Credit-Based Congestion Pricing: Policy & Response

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Congestion Costs
- Congestion estimated to waste $68 billion per year (fuel + time, 2000) in 75 U.S. major urban areas.
- $1,160 average cost per peak-period traveler in 75 urban areas (2000)
- In Austin: Congestion "cost" per peak-period driver = $1,190/yr (2000)
- Traffic Delay ~ 61 hours/peak user/yr in Austin (2000)
- Wasted Fuel ~ 104 gals/peak user/yr in Austin (2000)

Source: 2002 Urban Mobility Report, TTI

Congestion: Its Marginal Social Cost
Travel Time ($t$)

Example: 4-lane Highway, 10 mile section
Free-flow Speed = 60 mph
Capacity = 8000 veh/hr.

Externalized Cost at Capacity = 5 min. = $1.00

8000 vph Demand (D ≥ q)

Proposed Strategy: CBCP
- Road users are held responsible for the marginal social cost of their trip, as it impacts others.
- Bankable credits permit a basic amount of travel – & an opportunity to make money (by avoiding congested roadways during peak periods).
- Equitable & effective!
- Revenue neutral!
CBCP: A Scenario…
- Every month licensed drivers receive allowance of “driving credits” to drive on congested roads using an EZ-Pass/FastTrak credit-card account (or debit card) linked to his/her name.
- Some drivers would spend much more than others & travel under uncongested conditions, deriving benefits from reduced delays & less variable travel times.
- Some drivers would spend much less & receive cash (or tax credits) – &/or may donate credits to special groups.
- Total credit updates would be based on total revenues collected in prior month, so policy is revenue-neutral.
- Bus use & local shopping increase, emissions fall, roads busier at off-peak periods…

CBCP: Toll Collection…
- Each network link, at each time of day, priced distinctly, based on current demand.
- Electronic technology uses card-like transponders mounted on cars windshields.
- Tolls automatically deducted from user’s account (or debit card) when vehicle passes toll collecting point, with no delay.
- Electronic displays upstream of collection points (& on-line) indicate exact tolls.
- Maximum tolls & variability may be set (e.g., 50¢/mile, 1¢/mile/minute), to minimize uncertainty.
- Possible exceptions for HOVs, taxis, &/or others.

Transponder Technology:
- Place the transponder at least 1/4 inch past the top of the windshield of the vehicle.
- Do not mount it on the dashboard and maintain a clear view of the road.

Toll Collection Technology:
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Project Objectives:
- Identify practical & optimal approaches for:
  - Application
  - Administration
- Forecast:
  - Resulting road operations
  - Final benefits distribution
- Identify hurdles to implementation
- Examine a variety of urban CBCP cases
- Propose policy recommendations

Survey of Austin Residents
- Objective: Gauge Austinites’ perceptions of & travel responses to CBCP
- Spatial-sampling, RDD, & Internet surveys
- Almost 400 responses to date; survey still in progress
- ** Weblink: [http://cbcp.hypermart.net](http://cbcp.hypermart.net) **

Where are we now?
- Current survey of Austinites…
Some preliminary results:

Cost to Users:

- Missing
- Not Important
- Somewhat important
- Very important

Privacy:

- Missing
- Not Important
- Somewhat important
- Very important

Traffic congestion in Austin

- Not a problem
- A minor problem
- A problem
- A major problem

More preliminary results…

- 85.5% feel congestion is a problem in Austin. (48% "major problem")
- Travel during congestion ~1.9 times longer (on average)
- 54.8% in favor of light rail
- 27.3% supportive of a CBCP scheme
- 24.8% support flat tolls for reducing congestion

Factors affecting responses…

- Income
- Age
- Gender
- HHsize
- #Children
- #Vehicles
- #Peak-hour trips made by the traveler
- Distance usually traveled during peak hours

… & more!

Average responses to CBCP…

- Assuming 25¢/mile for 20 miles of peak-hour trip ($5 round-trip cost), avg. drivers willing to modify mode or re-schedule peak-period trip 3.71 weekdays per month (so as to save credits)
- If allowance covers just 15 of 20 workdays, avg. willing to pay = $4.81/day ($24.06/mo.) (in peak tolls, after credits expire)
- Avg. VOT = $12.42: People willing to pay $2.07 (average) to save 10 minutes on a work commute trip by car that presently requires 30 minutes.

Additional Observations…

- People who travel further &/or own more vehicles consider congestion a more serious problem.
- People making more work trips are more likely to seek ways to avoid congestion.
- More peak-hour trips &/or Older persons → Less willing to switch modes & will endure higher tolls to keep driving.
- Persons living in bigger households &/or having more kids will endure higher tolls

Coming Research:

- Enforcement & Privacy Provision on CBCP Accounts, Visitor Policies
- Travel Behavior Modeling for Welfare Estimates across Sub-Populations
- Integrated Modeling for Land Use Impacts
- Other Areas to Consider?

Thank you for your time!

Please link to our survey (cbcp.hypermart.net)!