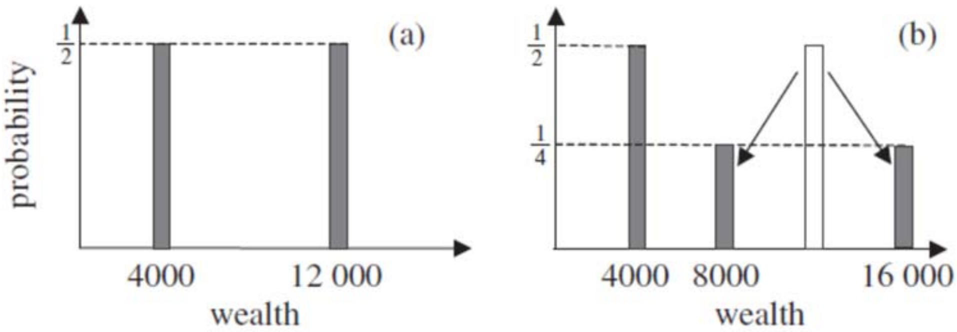
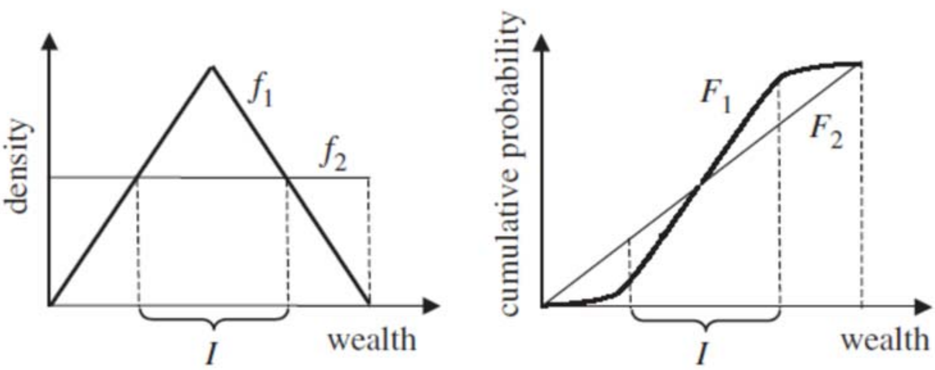
Foundations of Stochastic Dominance. Risk attitude. Expected utility

1. [1] Figures a), b) define two random variables. Please, draw cumulative distribution function.



Figures c), d) define Probability density function and cumulative distribution function of two random variables. Find expected value and compare variance.

(c) (d)



Discuss stochastic dominance relation. Which random variable is more riskier?

2.[2] Let random variables X, Y such that

$$P(X = 2)=1/5, \quad P(X = 12) = 4/5;$$

$$P(Y = 8)=4/5, \; P(Y = 18) = 1/5.$$

a) Verify that EX = EY, Var(X) = Var(Y).

b) Consider the nondecreasing and concave utility function u(x) = log x (for x > 0). Does any risk averse individual feel indifferent between the two risky prospects X and Y? In other

[1] From Eeckhoudt L., Gollier C., Schlesinger H.. Economic and Financial Decisions under Risk. Princeton University Press, 2005. p. 29. p. 31.
[2] From S. Sriboonchita, W.K. Wong, S. Dhompongsa, H.T. Nguyen. Stochastic dominance and applications to finance, risk and economics. CRC Press, 2009, p. 85-86.

words, is Eu(X) = Eu(Y)?

3. Bob has utility function $u(x) = \sqrt{x}$. He lives in the place with varying weather. There are two possible states: Rainy and Sunny. Let p be the probability of Rainy weather. Bob has no information about actual state, only probability p is known. There are two possible actions: Take an umbrella, Go without umbrella. The following table presents Bob's payoffs.

	Rainy	Sunny
Take an umbrella	1	2,25
Go without umbrella	0	4

a) What is the Bob's decision?
b) Company going to transfer Bob to another job. Initial place has p=1/4, new place is worse, it has p=1/3. What is the smallest possible compensation for Bob? Please, write only equation, do not solve it.
c) Local Meteorological Agency provides truthful weather forecast. What is the highest price Bob is willing to pay for weather forecast, if p=0.5?

4. Consider the following preference relation "Comparing the most likely prize." Check carefully whether it satisfies independence axioms[3]

5. Consider the insurance problem studied in the lecture. Show that if insurance is not actuarially fair (gamma>p), then the individual will not insure completely.

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[3] From Ariel Rubinstein: Lecture Notes in Microeconomic Theory. Princeton University Press, 2006, pp 97-99.