MTH6113

Brief Introduction to Behavioural Finance
Dr. Melania Nica

Behavioural Finance

- What is behavioural finance
- Bounded Rationality
- Rational but confused?

Rational Agents (a review)

An individual is rational if their preferences over a choice set, e.g. $\{X, Y, Z\}$ are:

1. complete:

   ▸ either $X \succ Y$ or $Y \succ X$ or $X \sim Y$;
     I can always rank goods

2. transitive:

   ▸ $X \succ Y \succ Z$ then $Z \not\succ X$
     There are no logical inconsistencies

Rational Agents (a review)

If agents are **rational**, they can use maths to make decisions!

- **Utility functions**: mathematical representations of preference relations
- Investors choose investments to maximize their utility subject to a budget constraint

In finance there is **uncertainty**: returns on assets are random variables

- Investors choose investments to maximize their expected utility subject to a budget constraint

Rational Agents (a review)

Independence axiom: if $L_1 \succ L_2$ then
$pL_1 + (1 - p) L_3 \succ pL_2 + (1 - p) L_3$ where L_1, L_2, L_3 are
lotteries or gambles

An investor could win:

$$X = \{\$0; \quad \$1,000,000; \quad \$5,000,000\}$$

A. Lotteries/probabilities of outcomes:

$$p_1 = (0; \quad 1; \quad 0)$$

or

$$p_2 = (0.01; \quad 0.89; \quad 0.10)$$

Which lottery do you prefer?

Allais Paradox

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$p_1 \succ p_2$

Allais Paradox

An investor could win:

$$X = \{\$0; \quad \$1,000,000; \quad \$5,000,000\}$$

B. Lotteries/probabilities of outcomes:

$$p_3 = (0.90; \quad 0; \quad 0.10)$$

or

$$p_4 = (0.89; \quad 0.11; \quad 0)$$

Which lottery do you prefer?

Allais Paradox

An investor could win:

$$X = \{\$0; \quad \$1,000,000; \quad \$5,000,000\}$$

B. Lotteries/probabilities of outcomes:

$$p_3 = (0.90; \quad 0; \quad 0.10)$$

or

$$p_4 = (0.89; \quad 0.11; \quad 0)$$

Which lottery do you prefer?

$$p_3 \succ p_4$$

Allais Paradox

In experimental studies with large number of respondents:

$$p_1 \succ p_2$$

and

$$p_3 \succ p_4$$

SAME ANSWER AS US?

Allais Paradox

However,

$$p_1 \succ p_2 :$$

$$u_1 > 0.01u_0 + 0.89u_1 + 0.1u_5$$

$$\Leftrightarrow$$

$$0.11u_1 - 0.01u_0 > 0.1u_5$$

$$\Leftrightarrow$$

$$0.11u_1 + 0.89u_0 > 0.1u_5 + 0.9u_0$$

$$p_4 \succ p_3$$

Allais Paradox

Cannot be!

Is this investor **confused**?

Independence axiom violated!

Expected utility theory is **not robust** enough to capture choices in which the economic agent tries to **avoid the disappointment** from not getting anything!

Behavioral Finance

Generalizations of the expected utility theory to account for this 'bounded rationality': ·

- *Prospect theory*, Daniel Kahneman and Amos Tversky
- *Regret theory*, Graham Loomes and Robert Sugden, David E. Bell, and Peter C. Fishburn
- *Framing theory*, Daniel Kahneman and Amos Tversky

Daniel Kahneman, Nobel prize (2002) and Richard H. Thaler, Nobel prize (2017) for contribution to behavioural economics

Maurice Allais, Nobel prize (1988) 'for his pioneering contributions to the theory of markets and efficient utilization of resources'

Behavioural Finance

- Looks at the psychology that underlies and drives financial decision making behaviour.
- Helps investors understand how human biases impact on financial decisions and market prices, returns and allocation of resources.

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Prospect Theory

- ▶ Theory of how people make decisions when faced with risk and uncertainty.
- ▶ Describes how individuals evaluate losses and gains.
- ▶ Developed in 1979 by Daniel Kahneman and Amos Tversky, as an alternative to expected utility theory.
- ▶ Assumes that people are risk averse when considering gains and risk seeking when considering losses.

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Prospect Theory - Example

Gains: 95% chance to win $10,000 or 100% chance to obtain $9,499:

$$95\% \times \$10,000 = \$9,500 > \$9,499$$

- ▶ Risk averse investor (fear of dissapointment): Accept unfavorable settlement of 100% chance to obtain $9,499

Losses: 95% chance to lose $10,000 or 100% chance to lose $9,499:.

$$95\% \times -\$10,000 = -\$9,500 < -\$9,499$$

- ▶ Risk seeking investor (hopes to avoid loss). Rejects favorable settlement, chooses 95% chance to lose $10,000

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Framing and Question-wording

- The wording of a question in terms of gains and losses can have a big impact on the decision made.
- Changing just a word or two can have a profound effect on the answer.
- Example: Do you get headaches frequently (occasionally), if so how often?

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Anchoring and Adjustment
Term used in psychology to describe the common human tendency
to rely too heavily, or "anchor" on one piece of information when
making decisions.

- ▶ Usually, once an anchor is set, there is a bias towards this
  value.
- ▶ The effect of anchoring and adjustment grows with the size of
  the difference between the anchor value and the pre-anchor
  estimate.
- ▶ People were exposed to absurdly high anchors and this had
  the effect of increasing the mean estimate considerably.

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Myopic Loss Aversion

- ▶ Similar to Prospect Theory, but based on repeated gambles.
- ▶ Investors are less risk-averse when faced with a multi-period series of gambles.
- ▶ When the performance of a risky asset is frequently assessed, the probability of detecting a loss is high.
- ▶ This puts off risk-averse investors.

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Estimating Probabilities

- ▶ Biases affecting probability estimates
- ▶ Dislike of negative events: people underestimate the probability that negative events may occur.
- ▶ Representativeness: people consider those events that they can easily imagine, to be more probable.
- ▶ Availability: people are influenced by the ease with which something can be brought to mind.

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Overconfidence

- People tend to over-estimate their own knowledge, abilities and skills.
- Discrepancy between accuracy and overconfidence increases as the respondent becomes more knowledgeable.
- Accuracy increases by a small amount, confidence increases to a much larger degree!
- Reason? – Various biases.

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Hindsight bias

- ► Events that have happened will be thought of as having been predictable prior to the event.
- ► Events that do not happen will be thought of as having been unlikely prior to the event.

Confirmation bias

- ► People tend to look for evidence that confirms their point of view.
- ► They tend to dismiss evidence that does not justify their point of view.

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Mental Accounting

- People show a tendency to separate related events and find it difficult to aggregate events.

Effect of Options

- Range of options presented to people may influence their decisions.
    - Primary effect: People tend to choose the first option.
    - Recency effect: People might prefer the final option presented.
    - Other research indicates that people might choose an intermediate option!
    - Greater range of options discourages decision-making.

Other factors

- ▶ Status quo bias: People prefer to leave things unchanged.
- ▶ Regret aversion: Retaining existing arrangements to minimise the possibility of regret.
- ▶ Ambiguity aversion: People are willing to pay a premium for rules.

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- Standard economic theory needs to adapt to include more refined observations about **human psychology**!

- To what extent are **bounded rational consumers** vulnerable to **profit maximizing firms**?

- What is the role of studying behavioural economics and finance?
  - **inform** and **educate**?

The term **'bounded rationality' is vague**!

Gilboa and Schmeidler (2001): '*a decision is **not rational** if it **embarrasses** the decision maker once the situation is explained to him*'!

Behavioural finance also analyses situations where **agents are fully rational** but the **result** is somehow **perplexing:**

- **Informational cascades/herding, anti-herding, political correctness and biased experts.**

Behavioural Finance: Herding due to informational cascades

Abhijit V. Banerjee – Nobel prize in Economics is 2019

A simple model of herd behavior, The Quarterly Journal of Economics, Volume 107, Issue 3, 1992

- Two restaurants with prior A better than B with 51 percent probability
- Diners arrive at the restaurants in sequence and observe the people before them
- Diners receive private signals (of equal quality) of which is the better restaurant
- 99 people receive signal B; 1 person receive signal A
- The one that goes first is the one who received signal A
- The next one has a signal B, however taking into account the previous diner chose A (signals have the same probability hence they cancel each other), she chooses A;
- Herd occurs; everyone will choose A

Behavioural Finance: Herding due to career concerns

Information asymmetry between a decision maker and an imperfectly informed expert that cares about their career

- on agent's ability to see the state of the world:

Herding: Scharfstein and Stein (1990), Ottaviani and Sorensen (2001)

Anti-herding: Trueman (1999), Levy (2004)

Within the **cheap talk game** framework:

- the expert offers advice, but the decision maker takes the action

Behavioural Finance: Biased experts

Information asymmetry between decision maker and an imperfectly informed expert that cares about their career

- on type of the agent: biased or not biased

Political Correctness : Morris (2001)

- Reputation is formed once the true state of the world is verified

Nica (2014): Career concerns models with possibly biased experts when the **truth is not verifiable/unobservable**

Behavioural Finance: Biased experts

Why unobservability of the state of the world?

- too complicated to fully understand
- accessible only over a longer period of time
- once an economic policy or advice is implemented the original state of the world is not verifiable anymore

Reputation formed by comparing:

- **expert's report** and **public belief** on the state
- once you make a report the public belief changes

Behavioural Finance: Biased experts

Two incentives at play

- if you are biased you will declare your bias to change the public belief and as a result the decision maker's action
- you still report against the bias to signal that you are not biased
- **Political correctness as herding or anti-herding**

Reputation formed by comparing:

- reports from two experts' reports (strategic interaction): **Conforming to Stand Out**
- report from one expert and from the public belief in the true state: **Post-truth**