1. O'Sullivan Chapter 11: Autos and Highways

Figure 11.1: Modal choice for commuters
Congestion model
- 10 mile two-lane highway
- Private direct cost of auto $0.20 per mile
- Private opportunity cost $0.10 per minute

Figure 11.2: Externality diagram
Social trip cost > private trip cost

Congestion tax
- Determine tax amount based on trip time = f(volume) p. 260
- Benefit: People who continue to use have lower time costs
- Cost: People who stop using forego highway travel
- Total benefits > total costs by welfare triangle (MSC > MPC)

What to do with collected tax revenue?
- Distribute to drivers who no longer use freeway
- Use to expand freeway to eliminate congestion externality
- Put into general fund

Peak vs. off-peak travel
- Figure 11.3
- Range of estimated congestion tax values
- Peak: (SF) 0.65 on urban, 0.21 on suburban, 0.17 on fringe
  (Minn.) 0.09 to 0.21
  (LA) 0.15 average
- Decrease traffic congestion by about 25%

Implement with vehicle identification system
Very limited use: Singapore, Toronto, and London
HOT (high occupancy and toll) lanes: Riverside and San Diego

How taxation reduces congestion
- Modal substitution, time chosen to travel, route of travel, resident choices

Reduce traffic congestion with other alternatives
- Gasoline tax: Increases the cost of all auto travel
- Downtown parking tax: Only on peak-load travelers, no account distance, others cause
- Widen highway
  - Figure 11.4: Is CS gain > cost?
  - Latent demand

Transit subsidies
Figure 11.5
Subsidy never as efficient as highway congestion taxes
Urban road users in U.S. subsidize rural users
Congestion tax and urban land use
Figure 11.8: $R_0$ to $R_c$ if tax revenue not given back
$R_o$ to $R_e$ if given back
Bid-rent changes around $u^*$, smaller residential area
Congestion and labor supply
Switch to congestion tax improves net welfare of residents in area
More want to live there and labor supply up
Wages fall, quantity of labor demanded up (more firms)
Congestion taxes cause economic growth, why do we not use them?
Air pollution from autos
Federal Clean Air Acts (1963, 70, 77, and 90)
Regulatory
Economic approach: MSC > MPC of driving
Cause us to drive too polluting cars and too many miles
Effluent fee
Monitoring device
One time charge on new car
Gasoline tax
Small estimates per gallon tax of $0.60 to $1.48
Auto safety
Federal vehicle safety act of 1966
$1,000 increase per car
30% reduction in fatalities, 20,000 lives per year
Theory of risk compensation
Figure 11.10
Switch to small cars
Benefits
Fuels savings, less pollution, less congestion (less space)
Fewer pedestrian/bicycle deaths
People drive more carefully
Costs
Traffic injuries/deaths up (less if all switched)
How to carry our stuff

2. O'Sullivan Chapter 11, Question 4
a. Figure 11.4 with an appropriate shift in D curve.
b. Increases

3. O'Sullivan Chapter 12: Mass Transit
Figure 12.1 and 12.2: U.S. transit use
3 parts of commuting trip
Collection, line haul, and distribution phases
Important facts
   Price elasticity of transit use: -0.33
   Line haul time elasticity: -0.39
   Access time elasticity: -0.71
   Elasticities of demand for noncommuting travel > commuting travel
   Opp. Cost of time spent in transit vehicle at half wage
   Opp. Cost of walking or waiting at 1 to 1.5 of wage

Table 12.2: Total costs for various travel modes
   Change from optimal auto use
      Get her on BART: -$1.21 fare
      Collection, line haul, and distribution times need to drop
      Auto cost and parking cost up
      Wage would fall
   Who uses mass transit?
      Close to stops and stations
      Low opportunity costs
      Enjoys walking
      Dislikes driving
      Cannot afford fixed cost of auto
      Altruistic (It’s the “right” thing to do)

Mainline vs. an integrated system
   Spacing between stations
      HOV lanes
         Greatly reduce line haul times
         Figure 12.3: Impact in non-diamond lanes

Choosing a transportation system
   Auto-based highways, integrated bus system, BART
   Figure 12.4: Average cost curves
      Integrated bus system less expensive (except NY City and Chicago)
      Must exceed 30,000 users per hour
      Metro in DC ($8 fare) LA ($11 fare)

Light rail
   Lower K cost than BART (10 times less per mile)
   Lower L cost than buses, but higher overall operating
   High collection and distribution costs
   Takes passengers off buses
   Table 12.3: Bus cost comparisons

Mass transit subsidies
   Figure 12.5
      Only 38% of operating costs covered by fares
      None of construction costs
   Subsidy reasons
      Declining ATC over potential ridership, must P low to get to
      Used to offset the artificially low priced autos
      Declining fiscal health of mass transit
      Low fares
      High wages
      Extensions to low density areas
Decrease in labor productivity
Policy reforms
  Eliminate cross subsidization of routes
  Beyond scale economies in many situations
  Private contractors (25 to 30%)
  Deregulation: dial-a-ride, jitneys, paratransit, subscriptions
Investment in mass transit only shapes urban land use if used in conjunction
  with land-use instruments

4. O’Sullivan Chapter 12, Question 14

Public education improvements, auto ownership subsidies, jitneys

5. Wassmer Chapter 33: You Ride, I’ll Pay

Article by Pack
Every $ paid by riders, taxpayers pay 2$’s
But + externalities
  Reduced congestion, parking problems, traffic accidents
Simple B/C study of Southeastern PA commuter rail
Table 1
But social benefits not translated into transit revenues
  But do raise property values near stations
  Transit authority buys up land, plans developments
  Greater value-capture efforts
Why not just buy all people using transit a car?

6. Wassmer Chapter 34: Urban Traffic Congestion

Article by Small
New road capacity not always the answer due to latent demand
Time is ripe for congestion pricing
  Promotes a wide variety of alternatives
Federal gov’t conditions it revenue sharing on the fact the state uses peak-load
congestion pricing
  Not just how much too spend, but how to spend it efficiently
People’s likely responses
  Less congestion, carpools easier to arrange, relative wage and property
  value changes, shipping at off hours
  Hit low-income harder (makes it politically difficult)
Political salability rests on how congestion tax revenue distributed
Three equal pots
  Reimburse travelers
    Equal commuting allowance to every worker, cut in fuel taxes
  General tax reduction in local sales and property taxes
  Fund local transportation projects
6. Homework Due the Start of Meeting 9

1) Read all of the material under meeting 9 in the syllabus schedule; come prepared to discuss.
2) One sentence, typed question regarding material that you read for next meeting but do not understand.
3) Answer discussion questions listed under Meeting 9 (November 6) in a typed, double-spaced manner. Two pages should be sufficient to do this.