

**Note: This list is just for your reference; you should know everything in the lecture slides.**

**Basics: Demand and Supply**

- Analysis scenarios with demand and supply diagram
- Demand and Supply Own Price Elasticities, Cross Price Elasticities, Income Elasticities
- Effect of tax

**Lecture 3: Choice Under Uncertainty**

- Expected Value and Variance – calculations
- Expected Utility and Expected Wealth/Income/Payoff – Individuals maximizes the former
- Risk attitudes: risk neutral, risk averse and risk loving
- Risk Premium

**Lecture 4 – 7: Consumer Choice**

**Utility Maximization**

- Constraint:  $Income = I$
- Negative slope of IC =  $MRS = MU_x/MU_y$
- Negative slope of BC =  $P_x/P_y$
- Optimal Condition:  $MRS = P_x/P_y$
- Substitute into BC:  $P_x \cdot X + P_y \cdot Y = I$

**Curves**

Curve	Vertical Axis	Horizontal Axis
Income Consumption	Quantity of y	Quantity of x
Engel	Income	Quantity of x or y
Price Consumption	Quantity of y	Quantity of x
Demand	Price of x or y	Quantity of x or y

**Income and Substitution Effects**

- About a change in price; income held constant

**Substitution Effect**

- “buy relatively more of the cheaper good”
- new prices but touches old IC
- Always negative (decrease quantity) with price increase

**Income Effect**

- Poorer in real terms (purchasing power)
- Difference between total effect and SE
- Negative with price increase for normal good
- Positive with price increase for inferior good
  - o +ve Income Effect > -ve Substitution Effect → Giffen Good

## Consumer Price Index

$$P_{\text{real}} = \text{CPI}_{\text{base}} / \text{CPI}_{\text{current}} * P_{\text{current}}$$

## Market Demand

= horizontal summation of individual demands

## Network Effect

### Bandwagon Effect

- demand shifts up with price drop/increase in quantity demanded

### Snob Effect

- demand shifts down with price drop/increase in quantity demanded

## Applications

### Labor Supply

- Backward bending Labor Supply – wage increase may increase or decrease hours of work

### Inter-temporal Substitution

- Saving = Income in Period 1 – Consumption in Period 1

- Consumption in Period 2 is normal good – effect of interest rate on saving uncertain

- Consumption in Period 2 is Giffen Good – interest rate increase -> savings decreases

## Lecture 7 – 11: Production

### Returns to Scale

Compare  $F(aK, aL)$  to  $aF(K,L)$ ,  $a \geq 1$

-  $F(aK, aL) = aF(K,L)$  - CRS

-  $F(aK, aL) > aF(K,L)$  - IRS

-  $F(aK, aL) < aF(K,L)$  - DRS

### Diminishing Marginal Returns in X (X = K or L)

-  $d^2(X, \dots) / dX^2 < 0$

### Production Graphs

- Isoquant: “Indifference curve of production”

e.g.  $F(K,L) = 100$

- Isocost: “Budget constraint of production”

e.g.  $rK + wL = 50$

### Cost Minimization

- Graphically: fix isoquant, move isocost to touch the isoquant

- Constraint: Output = Q

- Negative slope of isoquant = MRTS =  $MU_L / MU_K$

- Negative slope of isocost =  $w/r$

- Optimal Condition: MRTS =  $w/r$

- Substitute into output constraint:  $F(K,L) = Q$

### Paths/Curves

Path	Vertical Axis	Horizontal Axis
Output Expansion	Quantity of K	Quantity of L
Factor Price	Price of K or L	Quantity of K or L

Increase the price of one input, all else equal → use more of the other input

### Cost Functions

Cost Minimization gives us *total cost function*  $TC(Q)$

- Average Total Cost:  $ATC(Q) = TC(Q)/Q$
- Marginal Cost:  $MC(Q) = dTC(Q)/dQ$ 
  - o passes through the minimum of  $ATC(Q)$
- Variable Cost:  $VC(Q) =$  terms in  $TC(Q)$  with a  $Q$
- Fixed Cost:  $FC =$  terms in  $TC(Q)$  with no  $Q$ 
  - o  $TC(Q) = FC + VC(Q)$

### Output Elasticity of Total Cost

- $= MC/AC$
- $> 1$  – AC rising
- $< 1$  – AC falling

### Long Run and Short Run

$LRTC(Q) \leq SRTC(Q)$  for every  $Q$

$LRATC(Q) \leq SRATC(Q)$  for every  $Q$

SRMC steeper than LRMC

### Profit Maximization

#### Output Decision

$$MR(Q) = MC(Q)$$

#### Shutdown Decision

No Sunk Cost:  $P < ATC_{min}$

Fixed Cost Sunk:  $P < AVC_{min}$

### Competitive Supply

- Firms take price as given
- Can sell as many units as they want at the given price
  - Optimal Quantity:  $P = MC(Q)$
- Not shutting down
  - Fixed cost not sunk:  $P > ATC_{min}$
  - Fixed cost sunk:  $P > AVC_{min}$
- Individual Supply Curve is the segment of  $MC(Q)$  about  $ATC_{min}/AVC_{min}$
- Market Supply is horizontal summation of individual Supplies

**A Partial List of Topics Not Covered in Section but You Should Know:**

Lecture 5

- CPI Bias

Lecture 8

- Elasticity of Substitution
- Technical Progress
- Accounting Cost versus Opportunity Cost

Lecture 10 & 11

- Output Elasticity of Total Cost
- Economics of Scope
- Learning in Production