Transportation Supply and Demand

John K. Abraham

Supply and Demand..

- Classical Micro-economics theories can be applied to transportation
- There is a joint demand for travel and an activity
  - Utility gained is the total utility of the trip and activity
  - Price expended also is the total cost of the trip and activity
- Assumption: decrease in price of travel will result in travel increase
  - May be more sensitive to trips for recreation, shopping rather than work
Trip purposes

- Work trip
- School trip
- Shopping trip
- Employer’s business trip
- Personal business trip
- Social trip
- Trip to eat a meal
- Recreational trip
  - Home
  - Serve passenger
  - Change travel mode

Demand: Series of amounts of service which consumers are willing to purchase at a series of prices in a given period of time
  - Is a downward sloping curve
- Total Revenue = Price x Quantity
- Total Cost = Cost of manufacturing, transport etc..
- Profit = Total Revenue - Total Cost
- Price of travel - outlay of resources required in order to consume travel – money, time, discomfort, energy, hazards etc.
Demand is not unlimited
Reduction in price may not always increase consumption
Cannot design a product for infinite demand

Elasticity
- Sensitivity of demand to changes in price
  \[ E = \frac{\% \text{Change in Quantity}}{\% \text{Change in Price}} \]
- Point elasticity: % change in volume that results from 1% change in price

Inelastic Demand: \( E < 1 \)
Elastic Demand: \( E > 1 \)
Highway Travel Demand

- Is highly inelastic
- May not vary in volume with price
  - E.g. Price changes, quantity may change, but at the same time income changes
  - Fuel is inelastic - before and after a price increase, #gallons showed no change
- A new route/highway will be used heavily
- Increase in comfort, convenience leads to heavy travel
- Supply demand theories normally applied to a situation of perfect competition
  - In transportation its almost monopoly

Fundamental Diagram

- $V_m$: Maximum volume
- $V_A$: Space mean speed
- $D_B$: Density
- $D_A$: Jam density
- $V_m$: Capacity
- Critical speed
- Flow

Wayne State University
P-V curve to one traveler

Equilibrium
Consumer Surplus

- It measures the value customers get from a good but do not have to pay for

- Area above the price paid and below the demand curve

- May be used to find the amount that the consumers would be willing to pay