

General Equilibrium and Welfare

Mid-Semester Examination (S)

Full Marks: 30

Answer All Questions

1. Consider the following endowment economy where, preference and endowment of Individual 1 is: utility: $u^1(x_1^1, x_2^1) = (x_1^1)^\alpha (x_2^1)^{1-\alpha}$; $0 < \alpha < 1$. Here, x_1^1 is the consumption of good 1 by individual 1, and x_2^1 is the consumption of good 2 by individual 1. Suppose, the endowment of good 1 to individual 1 is ω_1^1 , and the endowment of good 2 to the individual 1 is, ω_2^1 . The preference and endowment of Individual 2: utility: $u^2(x_1^2, x_2^2) = (x_1^2)^\beta (x_2^2)^{1-\beta}$; $0 < \beta < 1$. Here, x_1^2 is the consumption of good 1 by individual 2, and x_2^2 is the consumption of good 2 by individual 2. Suppose, the endowment of good 1 to individual 2 is ω_1^2 , and the endowment of good 2 to the individual 2 is, ω_2^2 . Price of good 1 is p_1 . Price of good 2 is, p_2 . Total endowment of good 1: $\omega_1 = \omega_1^1 + \omega_1^2$. Total endowment of good 2: $\omega_2 = \omega_2^1 + \omega_2^2$. (20)

- Derive the Marshallian demand functions for both goods for individual 1 and individual 2. (2+2+2+2=8)
- Assuming good 2 as numeraire, derive the market clearing relative price for good 1 relative to good 2, p_1^* . (4)
- Calculate, p_1 when, $\alpha = \beta = 0.5$; $\omega_1^1 = \omega_2^2 = 10$; $\omega_2^1 = \omega_1^2 = 0$. (2)
- Calculate, Marshallian demand for both goods for both individuals when, $\alpha = \beta = 0.5$; $\omega_1^1 = \omega_2^2 = 10$; $\omega_2^1 = \omega_1^2 = 0$. (4)
- Write down the competitive/Walrasian equilibrium of the economy. (2)

2. Consider an economy where, individual lives only two periods – current period, and future period. Utility function of the individual is, $u = u(c, c_f) = c^\alpha c_f^{1-\alpha}$; $0 < \alpha < 1$, c is the real consumption in the current period, and c_f is the same for the future period. Endowment of the current period is, ω ; and the same for the future period is, ω_f . Individual saves (s) in current period and earns nominal interest, i . Price in the current period is, p , and the same for future period is, p_f . Net inflation rate is, π , and gross inflation rate is, $1 + \pi = \frac{p_f}{p}$. (10)

- Derive the Marshallian demand functions for real current and future consumption. (2+2=4)
- Assuming current real consumption as numeraire, derive the market clearing gross real interest rate. (2)
- Calculate, the market clearing gross real interest rate, $(1 + r)$ when, $\omega = 12$, $\omega_f = 5$, $\alpha = 0.5$. (1)

9/10 ✓

- d) Calculate, the Marshallian demand for real current and future consumption when,
 $\omega = 12, \omega_f = 5, \alpha = 0.5$ ($1+i=2$)
- e) Write down the competitive/Walrasian equilibrium of the economy. (1)