

University of Toronto
Economics 336Y – Public Economics (Taxation)

Practice exercises #1

1. For the following economies, find an equation for the set of feasible, Pareto efficient allocations and graph it.

- (a) Society has 100 units of a private good available to share between two consumers with utility functions

$$u_A(x_A) = \sqrt{10x_A}$$

$$u_B(x_B) = \sqrt{20x_B}$$

- (b) There are two private goods which are in fixed supplies X and Y , and two consumers A and B with utility functions

$$u_A(x_A, y_A) = x_A$$

$$u_B(x_B, y_B) = \min\{x_B, y_B\}$$

2. The *utility possibility frontier* is defined as the set of maximum utility levels for all consumers that is feasible in the economy, given resource constraints and preferences. For a two-consumer economy, it is defined formally as the solution to:

$$u_A^*(\bar{u}_B) = \max u_A(x_A) \text{ subject to } u_B(x_B) \geq \bar{u}_B \text{ and } (x_A, x_B) \text{ feasible.}$$

For each of the economies above, find an equation for the utility possibilities frontier, and graph it.

3. An economy has two commodities and two consumers with preferences

$$u_A(x_A, y_A) = 2 \log x_A + y_A$$

$$u_B(x_B, y_B) = 3 \log x_B + y_B$$

Society has an endowment of one unit of each good in total so that $x_A + x_B = y_A + y_B = 1$. Calculate the UPF for this economy and graph it. Why does it have such a special shape, in spite of diminishing marginal utility?

4. A worker's labour supply function is given by

$$H(w) = 100w$$

where H is hours worked per year and W the after-tax hourly wage.

- (a) Calculate the worker's Marshallian consumer surplus (or if you prefer "producer surplus") as a function of the wage rate.
- (b) Now suppose that the worker can earn a pre-tax wage of \$20 per hour, but must pay a proportional wage income tax of 25 per cent. Calculate the revenue raised by the tax and the Harberger triangle measure of its excess burden. Draw a graph illustrating the results.
- (c) Do you think the assumed labour supply function is realistic? Justify your answer.