Intermediate Microeconomics Exercise Class 3

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Content

Preference, Utility and Indifference Curve

- Marginal Benefit
- Marginal Cost
- Rational Behavior: keep consuming until MB=MC

Preference, Utility and Indifference Curve Cont'd

- Preference
  - Completeness
  - Reflexivity
  - Monotonicity
  - Transitivity

Preference, Utility and Indifference Curve Cont'd

- Utility
  - Ordinal Utility: monotonic transformation
  - Cardinal Utility
- Marginal Utility: law of diminishing marginal utility?
  - Quasilinear Preferences
- Marginal Rate of Substitution: $\frac{dY}{dX} = -\frac{MU_X}{MU_Y} = MRS_{XY}$.

Preference, Utility and Indifference Curve Cont'd

- Indifference Curve
  - Law of Diminishing Marginal Rate of Substitution
  - Convexity: average is better than extreme!
- Indifference Map

Example

- Cobb-Douglas Preferences
- Perfect Substitutes
- Perfect Complements

Preference, Utility and Indifference Curve Cont'd

- Economic Good
- Economic Neuter
- Economic Bad

Consumer Choice

- Budget
- Budget Constraint
  - Budget Line: Boundary
  - Affordable
  - Unaffordable

Consumer Choice Cont'd

Budget Line

- Vertical Intercept$=\frac{M}{P_y}$
- Horizontal Intercept$=\frac{M}{P_x}$
- Slope$=\frac{\Delta y}{\Delta x}=-\frac{P_x}{P_y}$
- Changes in Budget Line
  - Income Changes
  - Price Changes

Consumer Choice Cont'd

- Consumer Choice
  - Choose the best affordable point
  - Highest affordable utility
- Rule of Thumb for Consumer Choice: $\frac{P_x}{P_y} = \frac{MU_x}{MU_y}$

Consumer Choice Cont'd

- Demanded Bundle: e.g. a tuple (1,2)
- Demand Function: $(x_1(p_1, p_2, m), x_2(p_1, p_2, m))$

Consumer Choice Cont'd

- Perfect Substitutes: $u(x_1, x_2) = ax_1 + bx_2$
- Perfect Complements: $u(x_1, x_2) = \min\{ax_1, bx_2\}$
- Neutrals and Bads: $x_2 = 0$
- Graphs

Consumer Choice Cont'd

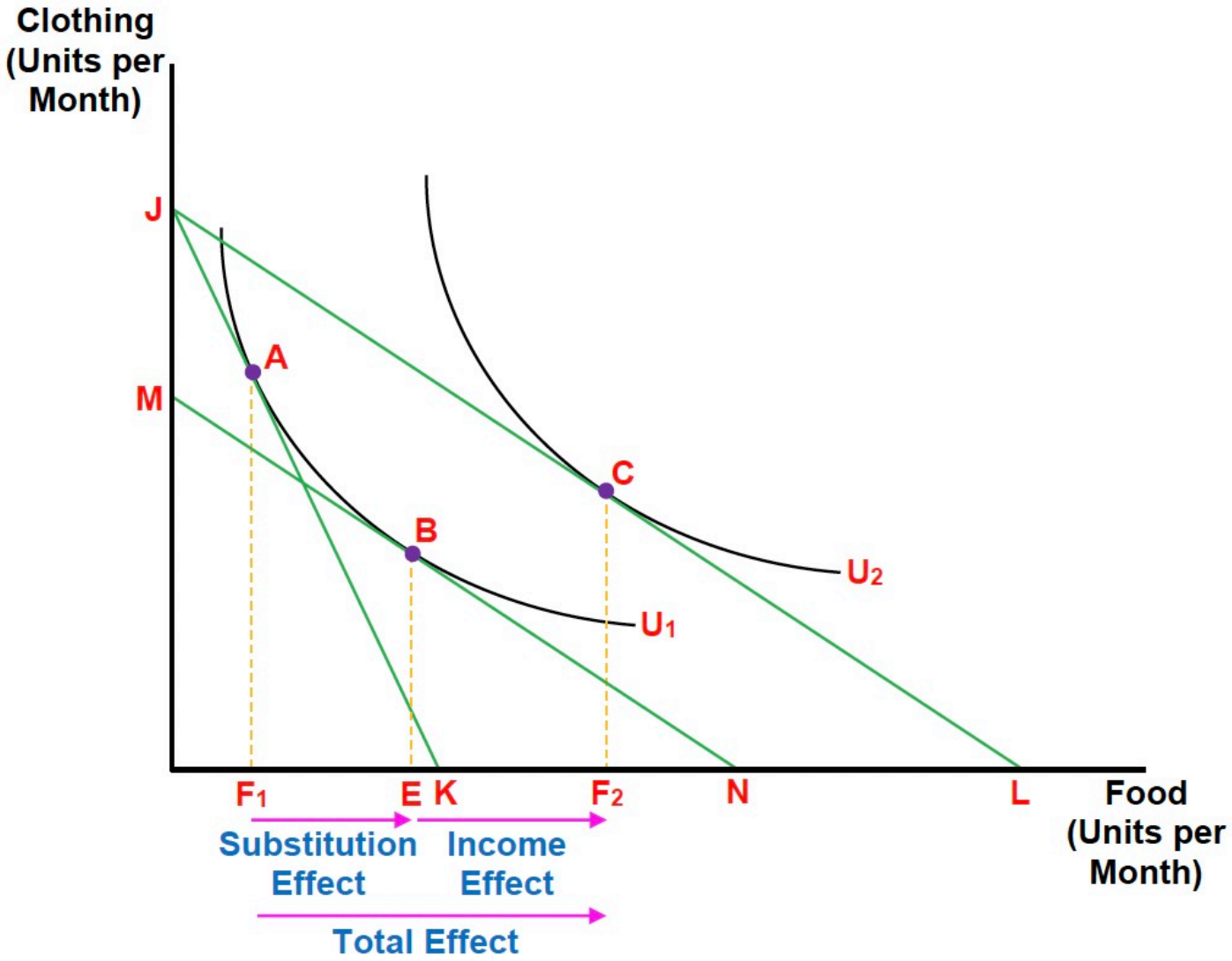
- Cobb-Douglas Preferences: $u(x_1, x_2) = x_1^a x_2^b$
  - $x_1 = \frac{a}{a+b}\frac{m}{p_1}$
  - $x_2 = \frac{b}{a+b}\frac{m}{p_2}$
- Log Representation: $u(x_1, x_2) = a \log x_1 + b \log x_2$
- Property of the Cobb-Douglas Preferences
  - The fraction of income that the consumer spends on Good 1 is $\frac{a}{a+b}$
  - The fraction of income that the consumer spends on Good 2 is $\frac{b}{a+b}$
  - If $u(x_1, x_2) = x_1^\alpha x_2^{1-\alpha}$, α is the fraction of income spent on Good 1

Income and Substitution Effects

- Relative Price: $\frac{P_x}{P_y}$
- Substitution Effect
  - Hicks Substitution Effect
  - Slutsky Substitution Effect
- Income Effect
- Total Effect = Substitution Effect + Income Effect

Income and Substitution Effects Cont'd

Hicks Substitution Effect



Income and Substitution Effects Cont'd

Hicks Substitution Effect

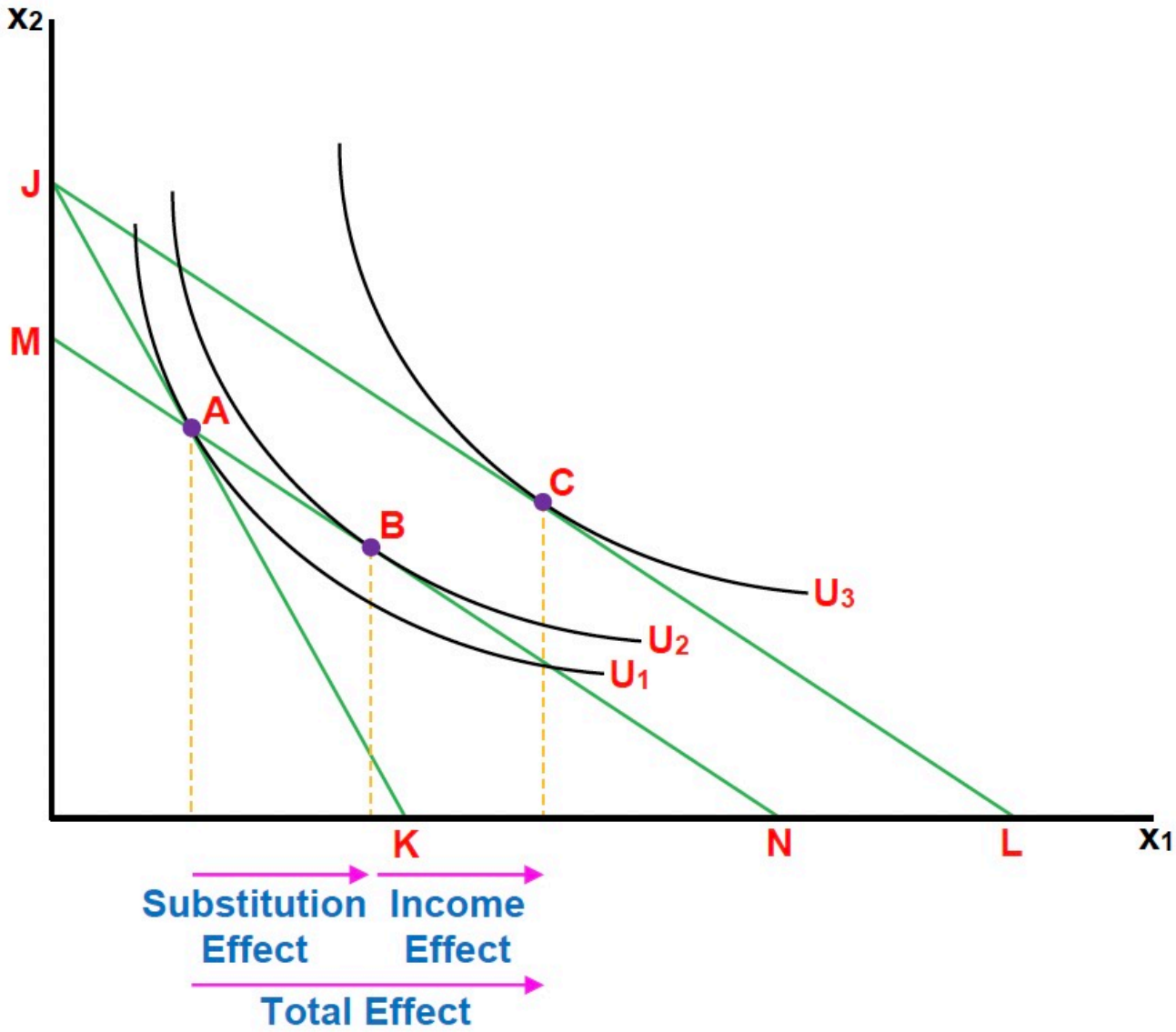
- Normal Goods
  - Substitution Effect: Positive
  - Income Effect: Positive
  - Total Effect: Positive
- Inferior Goods
  - Substitution Effect: Positive
  - Income Effect: Negative
  - Total Effect: ?
- Giffen Goods
  - Substitution Effect: Positive
  - Income Effect: Negative
  - Total Effect: Negative

Theorem

Giffen goods must be inferior goods.

Income and Substitution Effects Cont'd

Slutsky Substitution Effect



Income and Substitution Effects Cont'd

Slutsky Substitution Effect

- Pivoted Budget
- Original Choice
- Final Choice

Income and Substitution Effects Cont'd

- Compensating Variation
- Equivalent Variation

Question 1

For lunch, Ada prefers to eat soup and bread in fixed proportions. When she eats X pints of soup, she prefers to eat $\sqrt{X}$ ounces of bread. If she has X pints of soup and more than $\sqrt{X}$ ounces of bread, she eats all the soup along with $\sqrt{X}$ ounces of bread, and throws the extra bread away. If she has X pints of soup and fewer than $\sqrt{X}$ ounces of bread (say Y ounces), she eats all the bread along with Y^2 ounces of soup and throws the extra soup away.

a) Draw Ada's indifference curves between soup and bread.

b) Assume she spends all her income on soup and bread. Plot her income-consumption curve, her Engel curve for soup, and her Engel curve for bread.

c) Derive her demand function for the two goods. [Note that demand function is a function of prices and income].

Question 2

Gary has two children, Kevin and Dora. Each one consumes "yummies" and nothing else. Gary loves both children equally. For example, he is equally happy when Kevin has two yummies and Dora has three, or when Kevin has three yummies and Dora has two. But he is happier when their consumption is more equal.

a) Draw Gary's indifference curves.

b) What would they look like if he loved one child more than the other?

c) Suppose that Kevin starts out with two yummies and Dora with eight yummies, and that Gary can redistribute their yummies. Draw a "budget line" that shows his available choices and indicate his best choice by adding indifference curves.

d) How would your answer differ if Kevin started out with six yummies and Dora with four?

Question 3

Suppose that the utility function is $u(x_1, x_2) = (x_1^\rho + x_2^\rho)^{1/\rho}$, $0 \neq \rho < 1$, derive demand functions ($x_i = x_i(p_1, p_2, m)$, $i = 1, 2$).

Question 4

John has a utility function that is given by $U(C, R) = 32\sqrt{R} + C$, where R is the hours of leisure and C is the amount of dollars spent on consumption goods. He has $\bar{R} = 16$ hours a day to divide between work and leisure. If John has a non-labor income of $m = 40$ and is paid a wage rate $w = 8$ per hour, how many hours will he choose to work?

Thanks!