AAE 635

Applied Microeconomic Theory

Fall 2009

11/4/2009 classes 17-18

Last class

- Cost minimization (lecture note 9, chapter 9)

Today & Next class (and more)

- Homework 4 due Nov. 10th
- Consumer theory (lecture note 10, chapters 7-9)
- Duality in Consumer theory (lecture note 11, chapters 7-9)

11/4/2009 classes 17-18

Consumption decisions

- Constrained optimization problem
  - *Max* utility s.t. Budget constraint (and other non-negativity assumptions)
  - Solutions: Marshallian demand functions
- Assumptions
  - A1: non-satiation
    - Bundget constraint binding
    - Lagrange multiplier always positive
- Economic interpretation of FONCs (and in graph?)
  - MRS = price ratio
  - Indifference curve
- Under what conditions the FONCs also sufficient?

Linear expenditure system (LES)

- Objective function: $u(\mathbf{x}) = \sum_i \beta_i \ln(x_i - \gamma_i)$
- FONCs
- Linear expenditure system
  - Special case: Cobb-Douglas utility function (recall the cost minimization for Cobb-Douglas production function)

Consumption behavior

- Comparative statics
  - Income effects
  - Price effects
- Adding-up restrictions
  - Weighted sum of the income elasticities across all goods must be 1
- Homogeneity property
  - Sum of the income and price elasticities must be zero

Results from dual approach

- Roy's identity: $x_i^*(y, \mathbf{p}) = -\frac{\frac{\partial V}{\partial p_i}}{\frac{\partial V}{\partial y}}$
- Slutsky matrix:

  $[\mathbf{x_p}^* + \mathbf{x}_y^*(\mathbf{x}^*)^T]$ symmetric, n.s.d.
  - Symmetry restrictions

$$\frac{\partial x_i^*}{\partial p_j} + \frac{\partial x_i^*}{\partial y} \cdot x_j^* = \frac{\partial x_j^*}{\partial p_i} + \frac{\partial x_j^*}{\partial y} \cdot x_i^*$$

  - Sign restrictions
    - Demand curve downward sloping if income effect is positive
    - Demand curve upward sloping **only if** income effect is negative (Giffen goods, normal vs. inferior)
    - Figure 10.3, 10.4

Household production

- Household being both consumer and producer
- Netput vector $\mathbf{z} = (\mathbf{z}_m, \mathbf{z}_n) \in \mathbf{R}^m$, marketable vs. not

- Household obj. fn:

$$V(y, \mathbf{p}, \mathbf{q}) = \underset{\mathbf{x},\mathbf{z}}{Max} \quad \{u(\mathbf{x}, \mathbf{z}_n) : \mathbf{p}^T \mathbf{x} \leq y + \mathbf{q}^T \mathbf{z}_m, (\mathbf{z}, \mathbf{x}) \in \mathbf{F}\}$$

  - Two stages: 1st choose $\mathbf{z}_m$, then choose $(\mathbf{x}, \mathbf{z}_n)$
  - Household utility max implies profit max w.r.t. the market production activities
  - Production decisions are separable from the consumption decisions
  - Explicit price vs. implicit (shadow) price

Example: time and labor allocation

- Leisure (s), work within household (z_n), wage labor (z_w)
- Time constraint: $s + z_n + z_w = T$
- Input z_n ➔ Household output $\mathbf{z}_h$, marketable, ➔ $\mathbf{z}_m = (z_w, \mathbf{z}_h)$

➔ Budget constraint: $\mathbf{p}^T \mathbf{x} \leq y + \mathbf{q}^T \mathbf{z}_m = y + q_w z_w + \mathbf{q}_h \mathbf{z}_h$

- Household obj. fn:

$$V(y, \mathbf{p}, \mathbf{q}) = \underset{\mathbf{x},\mathbf{z},s}{Max} \quad \{u(\mathbf{x}, s) : \mathbf{p}^T \mathbf{x} \leq y + q_w z_w + \mathbf{q}_h \mathbf{z}_h, z_w + z_n + s = T, (\mathbf{z}_h, z_n) \in \mathbf{H}\}$$

  - Two stages: 1st choose $(\mathbf{z}_h, z_n)$, then choose $(\mathbf{x}, s)$

Is leisure a Giffen good?

- Check the sign of $\partial s^*/\partial q_w$ (Why?)

- What is different here compared to the consumption only story?