

HINT: IF YOU READ THIS COURSE OUTLINE CAREFULLY AT THE BEGINNING OF THE COURSE, IT WILL SAVE YOU A LOT OF QUESTIONS AND PROBLEMS LATER.

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**COURSE OUTLINE**  
**ECONOMICS 4010**  
**"INTERMEDIATE MICROECONOMICS"**  
**SPRING SEMESTER, 2009**

INSTRUCTOR: Dr. David R. Kamerschen, Distinguished Professor of Economics

CLASSROOM: 309 Sanford

CLASS HOURS: Monday, Wednesday, and Friday, 11:15 a.m. to 12:05 p.m.

OFFICE HOURS: Tuesday and Thursday, 11:00 a.m. - 12:00 p.m., and by appointment if you are not free during these times.

OFFICE LOCATION: Room 536 - Brooks Hall

E-Mail: <[davidk@terry.uga.edu](mailto:davidk@terry.uga.edu)>

OFFICE TELEPHONE: 706-542-368; Messages can be left at 706-542-3681.

WEB SITE FOR HANDOUTS AND COURSE OUTLINE:

To obtain a copy of your class handouts, go to <http://www.terry.uga.edu/economics>; under 'departments,' click on 'economics,' then 'class schedule.' Next, in 'choose term' drop down menu click on Spring 2009, click Go. Click on Econ 4010; under 'syllabi,' click on Spring 2009 (Kamerschen) for Dr. Kamerschen's class.

COURSE DESCRIPTION: This course studies intermediate microeconomics or price theory, application, and policy. We examine the economics of households, firms, and the government's determination of prices and allocation of resources. Much of the class focuses on the price system--how it operates, how it organizes society's economic activities, and how it performs according to various criteria. The class also addresses some of the restrictions placed on the price system in the United States. This course has two goals: (1) an understanding of the tools of microeconomic analysis; and (2) an ability to apply these tools to specific situations including both "real world" topics and policy issues. An understanding of the text provides an understanding of the tools of analysis. It is more difficult to learn to determine the ability to apply the tools. But, the "Questions/ Problems" at the end of each chapter in the textbook, and class discussions are aimed at achieving this goal. **Prerequisites for this course: ECON 2106 and 2105, MATH 2200 and 2200L.**

REQUIRED TEXT: Edwin Mansfield and Gary Yohe, Microeconomics, 11<sup>th</sup> Edition (New York & London: W.W. Norton & Company, 2004) hereinafter referred to as 'Mansfield & Yohe' in this Course Outline.

RECOMMENDED: Edwin Mansfield and James Peoples, Microeconomic Problems - Case Studies and Exercises for Review, 11<sup>th</sup> Edition (New York & London: W.W. Norton & Company, 2004).

GRADES: Five examinations are given. Exams may be objective of either a multiple-choice or a true-false type, subjective of a brief essay type, or a combination of these two types. There are four generally not comprehensive examinations given approximately every 3 or 4 weeks on Monday; be sure to check the Assignments on the last page of this outline. Each of these four examinations counts 20.0 % of your final grade. The four examinations combined count for 20% (= 4 times 80%) of your final grade. Your three-hour comprehensive final examination counts 20.0% of your final grade. Thus, your five examinations combined account for one hundred percent (100%) of your final grade. The

examinations are based on your textbook and other reading and/or problem assignments and on the classroom lectures and discussion. Missing a scheduled examination without prior arrangements results in a grade of zero for that examination. Grades are not changed at the end of the semester. Any unusual circumstances which you feel may affect your grade must be discussed with me at the start of the semester. It is the responsibility of the student to provide verification to me as to the reason for class absence. Determining the validity of a class absence is the responsibility of individual faculty members. If there are further questions or concerns regarding the coverage of these responsibilities, contact the Office of Student Affairs, Academic Building, Telephone 542-3564.

The material covered in class and on the examinations will not come entirely from the assigned readings. The lectures and the reading assignments in this class are designed to complement each other. Therefore, to get the full benefit of this class, you must both attend lectures and read the textbook. You must do considerable work at home, studying the textbook, study guide, and working on the review questions and problems at the end of the chapters, as there is simply not time to discuss in class all the material in this source. The exams reflect that the lectures (including class handouts found on the internet) and the text are not perfect substitutes. Some of the test questions are based on lecture and class handouts material not found in the textbook. On the other hand, some of the exam questions cover topics discussed in the textbook, but not in class.

Your class participation is a deciding factor if your grade is on the borderline between two different letter grades. Classroom participation includes involvement in class discussions, timely completion of all assignments, display of dedication and commitment as a student, regular attendance, punctuality, alertness in class and classroom deportment, including not talking loudly with your neighbors apart from classroom discussions.

**GRADING:** The plus/minus grading system is the official grading system approved by the Board of Regents for a three-year period. It is the only grading system approved for the University of Georgia. All grades for Fall 2006 and throughout the three-year period will be provided in this plus/minus grading system. The assignment of grades in a course is the responsibility of the instructor. I will use the plus/minus system.

Under this system, letter grades will correspond to the following:

A = 4.0	C + = 2.3
A- = 3.7	C = 2.0
B+ = 3.3	C- = 1.7
B = 3.0	D = 1.0
B- = 2.7	F = 0.0

For the purpose of calculating eligibility for the HOPE Scholarship, the existing non plus/minus grading scale (A,B,C,D,F) will continue to be used. The average will be reported to HOPE authorities as is presently the case.

**ATTENDANCE:** Failure to attend lectures on a regular basis has been found to have a negative effect on the performance (and on the grade) in this class. Class attendance is governed by the prevailing University of Georgia policy, which is: "Students are expected to attend class regularly. A student who incurs an excessive number of absences may be withdrawn (WF) from a class at the discretion of the professor." Being late to class is never acceptable.

**SUGGESTIONS:** It is very important that you keep up in this class. Economics builds on itself. Many concepts are used repeatedly. However, we study those concepts intensely only when they are first introduced. After that, I will feel free to use the concepts without re-explaining them. As a result, if you do not understand the early parts of the course, you may have considerable trouble later in the class. **The best way to prevent this is to make sure that you do not fall behind: come to class, and come to see me if you are having trouble.** Thus, it is very important to consider economics as a progressive course, where each lecture builds upon the last.

The following is a methodical way of approaching economics that has proved successful in the past: (1) read each  
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chapter as it is assigned (see "Assignments"), (2) attend each class, (3) take thorough lecture notes, (4) review systematically, after class, the lecture notes, and class handouts, including rewriting the class notes in their entirety, and prepare questions to ask the instructor where your notes are vague, (5) practice new skills by completing "Questions/Problems" at the end of each chapter and reviewing the "Glossary of Terms" (pages A1-A13) in the textbook and use the Study Guide by reading and studying the terms, answering problems and questions (6) work with other students to strengthen your skills, and (7) see me on a regular basis to clear up any questions.

#### MISCELLANEOUS:

- (1) Please find a seat you wish to stay in so that I can associate names and faces.
- (2) Please don't hesitate to ask questions or make comments--you will be performing a service for yourself, for your classmates, and for me. **THE ONLY BAD QUESTION IS THE ONE THAT IS NEVER ASKED!** Active class participation is an indispensable part of a successful course.
- (3) Please feel free to stop me if I am going too fast, you don't understand me or the material being covered, you can't hear me, or any other valid reason. Let common courtesy be your guide when the instructor or a student is addressing the class.
- (4) **Do not wait until a day or two before an examination to get help. Come in as soon as you believe you are having trouble!!**
- (5) You are strongly advised that you are responsible for maintaining the highest standards of honesty and integrity in every phase of your academic careers. The penalties for academic dishonesty are severe and ignorance is not an acceptable defense. The University Council has approved the Student Honor Code proposed by the Student Government Association that states: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." Enforcement of the code is based on the Culture of Honesty: Policies and Procedures manual--you are urged to read this information. Academic honesty is defined broadly and simply--the performance of all academic work without plagiarism, lying, cheating, tampering, stealing, or receiving unauthorized or illegitimate assistance from any other person or using any source of information that is not common knowledge or not appropriately authorized or attributed. **Note that "Except in unusual circumstances, the minimum penalty is the lowest possible grade on the academic work and one of the following: (1) a notation on the transcript; (2) suspension for a semester; and (3) permanent expulsion."** A full version on academic honesty can be found on the Internet. The web page address is: <http://www.uga.edu/~vpaa/> (Tel: 542-0432). During the examinations you may look up for inspiration, or down in desperation--but not to the side for information!
- (6) Final Exams: For students who have three Terry College of Business exams on the same calendar day (not within a 24-hour period) I will, upon request from the student, provide an alternative exam time on another day if it is the student's earliest scheduled exam that day. If a student has two mass exams at the same time, the lower numbered one should provide a make-up.
- (7) Most classrooms are in use every period of the day. By the end of the day, most rooms are hopelessly trashed. Please put your trash into the cans provided in the room.
- (8) Grade rolls are due to the Registrar 52 hours after a final exam has been given.

**IMPORTANT CLARIFICATION: The course outline provides a general plan for the course: deviations may be necessary.**

ASSIGNMENTS: We will cover all the topics listed on the following schedule, although we may not discuss them on the dates indicated. The examination dates and the textbook chapters to be covered in those examinations will not be changed. Plan accordingly. Keep up with the reading assignment and the class is easier and more enjoyable.

**DATES**

**ASSIGNMENTS**

- |     |                       |   |
|-----|-----------------------|---|
| 1.  | Friday, January 9     | Introduction to "Intermediate Microeconomics"   |
| 2.  | Monday, January 12    | Mansfield & Yohe, Preface, Chapter 1; Study Guide; Read this Course Outline carefully |
| 3.  | Wednesday, January 14 | No new assignment   |
| 4.  | Friday, January 16    | Mansfield & Yohe, Chapter 2; Study Guide  |
| 5.  | Monday, January 19    | <b><i>Holiday For Martin Luther King Day</i></b> (No Classes)                         |
| 6.  | Wednesday, January 21 | Mansfield & Yohe, Chapter 3; Study Guide  |
| 7.  | Friday, January 23    | No new assignment   |
| 8.  | Monday, January 26    | Mansfield & Yohe, Chapter 4; Study Guide  |
| 9.  | Wednesday, January 28 | No new assignment   |
| 10. | Friday, January 30    | No new assignment; Review   |

**11. Monday, February 2 --FIRST EXAM: CHAPTERS 1-4 (11:15 a.m. – 12:05 p.m., 309 Sanford Hall)**

- |     |                        |  |
|-----|------------------------|--|
| 12. | Wednesday, February 4  | Review First Examination                 |
| 13. | Friday, February 6     | Mansfield & Yohe, Chapter 5; Study Guide |
| 14. | Monday, February 9     | Mansfield & Yohe, Chapter 6; Study Guide |
| 15. | Wednesday, February 11 | No new assignment                        |
| 16. | Friday, February 13    | Mansfield & Yohe, Chapter 7; Study Guide |
| 17. | Monday, February 16    | No new assignment                        |
| 18. | Wednesday, February 18 | Mansfield & Yohe, Chapter 8; Study Guide |
| 19. | Friday, February 20    | No new assignment; Review                |

**20. Monday, February 23--SECOND EXAM: CHAPTERS 5-8 (11:15 a.m. – 12:05 p.m., 309 Sanford Hall)**

- |     |  |   |
|-----|--|---|
| 21. | Wednesday, February 25                                 | Review Second Examination                 |
| 22. | Friday, February 27                                    | Mansfield & Yohe, Chapter 9 Study Guide   |
| 23. | Monday, March 2  | No new assignment; <i>Midterm</i>         |
| 24. | Wednesday, March 4                                     | Mansfield & Yohe, Chapter 10; Study Guide |
| 25. | Friday, March 6  | No new assignment                         |
|     | <i>Monday, March 9-Friday March 13 is Spring Break</i> |   |
| 26. | Monday, March 16                                       | Mansfield & Yohe, Ch. 11; Study Guide     |
| 27. | Wednesday, March 18                                    | No new assignment                         |
| 28. | Friday, March 20                                       | No new assignment; Review                 |

**29. Monday, March 23--THIRD EXAM: CHAPTERS 9-11 (11:15 a.m. – 12:05 p.m., 309 Sanford Hall)**

- |     |                     |   |
|-----|---------------------|---|
|     |                     | <i>Tuesday, Mar. 24, Midpoint Withdrawal deadline</i> |
| 30. | Wednesday, March 25 | Review Third Examination                              |
| 31. | Friday, March 27    | Mansfield & Yohe, Ch. 12; Study Guide                 |
| 32. | Monday, March 30    | Mansfield & Yohe Chapter 13; Study Guide              |
| 33. | Wednesday, April 1  | No new assignment                                     |
| 34. | Friday, April 3     | Mansfield & Yohe Chapter 14; Study Guide              |
| 35. | Monday, April 6     | No new assignment                                     |
| 36. | Wednesday, April 8  | Mansfield & Yohe, Chapter 15; Study Guide             |
| 37. | Friday, April 10    | No new assignment; Review                             |

**38. Monday, April 13--FOURTH EXAM: CHAPTERS 12-15 (11:15 a.m. – 12:05 p.m., 309 Sanford Hall)**

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|-----|---------------------|--|
| 39. | Wednesday, April 15 | Review Fourth Exam                               |
| 40. | Friday, April 17    | Mansfield & Yohe Chapter 16; Study Guide         |
| 41. | Monday, April 20    | No new assignment                                |
| 42. | Wednesday, April 22 | Mansfield & Yohe, Chapter 17; Study Guide        |
| 43. | Friday, April 24    | No new assignment                                |
| 44. | Monday, April 27    | Mansfield & Yohe, Chapter 18, Study Guide        |
| 45. | Wednesday, April 29 | Review for Final Examination, Last Day of Class  |
|     |                     | <i>Final Exams – Monday May 4 – Friday May 8</i> |

**46. Monday, MAY 4-- FINAL EXAM: CHAPTERS 1-18 (12:00 - 3:00 P.M., TO BE ANNOUNCED)**

**COURSE HANDOUT  
ECONOMICS 4010  
"INTERMEDIATE MICROECONOMICS"**

**INSTRUCTOR:**

Dr. David R. Kamerschen,  
Distinguished Professor of Economics

**COURSE DESCRIPTION:**

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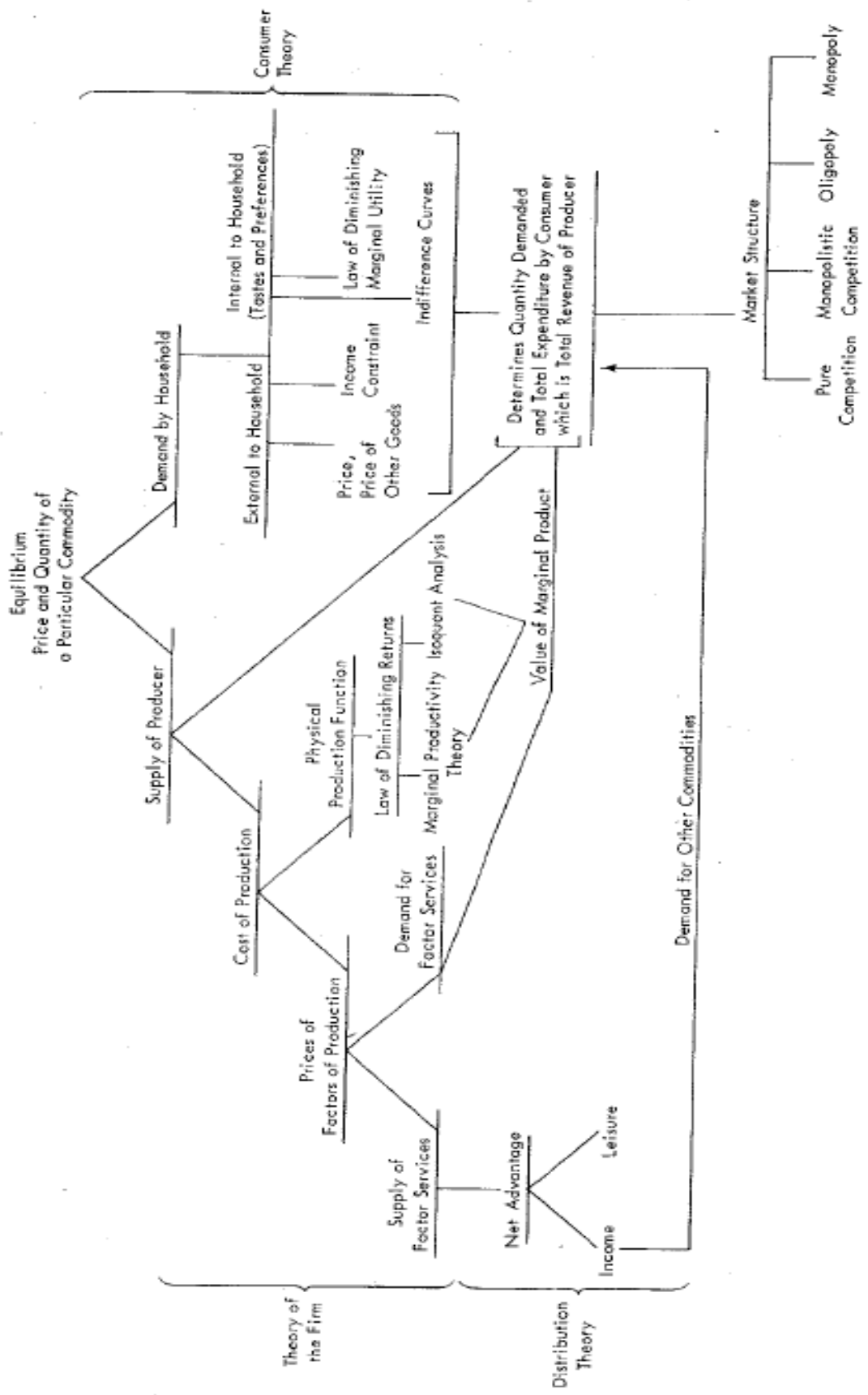
**Prerequisites for this course: ECON 2106 and 2105, MATH 2200 and 2200L.**

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TEN PRINCIPLES OF ECONOMICS

Table 1

HOW PEOPLE MAKE DECISIONS	#1: People Face Tradeoffs #2: The Cost of Something Is What You Give Up to Get It #3: Rational People Think at the Margin #4: People Respond to Incentives
HOW PEOPLE INTERACT	#5: Trade Can Make Everyone Better Off #6: Markets Are Usually a Good Way to Organize Economic Activity #7: Governments Can Sometimes Improve Market Outcomes
HOW THE ECONOMY AS A WHOLE WORKS	#8: A Country's Standard of Living Depends on Its Ability to Produce Goods and Services #9: Prices Rise When the Government Prints Too Much Money #10: Society Faces a Short-Run Tradeoff between Inflation and Unemployment

Table 2

PROPOSITION AND PERCENTAGE OF ECONOMISTS WHO AGREE

1. A ceiling on rents reduces the quantity and quality of housing available. (93%)
2. Tariffs and import quotas usually reduce general economic welfare. (93%)
3. Flexible and floating exchange rates offer an effective international monetary arrangement. (90%)
4. Fiscal policy (e.g., tax cut and/or government expenditure increase) has a significant stimulative impact on a less than fully employed economy. (90%)
5. If the federal budget is to be balanced, it should be done over the business cycle rather than yearly. (85%)
6. Cash payments increase the welfare of recipients to a greater degree than do transfers-in-kind of equal cash value. (84%)
7. A large federal budget deficit has an adverse effect on the economy. (83%)
8. A minimum wage increases unemployment among young and unskilled workers. (79%)
9. The government should restructure the welfare system along the lines of a "negative income tax." (79%)
10. Effluent taxes and marketable pollution permits represent a better approach to pollution control than imposition of pollution ceilings. (78%)

SOURCE: Richard M. Alston, J. R. Kearl, and Michael B. Vaughn, "Is There Consensus among Economists in the 1990s?" *American Economic Review*, May 1992, 209-209.

TEN PROPOSITIONS ABOUT WHICH MOST ECONOMISTS AGREE

TABLE 1

A. ECONOMIC COMPARISONS

1. Microeconomics V. Macroeconomics
2. Positive V. Normative
3. Theory V. Tautology
4. Exogenous (given) V. Endogenous (determined within the model)
5. Explanation V. Prediction
6. Equity V. Efficiency (Pareto)
7. Nominal Value V. Real Value
8. Demand V. Supply
9. Implicit Costs V. Explicit Costs V. Total Costs
10. Accounting V. Economics Costs
11. Avoidable (Recoverable or Nonsunk Costs) V. Nonavoidable (Nonrecoverable or Sunk) Costs
12. Fixed Costs = Sunk Costs + Nonsunk Costs
13. Competition V. Noncompetition
14. Equilibrium V. Constrained Optimization V. Comparative Statics
15. Average V. Marginal V. Total
16. Markets V. Government
17. Production Possibility Curve V. Paradise
18. Rationality (a) Present Aim Standard – whatever aims - “crankcase oil problem”  
(b) Self-Interest Standard – narrow material interests.
19. (a) Ceteris Paribus; (b) De gustibus non disputandum est; (c) TANSTAAFL;  
(d) Passionate Irrationality for Dispassionate Rationality

B. DEMAND (D) AND SUPPLY (S)

1. Definition
2. Graphs
3. Determinants  $\left\{ \begin{array}{l} \text{Demand Pynte} \\ \text{Supply Spent} \end{array} \right.$
4. Laws
5. Foundation
6. Exceptions
7. Change in QD V. Change in Demand and Change in QS V. Change in Supply

C. EQUILIBRIUM

1. Verbal, Graphic, and Algebraic
2. Stable, Unstable, and Metastable (neutral) Equilibrium
3.  $QD = 10 - 2P, QS = 5P - 4 \quad P = 2 \quad QD = QS = 6$

D. ELASTICITY

1. Definition of Own or Direct Elasticity of Demand ( ) and Supply (,)
2. Measure: Point and Arc
3. Types
  - (a) Constant Elasticity: if  $Q = aP^{-b}$ , the corresponding inverse demand is  $P = {}^{1/b}Q^{-1/b}$ , and  $\epsilon = -b$
  - (b) Nonconstant, e.g., Linear: if  $Q = a - bP$ , the corresponding inverse demand is  $P = (a/b) - (1/b)Q$ , and  $\epsilon = -b(P/Q)$
  - (c)  $a/b = \text{choke price where } QD = 0$

TABLE 2	P	Q	TR
A	25	8	200
B	20	12	240
C	15	16	240
D	10	20	200
E	5	24	120

4. Characteristics
5. Total Revenue (or Total Expenditure) Test
6. Firm V. Market Level Values
7. Determinants
8. Applications
9. Other Elasticities: Cross and Income

## BASIC TOTAL-AVERAGE-MARGINAL RELATIONSHIPS

### I. DEFINITIONS

T = total value, A = average value, M = marginal value, X = the variable in question, e.g., the quantity of an input, the quantity of an output, the quantity of money, etc.

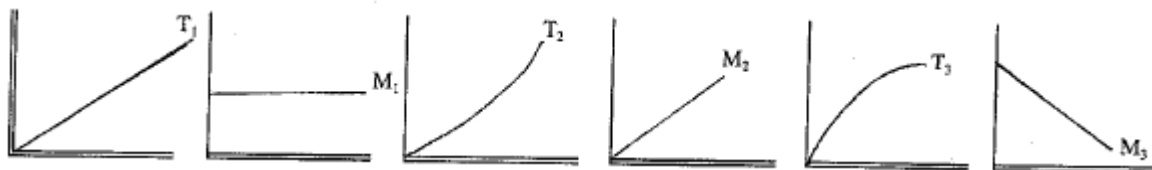
$$T = A * X = \Sigma M \, dX$$

$$A = T/X$$

$$M = (\Delta T)/(\Delta X) = T_n - T_{n-1} = A + \frac{\Delta A}{\Delta X} * X$$

In terms of geometry, M is the slope of T function.

In terms of the calculus, M is the first derivative of the T function (i.e.,  $M = \frac{dT}{dX} = T'$ )



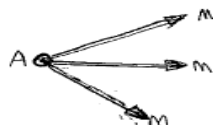
### II. GENERAL RELATIONSHIPS OR PROPOSITIONS

#### A. Discrete Case:

- 1.1 The sum of the first n marginal values equals the total value for n units of X.
- 2.1 The addition (or subtraction) of a fixed (constant) sum to the total value does not affect the marginal value.

#### B. Continuous Case:

- 1.2 The area under the marginal curve at any point equals the height of the total curve at the corresponding point.
- 2.2 The addition (or subtraction) of a fixed (constant) sum to the total curve does not affect the marginal curve.



#### C. Both Cases:

3. Whenever the average value is increasing, then the marginal value is greater than the average value.

$$8 \quad \bar{A} \quad \bar{M} > \bar{A}$$

4. Whenever the average value is decreasing, then the marginal value is less than the average value.

$$9 \quad \bar{A} \quad \bar{M} < \bar{A}$$

5. Whenever the average value is constant (is at a maximum or minimum), then the marginal value equals the average value.

$$\bar{A} \quad \bar{M} = \bar{A}$$

6. A useful mnemonic to remember this association is that THE AVERAGE VALUE (A) ALWAYS

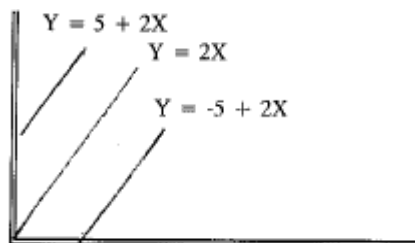
CHASES THE MARGINAL VALUE (M).

7. When the total value is at a maximum (or minimum), the marginal value is equal to zero.  
Max (or Min)  $T - M = 0$
8. (a) If the average value is constant, the marginal value must equal the average value.  
(b) However, the converse is not necessarily true.
9. If the total curve of two different functions are tangent, the two average curves will also be tangent, and the two marginal curves will intersect at the corresponding point.
10. If a total curve is continuous but not smooth (for example, has a kink), the marginal curve will have a discontinuity, or gap, at the corresponding point.
11. The marginal curve is derived from the slope of the total curve, but a total curve cannot always be derived from the information given by the marginal curve. The marginal curve shows the slope of the total curve at every point, but it does not indicate the height, that is, the starting point, of the total curve. In other words, a more precise formulation of Proposition 1 would be: "The total value for any units of X equals the sum of the marginal values up to that point (that is, the area under the marginal curve), plus a constant, where the constant measures the total value when X is zero." However, when the total value equals zero when X = 0, (as is usually the case in economics), Proposition 1 above is correct.

III. PROOFS

$$1.1 \quad \sum_{i=1}^n M \Delta X = T = \sum \frac{\Delta T}{\Delta X} \Delta X = T$$

2.1



$$1.2 \quad \int_0^n T' dX = T$$

$$2.2 \quad \frac{dT}{dX} = T' = \frac{d(T + C)}{dX}, C = \text{some constant}$$

$$3. \quad (a) \quad \frac{T + \Delta T}{X + \Delta X} - \frac{T}{X} > 0, (T + \Delta T) > T(X + \Delta X)$$

$$TX + \Delta TX > TX + T\Delta X, \Delta TX > T\Delta X, \frac{\Delta T'}{\Delta X} > \frac{T}{X}$$

$$(b) \text{ Or } \frac{d(T/X)}{dX} > 0, \frac{X'T - T'X}{X^2} > 0, \frac{T'}{X} - \frac{T}{X^2} > 0$$

$$\frac{T'}{X} > \frac{T}{X^2}, \text{ where } T' = \frac{dT}{dX}, X' = \frac{dX}{dX}$$

**TABLE 1. A CHANGE IN SUPPLY OR DEMAND SHIFTS THE ENTIRE CURVE**

A change in quantity demanded or quantity supply is caused only by a change in the price of the good itself. It involves moving along a given curve. A change in demand or supply is caused by a change in one of the determinants. It involves shifting the entire curve to the right (increase) or left (decrease). See the summary of sources or determinants of supply or demand shifts in Table 1.

**A. Sources or Determinants of Shifts in Market Supply Curves**

- 1. A change in the prices of suppliers' inputs (S) (
- 2. A change in technology (T) (
- 3. A change in the natural environment (e.g., weather) ( whole supply curve shifts
- 4. A change in expectations (E) ( (SPENT)
- 5. A change in the cost and/or availability of credit ( (
- 6. A change in government taxes or subsidies ( (
- 7. A change in the price of goods related in production (P): ( Individual Supply Curve #1-8  
substitutes and complements ( Market Supply Curve #1-9
- 8. A change in time and/or place ( (
- 9. A change in the number of suppliers (N) ( (

**B. Sources or Determinants of Shifts in Market Demand Curves**

- 1. A change in permanent income and wealth, normal vs. inferior goods (Y) ( (
- 2. A change in the price of goods related in consumption: substitutes and complements (P) ( (
- 3. A change in the composition of the population or demographic effects ( whole demand curve shifts  
( (PYNTE)
- 4. A change in tastes and preferences (T) ( (
- 5. A change in information ( (
- 6. A change in the availability of credit ( Individual Demand Curve #1-9
- 7. A change in expectations (E) ( Market Demand Curve #1-10
- 8. A change in government taxes or subsidies ( (
- 9. A change in time and/or place ( (
- 10. A change in the number of demanders (N) ( (

**TABLE 2. EQUILIBRIUM**

Indicate to the right of each of the following the effect (**increase (+), decrease (-), no change (NC), or indeterminate (I)**) upon equilibrium quantity and equilibrium price of each of the following changes in demand and/or supply. Unless otherwise specified, assume throughout that the demand curves are negatively sloped, the supply curves are positively sloped, and neither demand nor supply is horizontal or vertical.

	EFFECT ON PRICE	EFFECT ON QUANTITY
(a) Decrease in demand, supply constant	-	-
(b) Decrease in supply, demand constant		
(c) Increase in demand, supply constant		
(d) Increase in supply, demand constant		
(e) Decrease in demand, decrease in supply		
(f) Decrease in demand, increase in supply		
(g) Increase in demand, increase in supply		
(h) Increase in demand, decrease in supply		
(i) Increase in demand, supply constant and vertical	+	NC
(j) Increase in demand, supply constant and horizontal		

TABLE 1. DEMAND AND SUPPLY SHIFTS

This question relates to the effect of various events on the market for gadgets and widgets. Each event should be considered as separate and distinct from the other events. Assume throughout that (1) gadgets and widgets are substitutes, which means that a decrease (increase) in the price of one will decrease (increase) the demand and, therefore, decrease (increase) the price of the other; (2) gadgets are superior or normal good and widgets are inferior good; (3) the demand curves are negatively sloped, the supply curves are positively sloped, and neither demand nor supply is horizontal or vertical; and (4) factors of production or resources cannot be shifted from gadgets to widgets or vice versa.

In the blanks insert + for an increase, - for a decrease, and 0 for no change. Where X's appear, do not answer that part of the question. Remember, each question is independent of the other.  $D_g$  = "demand for gadgets,"  $S_g$  = "supply of gadgets,"  $P_g$  = equilibrium of gadgets,  $Q_g$  = equilibrium quantity of gadgets, and similarly for widgets (w). The first question is answered for you.

	Gadgets				Widgets			
	$D_g$	$S_g$	$P_g$	$Q_g$	$D_w$	$S_w$	$P_w$	$Q_w$
(a) Consumers become gadget freaks as gadget consumption becomes high camp.	+	0	+	+	-	0	-	-
(b) The income of consumers increases substantially because of a cut in personal income taxes.								
(c) A cost saving innovation in producing gadgets is introduced.								
(d) There is a substantial increase in the wage rates and incomes for specialized widget workers. Only spent part of income on widgets.								
(e) A government subsidy of \$1 per unit is granted to manufacturers of gadgets.								
(f) A government subsidy of \$1 per unit is granted to buyers of gadgets.								
(g) Medical findings establish that widget consumption causes cancer in humans.								
(h) The sale of gadgets is banned completely by the EPA because of extensive pollution emission.			X					
(i) On the basis of reliable news information, the price of gadgets is expected to increase next year.								
(j) A widget worm suddenly appears and destroys a substantial portion of the widget inventories.								
(k) There is a substantial decrease in the profitability of producing badgets, which can be produced instead of gadgets by potential gadget producers.								
(l) There is an increase in the price of gidgets, which are complementary goods to gadgets.								
(m) A tax of \$1 per unit is placed on the manufacture of widgets.								
(n) Improved working conditions increase widget production.								

### MARGINAL UTILITY PROBLEMS

Assignment: Calculate how many units of each good the consumer should purchase to reach an optimal where total utility is maximized.

PROBLEM A					
Q <sub>X</sub>	MU <sub>X</sub>	MU <sub>X</sub> /P <sub>X</sub>	Q <sub>Y</sub>	MU <sub>Y</sub>	MU <sub>Y</sub> /P <sub>Y</sub>
0	0	0	0	0	0
1	40	40	1	30	30
2	36	36	2	29	29
3	32	32	3	28	28
4	28	28	4	27	27
5	24	24	5	26	26
6	20	20	6	25	25
7	12	12	7	24	24
8	4	4	8	20	20

Assume: Income = \$12, P<sub>X</sub> = \$1, P<sub>Y</sub> = \$1,  $\frac{\Delta MU_i}{\Delta Q_j} = 0$

PROBLEM B					
Q <sub>X</sub>	MU <sub>X</sub>	MU <sub>X</sub> /P <sub>X</sub>	Q <sub>Y</sub>	MU <sub>Y</sub>	MU <sub>Y</sub> /P <sub>Y</sub>
0	0	0	0	0	0
1	50	25	1	30	30
2	44	22	2	28	28
3	38	19	3	26	26
4	32	16	4	24	24
5	26	13	5	22	22
6	20	10	6	20	20
7	12	6	7	16	16
8	4	2	8	10	10

Assume: Income = \$15, P<sub>X</sub> = \$2, P<sub>Y</sub> = \$1,  $\frac{\Delta MU_i}{\Delta Q_j} = 0$

PROBLEM C								
Q <sub>X</sub>	MU <sub>X</sub>	MU <sub>X</sub> /P <sub>X</sub>	Q <sub>Y</sub>	MU <sub>Y</sub>	MU <sub>Y</sub> /P <sub>Y</sub>	Q <sub>Z</sub>	MU <sub>Z</sub>	MU <sub>Z</sub> /P <sub>Z</sub>
0	0	0	0	0	0	0	0	0
1	18		1	39		1	12	
2	16		2	36		2	10	
3	14		3	33		3	9	
4	12		4	30		4	8	
5	10		5	27		5	7	
6	8		6	24		6	5	
7	6		7	21		7	3	

Assume: Income = \$26, P<sub>X</sub> = \$2, P<sub>Y</sub> = \$3, P<sub>Z</sub> = \$1,  $\frac{\Delta MU_i}{\Delta Q_j} = 0$

MARGINAL UTILITY PROBLEMS (Continued, Page 2)

PROBLEM D					
Q <sub>X</sub>	MU <sub>X</sub>	MU <sub>X</sub> /P <sub>X</sub>	Q <sub>Y</sub>	MU <sub>Y</sub>	MU <sub>Y</sub> /P <sub>Y</sub>
0	0	0	0	0	0
1	20		1	9	
2	18		2	15	
3	15		3	26	
4	10		4	38	
5	7		5	49	

Assume: Income = \$5, P<sub>X</sub> = \$1, P<sub>Y</sub> = \$1,  $\frac{\Delta MU_i}{\Delta Q_j} = 0$

PROBLEM E														
Q <sub>a</sub>	MU <sub>A</sub>	MU <sub>A</sub> /P <sub>A</sub>	Q <sub>B</sub>	MU <sub>B</sub>	MU <sub>B</sub> /P <sub>B</sub>	Q <sub>C</sub>	MU <sub>C</sub>	MU <sub>C</sub> /P <sub>C</sub>	Q <sub>D</sub>	MU <sub>D</sub>	MU <sub>D</sub> /P <sub>D</sub>	Q <sub>S</sub>	MU <sub>S</sub>	MU <sub>S</sub> /P <sub>S</sub>
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	36		1	15		1	24		1	72		1	5	
2	30		2	12		2	15		2	54		2	4	
3	24		3	8		3	12		3	45		3	3	
4	18		4	7		4	9		4	36		4	2	
5	13		5	5		5	7		5	27		5	1	
6	7		6	4		6	5		6	18		6	1/2	
7	4		7	3½		7	2		7	15		7	1/4	
8	0		8	3		8	1		8	12		8	1/8	

Assume: Income = \$106, P<sub>A</sub> = \$24, P<sub>B</sub> = \$4, P<sub>C</sub> = \$6, P<sub>D</sub> = \$18, P<sub>S</sub> = \$1.  
 Q<sub>S</sub> = Quantity of savings, P<sub>S</sub> = Price of savings,  $\frac{\Delta MU_i}{\Delta Q_j} = 0$

## PRODUCTION DEFINITIONS AND LAWS

Production = any activity that creates, i.e., value added, present or future utility: (1) time (2) place (3) form

Short-Run = longest time at least one input cannot be varied

Long-Run = shortest time to change all inputs

### Law of Diminishing Marginal Returns

- (1) an empirical generalization, not a law of logic
- (2) assumes level of technology, socio-economic organization, and quantity and quality of inputs are fixed
- (3) at least one input is fixed
- (4) it must be possible to vary input proportions

Isoquant = set of input combinations that yield the same total output

Isoquant = curve showing all possible efficient combinations of inputs that are capable of producing a certain level of output

Slope of Isoquant Function: =  $MRTS_{AB} = MP_A / MP_B$

Isocost Equation:  $Q_b = \frac{\overline{TC} - \overline{FC}}{P_b} - \frac{P_a}{P_b} Q_a$

Slope of Isocost Function: =  $\frac{P_a}{P_b}$

Economic Range or Region = Marginal Physical Product (MPP) of all inputs is positive and declining

## PRODUCTION FUNCTIONS AND LAWS

TABLE 1 - NUMERICAL EXAMPLE

(This table assumes that land is fixed at, say, one acre)

Units of Labor	Total Product 1, (TP <sub>1</sub> )	Marginal Product 1, MP <sub>1</sub>	Average Product 1, AP <sub>1</sub>	Total Product 2, TP <sub>2</sub>	Marginal Product 2, MP <sub>2</sub>	Average Product 2, AP <sub>2</sub>
0	0	0	0	100	0	---
1	100	100	100	200	100	200
2	300	200	150	400	200	200
3	600	300	200	700	300	233.3
4	800	200	200	900	200	225
5	900	100	180	1,000	100	200
6	960	60	160	1,060	60	176.7
7	950	-10	135.7	1,050	-10	150

1. Short-run production functions are subject to the Law of Diminishing Returns (LDR), which is a special case of the LVP.

If the quantities of a variable factor input are increased while some other factor or factors remain fixed, eventually the increases in total product will successively diminish (because the proportion of "variable" factor to "fixed" factor is increasing).

- a. Law of Diminishing Marginal Product
- b. Law of Diminishing Average Product
- c. Law of Diminishing Total Product

2. Short-run production functions are subject to the Law of Variable Proportions (LVP) or Law of Disproportionality

If the proportion of one factor input is increased relative to all other factor inputs, eventually the increases in total product will successively diminish (because the proportion of "variable" factor to "fixed" factor is increasing).

3. Long-run production functions are subject to the Law of Returns to Scale (LRS) or Law of Proportionality

If all factor inputs (A,B,C) that produce a given total output (Q) are increased by a scale constant ( $\lambda$ ) or proportionally, the total output (Q) will be increased by the same, greater, or lesser amount.

*If  $Q = f(A, B, C)$ , then for a homogeneous production function  $\alpha Q = f(\lambda A, \lambda B, \lambda C)$ .*

*If  $\alpha < \lambda$ , there are Decreasing Returns to Scale*

*If  $\alpha = \lambda$ , there are Constant Returns to Scale*

*If  $\alpha > \lambda$ , there are Increasing Returns to Scale*

**TYPES OF PRODUCTION FUNCTIONS**

1.  $\sigma = \text{elasticity of substitution} = \frac{\% \Delta \left( \frac{K}{L} \right)}{\% MRTS_{LK}}$
2. PERFECT SUBSTITUTES - Linear Isoquant,  $\sigma = \infty$
3. LEONTIEF - FIXED PROPORTIONS,  $\sigma = 0$   
 $Q = \text{minimum} \left[ \frac{K}{\alpha}, \frac{L}{\beta} \right]$  where  $\alpha, \beta$  are constant
4. COBB-DOUGLAS ( $\bar{A}, \bar{\alpha}, \bar{\beta} > 0$ ),  $\sigma = 1$   
 $Q = AL^\alpha K^\beta$ , where  $0 < \alpha, \beta < 1$
5. CONSTANT ELASTICITY OF SUBSTITUTION (CES),  $\sigma = 0 \text{ to } \infty$ ; 2, 3, 4, above are classes of CES production function.  
 $Q = [aL^{\frac{\sigma-1}{\sigma}} + bK^{\frac{\sigma-1}{\sigma}}]^{\frac{\sigma}{\sigma-1}}$
6. HOMOGENEOUS
7. HOMOTHETIC
8. VARIABLE ELASTICITY OF SUBSTITUTION
9. EFFICIENCY FRONTIER

**COST FUNCTION**

1. Constant Elasticity Cost Function  
 $TC = aQ^b w^c r^d$  where  $\bar{a}, \bar{b}, \bar{c}, \bar{d} > 0$   
 $\log TC = \log a + b \log Q + c \log w + d \log r$   
 where Q = output, w = price of labor and r = price of capital rental value
2. Translog Cost Function. It postulates a quadratic relationship between the log of TC and the logs of input prices and output, and allows for average cost to be U-shaped.  
 $< IRS$
3. Elasticity of Total Cost =  $\frac{\% \Delta TC}{\% \Delta Q_x} = \frac{MC}{AC} = 1$  CRS  
 $> DRS$
4. LEARNING OR EXPERIENCE CURVE – Labor Only  
 $L = A + BN^{-\beta}$   
 N = cumulative units of output produced  
 L = labor input per unit of output  
 $\bar{A}, \bar{B} > 0 \quad 0 < \bar{\beta} < 1$

Value of $\beta$	Value of L	Is there Learning?
0	A + B	No
>0		Yes
→1	→A	Yes

5. Economies of Scope (ES) exists if  $\frac{(TC_x + TC_y) - (TC_{xy})}{TC_{xy}} > 0$  (If  $MC > 0$  ES can't be > 1)

Shepherd's Lemma: The rate of change of the LTC with result to an input price is equal to the corresponding input demand function. So if we know the LTC, we can derive the input demand function and if we know the input demand function we can "back out" the production function. For example, if Pa increases by \$1 per hour, then total costs should increase approximately by the \$1 increase in Pa multiplied by the Qa the firm is currently using. This is because as firm minimizes its costs, the increase in Pa leads to a decrease in the Qa used and an increase in the Qb

used.

DECISION-MAKING ALGORITHM FOR MAXIMIZING PROFITS IN ALL MARKET STRUCTURES WHETHER MONOPOLY OR COMPETITION:

TABLE 1

Output n is a unique profit maximizing level of output if:

- (1) a. Short run:  $TR_n \geq TVC_n, (= P_n \geq AVC_n)^*$
- b. Long run:  $TR_n \geq TC_n, (= P_n \geq LAC_n)$
- (2)  $MR_n = MC_n$
- (3) a.  $MR_{n-1} > MC_{n-1}$ , where n-1 represents in general outputs smaller than n,
- b.  $MR_{n+1} < MC_{n+1}$ , where n+1 represents in general larger outputs than n

Proof of (1)a that (2) is called the marginal equality and (3) is called the marginal inequality. The marginal inequality is a much more powerful and general approach to finding an optimal value.

TABLE 2

Decision rule to determine whether it pays a firm to produce or close down

- (a) Losses of producing must be  $\leq$  Losses of closing down
- (b)  $TC - TR \leq TFC$
- (c)  $(TVC + TFC) - TR \leq TFC$
- (d)  $TVC - TR \leq 0$
- (e) *Thus,  $TVC^* \leq TR$  is the test*

\*This table assumes that all fixed costs (i.e., costs that do not vary in total with output) are sunk costs (i.e., costs that are not recoverable). If only a portion of fixed costs are sunk costs, all the rules in Table 1 and 2 change from "variable" costs to "avoidable" or nonsunk costs (i.e., the sum of variable costs and the recoverable (nonsunk) part of fixed costs)).

For example, if  $TC = \$180$ , and  $TFC = \text{total sunk cost} = \$100$ , then the firm should produce if  $TR > \$80 (= TVC)$ .

If  $TC = \$180$ ,  $TFC = \$100$ ,  $TVC = \$80$ , but total sunk costs = \$40, then the firm should produce if  $TR > \$140 = (\$80 \text{ of variable costs} + \$60 \text{ of recoverable fixed costs} = NSFC)$ .  $TFC = TSC (= \text{total sunk costs}) + TNSC (= \text{total nonsunk costs})$ . Thus,  $TC = TSC + TNSC$ .

SHORT RUN	LONG RUN
$PS = TR - TNSC$ , if all fixed costs are sunk, $PS = TR - TVC$	$PS = TR - TC$
$\pi = TR - TC$ , Therefore, $PS > \pi$	$\pi = TR - TC$
$PS = \pi + TSC (= \pi + TFC \text{ if all fixed costs are sunk})$	Therefore, $PS = \pi$ , if constant cost industry, if increasing cost industry, $PS > \pi$
Example if all fixed costs are sunk, $TR = 200$ , $TC = 180$ , $TVC = 80$ , $TFC = 100$ $\pi = TR - TC = 200 - 180 = 20$ $PS = TR - TVC = 200 - 80 = 120$ $PS = \pi + TFC = 20 + 100 = 120$	

## SUMMARY OF SOME MARKET MODELS

<b>A. SELLERS' SIDE</b>							
	Number of Firms	Conditions of Entry	Type of Product	Example in the United States	Short-Run Profit	Long-Run Profit	Price-Marginal Cost Markup
1. PERFECT COMPETITION	Many	Very Easy	Homogeneous	Wheat Computer Chips Gold	+,-	0	0
2. MONOPOLISTIC COMPETITION	Many	Relatively Easy	Differentiated	Pens Books Paper	+,-	0	+
3. OLIGOPOLY	Few	Difficult	Either Homogeneous or Differentiated	Clothing Steel Light Bulbs Autos Cereal	+,-	+(or 0)	+
4. PURE MONOPOLY	One	Barred	Unique	Public Utilities Postal Service	+,-	+(or 0)	+
5. PERFECTLY CONTESTABLE	Few or Many	Ultra Easy Entry & Exit	Either Homogeneous or Differentiated	Airlines	+,-	0	0
<b>B. BUYERS' SIDE</b>							
6. PERFECT COMPETITION	Many	Very Easy	Homogeneous	Retail Grocery-Store Consumers			
7. MONOPSONISTIC COMPETITION	Many	Relatively Easy	Differentiated	Aluminum- Can Buyers			
8. OLIGOPSONY	Few	Difficult	Either Homogeneous or Differentiated	Cigarette Producers			
9. PURE MONOPSONY	One	Barred	Unique	Federal Government's Missile Purchases			
<p>The late Nobel laureate George Stigler and others criticized the Chamberlin model on a variety of grounds. First of all, there is the difficulty of defining what is meant by the amorphous concept of an "industry group." From a methodological perspective, Stigler joined Milton Friedman in arguing that a theory should be judged not by the descriptive accuracy of its assumptions, but by its ability to predict responses to changes in the economic environment. Stigler believed that Chamberlin's theory significantly complicates the theory of perfect competition, without appreciably altering its most important predictions. But the most telling criticism of the Chamberlin model is not that it too closely resembles the competitive model, but that in at least one very important respect it does not depart sufficiently from it.</p>							

TABLE 1

MR = P - P/(η), where η = absolute value of price elasticity of demand, MR = Marginal Revenue, MC = Marginal Cost

$$P = MC \frac{\eta}{\eta - 1}$$

η = 1 => MR = 0  
 η > 1 => MR > 0  
 η < 1 => MR < 0

EXAMPLE:  
 If η = 2, and P = 2MC  
 If η = 10, P = 1.1MC  
 If η = 4, P = MC

TABLE 2

MONOPOLY POWER	MARKET POWER
1. Price > Marginal Cost	Price > Marginal Cost
2. Long run profit > 0	Long run profit = 0
Unilateral	Collusion

TABLE 3

THEORETICAL LIMITATIONS OF THE COMPETITIVE PRICE SYSTEM

1. Consumer Sovereignty
2. Public Goods
3. Increasing Returns to Scale
4. External Effects
5. Equity and Income Distribution
6. Other Economic Criteria--e.g., growth and stability
7. Dynamics. No advertising, change in technology, consumer preferences, or price strategies
8. Ethical, Political, and Societal Considerations
9. "Second Best" Analysis
10. Information Costs. Assumes Perfect Information
11. If the products are Bads not Goods
12. Countervailing Power--Buyer Power

- A. THE ECONOMIC EFFECTS OF MONOPOLY (Monopoly power exists if  $\frac{(P_M - P_C)}{P_M} > 0$ )
1. Monopolist has a price policy.
  2. Given the same costs, monopoly prices are usually higher than would prevail under pure competition because the amounts produced and offered for sale are lower.
    - a. If costs are higher, conclusion is strengthened.
    - b. If costs are lower for the monopolist, this is necessary but not sufficient condition for lower prices and higher outputs than pure competition.
  3. Excess profits may be earned under monopoly in the long run.
  4. Monopoly reduces the flexibility of the economy.
  5. Monopoly prevents the optimal allocation of resources (and causes deadweight losses).
  6. Monopoly tends to redistribute income.
  7. Monopoly can influence technological change and innovation.
    - a. Schumpeter vs. orthodox theory
  8. Can't predict response of price and quantity to an increase in demand except that both can't fall.
    - a. If demand becomes more elastic, price can fall, but quantity will rise.
    - b. If demand becomes more inelastic, price can increase, but quantity can fall.
    - c. In the most likely case, both price and quantity will increase.
  9. Other things being equal, prices and quantities will change less absolutely in monopoly than in competition in response to a change in marginal costs.
  10. Firms may not maximize their profits.
    - a. Long-run profit versus short-run profit comparison
    - b. Want to maximize profits but can't--lack information--full cost theory
    - c. May have other goals--depends on individuals and organizations--organization theory
    - d. Don't want to maximize profits--satisficing, sales maximizing, quiet life, etc.
  11. May be considerably more nonprice competition under monopolistic competition and oligopoly, but not pure monopoly.
  12. Monopoly may reduce macroeconomic stability--effect of rigid prices on unemployment, aggregate consumption, and aggregate investment.
  13. Other inefficiencies
    - a. X-inefficiencies or organizational slack
    - b. Promotional outlays
    - c. Operate lower output less than economies of scale justify
    - d. Wasteful cross hauling from basing point and other pricing schemes
    - e. Excess capacity from e.g., prorationing
    - f. Regulation
- B. THE POLITICAL EFFECTS OF COMPETITION
- a. Decentralize and disperse power
  - b. Solves economic problems impersonally and not through the personal control of entrepreneurs or bureaucrats
  - c. Provides freedom of opportunity

See "The Economic Effects of Monopoly: A Lawyer's Guide to Antitrust Economics," Mercer Law Review, Vol. 27, No. 4, (Summer, 1976), pp. 1061-1109. [This article was reprinted in Economic Analysis and Antitrust Law, edited by Terry Calvani and John J. Siegfried, (Boston: Little, Brown & Company, 1979), pp. 20-45.]

MARKET STRUCTURE	POST-MERGER HERFINDAHL-HIRSCHMAN INDEX-(HHI)	CHANGE IN HHI DUE TO MERGER	LIKELY AGENCY ACTION
UNCONCENTRATED	0-999		Will Not Challenge (except in extraordinary circumstances)
MODERATELY CONCENTRATED	1000-1800	(a) 0-100 (b) Over 100	(a) Unlikely to challenge (b) Likely to challenge*
HIGHLY CONCENTRATED	Over 1800	(a) 0-50 (b) Over 50	(a) Unlikely to challenge (b) Likely to Challenge*

The Herfindahl-Hirschman Index (HHI) is the sum of all market shares expressed as percentages (e.g., 20/100 = 20.) squared. That is, the

$$HHI = \sum_{i=1}^N (MS_i)^2$$

where  $MS_i$  is the percentage share of the market held by firm  $i$ , and there are  $N$  firms in the market. HHI ranges from near 0 in an atomistically competitive market to 10,000 in a purely monopolistic market with one firm. If all of the firms in the market are of equal size,  $HHI = 10,000/N$ , e.g., with 10 equal-sized firms  $HHI = 1,000$ . Thus, the number of equal-sized firms that generate an equivalent HHI is called the **numbers equivalent (NE)** =  $10,000/HHI$ . A market consisting of 4 firms with market shares of 30%, 30%, 20% and 20% have an HHI of 2600 ( $= 30^2+30^2+20^2+20^2$ ). A merger of two rivals with market shares of  $x\%$  and  $y\%$  respectively, increase the HHI by  $2\cong x\cong y$ . For example, a merger of two firms with market share of 10 percent and 5 percent respectively increases the HHI by  $100 = (2\cong 10\cong 5)$ . A HHI = 1000 corresponds roughly to  $CR_4 = 50\%$ , whereas a HHI of 1800 corresponds roughly to  $CR_4 = 70\%$ .

**SOURCE:** Developed by the author from U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines, Antitrust and Trade Regulation Report, U.S. Department of Justice, Washington, D.C., issued; April 2, 1992, and revised April 8, 1997, pp. 1 to 34. The unifying theme of these Guidelines is mergers should not be permitted to create or enhance market power (i.e., the ability to restrict output, raise prices above competitive levels for a significant period of time and exclude competitors profitably) or to facilitate its exercise. The mergers will not be challenged if adverse competitive effects or consequences are unlikely and will be challenged if they raise significant competitive concerns. The 1992 guidelines differs from the previous 1984 ones in at least two significant ways. The 1992 version eliminates the 35% rule, which triggered government scrutiny of a merger if one party held 35% of the market. Additionally, the 1992 version concerns only horizontal mergers.

\*Unless the Agency concludes on the basis of HHI, change in HHI, and presence or absence of the other factors that the merger is not likely substantially to lessen competition. However, if the HHI substantially exceeds 1800 and the change in HHI exceeds 100, only in extraordinary cases will such factors establish the merger is not likely substantially to lessen competition.

<i>Nature of Competition</i>	<i>Hirschman-Herfindahl Index (HHI)</i>	<i>Intensity of Price Competition</i>
Perfect Competition	Usually below 2,000	Fierce
Monopolistic competition	Usually below 2,000	May be fierce or light, depending on product differentiation.
Oligopoly	2,100 – 6,000	May be fierce or light, depending on interfirm rivalry
Monopoly	6,000 and above	Usually light, unless threatened by entry

Source: Besanko, D., Dranove, D., Shanley, M., and Schaefer, S., Economics of Strategy, (John Wiley & Sons, Inc., 2004), Table 6.2, page 207.

## ADVERTISING

TABLE 1

SEARCH GOODS--INSPECTION GOODS	EXPERIENCE GOODS
1. Learn quality attributes characteristics before buying	1. Learn characteristics after buying
2. a. Examples: PCs, clothing, auto equipment, garden tools, produce, barbells, furniture, oil change b. No products are pure search or experience goods.	2. Examples: software programs, perfume, processed foods, new soft drink, headache remedies, grass seed, automobiles, soap, detergent, psychotherapy, toothpaste, alcoholic beverage
3. More informative advertising	3. Less informative advertising--more persuasive and repetition to achieve brand name
4. Advertising done more by retailers	4. Advertising done more by manufacturers
5. More advertising in magazines and newspapers	5. More advertising in radio and television
6. Improves market performance via better information	6. Worsens market performance if brand identity that increases entry barrier
7. Most goods are both search and experience goods	7. More false advertising--lie to make a trial purchase. Hard to fool consumers so firms don't lie much.
8. Empirically, more likely positive effects especially price advertising. Search and retailing are likely positive.	8. Empirically, more likely negative effects. Experience and manufacturing are likely negative, but many exceptions.
<i>Ceteris paribus</i> , the advertising of search goods is less intensive, less persuasive, and more informative than for experience goods. Consumers are far more vulnerable to deceptive advertising than business purchasers, mainly because consumers buy a greater variety of goods in smaller quantities.	

TABLE 2 - CREDESCENCE GOODS

1. Costly to judge quality attributes even after purchase and consumption (normal use)
2. Examples: electronic repairs (test tube in tv), appendectomy, certain automobile repairs, medical care
3. Leaves consumers more vulnerable to fraud than search or experience goods--protect by more information, more technical expertise, putting burden of claim fulfilling on seller, etc.

TABLE 3 - ADVERTISING IS A DEMAND--INCREASING COST THAT MAY INFLUENCE DEMAND INELASTICITY AND ENTRY BARRIERS.

PRO ADVERTISING	CON ADVERTISING
1. Information	Refute 1-7
2. Stimulates product development	
3. Supports national communications – 50% magazines; 80% newspapers revenue.	
4. Allows economies of scale to be realized	
5. Helps maintain prosperity	
6. Advertising is an art with cultural and entertainment value	
7. Externalities--increase utility	

Company states “If not satisfied money will be returned” response.

Advertising Definitions, Concepts, and Results

1. Informative advertising--provides information—US government 24<sup>th</sup> largest advertiser
2. Persuasive advertising--changes utility
3. Predatory advertising
4. Cooperative or goodwill advertising--increases demand for all firms
5. Direct effects of advertising--decreases the profits of rival
6. Indirect effects of advertising--causes rival to change price or quantity
7. Welfare effects of advertising are complex, especially persuasive advertising
8. Few robust properties of advertising except price advertising tends to decrease the price if compared to where advertising is prohibited, e.g., eyeglasses, why doctors, lawyers dentist against advertising until the United States Supreme Court stopped the prohibition.

9. Horizontal product differentiation--Differentiation between brands based on different product characteristics but not on different overall quality, e.g., a McDonald's Quarter Pounder is somewhat different from a Burger King Whopper or a Wendy's Single, but the overall quality of the three burgers is similar. Toyota Camry and Ford Taurus. Few brand names in fruit and vegetables.
10. Vertical product differentiation--Differentiation in the actual quality of two brands, e.g., Ben & Jerry's ice cream and Haagen Dazs ice cream have a higher fat content than Breyers, which has a higher fat content than the typical store brand of ice cream. Lexus and Taurus-- firm doing the advertising attracts customers of rival—It is likely to exceed the social optimum. Spurious product, differentiation is (1) anticompetitive and (2) increases barriers.
11. Shopping goods--goods that are relatively expensive and are purchased intermittently, i.e., appliances, automobiles and TVs.
12. Convenience goods—consumers' goods that are relatively inexpensive items and are purchased on a regular basis, i.e., soft drinks, cigarettes, gasoline
13. The advertising sales ratio (AD/sales) is about 1.0% for all U.S. industries and grows with GDP. McDonald's is 25.0%, Ford is 2%. AD/sales ratio is highest in oligopoly and lowest in pure competition and somewhere in between for monopoly.
14. Bertrand with product differentiation can lead to higher prices, but greater variety so not necessarily lower social welfare
15. Under monopolistic competition and oligopoly can be too much or too little advertising relative to the social optimum.
16. The socially optimal number of firms  $N = E(CS + A)$
17. The Dorfman-Steiner rule for optimal advertising (OA) under monopoly calls for

$$OA = \frac{\$ADV}{\$TR} = \frac{\eta_{ADV}}{\eta_{PRICE}} = \left(\frac{P - MC}{P}\right)\eta_{ADV}. \text{ If Cournot oligopoly, } \eta_{ADV} \text{ is greater than under monopoly.}$$

$$OA_1 = \frac{\$ADV_1}{\$TR_1} = \frac{\eta_{ADV_1}}{\eta_{PRICE_1}} = \left(\frac{P_1 - MC_1}{P_1}\right)\eta_{ADV_1} + \left(\frac{ADV_1}{MS_1} \cdot \frac{\Delta MS_1}{\Delta AD_1}\right) \text{ For non-Cournot oligopoly there is a}$$

retaliation factor. Thus, there is definitely more advertising under Cournot oligopoly than pure monopoly and likely more than under non-Cournot oligopoly.  $MC_{AD} = MB_{AD}$

#### A. OLIGOPOLY THEORIES OF:

- (1) Cournot, 1838, conjectural variation as to quantity is zero. Market power is a function of the number of firms, market demand, product differentiation, capacity, capital costs.
- (2) Bertrand, 1883, conjectural variation as to price is zero without capacity constraint. Bertrand Paradox is that Price = marginal cost even if only two firms, but not robust to product differentiation, nonconstant costs, and capacity limits.
- (3) Edgeworth, 1897, conjectural variation as to price is zero with capacity constraint
- (4) Forcheimer, 1908, early residual demand model
- (5) Hotelling, 1929, linear location model
- (6) Chamberlin, 1933, interdependence recognized
- (7) Von Stackelberg, 1934, price leadership: follower-follower, leader-follower, leader-leader
- (8) Sweezy, 1938, kinked demand, price rigidity model
- (9) Cartel and price leadership models, 1930s
- (10) Von Neumann-Morgenstern, 1944, first game theory
- (11) Neogame Theory, 1980s, includes prisoner's dilemma

#### B. COURNOT-BERTRAND-NASH EQUILIBRIUM MODEL

- (1) A Nash equilibrium requires each firm to choose a strategy that maximizes its profits given the strategy of its rival.
- (2) In the Cournot model of duopoly, each firm selects its profit-maximizing output assuming that the output of its rival is constant. As compared to the cooperative solution, in a Nash equilibrium, the price is lower and total output is higher with two Cournot competitors.
- (3) In the Bertrand model of duopoly, each firm selects a price. In a Nash equilibrium, price equals marginal cost and falls abruptly to marginal cost when the number of sellers increases from one to two.

- (4) a. Observations on prices appear to fit the predictions of the Cournot model more closely than those of the Bertrand model.
- b. The standard Bertrand and Cournot models reach the same conclusion if:  $N$  (the number of firms) = one (i.e., monopoly) or  $N = \text{infinity}$  (i.e., pure competition).
- (5) The Cournot theory of oligopoly pertains to firms that make a single, once-and-for all decision on output. The Cournot equilibrium outcome is a natural focal point for firms that fully understand that they are simultaneously choosing output on a once-and-for-all basis and have full confidence in the rationality of their rival.
- (6) We can reconcile the different predictions made about industry equilibrium in the Cournot and Bertrand models in two ways. First, the Cournot model can be thought of as pertaining to long-run capacity competition, while the Bertrand model can be thought of as pertaining to short-run price competition for firms with sufficient capacity to satisfy market demand. Cournot is a better model if quantity or capacity is hard to adjust. Bertrand is a better model if price is hard to adjust. Cournot is a simultaneous move, quantity choice game of imperfect information (any simultaneous move game is imperfect information). Second, the two models make different assumptions about the expectations each firm has about its rivals' reactions to its competitive moves.
- (7) Two products are horizontally differentiated when some consumers regard one as a poor substitute for the other, while other consumers have the opposite opinion. Horizontal differentiation refers to differences between brands based on different product characteristics, but not on different over-all quality. Vertical differentiation refers to differences in the actual quality of two brands.
- (8) In a Bertrand equilibrium with differentiated products, equilibrium prices generally exceed marginal cost. When horizontal product differentiation between the firms is significant, the gap between prices and marginal costs can be substantial.
- (9) Each firm faces a downsloping residual demand curve. With Bertrand each firm faces a perfectly elastic demand at the price quoted by a rival. So for a Bertrand firm a price decrease is always profitable if  $P > MC$ . A Bertrand firm must end up with  $P_X = P_Y = MC$  which is a Nash equilibrium. The Bertrand model has been criticized because (1) if the products are homogeneous would not the firm's focus be on quantity and not price and (2) why would the market be divided equally.
- (10) A consistent conjecture is if rivals' behavior is as predicted at or near equilibrium, e.g., Cournot & Bertrand or if conjectures about rivals' behavior that a firm uses to make its own decisions are those implied by rival's reaction function. Cournot assumes 0 but really  $-1/2$  sloped reaction function (if constant  $\overline{MC}$  and no product differentiation)

### C. ASSUMPTIONS OF MOST OLIGOPOLY MODELS

- (1) Only price and quantity not advertising are modeled
- (2) Homogeneous products
- (3) No entry
- (4) No capacity constraints (except for Edgeworth)
- (5) Static, single period models
- (6) Identical and constant marginal costs
- (7) Perfect information
- (8) Linear demand
- (9) The buyers are pure competitors who collectively pay  $P > MC$

### D. GAME THEORY DEFINITIONS AND RESULTS

- (1) Game theory is the study of strategic interaction between players = interactive decision theory = theory of strategic rivalry. Thus, game theory is the branch of economics concerned with the analysis of optimal decision makers who are presumed to be rational, and each is attempting to anticipate the actions and reactions of its competitors.
- (2) Game theory is how interdependent decision makers make choices including players, actions, information, strategies, payoffs, outcomes, and equilibria. (Players, actions and outcomes are called the rules.)
- (3) Single period - only 1 period in game (1 year, etc.)
- (4) Repeated games - Repeated for  $X$  amount of periods
- (5) Super games - Repeated for infinite periods
- (6) Nature - a nonplayer who takes random actions
- (7) Static - both players move simultaneously – means imperfect information
- (8) Dynamic - players take turns moving sequentially (and a player may not have an advantage if he moves first).
- (9) A Nash equilibrium (NE) exists if all the players are doing the best they can, given the choices of their rivals and relies on the rationality of each player. In simple zero-sum games the minimax strategy is a dominant solution to the game. The dominant solution to the classic prisoner's dilemma game results a nonoptimal solution for the players. In a game of mixed strategy there is no NE or NE is unstable as profit is same regardless of strategies. There is little incentive to maintain the equilibrium. Furthermore, in the mixed strategy equilibrium, both players are indifferent between playing their mixed strategy equilibrium and any other strategy. In sequential games, the players take turns moving instead of moving simultaneously. In dynamic games, players take turns moving.



- (10) It is important to understand the information structure of a game. Nature is a nonplayer who takes random actions. In a game of perfect information each player knows every move that has been made by the other players before taking any action. In games of complete information, nature does not move first or nature's first move is observed by all the players. In a game of certain information, nature never moves after another player moves. In a game of symmetric information all players have exactly the same information when each moves. A game is cooperative if the parties can communicate and arrange binding contracts.
- (11) Dominant strategy (DS) A DS is strategy that outperforms all other strategies no matter what strategy an opponent selects
- All DSs are Nash Equilibrium (NE), but some games without a DS can have more than one NE
  - The DS for all zero sum games is minimax strategy
- (12) Single and repeated games- end in competitive solution if  $N$  (the number of firms)  $> 1$
- (13) Super Game - may be competitive or monopoly result
- (14) Robert Axelrod- contest for game theory
- (15) Rapaport - won with the shortest theory
- (16) Tit-for-tat-strategy - Cooperate on the first move-then do whatever rival did in the previous move
- (17) While in head-to-head battles, detect always wins, the most money is made by tit-for-tat strategy. Some degree of niceness gets better results for the doer.
- (18) trigger vs. grim strategy.
- (19) A prisoners' dilemma game illustrates the conflict between self-interest and collective interest. The dominant solution to the classic prisoner's dilemma game results in a nonoptimal solution for the players. In the Nash equilibrium of a prisoners' dilemma game, each player chooses a "non-cooperative" action, even though it is in the players' collective interest to pursue a cooperative action.
- (20) A pure strategy is a specific choice among the possible moves in a game. Under a mixed strategy, a player chooses among two or more price strategies according to pre-specified probabilities. Every game has at least one Nash equilibrium in mixed strategies.
- (21) In the repeated prisoners' dilemma game, the players might, in equilibrium, play cooperatively. The likelihood of a cooperative outcome is enhanced when the players are patient, their interactions are frequent, cheating is easy to detect, and the one-shot gain from cheating is small. An analysis of sequential-move games reveals that moving first in a game can have strategic value.
- (22) A *strategic move* is an action you take in an early stage of a game that alters your behavior and your competitors' behavior later in the game in a way that is favorable to you. Strategic moves can limit a player's flexibility and in so doing can have strategic value.
- (23) Folk theorem: Any combination of output levels could be infinitely repeated so long as each firm's profits at those levels are at least as great as the minimum each firm could earn in a one-period game.

#### **E. Von Stackelberg (VS) Models**

- Follower-Follower - Cournot
- Leader-Leader--Collapse of system as economic warfare-nondeterminate solution.
- If the leader anticipates correctly behavior of rivals, the leader-follower model enhances profit margin for both.
- The follower in a VS leader-follower model responds to the leader's quantity decision by producing on its reaction function. The leader maximizes its profit given the behavior of the follower on its reaction function. The Cournot and Bertrand models each moves at the same time, while in VS the leader moves first. VS is a two-stage sequential version of Cournot, but where one firm moves first. The leader (follower) produces more (less) output than a Cournot-Nash equilibrium.

THEORIES OF PRICE IN OLIGOPOLY MARKETS

FIGURE 1 COURNOT MODEL

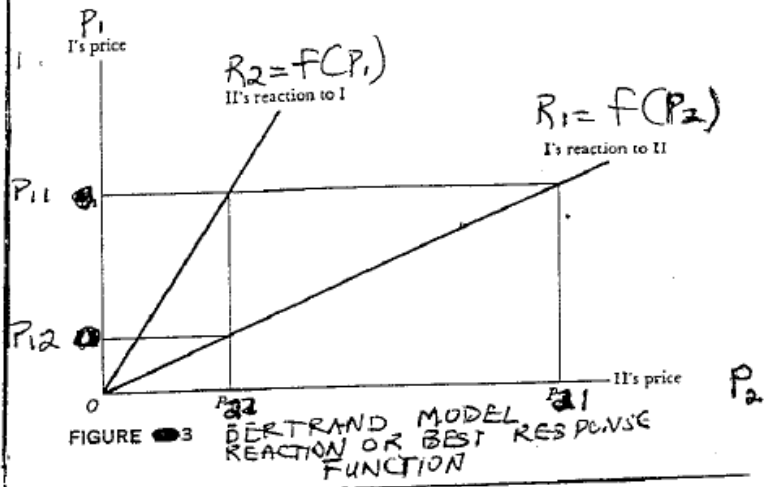
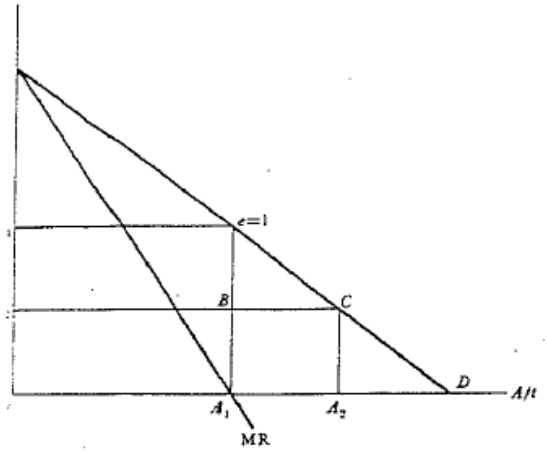


FIGURE 3 BERTRAND MODEL REACTION OR BEST RESPONSE FUNCTION

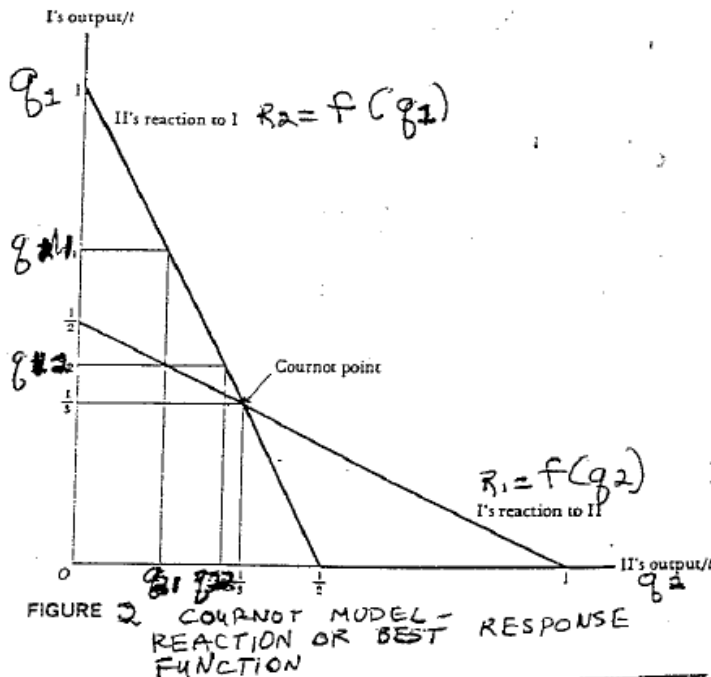


FIGURE 2 COURNOT MODEL - REACTION OR BEST RESPONSE FUNCTION

FIGURE 4 Edgeworth Solution

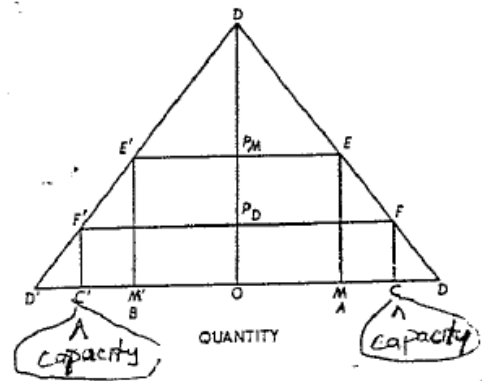


FIGURE 5 Chamberlin Solution

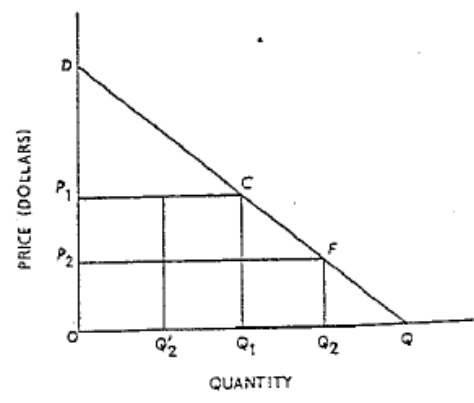


FIGURE 6 Hotelling Solution

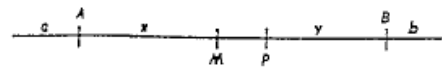


FIGURE 6A THEORIES OF PRICE IN OLIGOPOLY MARKETS  
Sweezy Solution

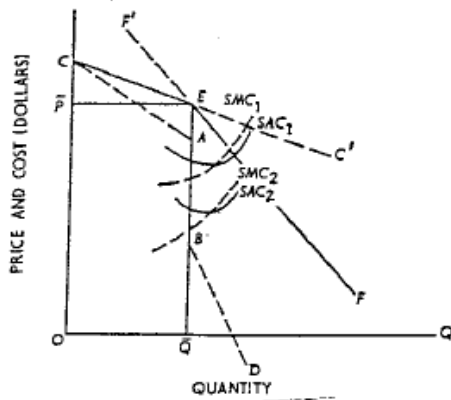


FIGURE 7

Cartel Profit Maximization

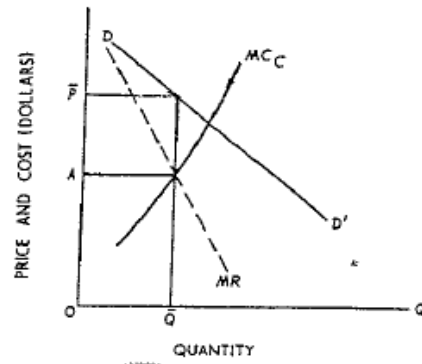


FIGURE 9

Price Leadership by the Dominant Firm

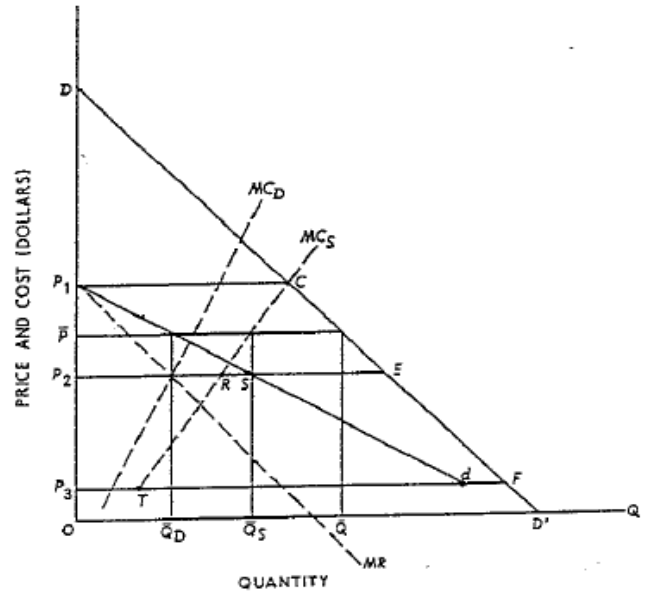


FIGURE 8 Ideal Market-sharing in a Cartel

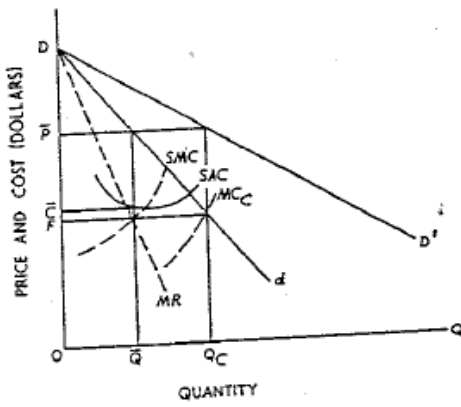


FIGURE 10

Price Leadership by the Lower Cost Firm

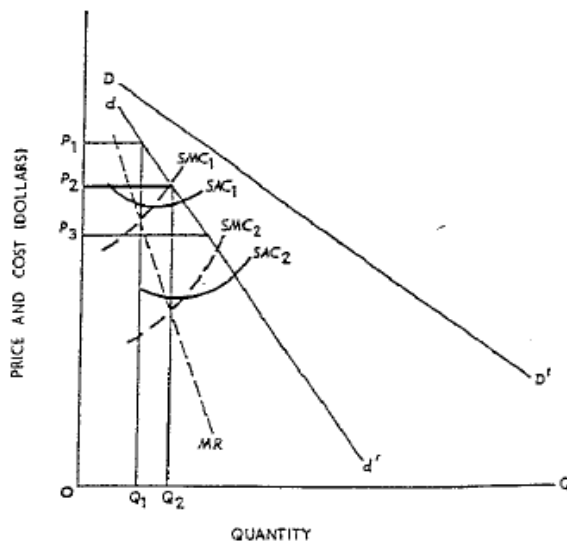


TABLE 1  
Payoff Matrix for a Two-person, Constant-Sum Game

A's Strategies	B's Strategies				Row Min.
	W	X	Y	Z	
C	10	9	14	13	9
D	11	8	4	15	4
E	6	7	15	17	6
Col. Max.	11	9	15	17	9 = 9

A's profits are shown

TABLE 2 Prisoners' Dilemma game

		McAlpin's strategies	
		Don't confess	Confess
Smith's strategies	Don't confess	-1, -1	-10, 0
	Confess	0, -10	-6, -6

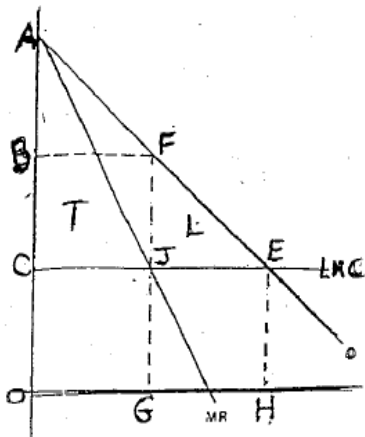
## DEADWEIGHT OR WELFARE LOSS ANALYSIS

Let DWL = Deadweight or welfare loss;

P = price;

Q = quantity;

$$d = \Delta P/P \text{ or relative price distortion} = \frac{P_M - P_{PC}}{P_{PC}} = \frac{P_M - MC}{P_{PC}} = \text{Lerner Index} = LI$$



$\eta$  = own-price elasticity of demand or  $(\Delta Q/Q)/(\Delta P/P) = (\Delta Q/Q)(P/\Delta P)$ ;

$R = P \times Q$  or total revenue; remembering  $LI = 1/\eta$

and assuming the supply curve or LMC is perfectly horizontal (infinitely elastic).

$$DWL = -\frac{1}{2} \Delta P \Delta Q \approx -\frac{1}{2} \frac{\Delta P}{P} PQ \left( \frac{\Delta Q}{Q \Delta P} \right) \frac{\Delta P}{P} \approx -\frac{1}{2} d^2 R \eta$$

If a firm maximizes profits, then  $\eta = \frac{1}{d = LI}$ , so  $DWL = -\frac{1d^2 R}{2d} =$

$$-\frac{1dR}{2}. \text{ Since } dR = \pi, \text{ we get } DWL = -\frac{\pi}{2}$$

It appears that DWL rises as R, d and  $\eta$  increases. This equation is deceptive as DWL does not necessarily rise as the absolute value of  $\eta$  increases. However, DWL does rise as R rises and d rises. This is true only if d is constant as  $\eta$  increases. But d is inversely related to  $\eta$  and as d changes so does R. Holding R constant, DWL falls as the absolute value of  $\eta$  increases. Thus, DWL depends on R, d, and  $\eta$

	COMPETITION	MONOPOLY
Price	OC	OB
Quantity	OH	OG
Consumer Surplus	$\Delta ACE$	$\Delta ABF$
Long-Run Economic Profit	Zero	BCJF
Deadweight Welfare Loss (DWL)	Zero	$\Delta JFE$
Rent Seeking	Zero	? BCJF ?

In general, DWL is the net loss in the sum of consumer and producer surplus from a monopoly price increase that is not transferred to another group. Since the price is higher in a monopoly, if there is a gain in producer surplus, this is less than the loss in consumer surplus.

Scherer & Ross, 3rd edition put DWL at 0.5-2.0% of national income, while Martin, 2nd edition (1994) puts it at .1%-13% of national income. Kamerschen estimates the DWL for the U.S. at 5.0%-15.0% of national income.

Even if DWL is, say, 1%, there are problems as (1) GDP is very large, (2) The losses may be large in some markets, and (3) Some strategies such as rent seeking make the losses greater than the DWL triangle.

### Limitations - Harberger Analysis

1. Only manufacturing included - which is 1/5 of the U.S. economy in the 1990s
2. Assumed  $\eta = 1$  for all industries
3. Distrust profit data - used average rather than lowest profit as competitive results
4. Neglected transmission through different stages
5. Labor may share in monopoly and set higher wages
6. Partial not general equilibrium analysis
7. Neglects x-inefficiency or organizational slack
8. Neglects rent seeking waste
9. Rent seeking is when government or a private monopoly margins are created, economic agents compete to earn them by spending until margins are transferred into costs.

### PRICE DISCRIMINATION AND PRICE DIFFERENTIAL

Economists generally define price discrimination as occurring when the prices of goods are sold at prices which are disproportionate to their marginal production, distribution, delivery, storage, risk, and uncertainty costs (e.g., Kamerschen and Valentine, 1981). Thus, the price cost margin differs between customers. Thus, *price differentiation may not involve price discrimination and price discrimination may not involve price differentiation*. While many people believe that price discrimination involves control over supply in the sense of both extant producers as well as potential entrants, these conditions seem overly restrictive. The actual necessary conditions are fourfold (Clarkson and Miller, 1982, p. 240).

$$\frac{P_1}{MC_1} \neq \frac{P_2}{MC_2}, \text{ i.e., price-cost margins differ.}$$

#### Necessary Conditions

Several conditions are necessary for the existence of price discrimination.

1. The firm must face a downward-sloping demand curve.
2. The two or more identifiable classes of buyers must be separable at a cost that does not exceed the monetary gains from separating them.
3. The resale by those buyers who pay a low price to those who would be charged a higher price must be deterred.
4. The price elasticity of demand for the product of two or more classes of buyers must be different and must be known by the firm, at least in an ordinal sense necessary for third-degree discrimination.

$$\frac{P_1}{P_2} = \frac{1 + \frac{1}{\eta_2}}{1 + \frac{1}{\eta_1}} \quad \text{where } \eta \text{ is not an absolute value, e.g. if } \eta_1 = -2, \eta_2 = -4, \frac{P_1}{P_2} = \frac{1-1/4}{1-1/2} = \frac{3/4}{1/2} = 1.5$$

Some economists have added to the above necessary requirements two further ones: (a) that there be control over existing sellers, and (b) that there be control over entry into the industry. To some extent, these two conditions seem overly restrictive.

Table 10-2: IN-STATE AND OUT-OF-STATE TUITION FOR SELECTED UNIVERSITIES, 1986

Wide differences exist for tuition paid by in-state and out-of state students at universities across the United States. The principle of monopoly price discrimination may be used to explain some of these variations, expressed in terms of ratios in the

table.

INSTITUTION	(1) IN-STATE TUITION	(2) OUT-OF-STATE TUITION	(3) DIFFERENCE (2) - (1)	(4) RATIO (2) / (1)	
Arizona State	\$1172	\$4260	\$3088	3.63	
University of Arkansas	1030	2542	1512	2.47	
UCLA	1296	5382	4086	4.15	
University of Colorado	1779	6559	4780	3.69	
University of South Florida	1124	3738	2614	3.33	
<b>University of Georgia</b>	<b>1662</b>	<b>4422</b>	<b>2760</b>	<b>2.66</b>	<b>UGA</b>
University of Illinois	2082	5141	3059	2.47	
Louisiana State University	1727	4127	2400	2.39	
Central Michigan University	1569	3925	2356	2.50	
University of Minnesota	1970	4495	2525	2.28	
<b>University of Mississippi</b>	<b>1727</b>	<b>2909</b>	<b>1182</b>	<b>1.68</b>	<b>LOW</b>
State University of New York	1495	3345	1850	2.24	
Miami University-Ohio	2584	5458	2874	2.11	
Oklahoma State University	889	2680	1791	3.01	
Texas A&M University	870	3990	3120	4.59	
North Texas State University	896	4016	3120	4.48	
<b>San Francisco State</b>	<b>679</b>	<b>4909</b>	<b>4230</b>	<b>7.23</b>	<b>HIGH</b>
University of Virginia	2238	5468	3230	2.44	
University of Wisconsin-Madison	1570	4914	3344	3.13	
University of Washington	1605	4461	2856	2.78	

Source: USA Today (November 10, 1985), p. 11A Excerpted with permission

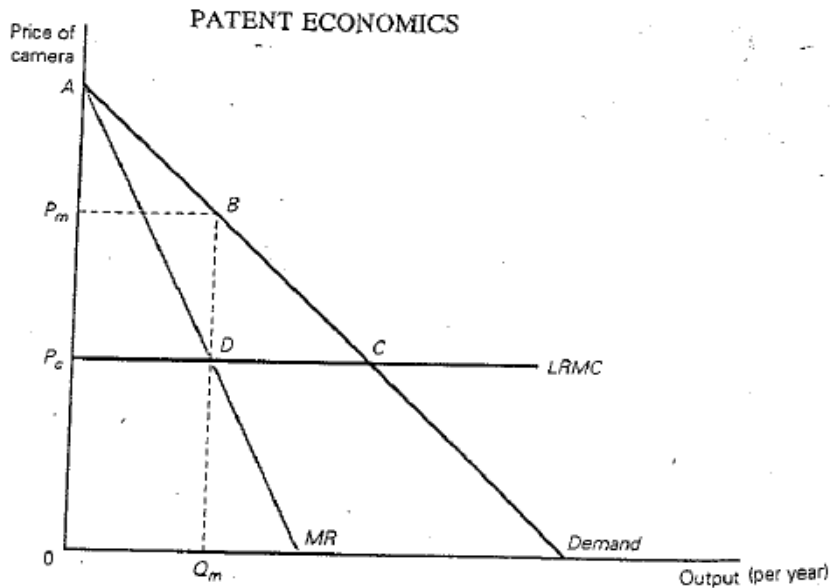
**TABLE 1: U.S. GOVERNMENT'S ANTITRUST POLICY**

1. The antitrust laws developed in response to the Industrial Revolution, which resulted in significant economies of scale and greatly increased the size of the geographic market for many products. The laws were also spurred by the development of modern capital markets that enabled firms to raise large amounts of capital in the equity market and the liberalization of the laws of incorporation in many states.
2. The ostensible purpose of these laws is to prevent business practices that materially reduce competition and to promote efficiencies. Private vs. public interest theory.
3. Federal antitrust policy is based on three principal laws.
4. The Sherman Act (SAT) outlaws any form of collusion or monopolization or any attempt to monopolize a market. There must be substantial monopoly power as every U.S. firm has some monopoly power.
5. The Clayton Act (CAT) is directed primarily against four specific practices: (1) price discrimination that lessens competition, (2) tying contracts and exclusive dealerships when the result is to lessen competition, (3) mergers that reduce competition, and (4) interlocking directorates among competing firms.
6. The Federal Trade Commission Act (FAT) empowers the Federal Trade Commission to investigate "unfair methods of competition."
7. SAT 1890      CAT 1914      FAT 1914
8. Robinson-Patman Act 1936
9. Celler-Kefauver Act 1950 (closed loophole in section 7 of CAT)
10. Overall, the antitrust laws have been fairly successful in horizontal agreements.

**TABLE 2: SHERMAN ACT VIOLATIONS**

- A. Section I Violation
1. A Section I violation claim requires proof of the following two elements:
    - (1) an express (explicit or implicit) contract, combination, or conspiracy (i.e. concerted action among two or more persons); and
    - (2) an unreasonable restraint of trade.
- B. Section II Violation
1. A Section 2 monopolization claim requires proof of the following two elements:
    - (1) Defendants' possession of monopoly power in some well-defined markets; and
    - (2) Defendants' willful acquisition or maintenance of such monopoly power as distinguished from growth or development as a consequence of a superior product, business acumen or historic accident.
  2. Concerted action is not an element of a Section 2A claim.
  3. A Section 2 attempt to monopolize claims requires proof of three elements:
    - (1) The Defendants engaged in anti-competitive conduct
    - (2) specific intent to monopolize a relevant market; and
    - (3) a dangerous probability that the attempt will succeed.
  4. A Section 2 unlawful conspiracy to monopolize claim requires proof of three elements:
    - (1) concerted action;
    - (2) overt acts in support of the conspiracy; and
    - (3) specific intent to monopolize.
  5. Proof of the relevant market is unnecessary in a conspiracy case, unless it is a rule-of-reason case. Moreover, the Defendants need not possess a dangerous probability of monopolization.

Source: Slightly adapted from David R. Kamerschen and Robert W. Kamerschen, "Tying Agreements and Franchising," Kentucky Journal of Economics and Business, Vol. 13 (1994), pp. 1-32.



COSTS	BENEFITS	TRANSFER
BDC 1-20 Years	(1) $ABP_m$ forever	(1) $P_mBDP_c$
	(2) BDC after 20 years	(a) 1 – 20 years to firm
		(b) > 20 years to consumer

FOUR TYPES OF PROTECTION OF PROPERTY RIGHTS	NUMBER OF YEARS OF PROTECTION	
	BUSINESSES	INDIVIDUALS
1. A. PATENT – new or improved product, process, substance, or design (Edison) B. PATENT – design	17 years after granted--20 after filed (1994).	17 years after granted--20 after filed. 14 years--design
2. COPYRIGHTS - e.g. book "The da Vinci Code" Articles, books, drawings, maps, musical compositions, photographs, etc.	Business 95 years (or 120 years, since created if that is shorter 1998).	Life + 70 years
3. TRADEMARKS – words, symbols or other marks to distinguish a good or service- Kodak film, Exxon gas, not generic or lose trademark, cornflakes, cellophane	None	None
4. TRADE SECRET - (Coke, Chanel) only patent if can't keep secret	None	None

100,000 patents per year. 44% are eventually accepted in U.S., France, Germany, and UK. 5 million patents since 1790  
 1/50 (2%) patents make money. Produce or license. New, nonobvious, practical utility  
 New, improved product, process, substance, design. Unlike Europe no tax to maintain and patent lengths vary in Europe  
 If patent holder and patent royalty paying user are equally efficient, selling & licensing provides the same result. Inventor gets all gains from a minor discovery, but not all gains in major discovery as ( $P$  falls,  $Q$  increases,  $CS$  increases). The costs of patents include the monopoly price and the slower rate of diffusion.

Benefits: incentive  $Q$  stays constant and disclosure accelerates--externality public good.

Surveys show that 46% cannot get along without scotch tape; 67% in Iowa think music videos suck; 0% put gloves in glove box

Cost:  $P \neq MC$  means monopoly power

First-to-file (most) better than first-to-invent – U.S.

Invention vs. innovation

Patent shorter time than copyright as greater exclusivity and greater monopoly power with patent, but harder to obtain--e.g., "Romeo & Juliet" and "West Side Story," each can be copyrighted. The Ford assembly line was duplicated; no patent on slot machines as considered bad.

Imitation discourages R&D. U.S. R&D 2.5% of GDP, whereas in Japan it is 2.7%. 17 years = length of apprenticeship in England.

Xerox plain paper copier had 16 firms emulating in 10 months. Imitation costs are about 65% development costs. Takes longer to duplicate with a patent. A small % of inventions are patent dependent.

Joint ventures (antitrust) and government prize research contracts (knowledge) are alternatives.

Joseph A. Schumpeter said monopoly leads to monopoly power and then to R&D. A patent leads to market power and with market power a firm can restrict entry Schumpeter said  $+R_{\text{innovation, monopoly power}}$  and not  $+R_{\text{innovation, size of firm}}$

Absent patents, many inventions would still be made as sufficient economic incentives exist in first-mover advantages or learning curve.

Antitrust policy has attempted to limit the most obvious patent abuses while still permitting patent holders to obtain the basic monopoly benefits associated with the system.

Although the courts have ruled that it is legal for a patent holder to fix the price a licensee may charge for a patented product, any attempt to extend the power of one patent into other areas, such as through a patent-pooling agreement, is on shaky grounds.

### PRESENT DISCOUNTED VALUE

The general formula for discounting becomes

$$P_t = \frac{A}{(1+r)^t}$$

where the exponent  $t$  refers to the number of years in the future the money is to be paid or received. Table 6-1 gives the present value of \$1 to be received  $t$  years hence for various interest rates. These interest rates which were

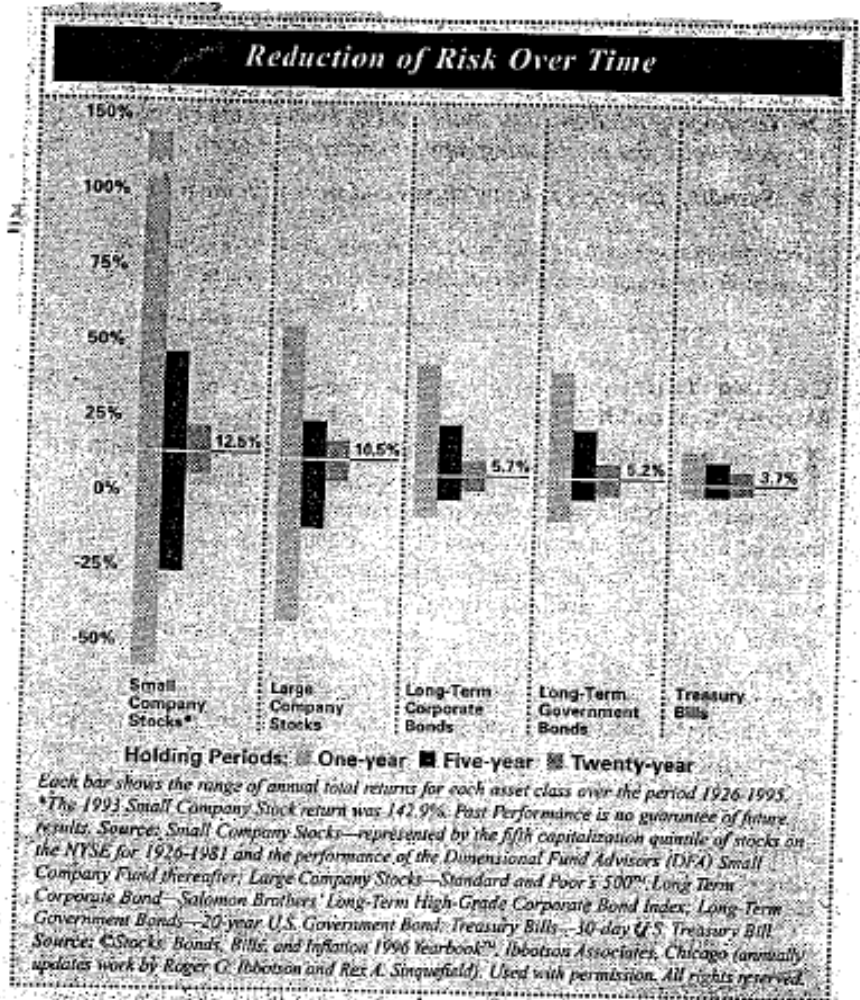
used to derive the present value are sometimes called the rate of discount, or the discount rate. We have specified the rate of discount in our examples as the market rate of interest available on savings. (That particular rate may not always be appropriate.) We note two important conclusions: (1) *The farther in the future a sum of money is to be paid or received, the lower is its present value for any given discount rate.* (2) *The higher the interest rate used, the lower is the present value of any given sum of money to be spent or received at a particular future time.*

Year	3%	4%	5%	6%	8%	10%	20%	Year
1	.971	.962	.952	.943	.926	.909	.833	1
2	.943	.925	.907	.890	.857	.826	.694	2
3	.915	.890	.864	.839	.794	.751	.576	3
4	.889	.855	.823	.792	.735	.683	.482	4
5	.863	.823	.784	.747	.681	.620	.402	5
6	.838	.790	.746	.705	.630	.564	.335	6
7	.813	.760	.711	.665	.583	.513	.279	7
8	.789	.731	.677	.627	.540	.466	.233	8
9	.766	.703	.645	.591	.500	.424	.194	9
10	.744	.676	.614	.558	.463	.385	.162	10
11	.722	.650	.585	.526	.429	.350	.134	11
12	.701	.625	.557	.497	.397	.318	.112	12
13	.681	.601	.530	.468	.368	.289	.0935	13
14	.661	.577	.505	.442	.340	.263	.0779	14
15	.642	.555	.481	.417	.315	.239	.0649	15
16	.623	.534	.458	.393	.292	.217	.0541	16
17	.605	.513	.436	.371	.270	.197	.0451	17
18	.587	.494	.416	.350	.250	.179	.0376	18
19	.570	.475	.396	.330	.232	.163	.0313	19
20	.554	.456	.377	.311	.215	.148	.0261	20
25	.478	.375	.295	.232	.146	.0923	.0105	25
30	.412	.308	.231	.174	.0994	.0573	.00421	30
40	.307	.208	.142	.0972	.0460	.0221	.000680	40
50	.228	.141	.087	.0543	.0213	.00852	.000109	50

**Table 6-1: Present value table: Present values of a future dollar.** Each column shows how much a dollar received at the end of a certain number of years in the future (identified on the extreme left-hand or right-hand column) is worth today. For example, at 5 percent a year, a dollar to be received 20 years in the future is only worth 37.7c. At the end of 50 years, it isn't even worth a dime today. To find out how much \$10,000 would be worth a certain number of years from now, just multiply the figures in the columns by 10,000. For example, \$10,000 received at the end of 10 years discounted at a 5 percent rate of interest would have a present value of \$6,140.

The present value of future income is an amount received immediately that is equivalent to the income received in future years.

## HOW TO GET RICH SLOWLY



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