

Fall 2019

Economics 355

Professor Savage

TRANSPORTATION ECONOMICS AND PUBLIC POLICY

Instructor:

Professor Ian Savage, 2211 Campus Drive (KGH), room 3371, 847-491-8241, ipsavage@northwestern.edu

Teaching Assistant:

Joe Long, JoeLong2020@u.northwestern.edu

Course Description: The objective of this course is to provide the student with an understanding of the transportation industries in the United States and the major policy issues confronting government and the public. All modes of transportation will be considered: trucking, highways, mass transit, airlines, maritime, railroads, and pipelines. The course will acquaint the student with the underlying economics of transportation provision including: demand, costs, the economics of regulation and regulatory reform, the pricing and quality of service, subsidies, competition between the various modes, and the social appraisal of projects. The course concludes by applying economic tools to two serious transportation problems in American cities - highway congestion, and the level of subsidies to mass transit.

Prerequisites: Economics 281, 310-1, and 310-2.

Lectures: There are two lectures a week on Monday and Wednesday from 11:00AM to 12:20PM in Harris Hall L07.

Discussion Section: Students are also required to attend weekly discussion sections held on Fridays at the same time and in the same room as the lectures. The discussion section on September 27 will consist of an overview of the history of U.S. transportation conducted by Professor Savage. Each week the Teaching Assistant will also present a small amount of new material that complements the lectures.

Office Hours:

Mondays	2:00-4:00	KGH 3371	Professor Savage
Tuesdays	3:30-5:30	KGH 3411	Joe Long
Wednesdays	9:00-10:30	KGH 3411	Joe Long
Wednesdays	1:30-3:30	KGH 3371	Professor Savage

Prior to the midterm exams, Professor Savage will hold additional office hours on Tuesdays October 15 and November 12 from 9:30-11:30 in KGH 3371.

You can arrange for an appointment at other times by e-mailing or seeing us before or after the lectures and discussion sections. Additional office hours prior to the final exam will be announced in class.

Evaluation:

- Seven graded problem sets (10% of the total grade)
- Midterm examination 1 in class on Wednesday October 16 (25%)
- Midterm examination 2 in class on Wednesday November 13 (25%)
- Final examination from 9AM to 11AM on Friday December 13 (40%).

No make-ups will be given for the midterm exams. In the event of a pre-approved absence, or a verified illness, additional weight will be given to the other midterm exam and the final exam. WCAS rules “forbid administering a final examination to individual students in advance of the assigned time. Students are required to take the final examination at the designated time.” An earlier exam will not be given.

Readings: Readings are either:

- (a) Chapters from the book José A Gómez-Ibáñez, William B. Tye and Clifford Winston (eds.) *Essays in Transportation Economics and Policy: A Handbook in Honor of John R. Meyer*, Washington D.C.: Brookings Institution. There is no need to purchase a hard copy. It is available as a free e-book through Northwestern University Library: site.ebrary.com.turing.library.northwestern.edu/lib/northwestern/detail.action?docID=10063824
- (b) Included in the course packet (readings closely tied to lectures)
- (c) Posted in Canvas.

Course Packet: There is a course packet containing class materials, problem sets and past examinations. It is available from the main office of the Economics Department, room 3317 in the 2211 Campus Drive building. The office is open Monday to Friday 8:30AM to 5PM. The price is \$20. Payment should be by cash or check. You should bring the packet to each class.

Problem Sets: There are seven problem sets, which will be graded, and then discussed at the Friday discussion sessions. Generally, the deadline for submitting completed problem sets is 5:00PM on the Wednesday prior to the relevant discussion section. Problem sets received late get zero credit. Copies of the problem sets are included in the course packet (the price of the course packet was calculated such that you are not charged for copies of the problem sets). The schedule for the problem sets is as follows:

<u>Set #</u>	<u>Submission Deadline</u>	<u>Returned & Discussed</u>
1	5pm October 2	October 4
2	5pm October 9	October 11
3	5pm October 23	October 25
4	5pm October 30	November 1
5	5 pm November 6	November 8
6*	5 pm November 20	November 22
7	5 pm November 25*	November 27

* The seventh problem set is due two days earlier than normal at 5PM on Monday November 25, and will be returned and discussed in place of the regular lecture on Wednesday November 27 (the day before Thanksgiving).

Laptop Computer Policy: Except in the case of proven medical necessity, students may not use a laptop computer or computer tablet during the lectures. Such devices must remain in your bag, and may not be placed on your desk.

Mobile Communications Policy: Mobile telephone devices should have the ringer turned off and placed in pockets or backpacks. Students may not make or receive phone calls, surf the web, or send or read text messages during class.

AccessibleNU: Any student requesting accommodations related to a disability or other condition is required to register with AccessibleNU (accessiblenu@northwestern.edu; 847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. All information will remain confidential.

Academic Integrity: Students are responsible for reading and understanding Northwestern's Academic Integrity policies. All suspected violations of academic integrity will be reported to the Weinberg College Dean's Office. These include: cheating, plagiarism, fabrication, unfair advantage, unauthorized collaboration, and aiding and abetting of academic dishonesty. Students found in violation of academic integrity may receive a zero on the assignment or a failing grade for the course, and may be suspended or permanently expelled from the University. The Provost's Office issues a document *Academic Integrity: A Basic Guide*, and the WCAS website has a page on academic integrity.

SYLLABUS

Listed below are the topics covered in the course. At the end there is a timetable showing when each subject will be covered, along with the assigned readings.

Part 1 - Issues, History and Descriptive Statistics

The course will commence with an overview of the history of American transportation, descriptive statistics on the current transportation system, and current issues of interest to economists. The history of transportation is marked by changing technology, competition between various forms of transportation, government regulation for most of the twentieth century, and then deregulation in the period since 1980. We will also learn about the relative importance of individual modes, the traffic they carry, and the market share of the major firms.

Part 2 - Principles of Transportation Economics

This section of the course is designed to equip the student with an understanding of the basic principles of the economics of the provision and regulation of transportation service.

2.1 Demand

Transportation is rarely demanded for its own sake. It is a *derived demand* because people in place A want to go to enjoy benefits at place B, and manufacturers in place C have profitable opportunities for selling their goods in place D. For any particular trip, many passengers and freight shippers have a choice for the mode of travel. In making their choice they will be responsive to both the price and service quality of rival modes. A major component of transportation service quality is the speed of travel, and hence the journey time. Considerable efforts have been made in the last fifty years to estimate the sensitivity of demand to changes in travel time by calculating the value that people place on time saving.

2.2 Costs

We will review the theory of production functions and their associated cost functions. Using this as a base, we will empirically investigate the cost structure of the railroad, trucking and airline industries.

2.3 Regulation

Transportation has a long history of governmental intervention and regulation. There was regulatory liberalization and reform in some modes from the late 1970s. While some transportation markets such as trucking, maritime and major air routes can operate effectively as competitive markets, there are other markets where there are fears that only one (“natural monopoly”) or a few firms can survive in the marketplace. We will discuss the form that regulation can take for natural monopolies such as bulk rail movements and pipelines, and the alternatives to regulation that may be applicable to non-bulk rail traffic (intermodal competition), urban bus services (“Demsetz competition”), and airlines (contestability).

2.4 Pricing

We will explore the reasons why pricing of transportation services is problematic. Transportation production is characterized by high fixed costs and relatively low marginal costs. Commercial companies cannot break even or make a profit by setting prices equal to marginal costs. The recovery of fixed costs becomes even more complex because firms offer multiple products (business versus leisure travel, peak versus off-peak travel, grain versus coal) that share the same infrastructure. We also consider pricing by firms competing for the same traffic.

2.5 Project Evaluation

Investments in transportation infrastructure usually cannot be evaluated using standard financial evaluation methods. This is because the provision of transportation service does not just affect the firm and the immediate consumer. There are frequently spill-over effects on third parties such as noise from airports, visual intrusion from new highways, and the risk of injury and death to pedestrians. Other investments have the characteristics of public goods, or involve characteristics that are not usually traded in an open market (such as safety). In the past fifty years evaluations of many large investments in transportation infrastructure have attempted to take these effects into account. We will review the underlying reasoning for doing so, and look at some case studies which quantify these spill-over effects and value non-market goods.

2.6 Safety

Safety is of considerable concern to passengers and freight shippers, but is expensive to provide. We will consider the demand for and supply of safety, and the nature of “optimal” safety provision. We will then consider why the market might not work to provide desired levels of safety, and the possible interventions to correct some of the market failures.

Part 3 - Contemporary Urban Transportation Problems

The urban transportation “problem” is characterized by road congestion, parking difficulties, environmental concerns, difficulties for pedestrians, road accidents, over-crowding on public transit in the peak hours, and infrequency of provision in the off-peak. It is an objective of the final

part of this course to understand how some of these “problems” arise, and evaluate possible solutions.

3.1 Highway Congestion

Excessive road congestion occurs because individual motorists do not take account of the delay they impose on other motorists by traveling at peak times on congested roads. We will explore the theories of congestion, and how imposition of a congestion toll could help alleviate the problem. Various methods have been proposed over the years for implementing congestion charges. We will review the range of policy options, and study some places where congestion tolls have been applied – Southern California, London, Stockholm and Singapore. Moreover, changes in tolling technology and the decline of traditional funding streams such as the gas tax have led to a recent expansion in the number of toll roads. Some of them have tolls that respond to changing levels of congestion. These pricing principles are also applicable to other congested facilities such as airport runways and maritime locks.

3.2 Transit Subsidies

Since the 1960s, operators of transit services have not traded commercially. Substantial funding has been provided both for capital and operating expenses from municipal, state and federal funds. The rationales for transit subsidies will be critically examined. The rationales commonly used to justify subsidy are: achieving “first best” in the presence of economies of scale; acting as a proxy for road congestion tolls; “social service” provision; and the provision of unremunerative routes. We will also discuss the trade-off that transit agencies face in setting fares and service frequency.

SCHEDULE OF LECTURES AND READINGS

Course Packet: Pages approximately corresponding with the lecture

Readings:

1. GTW = chapters from Gómez-Ibáñez, Tye and Winston (eds.) *Essays in Transportation Economics and Policy: A Handbook in Honor of John R. Meyer* available as a free e-book through Northwestern University Library: [site.ebrary.com.turing.library.northwestern.edu/lib/northwestern/detail.action?docID=10063824](http://site.ebrary.com/turing.library.northwestern.edu/lib/northwestern/detail.action?docID=10063824)
2. Bound into the Course Packet
3. Unless otherwise indicated in the “modules” section of Canvas.

Wednesday September 25	Lecture 1	Issues in U.S. Transportation / Freight Demand
	Course Packet	Pages 25-29
	Readings	None
Friday September 27	Lecture 1A	History of U.S. Transportation
	Course Packet	Pages 1-15 (also statistics on pages 17-24 that are used in Problem Set 1)
	Readings	<ul style="list-style-type: none"> • “Why Millennials are Shunning Cars” <i>Washington Post</i> • “Second Chances: Regulation and Deregulation of Taxi and For-Hire Ride Services” <i>Transportation Research News</i>

Monday September 30	Lecture 2	Passenger Demand
	Course Packet	Pages 29-39
	Readings	<ul style="list-style-type: none"> • GTW Chapter 12 “Transportation and Land Use” • GTW Chapter 2 “The Demand for Transportation: Models and Applications” (some of this chapter is too advanced for this course. In particular you need not - unless you want to - read the section entitled “Advanced Disaggregate Demand Models” on pages 24-31)
Wednesday October 2	Lecture 3	Valuation of Time, Theory of Costs
	Course Packet	Pages 40-53
	Readings	<ul style="list-style-type: none"> • <i>The Value of Travel Time Savings: Department of Transportation Guidance for Conducting Economic Evaluations</i> US Department of Transportation • GTW Chapter 3 “Learning About Transport Costs”
Monday October 7	Lecture 4	Empirical Cost Estimation
	Course Packet	Pages 46-64
	Readings	None
Wednesday October 9	Lecture 5	Regulation (I)
	Course Packet	Pages 65-85
	Readings	<ul style="list-style-type: none"> • “Economic Regulation of Transport: Principles and Experience” Course Packet pages 65-80 • “40 Years of Transportation Deregulation: Airlines, Railroads, Trucking, Intercity Buses” <i>Transportation Research News</i> • <i>Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services</i> Transportation Research Board Special Report 319 (Chapter 9 “Conclusions and Recommendations”)
Monday October 14	Lecture 6	Regulation (II)
	Course Packet	Pages 85-94
	Readings	None
Wednesday October 16	Midterm Examination I	
Monday October 21	Lecture 7	Pricing (I) – unconstrained monopoly pricing
	Course Packet	Pages 97-106
	Readings	<ul style="list-style-type: none"> • GTW Chapter 4 “Pricing” (pages 99-111, 119-136)
Wednesday October 23	Lecture 8	Pricing (II) – constrained “Ramsey” pricing
	Course Packet	Pages 109-116
	Readings	None
Monday October 28	Lecture 9	Pricing (III) - competitive pricing
	Course Packet	Pages 116-136
	Readings	None
Wednesday October 30	Lecture 10	Project Evaluation (I) – theory
	Course Packet	Pages 137-142
	Readings	<ul style="list-style-type: none"> • GTW Chapter 5 “Project Evaluation” • <i>Guidance on Treatment of the Economic Value of a Statistical Life in U.S. Department of Transportation Analyses</i> US Department of Transportation

Monday November 4	Lecture 11	Project Evaluation (II) – practice
	Course Packet	Pages 143-150
	Readings	None
Wednesday November 6	Lecture 12	Safety
	Course Packet	Pages 153-176
	Readings	<ul style="list-style-type: none"> • “Economics of Transportation Safety” Course Packet page 156-165 • “Comparing the Fatality Risks in United States Transportation across Modes and Over Time” <i>Research in Transportation Economics</i>
Monday November 11	Lecture 13	Structure of Cities / Congestion Pricing Theory
	Course Packet	Pages 177-188
	Readings	<ul style="list-style-type: none"> • GTW Chapter 10 “Determinants of Motorization and Road Provision” • “A Bathtub Model of Downtown Traffic Congestion” Access
Wednesday November 13	Midterm Examination II	
Monday November 18	Lecture 14	Congestion Pricing Practice
	Course Packet	Pages 188-208
	Readings	<ul style="list-style-type: none"> • Press Clippings on Solutions to Urban Road Congestion
Wednesday November 20	Lecture 15	Congestion Pricing Practice / Urban Transit Subsidies (I)
	Course Packet	Pages 209-215
	Readings	<ul style="list-style-type: none"> • “SFpark: Pricing Parking by Demand” Access • “Optimizing the Use of Public Garages: Pricing Parking by Demand” <i>Transport Policy</i> • “From Fuel Taxes to Mileage Fees” Access • “Public Perception of Mileage-Based User Fees” <i>Transportation Research News</i> • <i>Approaches to Making Federal Highway Spending More Productive</i> Congressional Budget Office • GTW Chapter 4 “Pricing” (pages 111-119) • GTW Chapter 11 “The Urban Transportation Problem: A Reexamination and Update”
Monday November 25	Lecture 16	Urban Transit Subsidies (II)
	Course Packet	Pages 216-220
	Readings	None
Wednesday November 27	Review of Problem Set 7	
Friday December 13	Final Examination (9AM-11AM)	