Micro, Part IIA, 2013

Section A.

Q3. Conceptual point examined in the Question:

> Like most General Equilibrium questions, this is asking you to compare the *competitive equilibrium* with the *Pareto-efficient* outcome.

(a) **Competitive Equilibrium**: Consumer A solves the following problem:

$$\max_{x_A, g_A} \frac{1}{2} \left[\ln x_A + \ln (g_A + g_B) \right] \qquad \text{s.t.} \qquad x_A + p g_A = e_A$$

solve to obtain

$$\frac{x_A}{G} = \frac{x_B}{G} = p$$

Intuition: In a competitive equilibrium, MRS_A and MRS_B equals p.

i. **Efficiency**: Social planner solves

$$\max_{x_A, x_B, G} u^A(x_A, G) + u^B(x_B, G) \qquad \text{s.t.} \qquad x_A + x_B + pG = e_A + e_B$$

• FOCs give you

$$\frac{1}{2x_A} = \frac{1}{x_B} = \frac{1}{pG}$$

$$\Rightarrow \qquad \frac{x_A}{G} + \frac{x_A}{G} = p$$

This is simply $MRS^A_{x,G} + MRS^B_{x,G} = p$. Comparing the public good provision in the competitive equilibrium $x_A = x_B = pG$ and Pareto-efficient outcome $x_A + x_B = pG$, clear that public good under-provided in the competitive equilibrium.

ii. Punchline: Competitive equilibrium is not efficient because the public good nature of G violates the First Welfare Theorem.