

Final exam

(part 1 for those who did the entire semester)

This is a 2 hour exam. There are three equally weighted questions. Please read them carefully and answer *each* of them. If you have problems understanding a question please do ask. *Good luck !!!*

Question 1: There are two assets. The first is riskfree and always pays 1 euro, the second pays amounts $a < b$ with probability π and $1 - \pi$ respectively. Assume that $a < 1$, and that the mean pay-off of the risky asset is greater than one. The decision maker is risk averse and seeks to maximize her 'expected utility'. Her wealth is one, and the prices of the two assets are also both equal to one. Her budget constraint is therefore $x_1 + x_2 = 1$, where $x_1, x_2 \in [0, 1]$ are her demands for the two assets.

- Formally state her maximization problem (including any constraint(s) and specifying over which variables she maximizes), and derive the first order conditions of this problem.
- Determine how her demand for the riskfree asset is affected by a change in a . Also provide an intuitive explanation for this effect.
- How does her demand for the riskfree asset change if π changes? Again, also offer an intuitive explanation.

Question 2: Suppose an individual's preferences vis-à-vis the three goods A , B , and C can be represented by the utility function $u(x_A, x_B, x_C) = x_A^{0.5} x_B^{0.3} x_C^{0.2}$. Furthermore, the individual takes prices p_A , p_B , and p_C as given, and has an income of I .

- Calculate the individual's budget shares, i.e. what percentage of her income she will spend on the consumption of goods A , B , and C respectively. Explain whether her preferences are (or are not) homothetic?
- Calculate the individual's compensated (Hicksian) demand functions. List two properties of Hicksian demand functions, and check whether the functions you have calculated satisfy them.
- Calculate the elasticity of substitution for the given utility function. Suppose you find the result too restrictive (say for purposes of empirical testing) — how can you generalize the above utility function to allow for a wider range of elasticities of substitution?

Question 3: A company's production technology is given by $f(z_1, z_2) = (z_1^\rho + z_2^\rho)^{1/\rho}$, $\rho < 1$, and it takes factor prices w_1 and w_2 as well as the output price p as given.

- a) Find the firm's conditional factor demand functions and express them in terms of the own factor price and a suitably chosen factor price index. Also determine the firm's cost function.
- b) Distinguishing three cases ($p < MC$, $p = MC$, $p > MC$), solve the firm's profit maximization problem, i.e. find its unconditional factor demand functions, its output supply function, and its profit function.
- c) Suppose the firm's CEO turns egomaniac and seeks to maximize revenue, now facing a cash-constraint. Solve this problem. Can you always tell apart the egomaniac CEO from his more traditional profit-maximizing (and not cash-constrained) counterpart?