# 14.03 Lecture Notes Outline - Spring 1997

**NOTE:** This outline is intended to help you study. The level of detail varies some throughout the outline; some topics were covered very briefly, others received a lot of attention. Refer to your notes to determine importance. Anything which I covered in class or which appeared on the problem sets, or in the corresponding readings, is fair game for the final. Some things were emphasized in more detail in the problem sets than in lecture. The week labels are very general guides and are probably off in a few places.

***Weeks 1-2***

## 1. Introduction, Overview, Tools, and an Application to Minimum Wages

### 1.1. Overview of the Course, Review of Supply and Demand

1.1.1. Course Outline

1.1.2. Motivation

a) Economics and Resource Allocation

b) What are the effects of government intervention in the economy, and how can we evaluate public policy proposals?

1.1.3. Questions...

a) Positive: What does the theory predict?

b) Normative: Which allocations are better?

c) Empirical issues: How can we test theories?

1.1.4. Formal economic models

1.1.5. Review Supply and Demand

1.1.6. Application: Minimum Wage

Freeman, Richard, "Comment: Review Symposium on *Myth and Measurement: The New Economics of the Minimum Wage*," *Industrial and Labor Relations Review* 48 (4) July 1995.

Kennan, John, "The Elusive Effects of Minimum Wages," *Journal of Economic Literature* 33 (December 1995), 1950-1965.

a) Background

b) Theoretical issues

c) Empirical issues

(1) Identification of structural models

(2) Natural Experiments

d) Findings

e) Criticisms

### 1.2. Mathematical tools

1.2.1. Single variable optimization

1.2.2. Multivariate optimization

1.2.3. The implicit function theorem and comparative statics

1.2.4. The envelope theorem

1.2.5. Constrained optimization

***<u>Weeks 2-3</u>***

## 2. Choice and the Theory of Demand

2.1. Rationality Axioms, Utility, and Indifference Curves; Constrained Utility Maximization

2.1.1. Axioms: Completeness, Consistency, Transitivity, Monotonicity, Continuity

2.1.2. Indifference Curves

2.1.3. Marginal Rate of Substitution (Diminishing MRS)

2.1.4. Budget Constraints and Utility Maximization

2.2. Individual Demand, Income and Substitution Effects

2.2.1. Deriving consumer demand from utility maximization

2.2.2. Comparative Statics on Income Changes

2.2.3. Comparative Statics on Price Changes

2.3. Duality: Expenditure Functions and Indirect Utility

2.3.1. Deriving the Slutsky Equation

2.3.2. Application: Giffen goods and Irish Potatoes

Dwyer, G.P. and C.M. Lindsey, "Robert Giffen and the Irish Potato," *American Economic Review* (March 1984): 188-192.

***<u>Weeks 4-5</u>***

2.4. Applications of Consumer Theory and Expenditure Functions

2.4.1. Lump-Sum v. In-Kind Transfers

2.4.2. Taxes and Rebates, and the Distortionary Effects of Taxation

2.4.3. Effects of a Single Price Change: Consumer Surplus

2.4.4. Price Indices

a) Laspeyres v. Paasche

b) Ideal price index

c) Sources of Bias

Boskin, Michael, et al, "Toward a More Accurate Measure of the Cost of Living," Interim Report to the Senate Finance Committee from the Advisory Commission to Study the Consumer Price Index, September 15, 1995.

Assorted newspaper articles.

2.5. Demand Relationships Between Goods

2.5.1. Net Substitutes and Complements

2.5.2. Gross Substitutes and Complements

***Week 6***

2.6. Market Demand and Elasticities

2.6.1. Income and Price Elasticity

2.6.2. Cross-Price Elasticities

2.6.3. Application: Demand for Abortions

a) How does abortion rate change with price, income, and medicaid funding?

b) Issues in empirically identifying demand curves.

2.6.4. Application: Effects of abortion restrictions

a) A model of choice: when people change behavior in response to a change in funding policy.

b) Effect on abortion rate v. effect on birth rate

c) Policy changes *both* abortion rate and number of pregnancies, so effect of restrictions is ambigous.

d) Some empirical evidence that small decreases in abortion access lead to lower birth rates.

Kane, J. and D. Staiger, “Teen Motherhood and Abortion Access,” working paper.

2.6.5. Application: Death and Taxes

Phelps, Charles E., "Death and Taxes: An Opportunity for Substitution," Journal of Health Economics, March 1988, v7, n1, 1-24.

a) Computing the effect of an alcohol tax on drinking: elasticities.

b) Optimal tax balances the externality of drinking against loss in consumer surplus.

***Week 7***

# 3. Production and Supply

3.1. Producer v. Consumer Theory

3.2. Production Functions

3.2.1. Returns to Scale

3.2.2. Isoquants and Rate of Technical Substitution

3.3. Production Costs and Cost Minimization

3.3.1. Labor and Capital Costs

3.3.2. Two step approach: fix quantity and minimize costs, then maximize over quantity.

3.3.3. Duality revisited

3.3.4. Expansion Path

3.4. Long Run Cost Curves

3.5. Short Run Costs

3.5.1. Relationships between long and short run curves, marginal and average cost curves

3.6. Profit Maximization, Short and Long Run Supply

3.6.1. Profit Maximization

3.6.2. Total Revenue and Marginal Revenue

3.6.3. Marginal Revenue and Elasticity

3.6.4. Short Run Supply

3.7. Long-Run Equilibrium

3.7.1. Constant Cost Case

3.7.2. Shape of Long-Run Supply Curve

3.7.3. Long-Run Producer Surplus

a) Derivation of Producer Surplus

b) Ricardian Rents

***Weeks 8-9***

3.8. Choice Under Uncertainty

3.8.1. Risk and Risk Aversion

3.8.2. Certainty Equivalents

3.8.3. Insurance

3.9. Moral Hazard and Incentive Theory

3.9.1. The Incentive-Insurance Tradeoff

3.9.2. A formal model: linear contracts

3.9.3. Comparative statics of the linear contracting model: the effects of risk aversion and measurement accuracy.

3.9.4. The multitask model: complementarities between incentive instruments for different uses of time.

3.9.5. Firm as an incentive system: the home contractor v. in-house production example

3.10. Organizations and Alternative Models of the Firm

3.10.1. Issues in Organization

a) Incentives, the free rider problem, and difficulties in providing correct incentives.

b) Information, Coordination, and Authority

c) Complementarities

Milgrom, Paul, and John Roberts, *Economics, Organizations, and Management* Prentice Hall: 1992, Chapter 1.

3.10.2. The Formal Analysis of Complementarities
- a) Formal definition of (Edgeworth) complements
- b) Comparative Statics
- c) Predictions for Organizations

3.10.3. Application: Modern Manufacturing

Milgrom, Paul, and John Roberts, "The Economics of Modern Manufacturing: Strategy, Structure, and Organizational Change," American Economic Review 1990.

***<u>Week 10</u>***

# 4. Prices and Perfect Competition

4.1. Partial Equilibrium Price Determination

4.1.1. Supply and Demand

4.1.2. Elasticity revisited

4.2. Applied Competitive Analysis

4.2.1. Taxes, ceilings, and other price changes
- a) Tax Incidence Analysis
- b) Tariffs and International Trade (Partial Eqm analysis)
- c) Efficiency v. Distribution

4.3. Labor Market Discrimination and Comparable Worth

Fischel, Daniel, and Edward Lazear, "Comparable Worth and Discrimination in Labor Markets," *The University of Chicago Law Review* 53 (3), Summer, 1986.

***<u>Week 11</u>***

# 5. General Equilibrium

5.1. Introduction to General Eqm.

5.2. Productive Efficiency

5.2.1. Edgeworth Box

5.2.2. Production Possibilties Frontier

Krugman, Paul, "Competitiveness: A Dangerous Obsession," *Foreign Affairs* 73 (2), March-April 1994, 28-44.

5.3. Economic Efficiency and Welfare

5.3.1. Perfectly Competitive Price System

5.3.2. Competitive Prices Yield Efficiency (under assumptions of perf. comp.)

***Week 12***

5.4. International Trade

5.4.1. Absolute and Comparative Advantage: The Constant Cost Case

5.4.2. Comparative Advantage: The general case

5.4.3. Tariffs

a) Open Economy Analysis
b) Tariffs in a Small Country
c) The effects of free trade: Efficiency v. Distribution revisited
d) Tariffs in a Big Country
e) The costs of inteventionist trade policies: trade wars.

Krugman, Paul, "The Narrow and Broad Arguments for Free Trade," *American Economic Review* 83 (2), May 1993, 362-66.

***Week 13***

# 6. Pricing Under Imperfect Competition

6.1. Monopoly Pricing

6.1.1. Monopsony and Monopoly

a) The inframarginal effects of increasing quantity
b) Inefficiencies due to underprovision of quantity

6.1.2. Price Discrimination

a) Identifying individual consumers
b) Market Separation
c) Self-Selection

6.1.3. Bundling by Quantity: Disneyland Problem

***Week 14***

6.1.4. High and Low Quality Goods, Damaged Goods

*optional:* McAfee, Preston, and Ray Deneckre, "Damaged Goods," *Journal of Economics and Management Strategy*, forthcoming.

6.1.5. Price Discrimination and Pareto Optimality

# 7. Limits of the Market

7.1. Externalities and Public Goods

*Optional:* Krugman, Paul, "The Tax-Reform Obsession," *New York Times Magazine*, April, 1996.

7.1.1. Social Efficiency v. Competitive Equilibrium

7.1.2. Taxation to Yield Social Efficiency

7.1.3. Example: Overproduction/overuse

7.1.4. Example: Computer Congestion

## 8. Review: Themes of the Course

8.1. The analysis of consumer theory

8.1.1. Using expenditure functions and indirect utility to evaluate changes in consumer welfare as a result of price changes, taxes, and policies. Make before-after comparisons taking into account optimizing behavior.

8.1.2. Inefficiencies of public policy when utility functions aren't known for each person: Taxes are distortionary; price indices are biased.

8.1.3. Tools: Duality; the envelope theorem; constrained optimization.

8.2. Consumer and Producer Theory can be used to derive market supply and demand curves; areas above/below these curves can be interpreted as consumer/producer surplus.

8.3. Uncertainty

8.3.1. Risk averse consumers consider risk of gamble, not just expected payoffs.

8.3.2. Tools: Expected Utility representation of preferences over gambles.

8.4. Incentive Theory

8.4.1. Optimal incentives resolve the tradeoff between providing strong incentives and exposing the agent to too much risk about the part of output he can't control. Noisier output measure or more risk aversion on part of agent will lead to lower commission rates.

8.4.2. When an agent has multiple activities to divide her effort between, the incentive instruments for the different activities are complementary. This implies that we may see systems of high-powered incentives across activities in some firms (i.e. independent contractor) and systems of low-powered incentives in other firms (i.e. in-house production).

8.4.3. Tools: The linear contracting model.

8.5. Organizations

8.5.1. Firms make many choices about organizational structure which fit together. It is useful to think about the fit between choices in terms of complementarities between the choices.

8.5.2. Different firms exist in different economic and regulatory environments; thus, they make different choices in response to different conditions, such as different costs and benefits to individual choices.

8.5.3. When a group of choices are complementary, something which makes one choice more desirable can lead a firm to increase all choices in the group.

8.5.4. Modern Manufacturing and Lean Retailing can be studied as systems of complementary choices about technology and organization.

8.5.5. Tools: mathematics of complementarity and comparative statics theorem.

8.6. Applied Competitive Analysis: Analysis of the effects of regulated price changes (labor markets: minimum wage, comparable worth; product markets: price ceilings; subsidies for abortions; int'l trade: tariffs)

8.6.1. The price system leads to efficient allocations under the assumptions of perfect competition. Interventions in general create deadweight loss.

8.6.2. The effects of these policies depend critically on whether firms have market power. Minimum wages can increase employment when firms have monopsony power and face an upward sloping supply curve, since they account for the inframarginal effects of increasing employment (paying higher wages to all other workers). Tariffs (so long as there is no retaliation) can increase a country's well-being if the country's consumers are are large part of the world market.

8.6.3. Many policies (such as tariffs) redistribute surplus between different interests in an economy. Governments consider not only long-run efficiency, but also the transactions costs, the social costs of unemployment, as well as the political pressures it faces.

8.6.4. Measurement of the effects of policies can be difficult. For example, our price-quantity data points may have been generated by simulataneous movements in supply and demand, and thus we can't make interpret price-quantity data points as points on a single supply or demand curve.

a) One solution: look for a "natural experiment." More generally, look for something exogenous which drives supply or demand.

b) Overall point in interpreting empirical analysis: think about how data is determined by individuals making decisions and responding to policies. Examples: Why was policy changed one place and not others? Is anything changing supply/demand at the same time? How do teenagers change their behavior in response to changes in access to abortion?

8.6.5. Tools: Supply/Demand Analysis, Elasticities, Consumer/Producer surplus.

8.7. General Equilibrium

8.7.1. Again, we see that price taking leads to efficiency under perfect competition.

8.7.2. The production possibilities frontier formalizes the idea that the economy must shift resources between alternative uses and cannot expand in every industry at once.

8.7.3. Trade allows countries to reallocate resources according to their comparative advantage, so that they can consume beyond the production possiblities frontier.

8.7.4. Tariffs are always bad for small countries. Large countries can benefit from unilaterally imposing a tariff since the foreign producers bear part of the burden. However, imposing tariffs may cause other countries to retaliate, reducing efficiency. Trade institutions can help countries cooperate.

8.7.5. Tools: Edgeworth Box, PPF & Representative Consumer Analysis of Trade

8.8. Price Discrimination

8.8.1. Monopolies create deadweight loss when they use linear prices (same price for each unit) due to the inframarginal effects of increasing quantity: they must lower price for all previous units.

8.8.2. If a monopolist can extract all consumer surplus, she will want to create as much as possible in order to extract it. But this requires knowing the demands of each individual.

8.8.3. Monopolists may segment markets according to price sensitivity if they can observe who is in different groups (i.e. students and professionals).

8.8.4. Monopolists may offer different bundles (nonlinear pricing) and choose prices so that high-value consumers self-select to buy a more valuable bundle than low-value consumers.

8.8.5. Tools: Monopoly and price discrimination models.

8.9. Externalities

8.9.1. If one person's actions creates costs on others, such as congestion costs, free markets will not lead to efficiency. This can lead to overuse of roads or other public services.

8.9.2. Taxes can be used to align people's interests with those of society.

8.9.3. Tools: Models of individual behavior with externalities.