Economics 101A
(Lecture 14)

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Outline

1. Mid-Term Feedback
2. Risk Aversion and Lottery
3. Measures of Risk Aversion
4. Production: Introduction
5. Production Function

1 Mid-Term Feedback

- Thanks for the feedback!

2 Risk aversion

- Risk aversion:
  - individuals dislike uncertainty
  - u concave, $u'' < 0$
- Implications?
  - purchase of insurance (possible accident)
  - investment in risky asset (risky investment)
  - choice over time (future income uncertain)

Theorem. (Jensen's inequality) If a function $f(x)$ is concave, the following inequality holds:

$$f(Ex) \geq Ef(x)$$

where E indicates expectation. If f is strictly concave, we obtain

$$f(Ex) > Ef(x)$$

- Apply to utility function U.
- Individuals dislike uncertainty:

$$U(Ex) \geq EU(x)$$

- Jensen's inequality then implies U concave ($U'' \leq 0$)
- Relate to diminishing marginal utility of income

- Experiment — Are you risk-averse?

3 Measures of Risk Aversion

- Nicholson, Ch. 7, pp. 209-213 (Ch. 18, pp. 541–545, 9th)

- How risk averse is an individual?

- Two measures:
  - Absolute Risk Aversion r_A:

$$r_A = -\frac{u''(x)}{u'(x)}$$

  - Relative Risk Aversion r_R:

$$r_R = -\frac{u''(x)}{u'(x)}x$$

- Examples in the Problem Set

4 Production: Introduction

- Second half of the economy. **Production**

- Example. Ford and the Minivan (Petrin, 2002):
  - Ford had idea: "Mini/Max" (early '70s)
  - Did Ford produce it?
  - No!
  - Ford was worried of cannibalizing station wagon sector
  - Chrysler introduces Dodge Caravan (1984)
  - Chrysler: $1.5bn profits (by 1987)!

- Why need separate treatment?

- Perhaps firms maximize utility...

- ...we can be more precise:
  - Competition
  - Institutional structure

5 Production Function

- Nicholson, Ch. 9, pp. 295-301; 306-311 (Ch. 7, pp. 183–190; 195–200, 9th)

- Production function: $y = f(\mathbf{z})$. Function $f : R_+^n \rightarrow R_+$

- Inputs $\mathbf{z} = (z_1, z_2, ..., z_n)$: labor, capital, land, human capital

- Output y: Minivan, Intel Pentium III, mangoes (Philippines)

- Properties of f:
  - no free lunches: $f(0) = 0$
  - positive marginal productivity: $f_i'(\mathbf{z}) > 0$
  - decreasing marginal productivity: $f_{i,i}''(\mathbf{z}) < 0$

- Isoquants $Q(y) = \{\mathbf{x} | f(\mathbf{x}) = y\}$

- Set of inputs $\mathbf{z}$ required to produce quantity y

- Special case. Two inputs:
  - $z_1 = L$ (labor)
  - $z_2 = K$ (capital)

- Isoquant: $f(L, K) - y = 0$

- Slope of isoquant $dK/dL = MRTS$

- Convex production function if convex isoquants

- Reasonable: combine two technologies and do better!

- Mathematically, $d^2K/d^2L =$

6 Next Lecture

- Two-Step Cost Minimization
- Solve an Example
- Cases in which s.o.c. are not satisfied
- Start Profit Maximization