Measurement of loss aversion in riskless and risky choices

Risk Preferences

Part 4

Theory and Decision
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Individual-level loss aversion in riskless and risky choices

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Abstract

Loss aversion can occur in riskless and risky choices. We present novel evidence on both in a non-student sample (660 randomly selected customers of a car manufacturer). We measure loss aversion in riskless choice in endowment effect experiments within and between subjects and find similar levels of average loss aversion in both. The subjects of the within study also participate in a simple lottery choice task which arguably measures loss aversion in risky choices. We find substantial heterogeneity in both measures of loss aversion. Loss aversion in riskless choice and loss aversion in risky choice are strongly positively correlated, but on average riskless loss aversion is higher than risky loss aversion. We find that in both choice tasks, loss aversion increases in age, income, and wealth, and decreases in education. Our results provide novel supportive input to the debate about the reality of loss aversion.

Keywords Loss aversion · Endowment effect · Reference-dependent preferences · Lab-in-the-field experiments

Riskless vs. Risky choices

Loss aversion—the psychological propensity that losses loom larger than equal sized gains relative to a reference point—can occur *in riskless and in risky choices*, as argued in two seminal papers by Amos Tversky and Daniel Kahneman (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991).

Riskless vs. Risky choices

- An example for loss aversion in **riskless choice** is the 'endowment effect'.

($105, 0.5 ; −$100, 0.5)

v(105)
v(−100)

- An example of loss aversion in **risky choices** is the observation that people reject small-scale gambles that have a positive expected value but may involve losses.

A lab-in-the-field experiment

- A lab-in-the-field experiment with a large non-student sample (660 randomly selected customers of a car manufacturer)

  - Lab-in-the-field experiments lie on a continuum between standard lab experiments and field experiments, and that they typically contain elements of both(Eckel & Londono, 2020, "How to tame lab-in-the field").

field experiment ⟷ lab experiment

Measuring loss aversion in riskless task

- The riskless task is an *endowment effect experiment* where the 'willingness-to-accept'(WTA) and the 'willingness-to-purchase' (WTP) are elicited.

- The gap between WTA and WTP has been interpreted as evidence for loss aversion in riskless choice.

for example $v(\cdot) = \begin{cases} x & , x \geq 0 \\ \lambda x & , x < 0 \end{cases}$

Measuring loss aversion in riskless task

Coefficient of Loss Aversion$= \lambda = \frac{WTA}{WTP}$

For example, using data from the mug experiments

$\lambda = 5.75/2.25 = 2.6$ (WTA / WTP)

In the following question there are no right or wrong answers. Your response should only reflect your own preferences. As the other parts of the questionnaire this following question is part of a scientific research project on how people make economic choices.

We will give you the following little toy car which you can keep.

THIS TOY CAR IS FOR YOU TO KEEP!

If you do not want to keep the toy car, you can **sell** it to the organizers of this scientific study. In the table below please mark the minimum acceptable price at which you are willing to sell the car.

- If at our offer price you have indicated in the table that you are willing to sell the toy car, you will receive this amount in cash instead of the toy car.
- If at our offer price you have indicated in the table that you are not willing to sell the toy car, you will keep your toy car.

Price in €	Please make a cross in each line depending on whether you are ready or not to **sell** the toy car at the respective price to us	
If the price is **€ 0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 0.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 1.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 1.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 2.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 2.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 3.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 3.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 4.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 4.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 5.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 5.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 6.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 6.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 7.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 7.5** …	… I am **ready** to sell ___	I am **not ready** to sell: ✓
If the price is **€ 8.0** …	… I am **ready** to sell ___	I am **not ready** to sell: ___
If the price is **€ 8.5** …	… I am **ready** to sell ✓	I am **not ready** to sell: ___
If the price is **€ 9.0** …	… I am **ready** to sell ✓	I am **not ready** to sell: ___
If the price is **€ 9.5** …	… I am **ready** to sell ✓	I am **not ready** to sell: ___
If the price is **€ 10.0** …	… I am **ready** to sell ✓	I am **not ready** to sell: ___

WTA

The price at which we will buy your toy car will be randomly determined and for sure be between €0 and €10. That is, our offered price will be determined by rolling dice after you have filled in the table below. All prices are equally likely. There is a scientific reason for proceeding this way. Since you cannot influence the price, which will be determined randomly, you have an incentive to state the price that corresponds to your **true preference**. Once you have made your choice, you cannot change it anymore. We will also not be able to negotiate about the price.

An incentive to report true value

Measuring loss aversion in risky choice task

- The risky choice task consists of six simple low-stake lotteries with a 50–50 chance of a fixed gain of €6 and losses that vary from €2 to €7.
- Subjects must indicate for each of the six lotteries whether they want to play this lottery or not.
- In case they reject a lottery their payoff is zero.

In the following table you find a list of coin tosses with different payoffs. **The payoffs differ in how much you lose if the coin turns up heads.** For each row you need to indicate whether you want to toss the coin or not. To determine your payoff, one of the six rows will be randomly selected by rolling a six-sided die. If you have indicated that for the randomly selected row you want to toss the coin, then the coin will be tossed, and you will be paid accordingly.

pay off equal to 0 // reject the risk accept the risk

	I don't want to toss the coin	I want to toss the coin
1. If the coin turns up heads, then you lose €2; if the coin turns up tails, you win €6.	O	O
2. If the coin turns up heads, then you lose €3; if the coin turns up tails, you win €6.	O	O
3. If the coin turns up heads, then you lose €4; if the coin turns up tails, you win €6.	O	O
4. If the coin turns up heads, then you lose €5; if the coin turns up tails, you win €6.	O	O
5. If the coin turns up heads, then you lose €6; if the coin turns up tails, you win €6.	O	O
6. If the coin turns up heads, then you lose €7; if the coin turns up tails, you win €6.	O	O

very loss

fix gain

indifferent point

Measuring loss aversion in risky choice task

We can determine loss aversion in the risky choice task by applying prospect theory. A decision maker will be indifferent between accepting and rejecting the lottery if, for the amount G gain and amount L loss:

taking the risk — not taking the risk

$$\pi(0.5)v(G) + \pi(0.5)v(-L) = 0$$

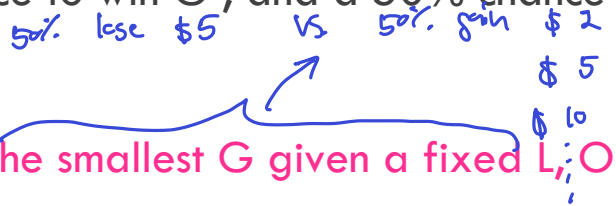
$$\pi(0.5)v(G) + \pi(0.5)[-\lambda v(L)] = 0$$

$$\lambda = v(G)/v(L)$$

If we assume $v(\,.\,)$ is linear, then the coefficient of loss aversion $\lambda = G/L$.

Measuring Loss Aversion in risky choice task

- We measured the coefficient of loss aversion from answers to whether you would accept a bet with a 50% chance to win G , and a 50% chance to lose L , where:



Coefficient of Loss Aversion $= \frac{G}{L}$ for the smallest G given a fixed L, OR for the largest L given a fixed G

- Loss aversion coefficient or ratio is generally found in range 1.5 to 2.5.