# Notes: Lecture 1

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# Risk?

Today we dig a little more into risk

Adding probabilities vs multiplying

Independence and the gamblers fallacy

# Four different interpretations of probability:

1. Classical: Everything has equal chance
2. Physical/Frequentist: Probability that is measured, BIAS
3. Logical: Axiomatic system, more of a way of communicating
4. Subjective: People’s opinion

# Uncertainty in gambling:

A is willing to accept 8:1 odd that Orban will lose. So if he believes the probability of winning is p, then he expects to win p\*8 and expects to not win anything with (1-p). Otherwise he can simply keep his dollar. So he thinks there **is at least** 12.5% chance that Orban will lose.

But now suppose we approach A and ask him if he is willing to bet at 8:1 odds that Orban lose and A declines. What does this mean? Does it mean that he thinks that 1>p\*8 and hence he believes that Orban does not have a 12.5 percent chance of losing? So that means if we offer A the opposite bet, say 8:1 odds that Orban will win, maybe he should take it? What if A still says no?

If for the same odds, somebody is unwilling to take EITHER of the sides. Then that person is said to have uncertainty.

Note that the above discussion assumes that beliefs are separate from evaluations. This isn’t as self-evident as it appears. For example, it may make sense that you hold the belief that your wife is the best person in the world for the sake of motivating you to be a better husband.

**Aesop’s fable:** A fox could not reach some grapes and therefore decided to assume they were sour. This means that the foxes beliefs about the action set influenced the foxes beliefs about the satisfaction that would be received. .

Independence, how much information does one thing give us about another? Give an example of an airplane with 2 engines vs one with 3 engines. Ask the students to reveal what is wrong with the Gambler who will bet on red because he has seen 12 consecutive blacks on the roulette wheel.

When do we add probabilities and when do we multiply them? We add them when the events are mutually exclusive, and multiply them if they compound.

# Homework: selected problems from the textbooks

We discuss the basic approach of equiprobable sample space and explore permutations vs combinations approaches. We then proceed to explain the basic problem the basic problem of forming probabilistic beliefs from primitive gambling behavior and the the importance of choices and power using a metaphorical.

# Recommended Reading

Chapter 3-4 IAN

Chapter 2 Peterson

# Seminar Questions

What is the difference between risk and uncertainty?

When would a consequentialist be justified in making probabilistic beliefs about the future states world?

What is the classical interpretation of probability? What are the other interpretations discussed in class?

# Quiz questions

Suppose that the gamble is, if a six lands on a six sided die, then you gain 600 euros, otherwise, you gain 0. To play the gamble you must pay q= 100 euros. Suppose you start with a wealth of 10000 euros.

a)

b)

c)

d)

e)

f)

*g) For each utility function above, compute the value of q, for which the player will prefer to play the game*