

1.963, A Sustainable Transportation Plan for MIT
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Session 11: Model Details and Parking Price Structure

What is the target population for switching from driving to transit? Those with less than 15 minute difference between driving time and transit time.

Driving times should add 10 minutes for walking, plus account for congestion (just add some amount or percentage of time) because we can't model in more detail.

Perceived vs. calculated commute time – 50th percentile has difference of 13 minutes. Should be using perceived times instead?

Looking at bus/subway/commuter rail to show who is already using transit – how (and is it feasible) to turn drivers into these people?

Using this 15-minute difference, do you get any commuter rail riders?

Suggested model: perceived time for driving, model time for transit. For short trips, perception < actual. For long trips, actual time < perceived.

Low and high estimate of switchers: one 15-minute group, one 20-25 minute group

Transit time minus congested drive time: how to explain the spike between 55-65 minutes?

- Model issue?
- Split where people are rational below, but choice riders above?
- One hypothesis: above 45 minutes, people may take rail even if it takes longer, to save themselves a long drive.

Have we accounted for cost? What is the cost difference between subsidizing 60%, or fully? What if we raised parking to 65% subsidy and subsidized rail passes 65% as well?

Modeling

Define U-Pass

\$10, 15, 20 per month – do the analysis for all, but don't present all the options. Commuter rail subsidy at 50% or 100%. It might be worthwhile to have a single scenario we analyze most fully.

Define Parking Price Structure

Constant: student residents, staff residents (such as housemasters), carpools, motorcycles, professor emeritus, non-employees

Define Elasticity and Target Groups

Applied to the two target groups: < 15 minutes, < 25 minutes

Elasticity: as price difference changes, how much does parking demand change?

Parking Rates

Carpools: \$180/year per person, so essentially free (this is the U-Pass price)

But this doesn't encourage 3-person carpools any more than 2-person carpools.

Motorcycles: only take up $\frac{1}{4}$ parking space, but still pollute. How to treat them?

Parking Possibilities:

- 1) \$120/180 (this is for U-Pass, at either \$10 or \$15 a month) plus \$720 fixed.
So the price would be the same for any parking spot.
- 2) \$120/180 plus a) \$2, b) \$4, or c) \$6 per day.
- 3) \$120/180 plus a) \$2, b) \$6, or c) \$10. Maybe the C spots could include guarantee.

Note that the distribution of A/B/C spots may change between 2 and 3.

Do you assume that demand will fill the C spots? What about the B spots? (Will everyone who wants a \$2 spot be able to get one?) This is such a behavioral thing, it's hard to model.

We can only analyze so many alternatives – this is a starting point.

How will the guarantee work? It would be an additional mechanism above the A/B/C price split.