

ECON 4561
Applied Computational Economics
Homework 1
Due June 30, 2009

1. Consider the market for potatoes, which are storable intraseasonally, but not interseasonally. In this market, the harvest is entirely consumed over two marketing periods, $i = 1, 2$. Denoting initial supply by s and consumption in period i by c_i , material balance requires that:

$$s = c_1 + c_2.$$

Competition among storers possessing perfect foresight eliminate inter-period arbitrage opportunities; thus,

$$p_1 + \kappa = \delta p_2$$

where p_i is equilibrium price in period i , $\kappa = 0.2$ is per-period unit cost of storage, and $\delta = 0.95$ is per-period discount factor. Demand, assumed the same across periods, is given by

$$p_i = c_i^{-5}.$$

Compute the equilibrium period 1 and period 2 prices for $s = 1$, $s = 2$, and $s = 3$.

2. Consider a simple endowment economy with three agents and two goods. Agent i is initially endowed with e_{ij} units of good j and maximizes utility

$$U_i(x) = \sum_{j=1}^2 a_{ij} (v_{ij} + 1)^{-1} x_{ij}^{v_{ij}+1},$$

subject to the budget constraint

$$\sum_{j=1}^2 p_j x_{ij} = \sum_{j=1}^2 p_j e_{ij}.$$

Here, x_{ij} is the amount of good j consumed by agent i , p_j is the market price of good j , and $a_{ij} > 0$ and $v_{ij} < 0$ are preference parameters.

A competitive general equilibrium for the endowment economy is a pair of relative prices, p_1 and p_2 , normalized to sum to one, such that all the goods markets clear if each agent maximizes utility subject to his budget constraints.

Compute the competitive general equilibrium for the following parameters:

(i, j)	a_{ij}	v_{ij}	e_{ij}
(1,1)	2.0	-2.0	2.0
(1,2)	1.5	-0.5	3.0
(2,1)	1.5	-1.5	1.0
(2,2)	2.0	-0.5	2.0
(3,1)	1.5	-0.5	4.0
(3,2)	2.0	-1.5	0.0