



SESSION 4: WHAT IS RISK?

Risk is ubiquitous... and has always been around

- Risk has always been part of human existence. In our earliest days, the primary risks were physical and were correlated with material reward.
- With the advent of shipping and trade, we began to see a separation between physical risk and economic rewards. While seamen still saw their rewards linked to exposure to physical risk – scurvy, pirates and storms – wealthy merchants bet their money on ships returning home with bounty.
- With the advent of financial markets and the growth of the leisure business, we have seen an even bigger separation between physical and economic risks.

The slippery response... play with words..

- In 1921, Frank Knight distinguished between risk and uncertainty by arguing if uncertainty could be quantified, it should be treated as risk. If not, it should be considered uncertainty.
- As an illustration, he contrasted two individuals drawing from an urn of red and black balls; the first individual is ignorant of the numbers of each color whereas the second individual is aware that there are three red balls for each black ball. The first one, he argued, is faced with uncertainty, whereas the second one is faced with risk.
- The emphasis on whether uncertainty is subjective or objective seems to us misplaced. It is true that risk that is measurable is easier to insure but we do care about all uncertainty, whether measurable or not.

Here is a good definition of risk...

- Risk, in traditional terms, is viewed as a 'negative'. Webster's dictionary, for instance, defines risk as "exposing to danger or hazard".
- In investing and business, risk cannot be viewed just as a negative, since the logical defense against would be to then to avoid it altogether.
- Risk is both a positive and a negative, providing good and bad outcomes. The question of whether to take or avoid a risk is contingent on whether the positives outweigh the negatives or vice versa.

Are you risk averse? A simple experiment

- I will flip a coin once and will pay you a dollar if the coin came up tails on the first flip; the experiment will stop if it came up heads.
 - ▣ If you win the dollar on the first flip, though, you will be offered a second flip where you could double your winnings if the coin came up tails again.
 - ▣ The game will thus continue, with the prize doubling at each stage, until you come up heads.

How much would you be willing to pay to partake in this gamble?

The Bernoulli Experiment and the St. Petersburg Paradox

- This was the experiment run by Nicholas Bernoulli in the 1700s. While the expected value of this series of outcomes is infinite, he found that individuals paid, on average, about \$2 to play the game.
- He also noticed two other phenomena:
 - First, he noted that the value attached to this gamble would vary across individuals.
 - His second was that the utility from gaining an additional dollar would decrease with wealth.

Measuring Risk Aversion

- a. Certainty Equivalents: In technical terms, the price that an individual is willing to pay for a bet where there is uncertainty and an expected value is called the certainty equivalent value. The difference between the expected value and your certainty equivalent is a measure of risk aversion.
- b. Risk Aversion coefficients: If we can specify the relationship between utility and wealth in a function, the risk aversion coefficient measures how much utility we gain (or lose) as we add (or subtract) from our wealth.

Evidence on risk aversion

- I. Experimental studies: We can run controlled experiments, offering subjects choices between gambles and see how they choose.
- II. Surveys: In contrast to experiments, where relatively few subjects are observed in a controlled environment, survey approaches look at actual behavior – portfolio choices and insurance decisions, for instance- across large samples.
- III. Pricing of risky assets: The financial markets represent experiments in progress, with millions of subjects expressing their risk preferences by how they price risky assets.
- IV. Game shows, Race tracks and Gambling: Over the last few decades, the data from gambling events has been examined closely by economists, trying to understand how individuals behave when confronted with risky choices.

Findings: We are risk averse, but there are differences across people

- Male versus Female: Men are less risk averse than women with small bets, but they are as risk averse, if not more, for larger, more consequential bets.
- Naïve versus Experienced: A study compared bids from naïve students and construction industry experts for an asset and found that students were more risk averse than the experts.
- Young versus Old: Risk aversion increases as we age and single individuals are less risk averse than married individuals.
- Racial and Cultural Differences: Human beings have a lot more in common when it comes to risk aversion than they have as differences

With some strange quirks...

- Framing: Would you rather save 200 out of 600 people or accept a one-third probability that everyone will be saved? While the two statements may be mathematically equivalent, most people choose the first.
- Loss Aversion: Would you rather take \$ 750 or a 75% chance of winning \$1000? Would you rather lose \$750 guaranteed or a 75% chance of losing \$ 1000?
- Myopic loss aversion: Getting more frequent feedback on where they stand makes individuals more risk averse.
- House Money Effect: Individuals are more willing to takes risk with found money (i.e. money obtained easily) than with earned money.
- The Breakeven Effect: Subjects in experiments who have lost money seem willing to gamble on lotteries (that standing alone would be viewed as unattractive) that offer them a chance to break even.

In summary

- Individuals are generally risk averse, and are more so when the stakes are large than when they are small. There are big differences in risk aversion across the population and significant differences across sub-groups.
- There are quirks in risk taking behavior
 - Individuals are far more affected by losses than equivalent gains (loss aversion), and this behavior is made worse by frequent monitoring.
 - The choices that people when presented with risky choices or gambles can depend upon how the choice is presented (framing).
 - Individuals tend to be much more willing to take risks with what they consider “found money” than with earned money (house money effect).
 - There are two scenarios where risk aversion seems to be replaced by risk seeking. One is when you have the chance of making a large sum with a very small probability of success (long shot bias). The other is when you have lost money are presented with choices that allow them to make their money back (break even effect).