EC202 Seminar
Week 3
(on materials of week 1)

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Welcome!

- My name is Junxi Liu, a second-year MRes/PhD student in the economics department
- Classes and office hours: week 3 to week 9; another one in term 3
- Office hours:
  - Tuesdays 4pm-6pm, Social Science 1.128b
  - Wednesdays 2pm-4pm, Social Science 0.86
  - Booking: junxiliu.com
- Contact:
  - junxi.liu.1@warwick.ac.uk
  - For technical questions, please try to book an office hour
- Format:
  - Fridays: Google form link to collect questions and general thoughts
  - Sundays: slides sent by email and on website
  - Mondays: go through in-class questions and other material based on the poll

Brief Introduction

- UK system
- Academic career?
- Don’t be shy about anything and try your best to engage
- Please give feedbacks
- General advice: treat it as a math class
- Make absolutely sure that you understand the intuition, definition, logic, thought process, and methods
- It’s the class to hone your thinking abilities

In-class Question

Q5. Consider a student deciding on their housing choices. We model this as having a budget of M to split between two goods: the first being accommodation, where the more luxurious a place the student rents, the more they have to pay, and the second being the composite good (ie money to spend on all other goods). We let h denote units of housing quality. A basic model could measure this in square metres or a more sophisticated measurement would include things like condition of the house, location, amenities etc. Let g be units of the composite good, that is money to spend on all other things. Let the price of housing be p_h per unit and the price of the composite good be 1.

We let our consumption set be $X = \mathbb{R}^2_{\geq 0}$. For each of the following utility functions $u : X \to \mathbb{R}$, draw indifference curves and budget constraint, write down the utility maximisation problem and solve it.

Define the problem

- We want to maximum utility
- We have a constraint
- A few notes:
  - Dimensions
  - Domain
  - Corner cases
  - Derivative technics

a) (quasi) Cobb-Douglas

$u(g, h) = g^{\alpha} h^{1-\alpha}$ for some exogeneous $\alpha \in [0, 1]$

b) (log-form quasi) Cobb-Douglas

$$u(g,h) = \begin{cases} \alpha \ln g + (1-\alpha)\ln h & g,h > 0 \\ -\infty & g = 0 \text{ or } h = 0 \end{cases} \quad \text{for some exogeneous } \alpha \in (0,1)$$

c) Complementary goods

$$u(g,h) = \min\{\alpha g, h\} \text{ for some exogeneous } \alpha > 0.$$

d) Substitute goods

$$u(g, h) = \alpha g + h \text{ for some exogeneous } \alpha > 0$$

e) Power function

$$u(g,h) = g + h^{\alpha} \text{ where } \alpha \in \left\{\frac{1}{2}, 2\right\}$$

Q6

Let $X = \mathbb{R}^3_{\geq 0}$ Consider perfect substitutes in the 3 good case: $u : X \to \mathbb{R}$ is defined by $u(x_1, x_2, x_3) = \alpha x_1 + \beta x_2 + x_3$ for some exogeneous $\alpha > 0, \beta > 0$. Find the optimal bundle as a function of income and prices.