

MPC REPORT NO. 95-49

**Course Syllabus for:
Industrial Organization -
Applications to Transportation**

John D. Bitzan

November 1995

**COURSE SYLLABUS FOR:
INDUSTRIAL ORGANIZATION - APPLICATIONS TO TRANSPORTATION**

by
John D. Bitzan

Upper Great Plains Transportation Institute
North Dakota State University
P.O. Box 5074
Fargo, North Dakota 58105

Acknowledgement

This report has been prepared with funds provided by the United States Department of Transportation to the Mountain-Plains Consortium (MPC). The MPC member universities include North Dakota State University, Colorado State University, University of Wyoming, and Utah State University.

Disclaimer

The contents of this report reflect the views of the author, who is responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation ,University Transportation Centers Program, in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

EXECUTIVE SUMMARY

A basic understanding of Industrial Organization is essential for students and practitioners in the field of transportation. An understanding of important issues related to transportation regulation, transportation firm behavior, and transportation sector performance will contribute to prudent decisionmaking by transportation practitioners. In this project, a syllabus for a course in Industrial Organization with its applications to transportation is developed. The course contains three basic segments. The first segment examines economic efficiency and the rationale for economic regulation. The second segment introduces the tools used in the "new" Industrial Organization literature. The third segment examines case studies of regulation and deregulation in transportation. Upon completion of this course, students should be equipped with tools that will allow them to: (1) analyze public policy issues related to economic efficiency and the impacts that government policies and/or regulation may have on the transportation industry and consumers, and (2) understand the literature in Industrial Organization, and be able to apply I/O theory to transportation.

CONTENTS

	Page
INTRODUCTION	1
COURSE SYLLABUS	2
Industrial Organization - Applications To Transportation	2
<i>Purpose, Goals and Objectives</i>	2
<i>Recommended Texts:</i>	2
<i>Prerequisites</i>	3
<i>Grading</i>	3
<i>Paper</i>	3
OUTLINE OF TOPICS	6

INTRODUCTION

A basic understanding of Industrial Organization is essential for students and practitioners in the field of transportation. An understanding of important issues related to transportation regulation, transportation firm behavior, and transportation sector performance will contribute to prudent decisionmaking by transportation practitioners. In this project, a syllabus for a course in Industrial Organization with its applications to transportation is developed. The course is developed through knowledge obtained from courses taken at the University of Wisconsin-Milwaukee. Much of the course direction and material was influenced by courses taught by James Peoples and Debashis Pal in Industrial Organization at the University of Wisconsin-Milwaukee.

The course contains three basic segments. The first segment examines economic efficiency and the rationale for economic regulation. The second segment introduces the tools used in the “new” Industrial Organization literature. The third segment examines case studies of regulation and deregulation in transportation.

Upon completion of this course, students should be equipped with tools that will allow them to: (1) analyze public policy issues related to economic efficiency and the impacts that government policies and/or regulation may have on the transportation industry and consumers, and (2) understand the literature in Industrial Organization, and be able to apply I/O theory to transportation.

The next section of the report provides the syllabus containing the recommended texts and articles, the course grading scheme, and the session by session schedule. The final section provides an outline of topics covered.

COURSE SYLLABUS

Industrial Organization - Applications To Transportation

Purpose, Goals and Objectives

This course is designed to give students studying the field of transportation theoretical and practical knowledge of the field of Industrial Organization. The course is composed of three general sections. The first section examines economic efficiency and the rationale for economic regulation. Moreover, it covers important issues for today's public policymakers; issues such as efficiency and equity in pricing, and the sustainability of natural monopoly. The second section of the course introduces some of the "new" Industrial Organization theory. This section of the course is designed to give the student the tools necessary to understanding most of the current literature in industrial organization. Finally, the third section examines case studies of regulation and deregulation in transportation. The effects that deregulation has had on industry profits, rates, service, efficiency, and equity are examined. Upon completion of this course, students should be equipped with tools that allow them to: (1) analyze public policy issues related to economic efficiency and the impacts that government policies and/or regulation may have on the transportation industry and consumers; and (2) understand the literature in Industrial Organization, and be able to apply I/O theory to transportation.

Recommended Texts:

- Berg, Sanford V. and John Tschirhart. *Natural Monopoly Regulation: Principles and Practice*, Cambridge University Press, New York, New York, 1988.
- Brown, Stephen J. and David S. Sibley. *The Theory of Public Utility Pricing*, Cambridge University Press, New York, New York, 1986.
- Friedman, James W. *Oligopoly Theory*, Cambridge University Press, New York, New York, 1986.
- Rasmusen, Eric. *Games and Information: An Introduction to Game Theory*, Blackwell Publishers, Cambridge, Massachusetts, 1989.
- Schmalensee, Richard and Robert D. Willig, eds. *Handbook of Industrial Organization: Volume I*, Elsevier Science Publishers B.V., Amsterdam, The Netherlands, 1989.
- Schmalensee, Richard and Robert D. Willig, eds. *Handbook of Industrial Organization: Volume II*, Elsevier Science Publishers B.V., Amsterdam, The Netherlands, 1989.
- Sharkey, William W. *The Theory of Natural Monopoly*, Cambridge University Press, New York, New York, 1982.
- Tirole, Jean. *The Theory of Industrial Organization*, The MIT Press, Cambridge, Massachusetts, 1988.

Prerequisites

The student should have completed one course in calculus, and a course in intermediate microeconomics.

Grading

The grading for this course will be based on two exams, a paper, and assigned problem sets. The final grade will be based on a curve.

Midterm Exam	30%
Final Exam	30%
Paper	25%
Problem Sets	15%

Paper

As part of the course, the student will be required to complete a paper examining the impacts of deregulation to one of the transportation industries. An empirical paper is strongly encouraged. In the final portion of the course, we will be looking at empirical studies of the impacts of deregulation on the transportation industries. Throughout this portion of the course, we will scrutinize other studies and look for possible methods of improvement. The paper should consist of a critical review of a previous study, and an update or improvement of that study.

Session	Topic and Readings
1	Economic Welfare and Efficient Pricing Natural Monopoly and The Justification for Regulation
2 and 3	Alternative Views of Regulation - the Demand and Supply of Regulation -G. Stigler, "The Theory of Economic Regulation," <i>Bell Journal of Economics</i> , 1971. -S. Pezman, "Towards a More General Theory of Regulation," <i>Journal of Law and Economics</i> , 1976.
4-5	Ramsey Pricing (Second-Best Pricing) -W. Baumol and D. Bradford, "Optimal Departure's from Marginal Cost Pricing," <i>American Economic Review</i> , 1970. -Brown and Sibley, Chapter 3. -Berg and Tschirhart, Chapter 3. -R.R. Braeutigam, "Optimal Pricing with Intermodal Competition," <i>American Economic Review</i> , 1979.
6	Pricing with an Allocation of Common Costs -R.R. Braeutigam, "An analysis of Fully Distributed Cost Pricing in Regulated Industries," <i>Bell Journal of Economics</i> , 1980. -Brown and Sibley, Chapter 3. -Berg and Tschirhart, Chapter 3.
7-8	Sustainability of Natural Monopoly -J. Panzar and R. Willig, "Free Entry and the Sustainability of Natural Monopoly," <i>Bell Journal of Economics</i> , 1977. -Sharkey, Chapter 5. - Berg and Tschirhart, Chapter 7.
9-10	Some Basic Concepts in Game Theory -Rasmusen, Chapter 1 and 2 -Tirole, Chapter 11
11-13	Topics in Oligopoly -Tirole, Chapter 5, 8 -Rasmusen, Chapter 3,12
14-15	Firm Location with Mill Pricing -C.J. d'Aspremont, J. Gabszewica, and J.F. Thisse, "On Hotelling's Stability in Competition," <i>Econometrica</i> , 1979. -S. Salop, "Monopolistic Competition with Outside Goods," <i>Bell Journal of Economics</i> , 1979. - Tirole Chapter 7

- 16-17 Firm Location with Delivered Pricing - Spatial Price Discrimination Models
 -A. Hurter and P. Lederer, "Spatial Duopoly with Discriminatory Pricing," *Regional Science and Urban Economics*, 1986.
 -H. Hwang and C. Mai, "Effects of Spatial Price Discrimination on Output, Welfare, and Location," *American Economic Review*, 1990.
- 18 Firm Location with Quantity Competition
 -S. Anderson and D. Naven, "Cournot Competition Yields Spatial Agglomeration," *International Economic Review*, 1991.
- 19-21 Case Study of Regulatory Reform - Airlines
 -T. Keeler, "Airline Regulation and Market Performance," *Bell Journal of Economics*, 1972.
 -T. Moore, "U.S. Airline Deregulation: Its Affect on Passengers, Capital, and Labor," *Journal of Law and Economics*, 1986.
 -Laurence E. Leigh, "Contestability in Deregulated Airline Markets: Some Empirical Tests," *Transportation Journal*, 1990.
- 22-24 Case Study of Regulatory Reform - Trucking
 -J. Annable, "The ICC, and the Cartelization of the American Trucking Industry," *Quarterly Review of Economics and Business*, 1973.
 -T. Moore, "The Beneficiaries of Trucking Regulation," *Journal of Law and Economics*, 1978.
 -P. MacAvoy and J. Snow, Eds. *Regulation of Entry and Pricing in Truck Transportation*, American Enterprise Institute for Public Policy Research, Washington, D.C., 1977.
 -J. Ying and T. Keeler, "Pricing in a Deregulated Environment: The Motor Carrier Experience," *Rand Journal of Economics*, 1991.
- 25-27 Case Study of Regulatory Reform - Railroads
 -E. Fitzsimmons and J. Knudsen, "Market Share Instability Among Class I Railroads and the Impact of Deregulation," *The Quarterly Review of Economics and Business*, 1991.
 -P. MacAvoy and J. Snow, Eds. *Railroad Revitalization and Regulatory Reform*, American Enterprise Institute for Public Policy Research, Washington, D.C., 1977.
 -J. MacDonald, *Effects of Railroad Deregulation on Grain Transportation*. U.S. Department of Agriculture, Economic Research Service, Technical Bulletin No. 1759, 1989.
 -T. Moore, "Deregulating Surface Transportation," In *Promoting Competition in Regulated Markets*, Ed by Almarin Phillips, The Brookings Institution, Washington, D.C., 1975.

OUTLINE OF TOPICS

- I. Economic Welfare and Efficient Pricing
 - A. Defining Economic Efficiency
 - B. Efficient Pricing with no Profit Constraints

- II. Natural Monopoly and the Justification for Regulation
 - A. Definition of Natural Monopoly
Cost Subadditivity VS. Declining Average Costs
 - B. Alternative Views of Regulation - Demand and Supply of Regulation
-Stigler and Peltzman

- III. Pricing Alternatives Under Regulation
 - A. Ramsey Pricing (Second-Best Pricing)
 - with zero and non-zero cross elasticities
 - derived from welfare maximization
 - with intermodal competition (Braeutigam)
 - B. Pricing with an Allocation of Common Costs
 1. Fully Distributed Cost Pricing
 2. Game Theoretic Approach to Cost Allocation
 - stand alone costs and cross subsidy
 3. The Axiomatic Approach to Cost-Sharing Prices
 - Aumann-Shapely price
 4. Economic Criticisms of Fully Distributed Cost Pricing

- IV. Sustainability of Natural Monopoly
 - A. Single Output Natural Monopoly
 - B. Multiple Output Natural Monopoly
 - C. Role in Preventing Destructive Competition

- V. Non-Cooperative Game Theory and Oligopoly Theory
 - A. Normal and Extensive Form Games
 - B. The Cournot Model of Quantity Competition
 - C. The Bertrand Model of Price Competition
 - D. The Stackelberg Model - Quantity Competition with Non-Zero Conjectural Variation

- VI. Firm Location
 - A. Mill Pricing (Consumers pay transport cost)
 - 1. Hotelling Model with No Price Competition
 - 2. Hotelling Model with Price Competition
 - 3. The Circular City
 - solve for equilibrium price and number of firms
 - market solution provides more than the optimal number of firms
 - B. Delivered Pricing (Firms pay transport cost) - Spatial Price Discrimination Models
 - 1. Continuous Linear Market
 - 2. Discrete Markets

- VII. Case Studies in Regulation and Deregulation
 - A. Railroads
 - 1. The Origins of Regulation
 - 2. The Effects of Regulation and Deregulation
 - B. Trucking
 - 1. The Origins of Regulation
 - 2. The Effects of Regulation and Deregulation
 - C. Airlines
 - 1. The Origins of Regulation
 - 2. The Effects of Regulation and Deregulation

Technical Report Documentation Page

1. Report No. MPC 95-49	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Course Syllabus for: Industrial Organization - Applications to Transportation		5. Report Date November 1995	
		6. Performing Organization Code	
7. Author(s) John D. Bitzan		8. Performing Organization Report No.	
9. Performing Organization Name and Address North Dakota State University Fargo, ND		10. Work Unit No. (TRAI5)	
		1. Contract or Grant No.	
12. Sponsoring Agency Name and Address Mountain-Plains Consortium North Dakota State University Fargo, ND		13. Type of Report and Period Covered Project Technical Report	
		14. Sponsoring Agency Code	
15. Supplementary Notes Supported by a grant from the U.S. Department of Transportation, University Transportation Centers Program			
16. Abstract In this report, a syllabus for a course in Industrial Organization with its applications to transportation is developed. The course contains three basic segments. The first segment examines economic efficiency and the rationale for economic regulation. The second segment introduces the tools used in the "new" Industrial Organization literature. The third segment examines case studies of regulation and deregulation in transportation.			
17. Key Words transportation, course, syllabus, industrial organization	18. Distribution Statement		
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages 11	22. Price

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE November 1995	3. REPORT TYPE AND DATES COVERED Project Technical		
4. TITLE AND SUBTITLE Course Syllabus for: Industrial Organization - Applications to Transportation			5. FUNDING NUMBERS	
6. AUTHOR(S) John D. Bitzan				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Mountain-Plains Consortium North Dakota State University Fargo, ND			8. PERFORMING ORGANIZATION REPORT NUMBER MPC 95-49	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation University Transportation Centers Program Washington, D.C.			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) In this report, a syllabus for a course in Industrial Organization with its applications to transportation is developed. The course contains three basic segments. The first segment examines economic efficiency and the rationale for economic regulation. The second segment introduces the tools used in the "new" Industrial Organization literature. The third segment examines case studies of regulation and deregulation in transportation.				
14. SUBJECT TERMS transportation, course, syllabus, industrial organization			15. NUMBER OF PAGES 11	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT UL	