

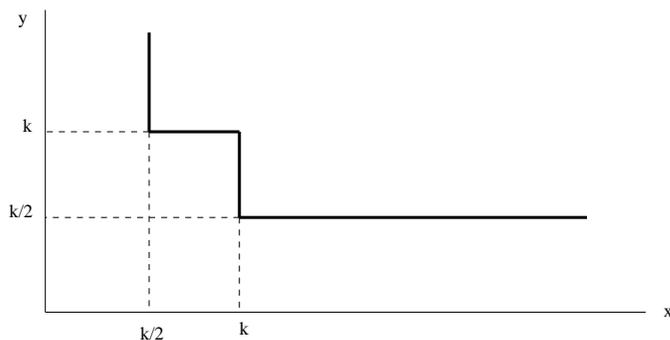
Homework # 2

due April 27

Problem 1: Consider the framework used in section 16.F of MWG.

- Explicitly derive the three types of conditions (16.F.4–16.F.6) for Pareto Optimality.
- Choose appropriate prices and show that the respective optimality conditions of consumers and producers (16.F.10 and 16.F.11) correspond to the conditions you derived under a).
- Standard definitions of price equilibria (e.g. Def 16.B.3) not only require consumption and production optimality, but also market clearing. Are conditions 16.F.10 and 16.F.11 sufficient for market clearing?

Problem 2: Consider a pure exchange economy consisting of two individuals, A and B, and two goods, x and y . A's preferences can be represented by the utility function $U_A(x, y) = xy$. B's preferences can be represented by the family of indifference curves that have the properties depicted in the following figure (there is one such curve for each k).



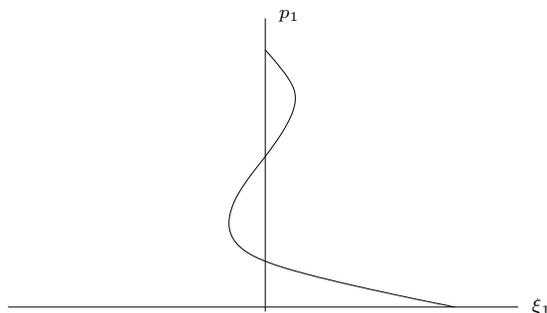
A is endowed with one unit of x , and no units of y . B is endowed with one unit of y , and no units of x .

- Is there a competitive equilibrium for this economy? If yes, describe it (i.e. give prices and allocations). If no, explain why, and indicate which assumption used to establish existence is violated.
- Suppose we “replicate” this economy eight times (that is, consider a new economy with 8 type A's, and 8 type B's). Is there a competitive equilibrium? If yes, describe it (give prices and allocations).

- c) In this example, what is the smallest number of replications for which a competitive equilibrium exists?

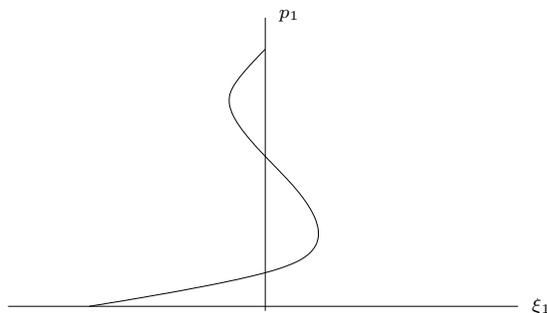
Problem 3: Consider an economy with two goods, 1 and 2. Normalize prices so that $p_1 + p_2 = 1$. Suppose that excess demand functions $\xi_i(p_i)$ are continuous.

- a) Suppose the aggregate excess demand for good 1 has the properties depicted in the following figure:



Sketch ξ_2 as a function of p_1 and indicate which prices are equilibria.

- b) Suppose that the aggregate excess demand for good 1 has the properties depicted in the next figure.



Again sketch ξ_2 and indicate equilibrium prices.

- c) For this simple economy, prove, using only the intermediate value theorem (do not use a fixed point theorem) that equilibrium exists. (Hint: think about your pictures, what happens if $\xi(0) \leq 0$?)