Rational Choice

Preference Reversal

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Buying Stocks

You want to invest in some stocks. Your broker asks you what maximum prize you would pay to buy the following stock portfolio:

Portfolio A: A 97% chance of a return of QR 2,000, but a 3% chance of a loss of QR 500.

Buying Stocks

You want to invest in some stocks. Your broker asks you what maximum prize you would pay to buy the following stock portfolio:

Portfolio B: A 31% chance of a return of QR 8,000, but a 69% chance of a loss of QR 750.

Choosing Stocks

You want to invest in some stocks. Your broker asks you to choose between the following two portfolios:

Portfolio 1: A 31% chance of a return of QR 8,000, but a 69% chance of a loss of QR 750.

Portfolio 2: A 97% chance of a return of QR 2,000, but a 3% chance of a loss of QR 500.

Which one do you pick?

Buying and Choosing Stocks

Notice the following . . .

Portfolio 1 = Portfolio B (call this P_1), and

Portfolio 2 = Portfolio A (call this P_2).

Preference Reversal

Many people make the following judgements:

1. Choose portfolio 2 over portfolio 1 (so $P_2 \succ P_1$), but

2. Price portfolio B higher than portfolio A (so $P_1 \succ P_2$).

This is an instance of a phenomenon psychologists call **preference reversal**.

Preference Reversal

Slovic and Lichtenstein, who first discovered this phenomenon, noticed that when setting prices the focus is on the payoffs, whereas choice tends to focus on the probability of being a winner or a loser.

Why Care About This?

First of all, economists are interested in figuring out your preferences. One way to do this is to ask you to set prices to the options. Another way is to see what you actually choose. The problem is that preference reversal shows how the method used influences what preference is revealed! How can an economist learn your "real" preferences?

Why Care About This?

Second, preference reversal shows a violation of asymmetry exposing you to a money pump:

1. You buy P_1 for price(P_1).
2. Now you prefer P_2, so you trade P_1 for P_2.
3. Now you sell P_2 for price(P_2).

If price(P_1) > price(P_2), then are back to where you started, but with slightly less money.

Why Care About This?

Third, preference reversal should make you ask: what is my preference here? Can it be both?

The Psychological Question

What principle of rational choice is violated?

Amos Tversky, Paul Slovic, and Daniel Kahneman consider the three following possibilities:

1. A violation of transitivity,

2. A violation of independence, or

3. A violation of procedure invariance.

They construct a study to determine which it is.

The Experiment

Tversky, Slovic, and Kahneman seek to create an experiment that can test all three hypotheses to see which one best explains preference reversal. Their experiment involves the following three bets:

- *H*: 28/36 chance to win $10,
- *L*: 3/36 chance to win $100, and
- *X*: $*x* for sure. (The novel idea is to include this.)

The Experiment

Participants are asked to make three choices:

1. Choose between H and L,
2. Choose between H and X, and
3. Choose between L and X.

Participants must also provide the following prices:

1. The price of H (C_H), and
2. The price of L (C_L).

The Experiment

In this experiment, preference reversal occurs just when the following hold:

$H > L$, and

$C_L > \$x > C_H$ (x is chosen so it falls in between).

They will then look in more detail at the people whose answers satisfy this pattern to figure out the principle cause of preference reversal.

The Experiment

If the judgment that $H > L$ is due to a violation of **transitivity**, then there must be two judgments that together are supposed to entail that $L > H$ instead.

There are two such judgments that this experiment is designed to catch: $L > X$ and $X > H$. Now if these two judgments appear together, then preference reversal is best understood as a violation of transitivity.

The Results

The results of the experiment show, however, that preference reversal does not have this pattern: only 10% of subjects claimed that both $L \succ X$ and $X \succ H$. So preference reversal is not due to a violation of transitivity. Something else is going on.

The Experiment

Now if **independence** is the problem, then you should see more preference reversals when using a scheme that assumes independence when it solicits buying/selling prices for the bets.

This experiment uses an ordinal solicitation scheme, which does *not* presume independence. Therefore, if independence is the problem, then this experiment should display fewer preference reversals than an experiment using a scheme assuming independence.

The Results

Preference reversals occur in this experiment roughly as much as they do in experiments using the Becker, DeGroot, and Marschak (BDM) method, which assumes independence. Therefore, independence is not likely the best explanation for preference reversal.

The Experiment

Tversky, Slovic, and Kahneman conclude that the problem must be one of **procedure invariance**. According to procedure invariance, the method of soliciting preferences should not influence those very preferences:

$$C_B = \$x \text{ if and only if } B \sim X.$$

That is, the price of bet B is $\$x$ if and only if you are indifferent between bet B and getting $\$x$ for sure.

The Experiment

With preference reversal, procedure invariance is violated. When asked for preference in terms of choice, *H* is more valuable. When asked for preference in terms of price, *L* is more valuable.

The Results

Procedure invariance is seen in the experiment because people tend to *overprice* L.

There is no intransitivity because a majority (65.5%) of people claim that $X > H$ and $X > L$. But this yields $C_L > X > L$, meaning people are giving a price to L that is too large. That is, most people prefer the price value of L (that is, C_L) than L itself. Thus this is a violation of procedure invariance.

Next Class...

We will look at one last common psychological phenomena: sunk cost reasoning.

Exam #2 is one week from today. It will be in **lecture hall 2152** and begin promptly at 1:00PM. Show up and be seated by that time.

You are allowed to use one A4-sized page of notes. Everything else (including cell phone) must put in the aisle or back of the room. Plan accordingly.

I will provide you with two pencils, one pen, a simple calculator, and plenty of scratch paper.