

Demand Forecasting: Class Examples

Civ E 342
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Example 2-1: (Text: Example 8-1) Predicting Trip Generation of a Household

- A simple linear regression model has been developed for vehicle-based shopping-trip generation during a shopping trip peak hour (T, trips/HH):

$$T = 0.12 + 0.09 \text{ Household Size} + 0.011 \text{ Income in Thousands of Dollars} - 0.15 \text{ Retail Employment in Neighborhood}$$

Consider a household with:

- 6 members and an annual income of \$50,000
- home in a neighbourhood with 450 retail employees

- What is the expected number of vehicle-based peak-hour shopping trips that this household makes?
- What if they move to a neighbourhood with 150 retail employees?



Example 2-2: (Text: Example 8-3) Predicting Trip Generation of a Neighbourhood

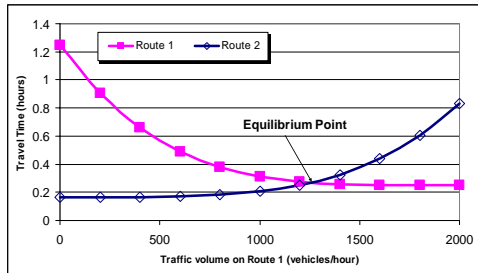
- A neighbourhood includes 800 households and a shopping plaza with 205 employees. The social-economic characteristics of the households are given in Table 1.

Type	HH Size	Annual Income (thousands \$)	# of HH
1	2	30-50	200
2	3	40-60	400
3	4	50-60	100
4	5	30-50	100

Use the trip generation model given in Example 2-1 to estimate the total number of peak-hour vehicle-based shopping trips that this neighbourhood generates.



Example 2-5



Example 2-6: Predicting Impacts of Road Construction

Following Example 2-5, suppose Route 1 includes a road that is under construction. The construction reduces its capacity from 1000 veh/hr to 600 veh/hr. The total # of auto trips from the neighbourhood to the shopping center is 3000 trips/hr with an average car occupancy of 1.5.

- What would be the increase in travel time for each individual?
- What would be the total wasted time (vehicle hours) due to the construction?

Think About: Predicting Route Choices under Toll

Following Example 2-5, suppose Route 1 includes a toll road (like Highway 407), which charges each vehicle \$1.0 per trip. The total # of auto trips from the neighbourhood to the shopping center is 3000 trips/hr with an average car occupancy of 1.5. Assume that the equivalent dollar value of a traveler's time (*value of time*) is \$10 per hour.

- How can the Wardrop's UE principle be extended (modified) to deal with route choices under toll?
- What will be the expected traffic volume on Route 1 and Route 2?
