

# Thinking Outside the Bus

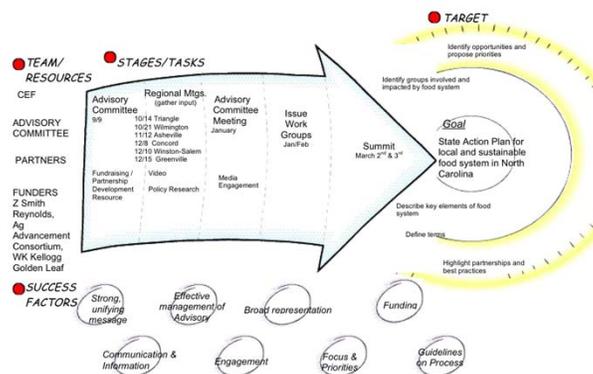
## Behavior, subsidies, and transit use



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**UCLA Luskin School of Public Affairs**



## Game plan



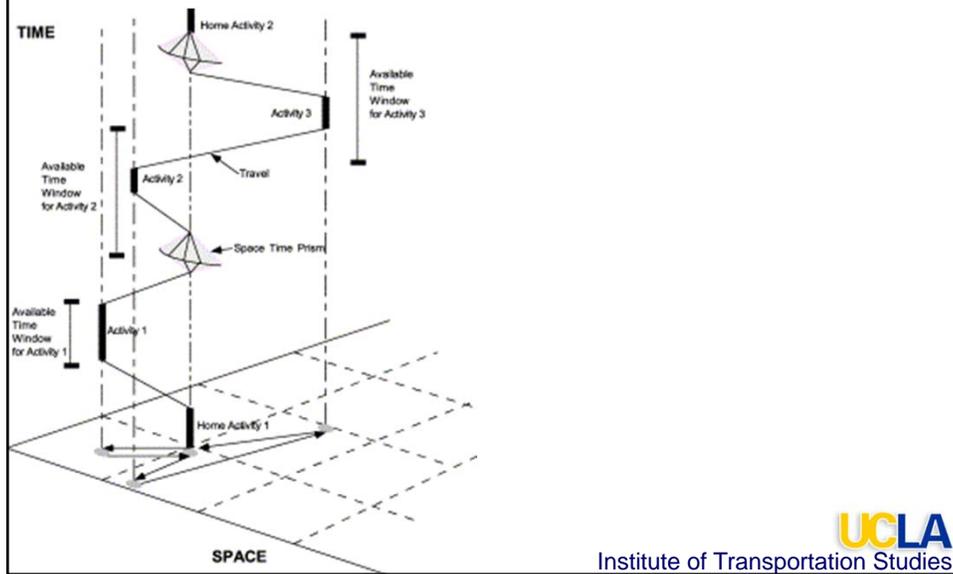
## Game plan

1. A quick overview of travel behavior
2. A thumbnail sketch of public transit today
3. Implications of transit subsidy and patronage research
4. Cost-effective ways to increase transit use
  1. Pricing transit services
  2. Reducing traveler uncertainty

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## Travel Behavior 101



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- Travel is a means, not an end
  - Most trips are to do something elsewhere
    - Activity participation is associated with subjective well-being
    - Trips are associated with activity participation

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- Travel is a means, not an end
  - Most trips to do something elsewhere
- People think about “tours” and not trips
  - The easiest way to Point B, may not be the easiest to Points C, D, and E
    - “Trip chaining” harder to do on traditional transit
    - “Schlepping” one’s stuff harder too

## Travel behavior 101

- Travel is a means, not an end
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- People think about “tours” and not trips
  - The easiest way to Point B, may not be the easiest to Points C, D, and E
- Risk/uncertainty, time, and money are most important
  - In that order!
    - Fear for safety trumps all
    - Reliability more important than speed
    - Out-of-pocket spending most noted

## Travel behavior 101

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  - The easiest way to Point B, may not be the easiest to Points C, D, and E
- Risk/uncertainty, time, and money are most important
  - In that order!
- People love car travel for good reason
  - Walking and biking share cars’ flexibility
  - Traditional transit less so

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## Public transit?

- Can take many forms:
  - Buses, streetcars, subways, and ferries operating in most urban areas on fixed-routes with fixed-schedules for a nominal fare



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- Can take many forms:
  - Buses, streetcars, subways, and ferries operating in most urban areas on fixed-routes with fixed-schedules for a nominal fare
  - Paratransit and taxis share much with cars, bikes, and feet, but are unfortunately viewed by many as mere niche players



## Public transit?

- 75 years ago:
  - Almost exclusively private, for-profit systems
  - Today, almost entirely public
- With shift to public ownership
  - Ever expanding public agenda for transit
  - Service and subsidies growing faster than ridership

## Public transit?

- Transit's strengths
  - Moving large numbers of people from a few origins to a few destinations at the same time



## Public transit?

- Transit's strengths
  - Moving large numbers of people from a few origins to a few destinations at the same time
- Metropolitan person trips 2009
  - Private vehicles = 83.5%
  - Public transit = 3.9%

## What are transit's primary markets?



## What are transit's primary markets?

- People who – because of age, income, or disability – have limited access to and use of automobiles
  - Most transit users are low-income



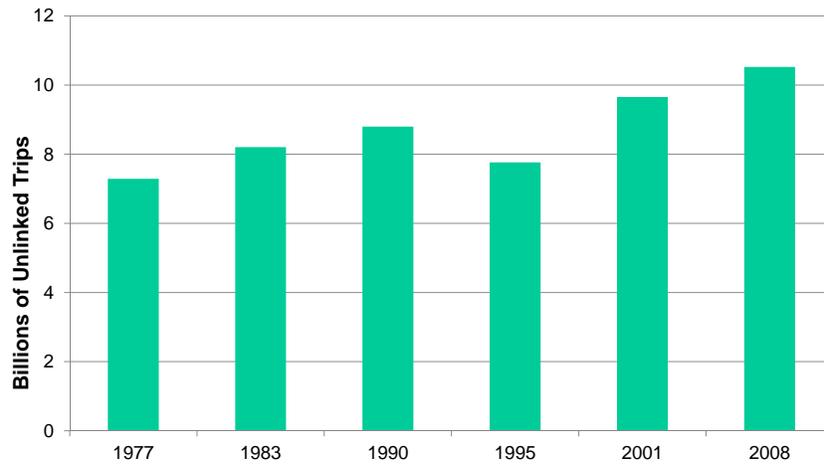
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## What are transit's primary markets?

- People who – because of age, income, or disability – have limited access to and use of automobiles
  - Most transit users are low-income
- Trips to and from places where parking is limited and/or expensive
  - Downtowns, universities, airports, etc..
- In sum:
  - The central parts of the oldest, and largest cities

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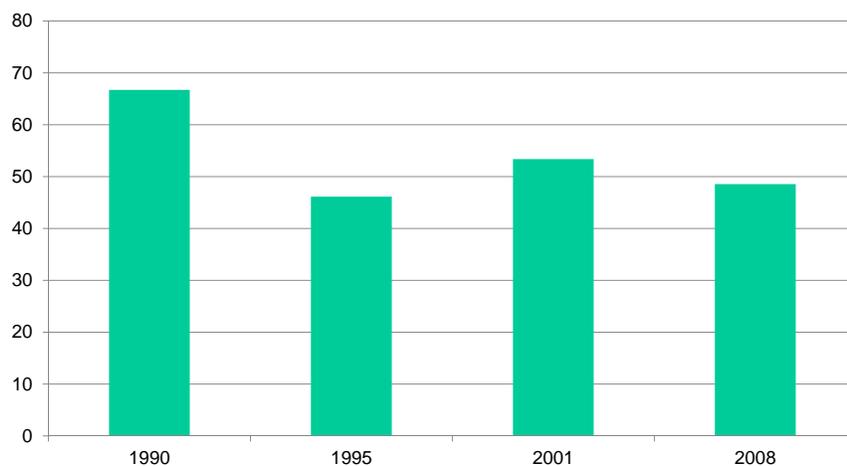
## But transit use is climbing of late (up 36% since 1995 and 9% since 2001)



Source: American Public Transit Association

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## Metropolitan areas are growing (up 85 million since 1990) but transit *trips per urban resident* are down 27%



Source: Author's Calculations from American Public Transit Association data

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Why aren't major investments in public transit "buying" more new riders?



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## Behind the eight-ball

- Transit increasingly operates in places that were designed around the automobile
  - Low densities
  - Lots of streets and roads
  - Lots and lots of free parking



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## Why so much driving?

- **Average journey-to-work time in 2010**
  - Public transit: 56.0 minutes
  - Private vehicles: 22.9 minutes

## Why all of this driving?

- **Average journey-to-work time in 2010**
  - Public transit: 56.0 minutes
  - Private vehicles: 22.9 minutes
- **Goods movements and personal business travel growing fastest**
  - Errands now outnumber work trips by more than 2.5:1
  - Increasing share of peak hour trips are chained into tours

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## So What Explains Overall Transit Ridership?



## Nature and Nurture

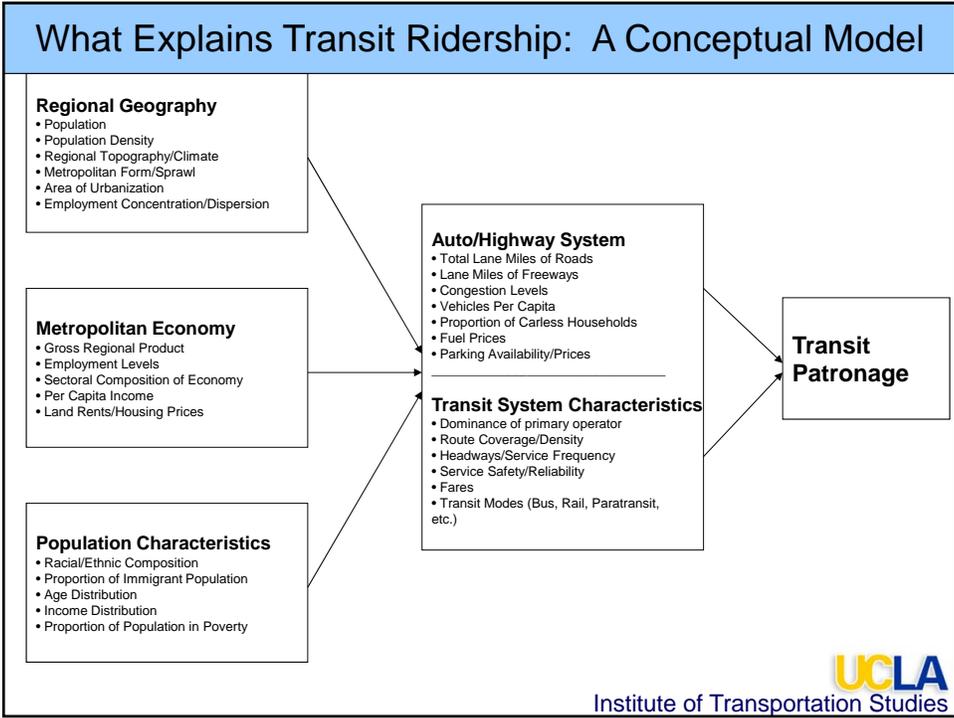


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## Nature and Nurture

- Nature
  - Bakersfield is never going to have as much transit use as San Francisco
- Nurture
  - Fare and service policies can double (or halve) patronage in a given area

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Of the things that transit managers' control, fares and headways have the most effect on ridership

	5th Percentile	95th Percentile	% Difference
<b>Average Fare per Unlinked Boarding</b>	\$0.95	\$0.20	-78.9%
<b>Predicted Per Capita Boardings</b>	7.1	15.6	119.7%
<b>Average Headways</b>	2,340	12,803	447.2%
<b>Predicted Per Capita Boardings</b>	6.4	15.1	135.9%

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So are there any cost-effective ways to boost transit ridership?

Yes!

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## Two promising paths forward



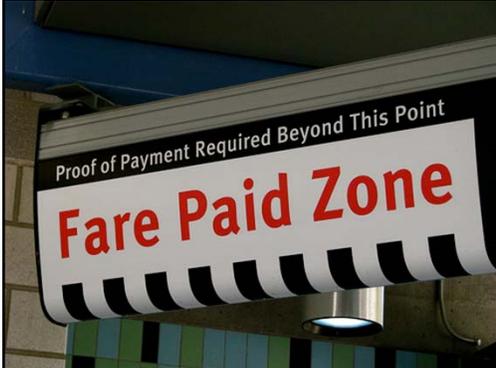
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## Two promising paths forward

1. Pricing services like businesses do would increase cost-efficiency, service-effectiveness, and social equity
2. Thinking outside of the bus to reduce uncertainty of transit travel

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## Current approaches to transit pricing



**CUSTOMER ALERT**

**Fare Change**  
**Effective Tuesday, January 1, 2013**

Everett Transit's proposed fare increase has been approved by city council and will take effect on **January 1, 2013**.

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## Current approaches to transit pricing

- While the costs of transit trips vary dramatically by time of day, distance, direction, and travel mode
  - Most transit operators do not carefully analyze their “marginal” costs
- As a result, fares tend to be “flat”
  - That is, they don’t vary much (if at all) by time, distance, or mode
  - Result: Lots of inefficient (and inequitable) “cross-subsidies”

## “Marginal cost” pricing...

- Encourages riders to consume more “cheap to provide” service
  - Off-peak trips
  - Backhaul trips
  - Short trips
  - Bus trips
- And to “co-pay” for more “expensive to provide” trips
  - Demand for these trips is more “inelastic”
  - Riders tend to be wealthier



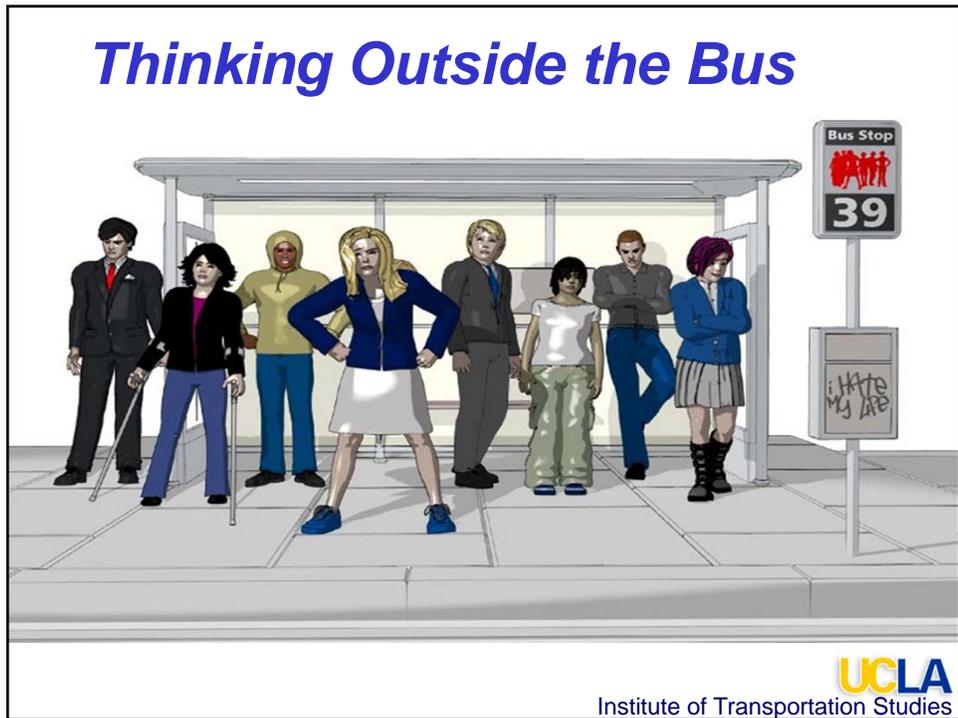
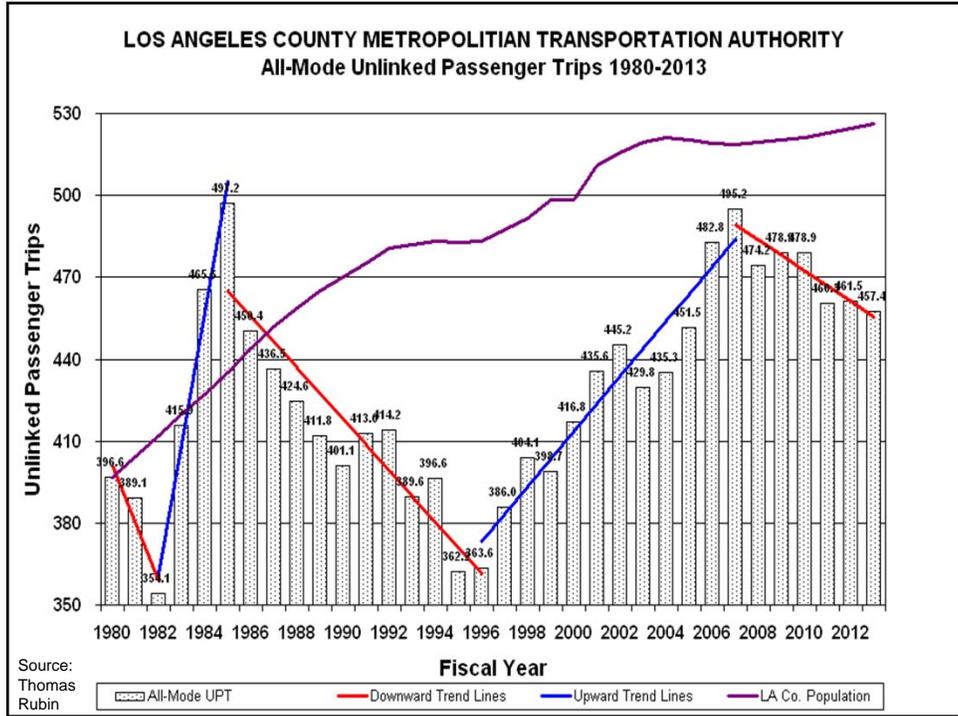
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## Responses of “choice” and “dependent” riders to fare changes

	<i>Fare Increases</i>	<i>Fare Decreases</i>
<b><i>Lower-Income Riders</i></b>	Relatively inelastic; have relatively few alternatives	Relatively elastic; limited incomes and few alternatives creates latent demand for transit travel
<b><i>Higher-Income Riders</i></b>	Relatively elastic; typically have many alternatives	Relatively inelastic; higher incomes and plenty of alternatives means that transit remains an inferior good for most

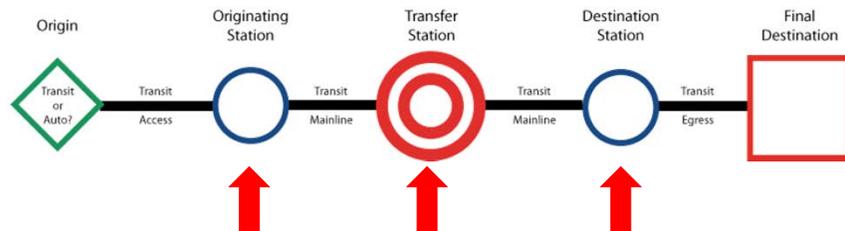


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## Out-Of-Vehicle Experience

- Public transit passengers must typically wait for and transfer between buses and trains
- Rider behavior tells us that this “out-of-vehicle” is 1.5 to 4 times more important than “in-vehicle” travel



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## Conclusions

- The most important determinant of user satisfaction is **frequent and reliable service** in an environment of personal **safety**



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## Conclusions

- Reliability, safety, and security factors outweighed other attributes of stops/stations
- Reliability, safety, and security were consistently important regardless of wait time
- Cleanliness, schedule/route info, shelter, guards, restroom, seating, food/drink become more important with increased wait times



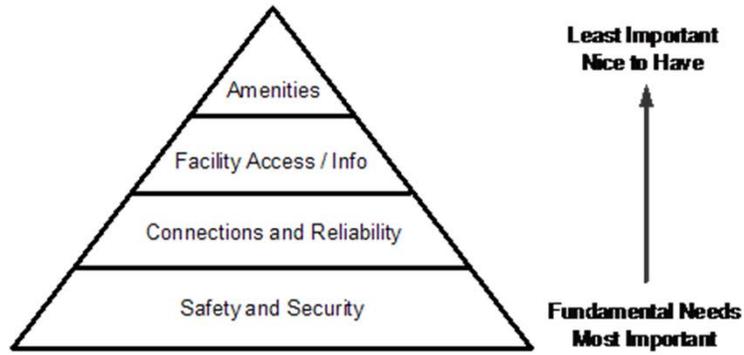
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## Example

- Bus-only lanes in congested, high-ridership corridors...
  - Increase vehicle speeds and reduce in-vehicle travel times
  - But also reduce headways, which may have an even *greater* effect on patronage



*Thinking outside the bus* about transit passenger needs



The transit users' hierarchy of needs



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Let's  
RECAP



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OK, so it's complicated. But what's most important?



Important  
Information

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OK, so it's complicated. But what's most important?

- #1: Travel time reliability
  - Travelers like speed, but they like reliability even more
  - Wait and transfer times are especially burdensome (1.5 to 4 times more than in-vehicle time)
    - Frequent service with few transfers will beat fast service with transfers every time
  - Lesson: Increasing service frequency and schedule adherence attracts lots of riders

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## Thinking outside the bus

- #1: Travel time reliability
  - Lesson: Increasing service frequency and schedule adherence attracts lots of riders
  - Cost-effective ways to improve reliability
    - Better tracking and management of vehicle spacing
    - Realistic schedule setting
    - Real-time “Next Bus” information at major stops and on smart phones
    - Transit signal prioritization
    - Queue jumper and, in limited cases, bus-only lanes

  
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## OK, so it's complicated. But what's most important?

- #2: Price
  - The cost of providing transit varies a lot
    - Peak hour, peak direction, and rail service cost a lot more than off-peak, contra-flow, and bus service
  - But transit fares tend to be “flat,” per trip or even per month
    - Long-distance, peak hour, peak direction rail passengers get the biggest government subsidies, while short bus trips in the off-peak tend to require little subsidy
    - This encourages inefficiency

  
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## What's a fair fare?

- #2: Price
  - Conventional wisdom holds that lowering fares is a costly way to add riders
  - Fare elasticity research:
    - Fare increases chase away higher-income riders (who can switch to cars)
    - Fare reductions attract lower-income riders (who have fewer choices)

## OK, so it's complicated. But what's most important?

- #2: Price
  - Lesson: Use smartcards to vary fares to reflect costs
    - Lower fares for inexpensive-to-provide trips (short, off-peak, backhaul trips)
    - Higher fares for expensive-to-provide trips (long, peak-period, peak direction, express and rail trips)
    - Would encourage better utilization of existing capacity, such as by adding rapid turnover short trips
      - Would add riders without adding much to costs

## Make transit smarter

- #2: Price
  - Lesson: Use smartcards to vary fares to reflect costs
    - Would increase both system performance and social equity
    - since higher-income riders disproportionately consume expensive-to-provide trips and lower-income riders disproportionately consume inexpensive-to-provide trips

There is low-hanging fruit out there to cost-effectively increase transit use



Thank you

