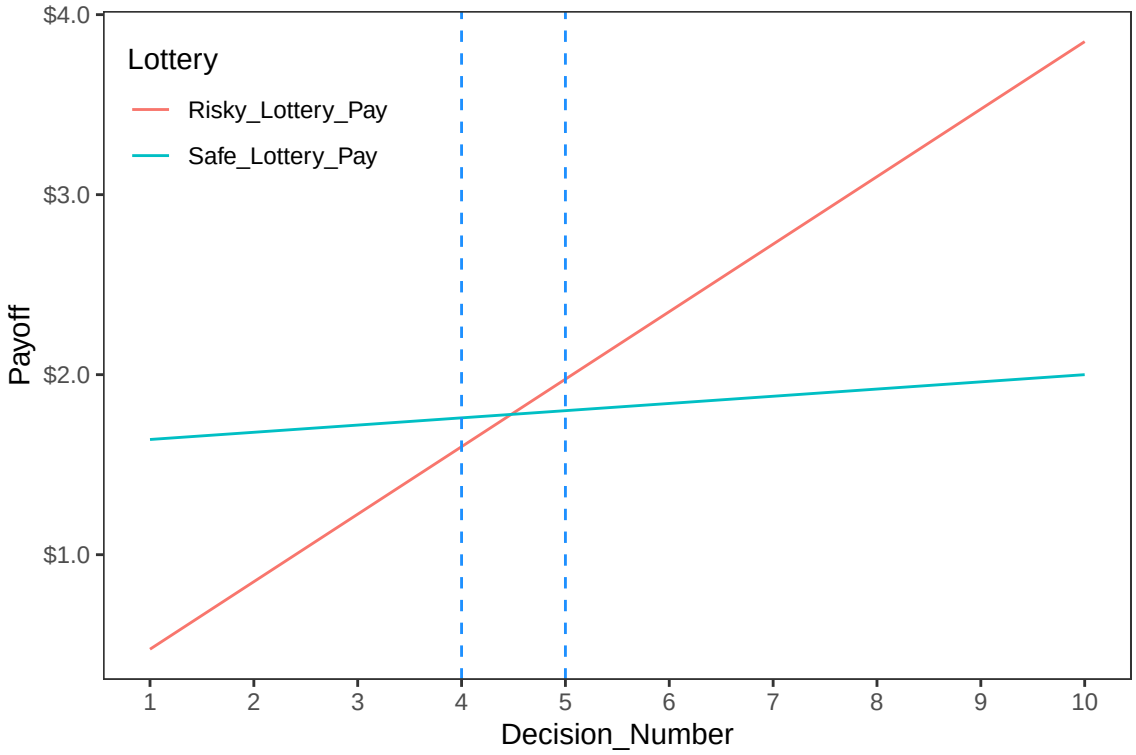
Contents

1 Lottery Payout

Decision_Number	Probability	Safe_Lottery_Pay	Risky_Lottery_Pay
1	0.1	1.64	0.475
2	0.2	1.68	0.850
3	0.3	1.72	1.225
4	0.4	1.76	1.600
5	0.5	1.80	1.975
6	0.6	1.84	2.350
7	0.7	1.88	2.725
8	0.8	1.92	3.100
9	0.9	1.96	3.475
10	1.0	2.00	3.850



2 CRRA

$U(x) = \frac{x^{1-r}}{1-r}$

2.1 CRRA: r = 0.3

Decision_Number	Probability	CRRA_Safe_03	CRRA_Risk_03	choice
1	0.1	2.018677	0.6235831	CRRA Safe
2	0.2	2.052237	0.9621287	CRRA Safe

Decision_Number	Probability	CRRA_Safe_03	CRRA_Risk_03	choice
3	0.3	2.085798	1.3006743	CRRA Safe
4	0.4	2.119358	1.6392199	CRRA Safe
5	0.5	2.152919	1.9777655	CRRA Safe
6	0.6	2.186479	2.3163111	CRRA Risk
7	0.7	2.220040	2.6548568	CRRA Risk
8	0.8	2.253600	2.9934024	CRRA Risk
9	0.9	2.287161	3.3319480	CRRA Risk
10	1.0	2.320721	3.6704936	CRRA Risk

Overall for someone with r = 0.3, 5 of 10 choices will be safe.

2.2 CRRA: r = 0.6

Decision_Number	Probability	CRRA_Safe_06	CRRA_Risk_06	choice
1	0.1	3.045256	1.324412	CRRA Safe
2	0.2	3.073424	1.653557	CRRA Safe
3	0.3	3.101593	1.982701	CRRA Safe
4	0.4	3.129761	2.311845	CRRA Safe
5	0.5	3.157929	2.640990	CRRA Safe
6	0.6	3.186097	2.970134	CRRA Safe
7	0.7	3.214265	3.299279	CRRA Risk
8	0.8	3.242434	3.628423	CRRA Risk
9	0.9	3.270602	3.957568	CRRA Risk
10	1.0	3.298770	4.286712	CRRA Risk

Overall for someone with r = 0.6, 6 of 10 choices will be safe.

3 Small payoffs

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.000   4.000   4.000   4.596   5.000   9.000
```

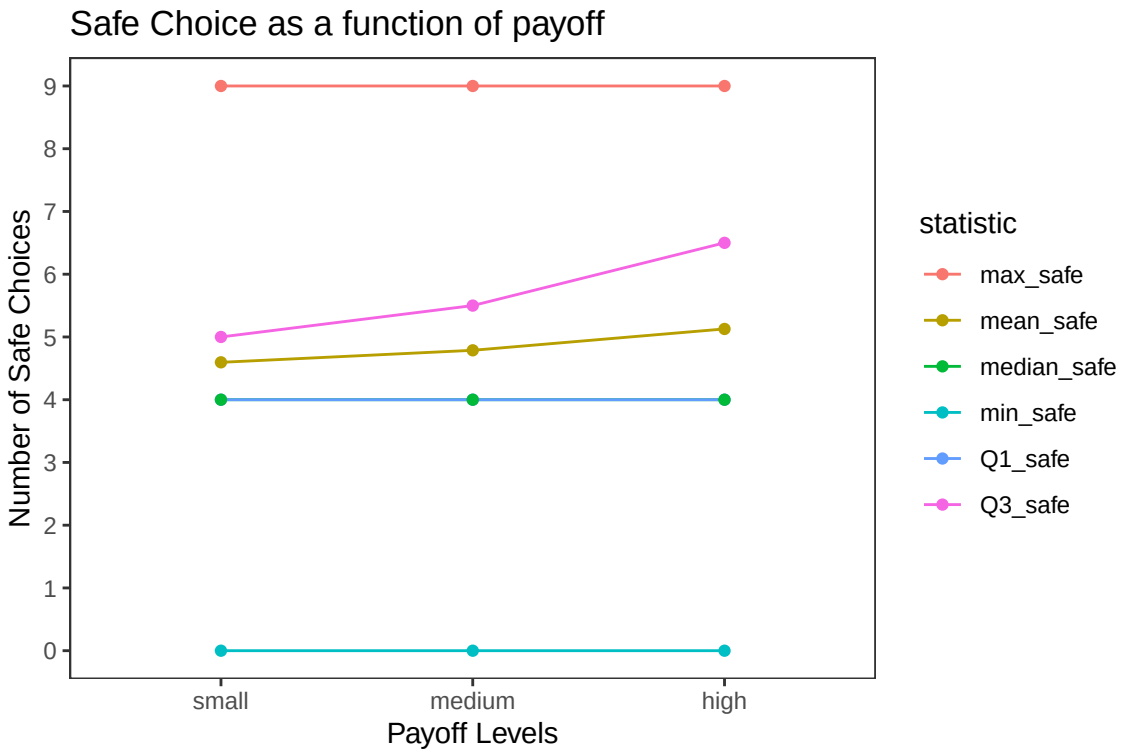
4 Medium and High Payoffs

4.1 Medium payoff

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.000   4.000   4.000   4.787   5.500   9.000
```

4.2 High payoff

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.000   4.000   4.000   5.128   6.500   9.000
```



Key takeaway:
1. It appears that some people are always either risk taking or always risk averse(refer to min_safe and max_safe on the figure). In some aspect, it really didnt make much sense at all as to why they would choose no safe choice or all safe choice.
2. However, there are some people who reduced their appetite for risk as the payoff increased. It could be because of the utility associated with it(mean_safe and median_safe).
3. One of the reasons why the median didnt change might have been due to the expected value of the payoffs. Almost half the people didnt make any change to their choices even as the payoffs increased.

5 Pairwise choices

Treatment	Choice_Number	Choice_A	Choice_B
1	1	21	25
1	2	11	35
2	1	27	19
2	2	36	10

6 Allais Paradox

Treatment 1: List of Decision Problems				
Decision		**Option A**		**Option B**
Round 1:		**1.00** of **$30.00**		**0.80** of **$40.00**
		0.00 of **$0.00**		**0.20** of **$0.00**
Round 2:		**0.25** of **$30.00**		**0.20** of **$40.00**
		0.75 of **$0.00**		**0.80** of **$0.00**

Figure 1: Problem 6 Choices

6.1 Allais Paradox

1. At a high level, this involves choosing a payout with certainty but choosing the opposite over a comparable situation constitutes this paradox.

2. In the case in point, there is 100% chance to win $30 by choosing option A. Multiplying both the Option A and Option B round-1 payouts by 25%, we get the second round. So choosing Option-A for the first round and choosing Option-B for the second round constitutes this paradox.

switched	Count
Allais Paradox	11
Consistent	34
Reverse Allais Paradox	1

It appears that 34/46 are consistent with their choices between the two choices and didnt succumb to the Allais paradox. A small but significant portion do suffer from the paradox (11/46). There is only one participant who chose the reverse of Allais paradox situation.

7 Risk Averse or Risk Tolerant

For question 7				
Treatment 2: List of Decision Problems				
Decision		**Option A**		**Option B**
Round 3:		**1.00** of **$-30.00**		**0.80** of **$-40.00**
		0.00 of **$0.00**		**0.20** of **$0.00**
Round 4:		**0.25** of **$-30.00**		**0.20** of **$-40.00**
		0.75 of **$0.00**		**0.80** of **$0.00**

Figure 2: Problem 6 Choices

7.1 Riskier Choice

19 Students made the choice to be risk tolerant in the loss domain(they chose riskier choice with the potential lose $40) while 25 students were risk tolerant in the gains domain(they chose the risker choice with the potential to gain $40).

7.2 Risk averse in gains and tolerant in losses

PID	1	2	gains	losses
2	1	0	Risk Averse	Risk Tolerant
3	1	0	Risk Averse	Risk Tolerant
6	1	0	Risk Averse	Risk Tolerant
8	1	0	Risk Averse	Risk Tolerant
9	1	0	Risk Averse	Risk Tolerant
14	1	0	Risk Averse	Risk Tolerant
16	1	0	Risk Averse	Risk Tolerant
21	1	0	Risk Averse	Risk Tolerant
26	1	0	Risk Averse	Risk Tolerant
27	1	0	Risk Averse	Risk Tolerant

PID	1	2	gains	losses
30	1	0	Risk Averse	Risk Tolerant
31	1	0	Risk Averse	Risk Tolerant
32	1	0	Risk Averse	Risk Tolerant
38	1	0	Risk Averse	Risk Tolerant
39	1	0	Risk Averse	Risk Tolerant
41	1	0	Risk Averse	Risk Tolerant
46	1	0	Risk Averse	Risk Tolerant

17 of the 46 students were risk averse in the gains territory(Treatment-1 choosing Option-A) but risk tolerant in the losses territory(Treatment-2 choosing Option-B).

7.3 Key Takeaway

1. The students who made this switch are inconsistent with their choices when it comes to gains and losses. They do not adhere to the same expected value principle in both the cases. When there is a gain, they tend to play it safely but in the face of a loss, they decide to gamble instead of face a loss for sure. Though in theory it is contradictory to the choice in each of these two cases.