

EXERCISES CHAPTER 18

Exercise 1. Consumer A and Consumer B consume goods 1 and 2. Consumer A has an endowment of only good 1: $\omega_{1,a} = 20$ and $\omega_{2,a} = 0$. Consumer B has an endowment of only good 2: $\omega_{1,b} = 0$ and $\omega_{2,b} = 20$.

Consumer A has demand:

$$x_{1,a} = \frac{\frac{1}{2}(p_1\omega_{1,a} + p_2\omega_{2,a})}{p_1}, \quad x_{2,a} = \frac{\frac{1}{2}(p_1\omega_{1,a} + p_2\omega_{2,a})}{p_2}.$$

Consumer B has demand:

$$x_{1,b} = \frac{p_1\omega_{1,b} + p_2\omega_{2,b}}{p_1 + p_2}, \quad x_{2,b} = \frac{p_1\omega_{1,b} + p_2\omega_{2,b}}{p_1 + p_2}.$$

- (a) Write down the market-clearing conditions.
- (b) Is $p_1 = 1$ and $p_2 = 2$ an equilibrium?
- (c) Assume $p_1 = 1$. What must p_2 be in equilibrium?
- (d) Find the consumers' equilibrium *allocations* by determining what they demand at these prices.
- (e) Consumer A and Consumer B have the following utility functions:
 - Consumer A: $u(x_{1,a}, x_{2,a}) = x_{1,a}x_{2,a}$
 - Consumer B: $u(x_{1,b}, x_{2,b}) = \min\{x_{1,b}, x_{2,b}\}$

Could either be made better off without the other being worse off?

Exercise 2. Consumer A and Consumer B consume goods 1 and 2. Consumer A has an endowment of only good 1: $\omega_{1,a} = 20$ and $\omega_{2,a} = 0$. Consumer B has an endowment of only good 2: $\omega_{1,b} = 0$ and $\omega_{2,b} = 20$.

Consumer A has demand:

$$x_{1,a} = \frac{\frac{1}{2}(p_1\omega_{1,a} + p_2\omega_{2,a})}{p_1}, \quad x_{2,a} = \frac{\frac{1}{2}(p_1\omega_{1,a} + p_2\omega_{2,a})}{p_2}.$$

Consumer B has demand:

$$x_{1,b} = \frac{\frac{1}{2}(p_1\omega_{1,b} + p_2\omega_{2,b})}{p_1}, \quad x_{2,b} = \frac{\frac{1}{2}(p_1\omega_{1,b} + p_2\omega_{2,b})}{p_2}.$$

- (a) Write down the market-clearing conditions.
- (b) Assume $p_1 = 1$. What must p_2 be in equilibrium?
- (c) Find the consumers' equilibrium *allocations* by determining what they demand at these prices.
- (d) Consumer A and Consumer B have Cobb–Douglas utility functions:
 - Consumer A: $u(x_{1,a}, x_{2,a}) = x_{1,a}x_{2,a}$
 - Consumer B: $u(x_{1,b}, x_{2,b}) = x_{1,b}x_{2,b}$

Could either be made better off without the other being worse off?

Exercise 3. In the question above, suppose instead that Consumer A has the endowment $\omega_{1,a} = 10$ and $\omega_{2,a} = 0$, and Consumer B has the endowment $\omega_{1,b} = 0$ and $\omega_{2,b} = 20$.

- (a) Assume $p_1 = 1$. What must p_2 be in equilibrium?

Exercise 4. Consumer A and Consumer B consume goods 1 and 2. Consumer A has an endowment of only good 1: $\omega_{1,a} = 20$ and $\omega_{2,a} = 0$. Consumer B has an endowment of only good 2: $\omega_{1,b} = 0$ and $\omega_{2,b} = 20$.

Consumer A has demand:

$$x_{1,a} = \frac{\frac{1}{2}(p_1\omega_{1,a} + p_2\omega_{2,a})}{p_1}, \quad x_{2,a} = \frac{\frac{1}{2}(p_1\omega_{1,a} + p_2\omega_{2,a})}{p_2}.$$

Consumer B has demand:

$$x_{1,b} = \frac{\frac{2}{3}(p_1\omega_{1,b} + p_2\omega_{2,b})}{p_1}, \quad x_{2,b} = \frac{\frac{1}{3}(p_1\omega_{1,b} + p_2\omega_{2,b})}{p_2}.$$

- (a) Write down the market-clearing conditions.
 (b) Assume $p_1 = 1$. What must p_2 be in equilibrium?
 (c) Find the consumers' equilibrium *allocations* by determining what they demand at these prices.