

Homework # 1

due March 24, in class

Problem 1: Consider an exchange economy populated by Asterix and Obelix. Both of them have identical preferences which can be expressed by $U(x_1, x_2) = x_2 - 1/x_1$, take prices as given, and have endowment vectors $(e_1^A = 6, e_2^A = 2)$ and $(e_1^O = 2, e_2^O = 6)$ respectively.

- Draw the corresponding Edgeworth box (pls label the axes and origins), indicate the endowment point, find the specific contract curve, and depict it in the Edgeworth-box.
- Calculate the market outcome, i.e. the equilibrium price and quantities. Does the equilibrium allocation lie on the contract curve? Does it have to?
- Suppose there is a transaction tax of t percent whenever Angela and Nicolas exchange goods, and the revenue collected is returned 50-50 to Angela and Nicolas. Find the resulting market outcome. Does it lie on the contract curve, i.e. is it Pareto-efficient?

Problem 2: Suppose you have been stranded on an uninhabited island. The technology available to produce food is $y = h^\alpha$, where h is labor input (in hours) and $\alpha < 1$. Your preferences vis-à-vis food and leisure are Cobb-Douglas, i.e. $U(f, l) = f^\beta l^{1-\beta}$.

- Mathematically determine all Pareto optimal allocations.
- Suppose you go nuts and play price taking consumer vs. price taking firm. Find the market equilibrium.
- Write a Mathematica notebook that takes the values of α and β as inputs and produces a diagram that features the production function, the relevant indifference curve, the optimal allocation, and the equilibrium price.

Problem 3: Consider two economies with convex preferences and production sets and suppose competitive equilibria exist. Prove that for each country there exists a national transfer scheme such that the free trade price equilibrium with transfers Pareto-dominates the autarky equilibrium.