Mobility, Access & Pricing Study

evaluating Congestion Pricing as a Demand Management Strategy for improving San Francisco mobility

presented by Zabe Bent
Principal Transportation Planner
San Francisco County Transportation Authority

Federal Highway Administration Congestion Pricing Webinars | September 2011
www.sfmobility.org | twitter.com/SanFranciscoTA | www.facebook.com/sfmobility

Why study congestion pricing?

- Bay Area among top 5 most congested regions in the US (Texas Transportation Institute)
- Average regional peak period trip to Downtown SF is twice as long as off-peak trip
- Focus on congestion impacts not just for motorists, but also transit performance, etc
- San Francisco sacrificed over $2 billion to congestion in 2005 (over $3B/yr by 2030)
- Transportation responsible for about half of greenhouse gas emissions in SF
- 2004 SF Countywide Transportation Plan
- 2004 SF Climate Action Plan
  2011 SF Climate Action Strategy

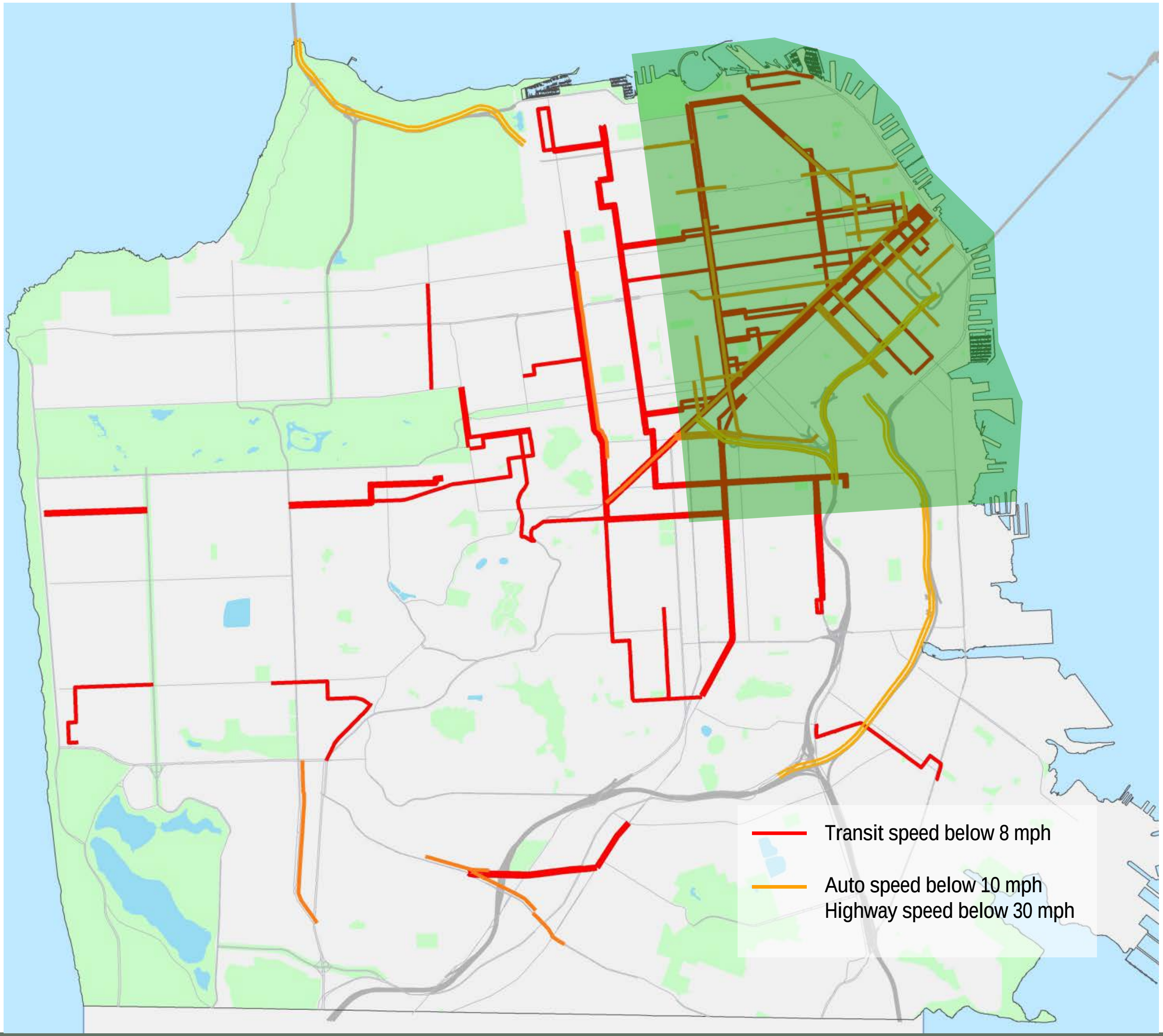
Key characteristics in scenario analysis

Fee Analyzed		
	Weekdays	Weekends
6am – 9am	$3	NO FEE
9am – 3pm	NO FEE	NO FEE
3pm – 7pm	$3	NO FEE
evenings	NO FEE	NO FEE

Discounts Analyzed:		
Disabled Drivers Zone Residents Low-income Drivers	(50%)	$6 daily cap $1 rebate on bridge tolls Fleet program for businesses

Potential Scenarios for SF

Northeast Cordon



Reinvestment of funds—program could generate $60-80M/yr

Up-front/Day One:

San Francisco

- BRT in key corridors (Van Ness, Geary)
- Signal priority and peak bus-only lanes on Fulton, Mission, California
- Bike lanes citywide
- Real-time signage and wayfinding

Regional improvements

- BART station wayfinding, capacity, access improvements
- 101 corridor management / HOV lane
- Caltrain access improvements

Ongoing/Annual:

San Francisco

- More frequent rapid/express service
- Street paving/pothole repair
- Traffic calming
- Streetscape improvements
- Parking management & enforcement

Regional/programmatic improvements

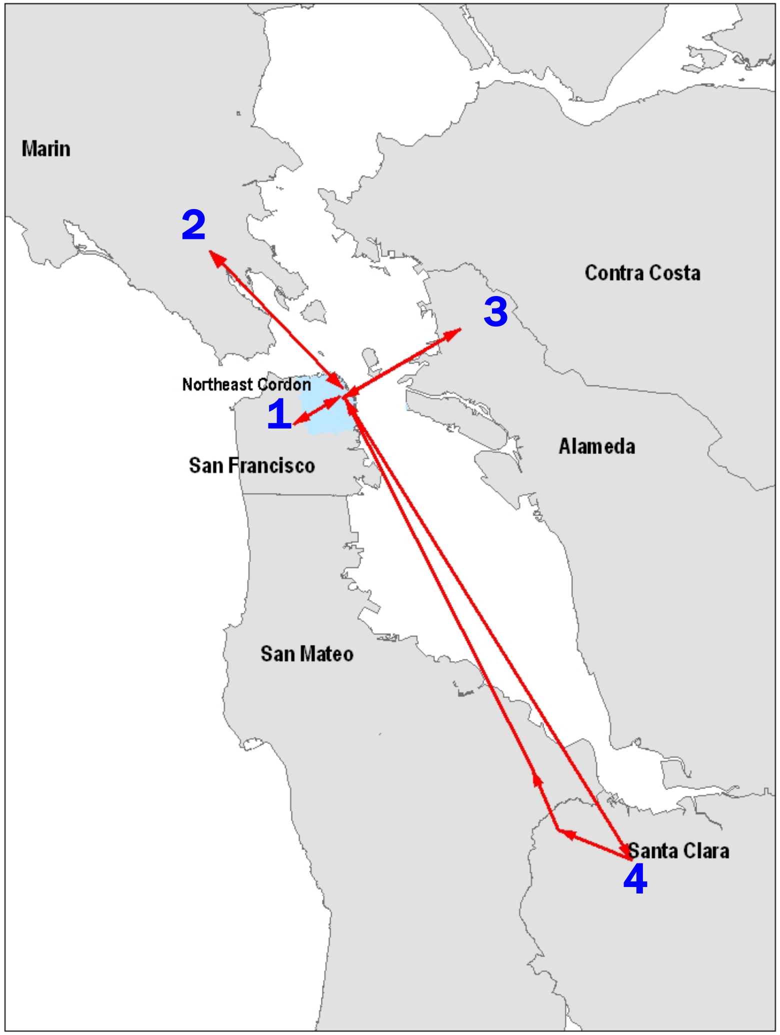
- More frequent regional/express service
- School, worksite TDM programs
- Power-washing sidewalks

Scenario Comparison – by the numbers

	NE Cordon (AM/PM)	NE Cordon (PM, outbound)	Southern Gateway (AM/PM)
Fee analyzed	$3 am/pm both directions	$6 pm outbound only	$3 am/pm both directions
Net Operating Revenue*		$60 – 80M	
Peak Auto Trips to/from NE Cordon (avg)	-12%	-10%	-5%
Peak Auto Trips to/from S. Corridor (avg)	-4%	-4%	-20%
Improvement in Transit Speeds	up to 20%	up to 20%	up to 15%
Daily Person Trips (NE Cordon)		negligible (less than 0.5% change)	
Daily Vehicle Hours of Delay (NE Cordon)	-21%	-10%	-4%
Daily Vehicle Miles Traveled (San Francisco)	-5%	-3%	-4%
Change in $PM_{2.5}$ Emissions (NE Cordon)	-17%	-11%	-8%
Change in Collisions (NE Cordon)	-12%	-5%	-3%

Values in 2009$ for single representative year

How might trip patterns change?



Origin	Mode	Roundtrip Travel Time	Cost	Peak vs. Off-Peak
1.Haight/Ashbury, SF	Drive Alone	54 mins	$2	AM/PM peak
Switches from drive alone to transit and saves 15 mins/day				
2.Mill Valley, Marin	Drive Alone	91 mins	$9	Mid-day/PM peak
Switches time of day and saves 13 mins/day				
3.Rockridge, Alameda	Transit	147 mins	$7	AM/PM peak
Keeps taking transit and saves 20 mins/day				
4.San Jose, Santa Clara	Carpool	206 mins	$62	AM/PM peak
Keeps carpooling and saves 53 mins/day				

Estimated Economic/Social benefits

User Benefits/Costs	Congestion Charges Paid	- $145 M
	Travel Time Savings	+ $370 M
	Vehicle Operating Cost Savings	+ $30 M
Social Benefits/Costs	Safety, Health, & Environmental Benefits	+ $30 M
	Congestion Charges Received	+ $145 M
	Program Costs	- $65 M
Total Benefits/Costs	Annual Costs	- $260 M
	Annual Benefits	+ $620 M
	Overall Annual Social benefit	+ $360 M

SF CHAMP 3.1.9, p2007
Values in 2008$ for single representative year

Estimated Travel Time Benefits

Travel Time Benefits	Drivers	+ $300 M
	Transit Riders	+ $70 M

Travel Time Benefits	San Francisco Travelers	+ $115 M
	Other Regional Travelers	+ $255 M

SF CHAMP, June 2010

Values in 2008$ for single representative year

Economic/business impacts broadly neutral

Neutral to positive retail impacts expected considering multiple factors:

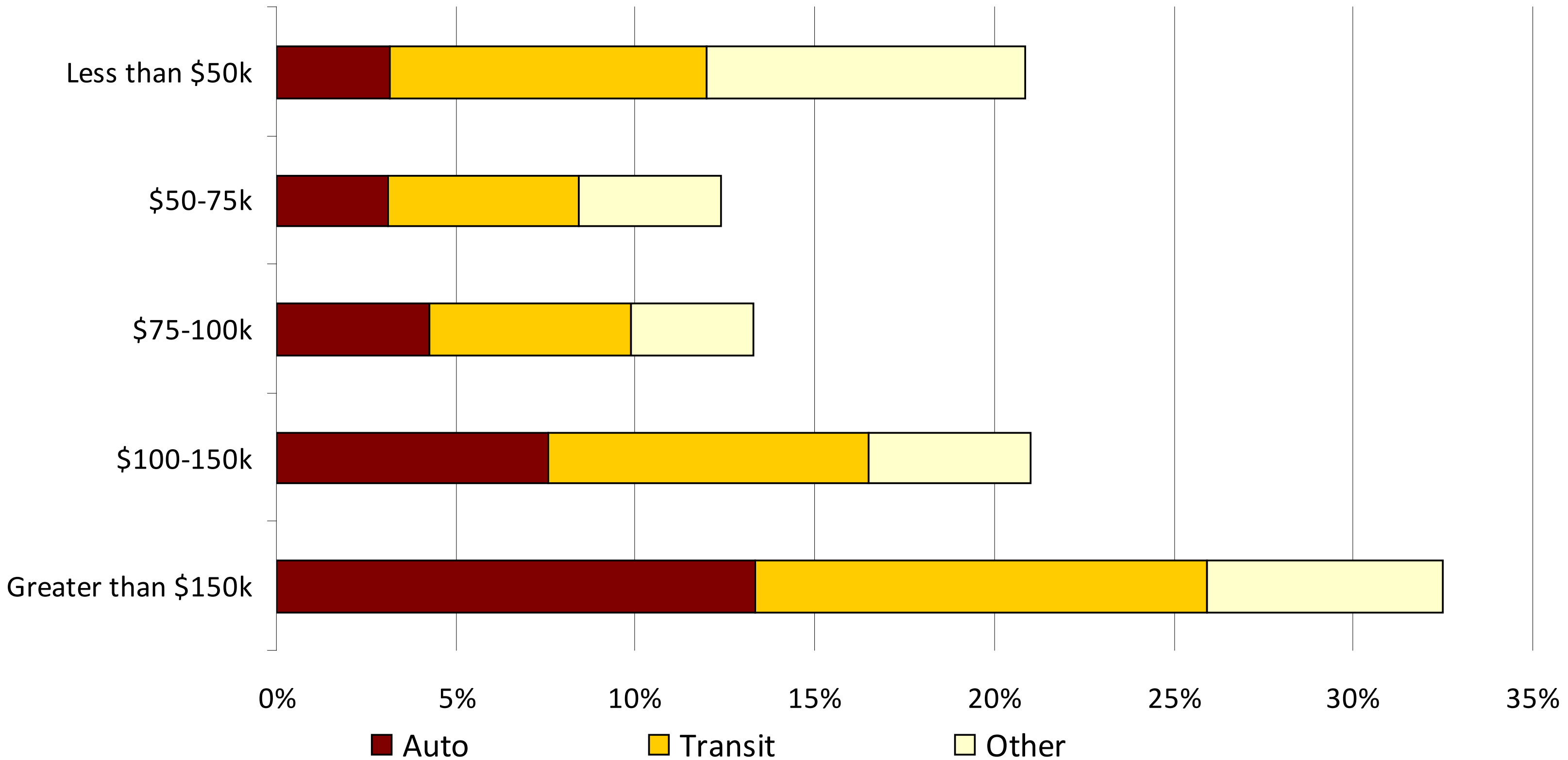
- retail survey shows comparable to greater spending by transit/ped than drivers
- 60,000 more transit and walk/bike trips per day in the cordon area (conservative estimate) ➔ more foot traffic
- fleet program to reduce administrative costs to businesses

Average Spending & Frequency by Mode

Mode	Drive	Transit	Walk
Average Spend per Visit	$56	$39	$42
Average # Trips per Month	4	7	7
Average Spend per Month	$224	$273	$294

Survey of 1390 travelers in San Francisco's downtown retail areas, December 2007 and April 2008

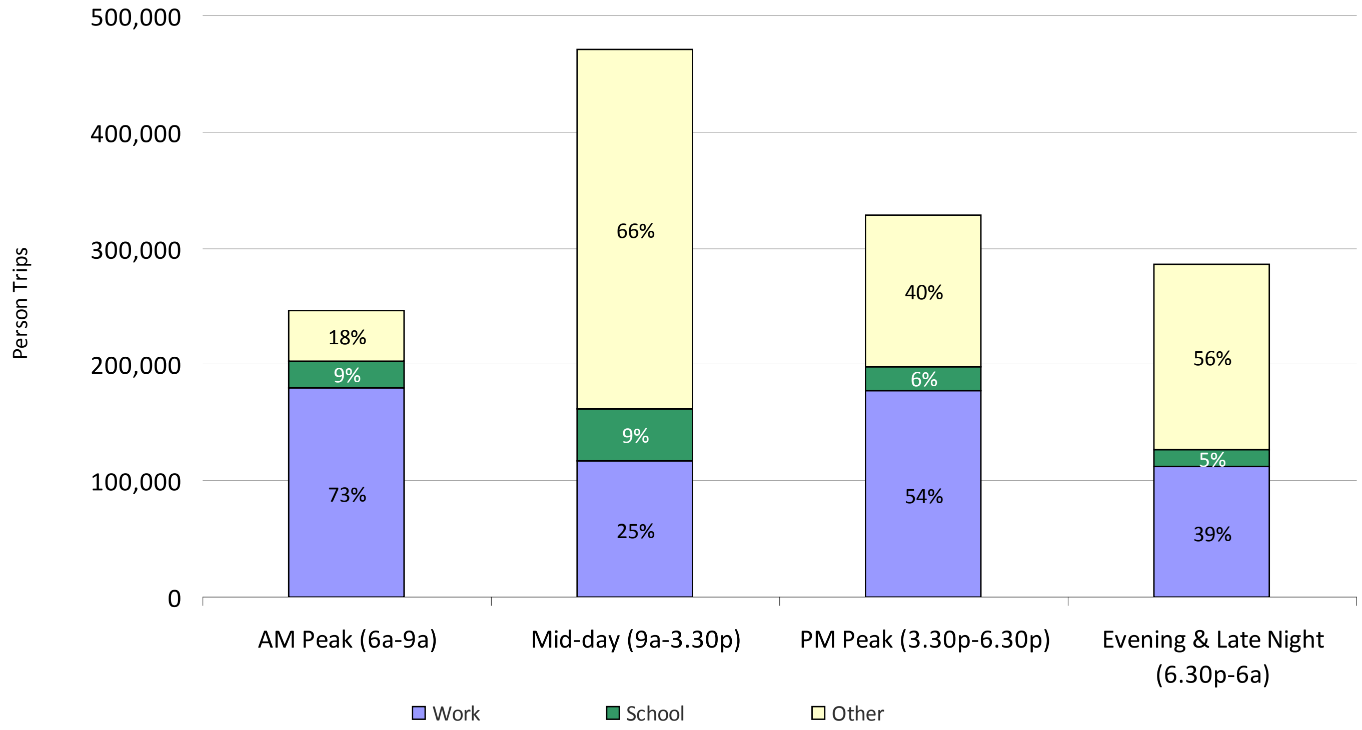
Distribution of AM Peak Period Travelers by Income & Mode



- higher-income drivers far outnumber lower- and middle-income drivers
- about 5% of peak-period travelers are low-income drivers
- would be eligible for discounts or transit fare assistance

Base Year (2005)
Source: SFCTA, SF-CHAMP 3.1.9, p2007

Distribution of Daily Travelers by Trip Purpose



- high percentage of discretionary travel during peak-periods
- just 28% of daily travel is work-related
- higher during peak-periods at about 65% (combined), including school-related travel

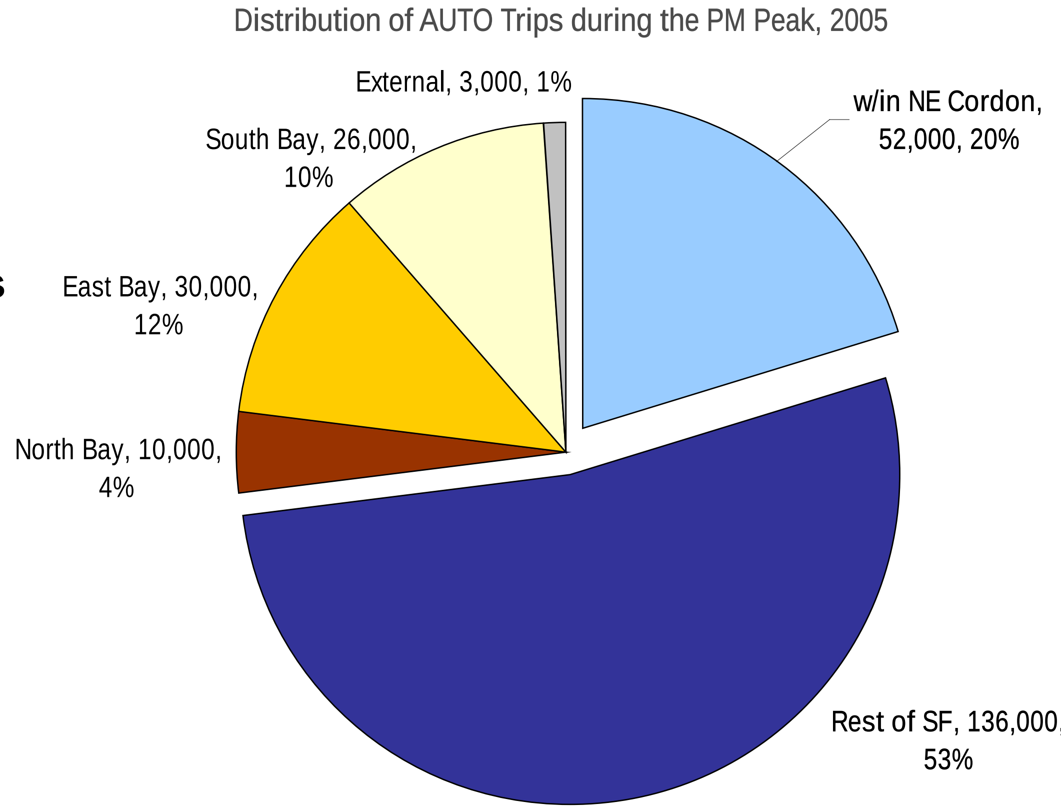
Base Year (2005)
Source: SFCTA, SF-CHAMP 3.1.9, p2007

Distribution of trips, motorists in downtown areas

2.3M person-trips in the Northeast Cordon daily

- nearly half are auto trips
- over 40% of trips are made during peak periods (17% AM; 25% PM)

More than half of the 260,000 auto person-trips during the PM peak in the Northeast Cordon are made by San Francisco residents

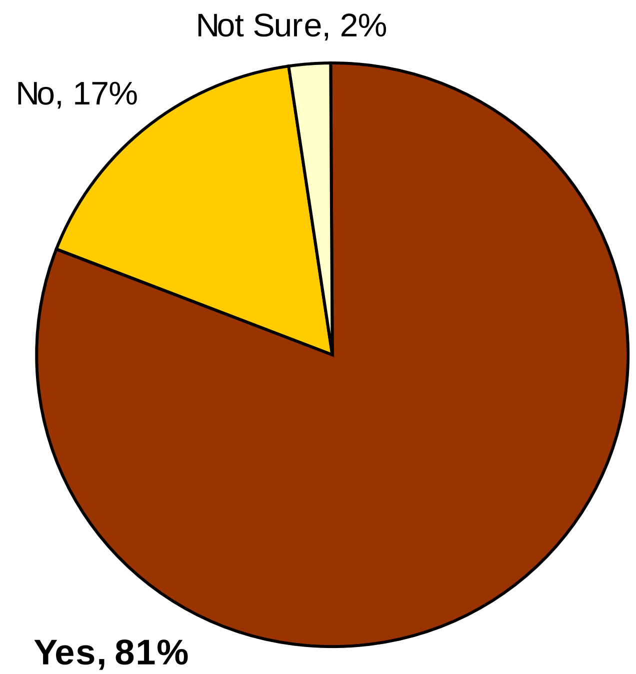


Source: SFCTA, SF-CHAMP 3.1.9, p2007

WHAT WE'VE LEARNED FROM TRAVELERS

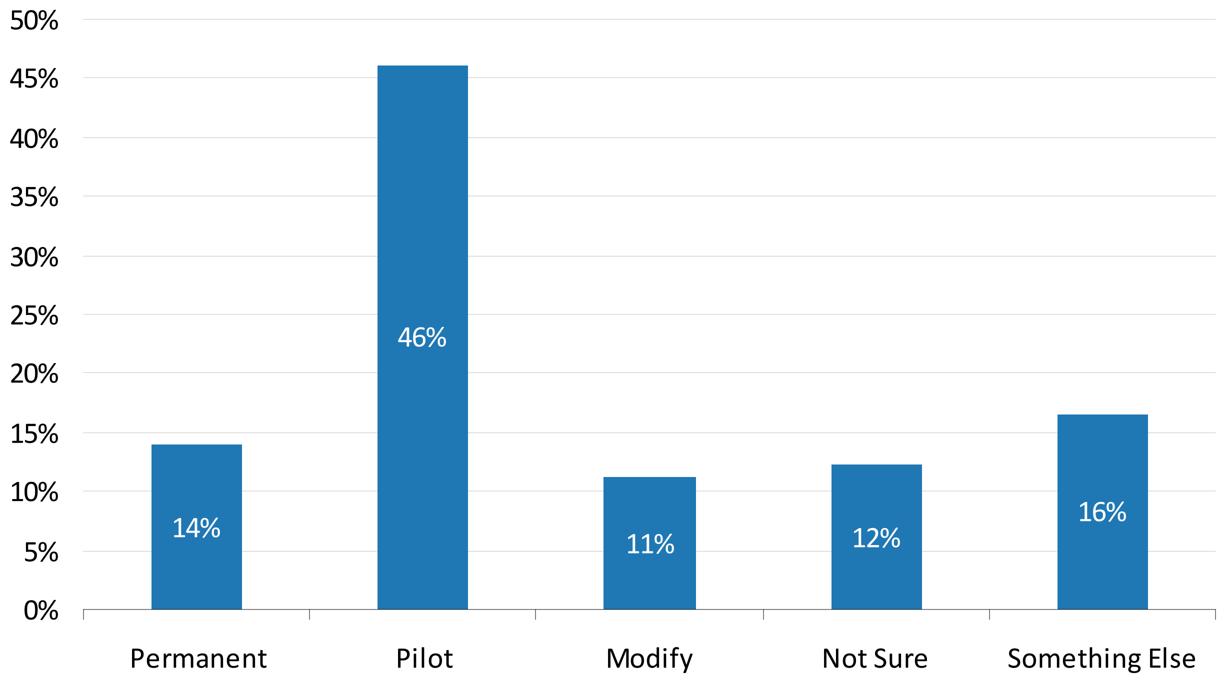
- 60% of travelers visit downtown SF in off-peak hours
- Vast majority (about 80%) of travelers have transit options
- Top benefits expected: improved environment and traffic reduction
- Top concerns: business impacts, affordability, and skepticism

Travelers with an Available Transit Option to Downtown SF



Source, SFCTA Poll of Bay Area Travelers, August 2007
n=~600

Opinions on a potential congestion pricing project for San Francisco (in the next 3-5 years)



~60-70% of participants willing to consider pricing as a viable tool to improve mobility, achieve goals

Source: SFCTA, summary of local and regional workshops, Fall 2010
n= ~400

Status & Next Steps

- Board action December 2010
  - congestion pricing is technically feasible
  - an appropriately designed program could contribute to goals for mobility improvement, sustainable growth and reduced impacts on climate change
  - identified key areas for consideration moving forward
- Staff pursuing funds for environmental analysis focused on:
  - more detailed economic evaluation
  - expenditure plan for investments
  - implementation plan for improvements
  - modeling tools for parking alternatives (& strong coordination w/SFpark)

QUESTIONS/FEEDBACK:

www.sfmobility.com

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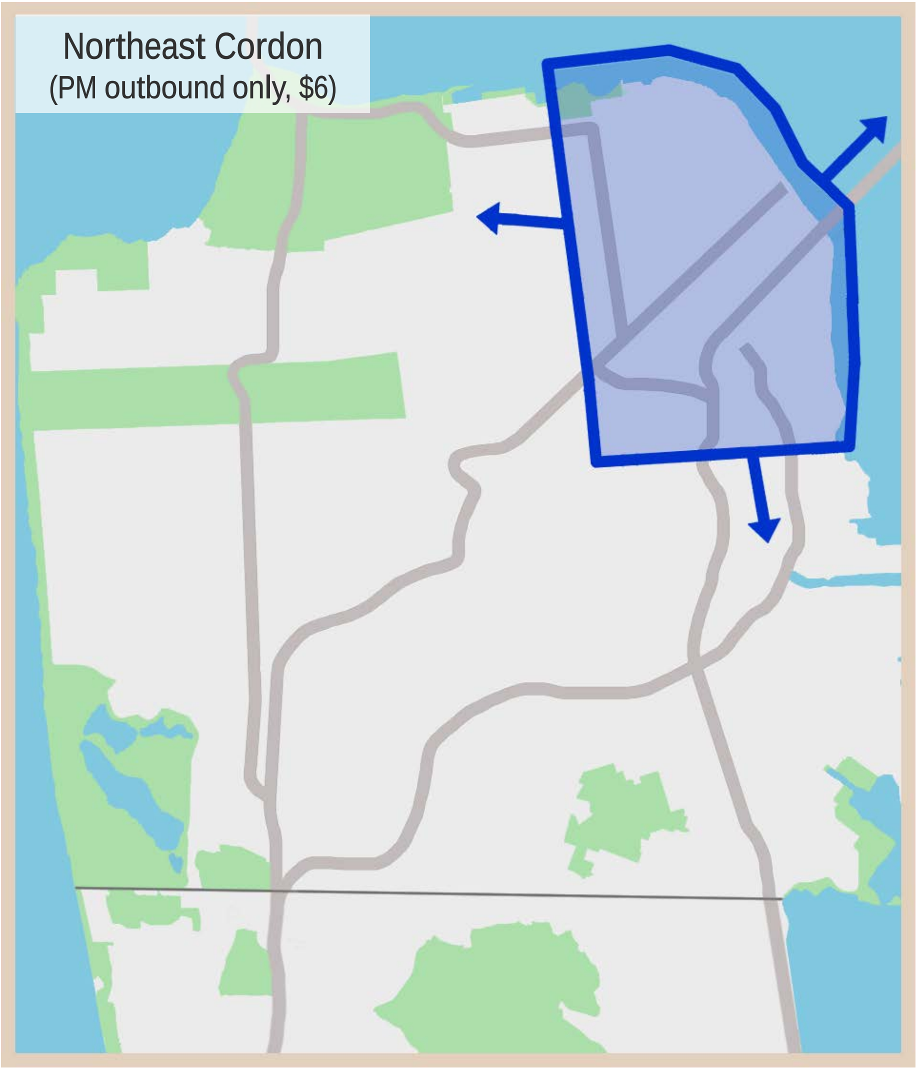
mobility@sfcta.org

twitter/SanFranciscoTA

415.522.4800

A measured approach – candidate pilot scenarios



Overall study outreach

Major public events	4 series of workshops 2 series of webinars 1 series of regional e-townhalls
Meetings w/community group & merchant groups	over 60, 1 – 3 times each
Focus groups	7: drivers, non-drivers, business interests
Ongoing Advisory Committee meetings	4: business, stakeholders/advocates, partner agencies (exec & staff)
Number of individuals through direct outreach	**1,000+**
Project mailing list	500+
YouTube video (www.youtube.com/sfcta)	870+ hits
Social Media (Facebook, Twitter, etc.)	~350 total friends/followers
Press hits	more than 300

Potential Timeline

2011-12 — Implement and evaluate SFpark (SFMTA), Bay Bridge peak-period pricing (MTC/BATA) and other near-term projects:

- More data to better characterize and track parking benefits & impacts: supply, demand, turnover
- Track congestion reduction benefits & impacts

2012 - 2013 — Environmental analysis, system design
Legislative Authorization*
Coordination with SF Transportation Plan Update (underway)

IMPLEMENTATION DECISION

2013 - 2014 — Final Design & Procurement

2014 - 2015 — Construction of system & capital improvements
Additional transit services

2015/16 — Potential Implementation

*Pending Transportation Authority Board Decision

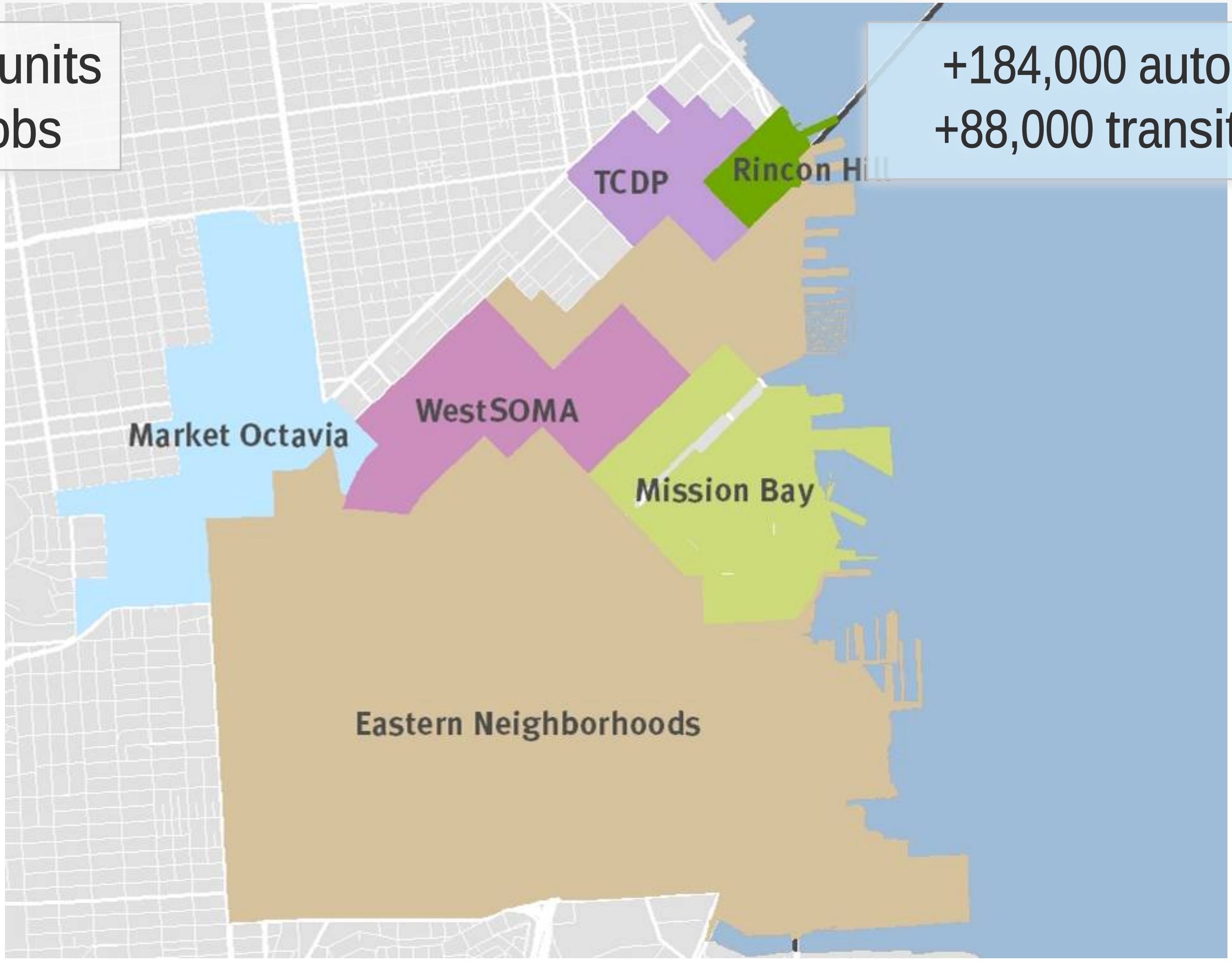
Institutional considerations & milestones

- Obtain Legislative Authority to toll
  - Local ordinance (BoS)
  - State authority (legislature, governor)
  - Environmental analysis (local/federal approval)
- Designate/create toll authority/agency, functions to include:
  - Set toll and discount policy
  - Bonding to deliver improvements up front
  - Concession with a program operator
  - Directly produce or contract for services/capital improvements
  - Monitor performance, change fee level/investment program as appropriate
- Governance
  - MOAs with MTC/BATA, transit operators
  - Joint Powers Authority, e.g. ACCMA/VTA Express lanes

Downtown Growth Planned

+ 24,000 hsg units
+ 107,000 jobs

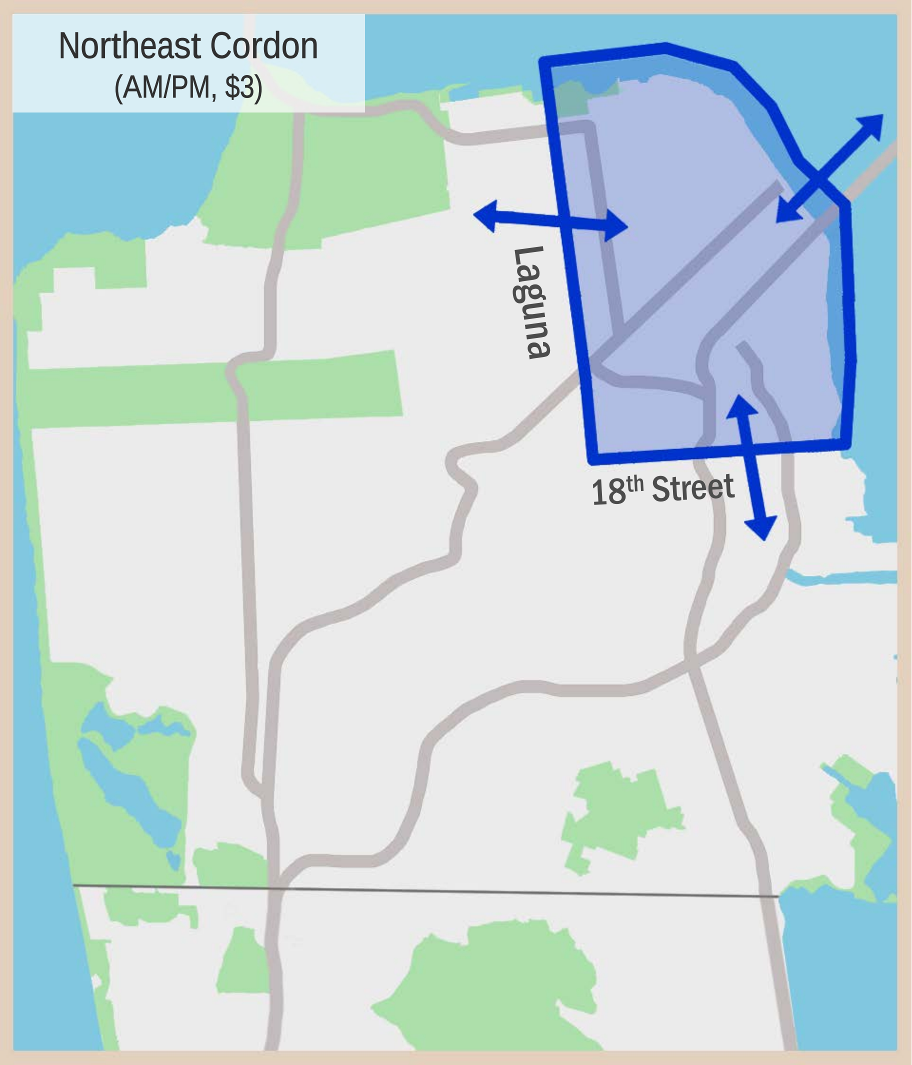
+184,000 auto trips
+88,000 transit trips



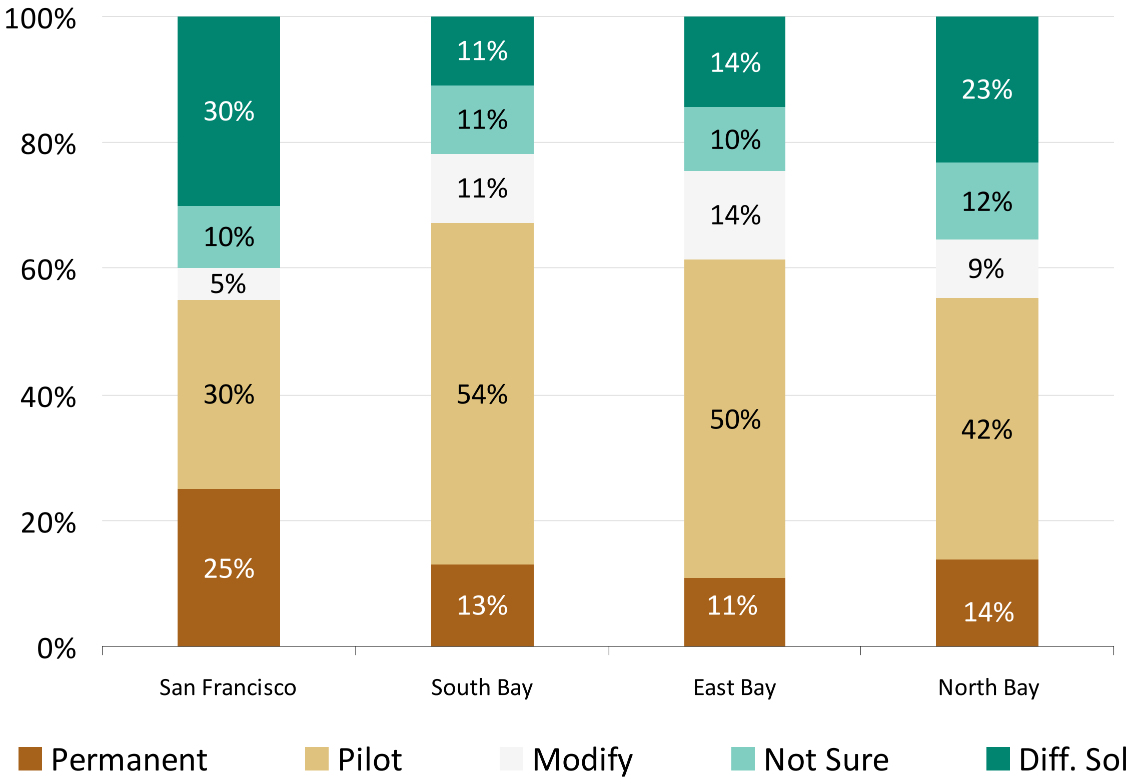
projected growth by 2030, Projections 2007 and SF-CHAMP 3.19

AM/PM Northeast Cordon performs best

- $3 fee on crossings in AM & PM peak
- 12% fewer peak period auto trips
- 21% reduction in vehicle hours of delay
- 16% reduction in Northeast Cordon GHGs
  (5% citywide GHG reduction)
- $60-80M annual net revenue
- 20-25% transit speed improvement
- 12% reduction in pedestrian incidents



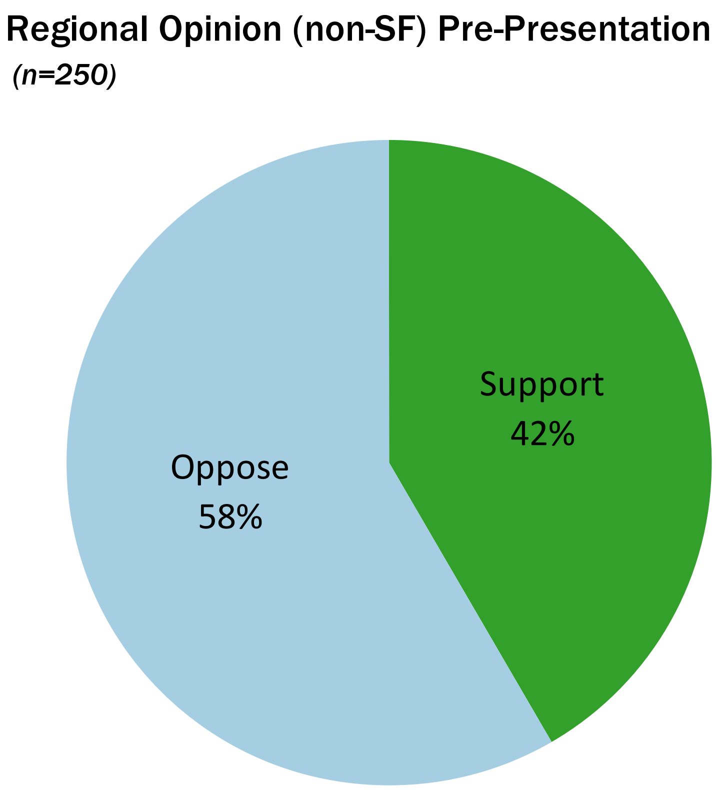
Opinions on next steps broadly consistent among participants throughout region...

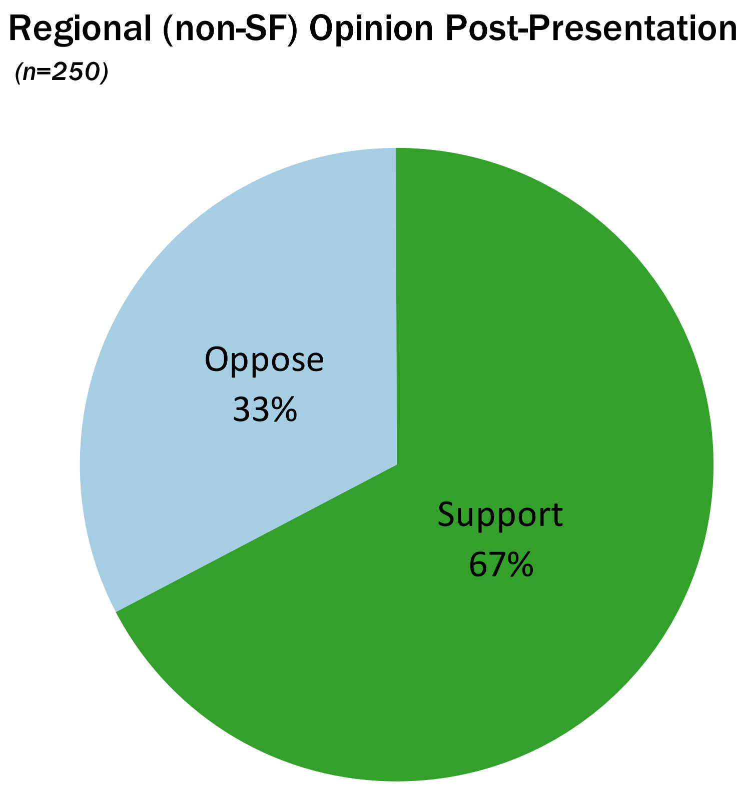


- I support implementing a permanent program
- I prefer taking a pilot approach
- I could support congestion pricing with modifications
- I'm not sure yet/ undecided/ need more information
- I prefer another solution

Source: SFCTA, Summary of Feedback, Fall 2010

Opinions change with information…





Source: SFCTA, Summary of Feedback, Fall 2010

How congestion pricing would work

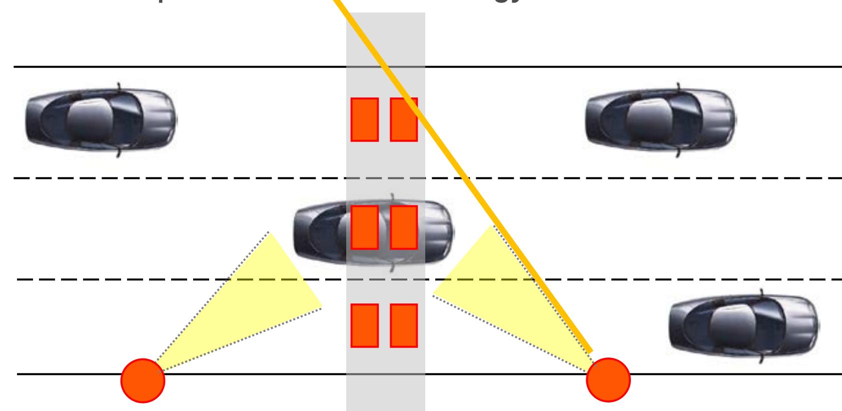
Technology would leverage existing systems, e.g. FasTrak accounts

Design considerations support camera-based equipment

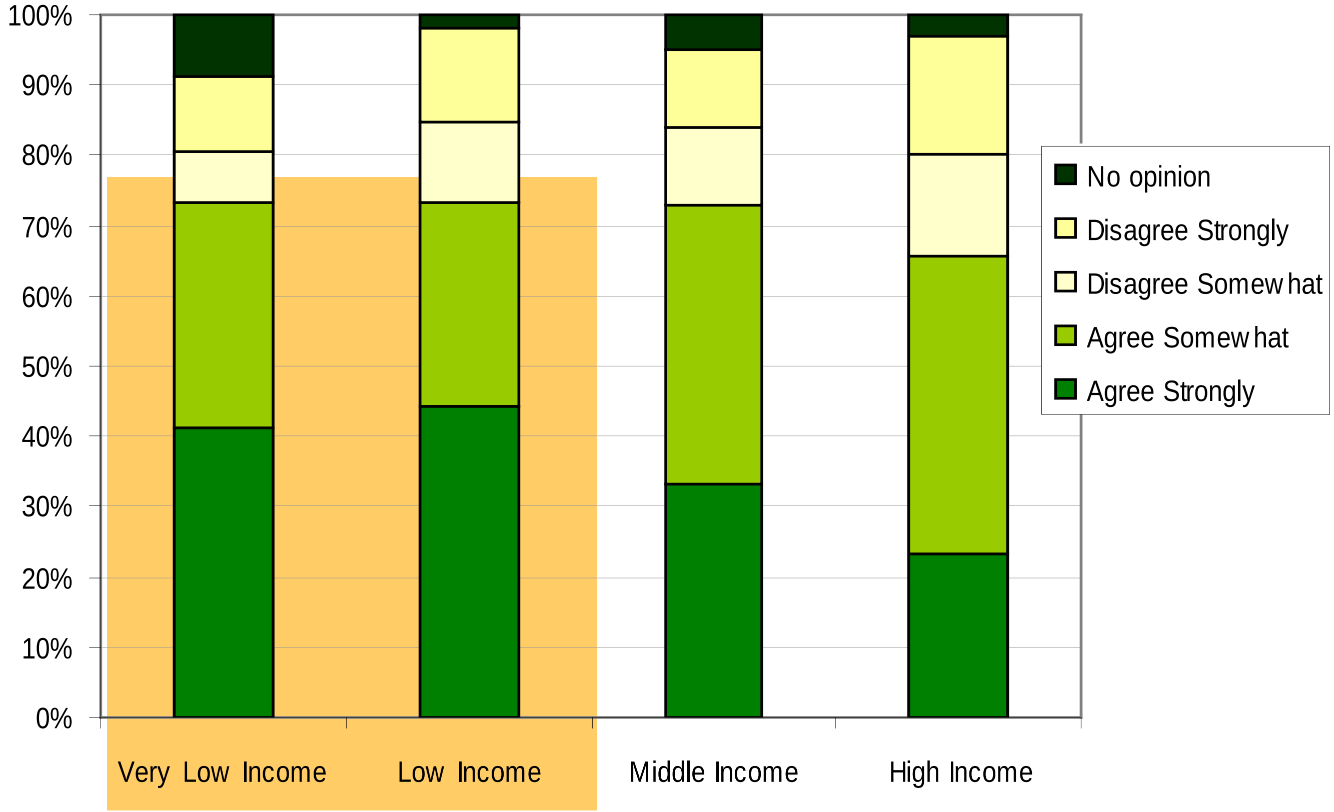
Multiple payment methods possible

- Phone, web, text, retail, etc.

Sample Detection Technology

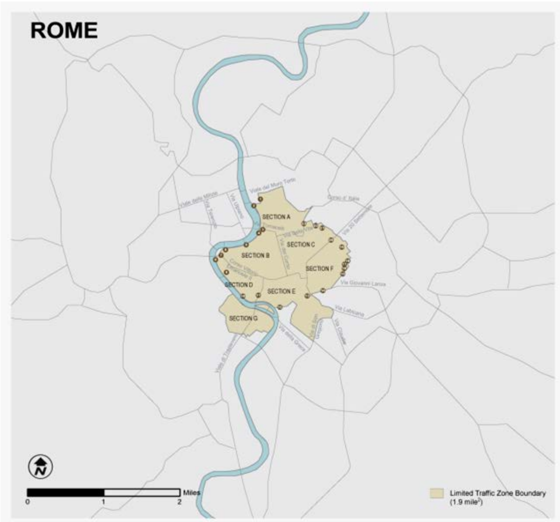


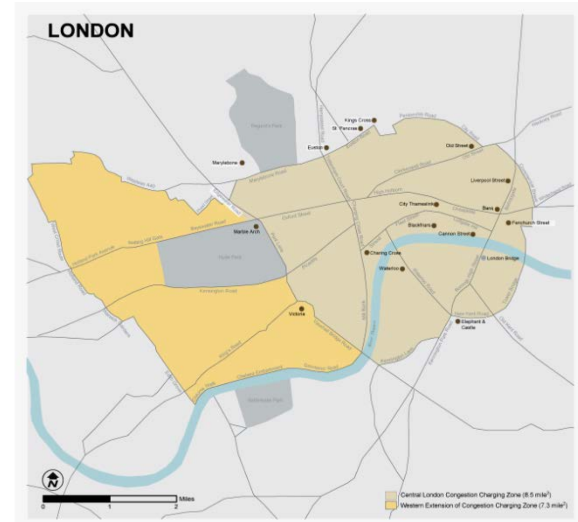
Support for Studying Congestion Pricing by Income

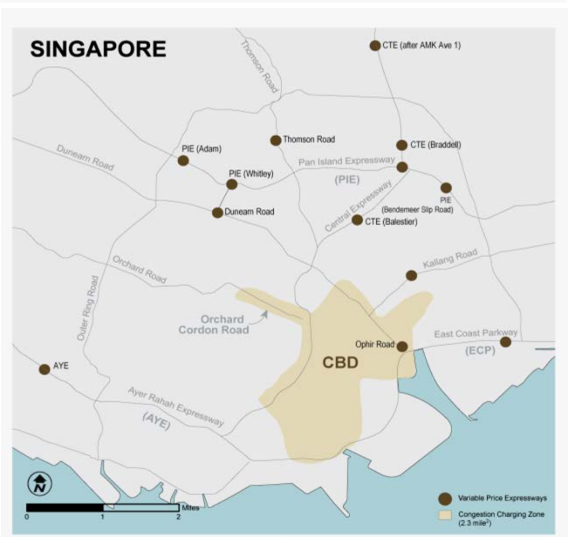


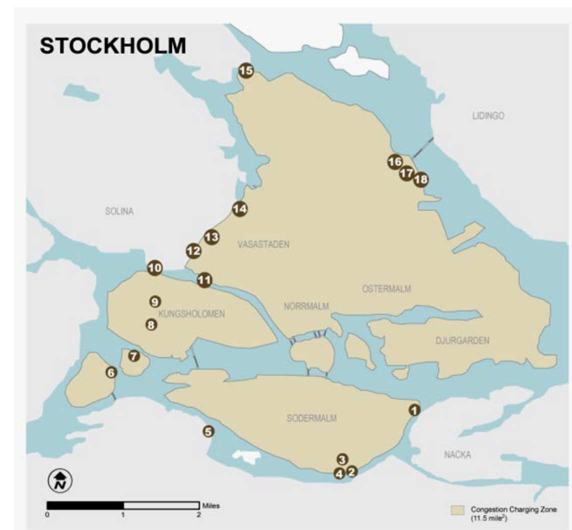
SFCTA, Poll of Bay Area Travelers, August 2007
n=~600

GEOGRAPHY of EXISTING SCHEMES











Measuring Economic Costs of Congestion in the New York City Region

Overview of Approach

Ewa Tomaszewska, HDR Corporation

September 22, 2011

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Outline

- Study Background and Purpose
- General Approach
- Implementation
- Sample Study Results

Study Background and Purpose

- In 2006, New York City was assessing hypothetical scenarios of congestion charges for CBD and their effects on traffic patterns, average speed, and congestion across the NYC Region
- Certain business groups were expressing concerns over above plans and their costs to individual businesses that would result under congestion pricing
- To provide a broader perspective on congestion, HDR was retained by Partnership for New York City to assess the economic costs and impacts of congestion in the Region

General Approach

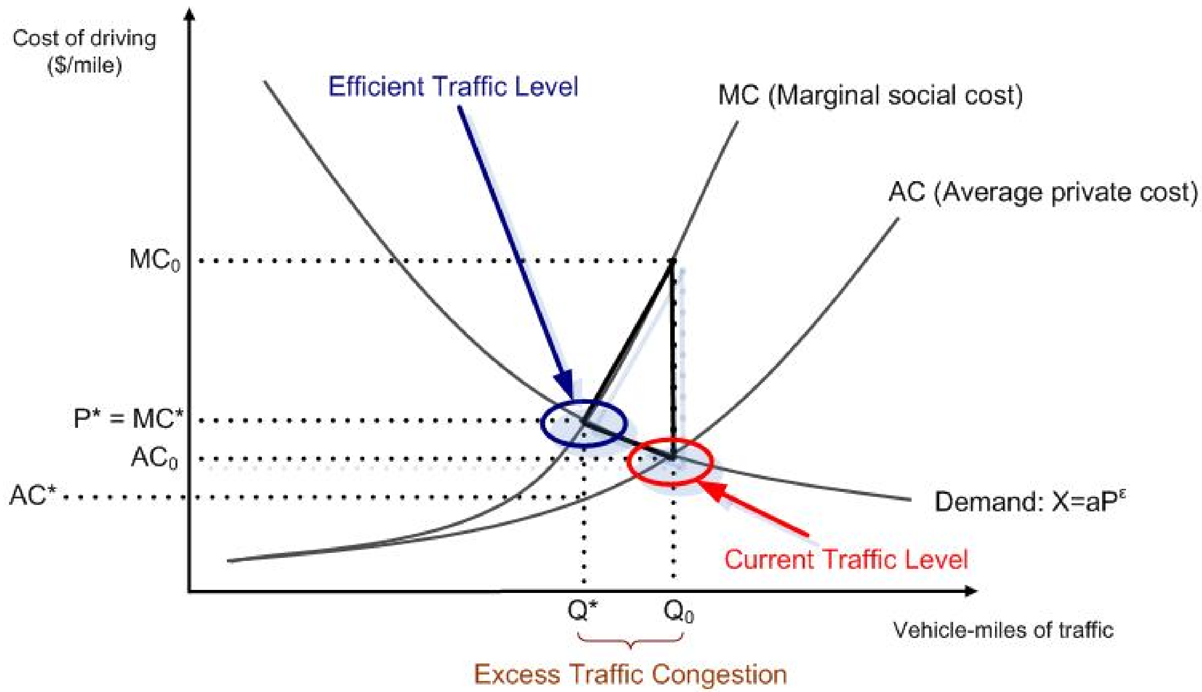
- Study focused on the effects of <u>excess</u> congestion above the economically efficient level
  - *Maintaining free-flow at all times would under-utilize/waste road capacity*
  - *For given road capacity, there is an economically efficient level of traffic congestion*
  - *Some level of congestion is beneficial*
  - *Traffic above this level is excess; reduced speeds increase travel time and create various costs across the economy*

General Approach (cont'd)

- The efficient level of congestion is the traffic volume that would result if people would altruistically take into account in their travel decisions the externalities that they create, or delays they cause to all other travelers on the road
- The actual level of congestion is above this level because people do not behave in this way
- The difference between the actual traffic and the efficient traffic is the <u>excess</u> congestion
  - *Technically, the efficient level of congestion is determined by the point where the travel demand curve intersects the social marginal costs of driving curve (rather than the average private costs of driving curve)*

General Approach (cont'd)

- Actual versus efficient traffic – typical graphical illustration



- Average private cost = vehicle operating costs + personal value of time
- Marginal social cost = vehicle operating costs + personal value of time + externalities (delays to other motorists, emissions, accidents)

General Approach (cont'd)

- Excess travel and reduced average travel speeds due to excess congestion generate various costs throughout the economy

- Study assessed the following manifestations of congestion costs

1. *Time lost to travel (for commuting and other general purposes)*
   - Excess travel time for commuting and other personal travel (compared to actual travel time) can be converted into monetary values using value of time assumptions; represents loss to travelers, less time for leisure and personal pursuits
   - Lower average speeds increase vehicle operating costs (reduced fuel economy)
2. *Time lost in work travel*
   - Excess travel time for work purposes can be converted into monetary values using value of time assumptions; represents loss to employer, loss in productive work time, or lost productivity
3. *Other economic costs* *(cont'd on next slide)*

General Approach (cont'd)

3. *Other economic costs*

- Labor demand impacts: high congestion leads to an increase in labor costs and reduction in demand for labor
  - Employers compensate partially employees for higher commuting costs/longer commutes in an effort to continue to attract suitable employees but this reduces overall demand for labour
- Industry-level effects on revenues, operating costs, and employment: lower average speeds increase total private cost of travel and affect people's decisions for travel such as trips for shopping or entertainment, make travel longer, more unreliable, including commercial deliveries of merchandise/supplies and business service trips
  - Higher cost of travel reduces the number of some trips and thus business revenues of businesses that rely on these trips
  - Long and unreliable commercial delivery times inhibit cost-saving strategies in inventory and logistics management and increase operating cost
  - Long travel times reduce productivity of business services
  - Industries particularly sensitive to above issues include retail trade, restaurants, arts and entertainment, construction, manufacturing, taxi cabs, services and repair

Implementation

- Logic models were built from "bottom-up" that track the underlying cause-and-effect relationships
- Spreadsheet-based economic model was developed and coded and populated with data/assumptions for theoretical variables:
  - *Value of time ($/hour)*
  - *Costs of travel ($/mile)*
  - *Average vehicle speeds (miles/h) in NYC Region*
  - *Elasticity of demand for travel*
  - *Speed-traffic volume relationship*
  - *Current volume of traffic, trips in NYC Region*
  - *Current industry sales and employment in NYC Region*
  - *Elasticity of logistics costs wrt travel times; share of logistics in total costs and sales*

Implementation (cont'd)

- Major sources of data :
  - *Previous study by other consultants on traffic in NYC Region and potential impact of congestion charges*
  - *US population and economic Census*
  - *New York Metropolitan Transportation Council publications*
  - *Freight-Benefit Cost Study (2002 study for FHWA by HLB and other consultants) on the benefits of freight transportation improvements*
  - *Related economics literature on congestion issues and impacts*
  - *Related trade/association publications*
- All costs and impact estimated by NYC sub-area/county and summed across
  - *Due to data limitations some impacts (industry impacts) estimated for one or two areas and extended/prorated to entire NYC Region*

Sample Study Results

- Summary of impacts, by type of effects

Type of Effect	Estimated Impact ($ Millions)
Travel costs	
Travel costs, total	$4,972
Car-commuting costs	$2,170
Car travel for business	$615
Total, car travel for work and business	$2,785
Industry logistic costs	$1,911
Vehicle operating costs	$200-$2,000
Economic Activity Indicator	
Gross Regional Product	-$4,022
Employment (number of jobs)	-51,515

Sample Study Results (cont'd)

- Impacts of excess congestion on industry revenue, operating costs, and employment, total and selected industries

CATEGORY OF IMPACT	TOTAL	RETAIL	RESTAURANTS	CONSTRUCTION	MANUFACTURING	WHOLESALE
Reduction in Revenue, $Millions/Year	**$4,578**	$260	$214	$156	$247	$1,279
Increase in Operating Costs, $Millions/Year	**$1,911**	$221	$9	$1,282	$2,035	NA
Reduction in Employment, FTE/Year	**22,285**	1,079	2,043	5,218	8,674	NA

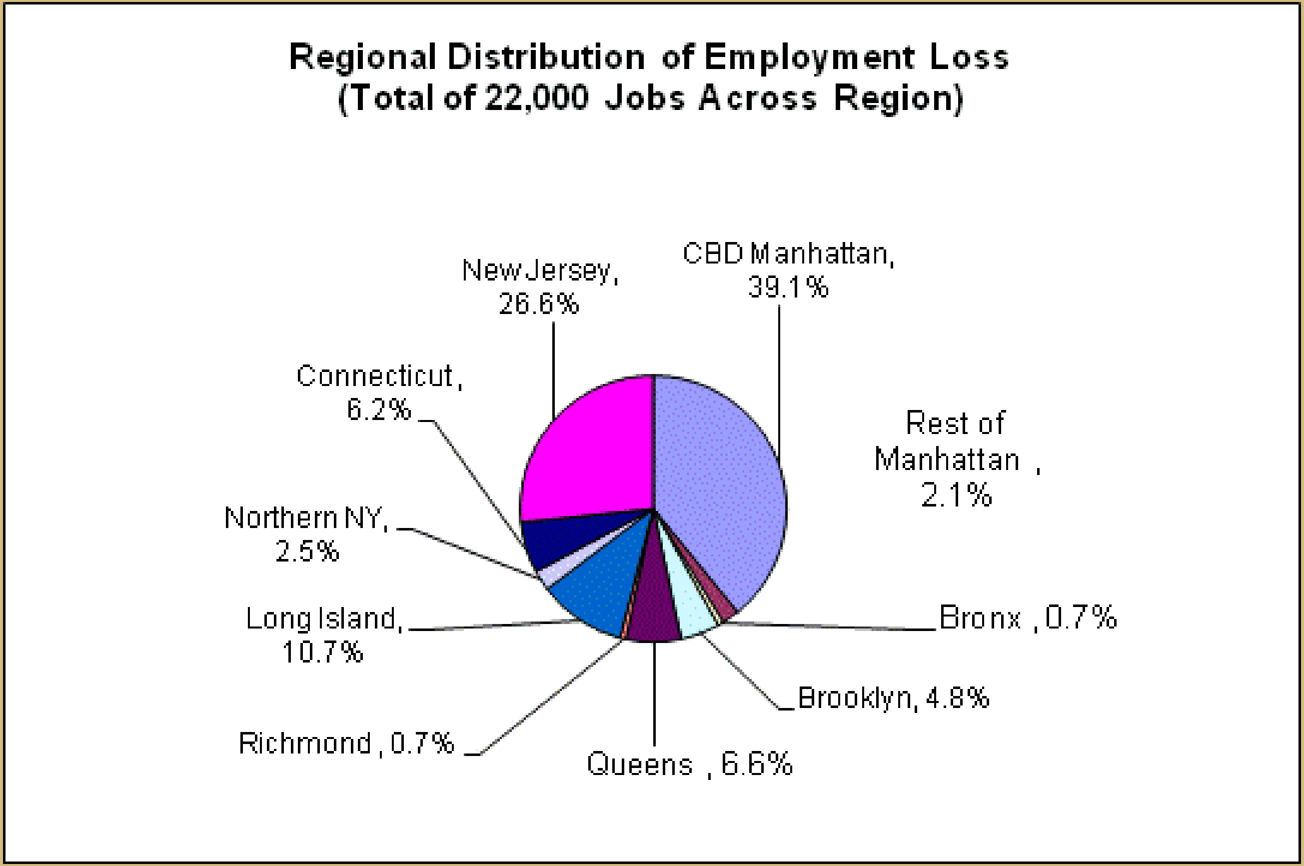
Sample Study Results (cont'd)

- Impacts of excess congestion relative to industry size

INDUSTRY	Revenue Impacts in Region in % of Total Revenue	Operating Cost Impact in Region in % of Total Revenue
Construction	1.33%	0.16%
Manufacturing	1.28%	0.16%
Wholesale		0.23%
Retail	0.11%	0.09%
Health Care & Social Services	0.33%	
Arts & Entertainment	0.76%	
Restaurants	0.81%	0.03%
Business Repair & Maintenance	3.60%	

Sample Study Results (cont'd)

- Geographic distribution of impact (employment)



The Impacts of Freight Road Pricing on Businesses: Empirical Evidence

José Holguín-Veras,
William H. Hart Professor,
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Rensselaer

Empirical evidence of impacts of freight pricing

- Extremely limited
- The experience of toll roads, not always analyzed
- Implementations that have been studied:
  - Intercity:
    - Ohio Turnpike (ex-post analysis)
  - Urban:
    - New York City (2001)
    - London (2003) (though not discussed here, results are similar to the ones for NYC)

Part I: Empirical Evidence
-The Intercity Case-

Swan, P. and M. Belzer (2010). "Empirical Evidence of Toll Road Traffic Diversion and Implications for Highway Infrastructure Privatization." Public Works Management Policy 14(4): 351-373. 10.1177/1087724X09360806

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Case study: The Ohio Turnpike

- The case analyzed
  - Truck tolls increased in the 1990s to finance construction
  - Trucks shifted routes and began using local routes
  - Communities complained about surge in truck traffic
  - Truck tolls were lowered to attract truck traffic
- Tolls
  - Before 1983: $21.50
  - 1983 - 1994: $23.25
  - 1995 - 2005: Gradually increased to $42.45
  - After 2005: $31.00 (due a subsidy from the state)

Approach

- Swan and Belzer:
  - Estimated the Truck VMT for the Ohio Turnpike
  - Estimated regression models linking truck VMT (at the turnpike) to independent variables:
    - US Truck VMT
    - Tolls at the Ohio Turnpike (nominal and real)
    - Speeds

Table 3
OLS Results

Independent Variables	Model 1 Coefficients	Model 2 Coefficients
U.S. Truck (billions)	5.1328***	5.2659***
Nominal_Rate x US Truck	-0.029099***	
Real_Rate x US Truck		-0.04642***
Speed x US Truck	0.038145*	0.02946
Constant		
F	4,215***	3,817***
N	16	16
Adjusted R-squared	0.9987	0.9986

Key findings

- Some intercity trucks could shift routes
  - Implication:
    They could not pass toll costs, and tried to avoid the toll
- Nothing is known about the carriers that remained:
  - How many passed the toll costs?
  - How many had to absorb the tolls?
  - How many reacted in other ways in response to the toll?

Part II: Empirical Evidence -Urban Deliveries-

Port Authority of New York and New Jersey's Time of Day Pricing Initiative

Holguín-Veras, J., Q. Wang, N. Xu, K. Ozbay, M. Cetin and J. Polimeni (2006). "The Impacts of Time of Day Pricing on the Behavior of Freight Carriers in a Congested Urban Area: Implications to Road Pricing." Transportation Research Part A: Policy and Practice 40 (9): 744-766.

Rensselaer

This presentation is based on:

- A significant amount of outreach/data collection:
  - Revealed Preference data post pricing implementation
  - Dozens of in depth interviews with industry
  - Four focus groups with industry representatives
- The first project that collected behavioral data

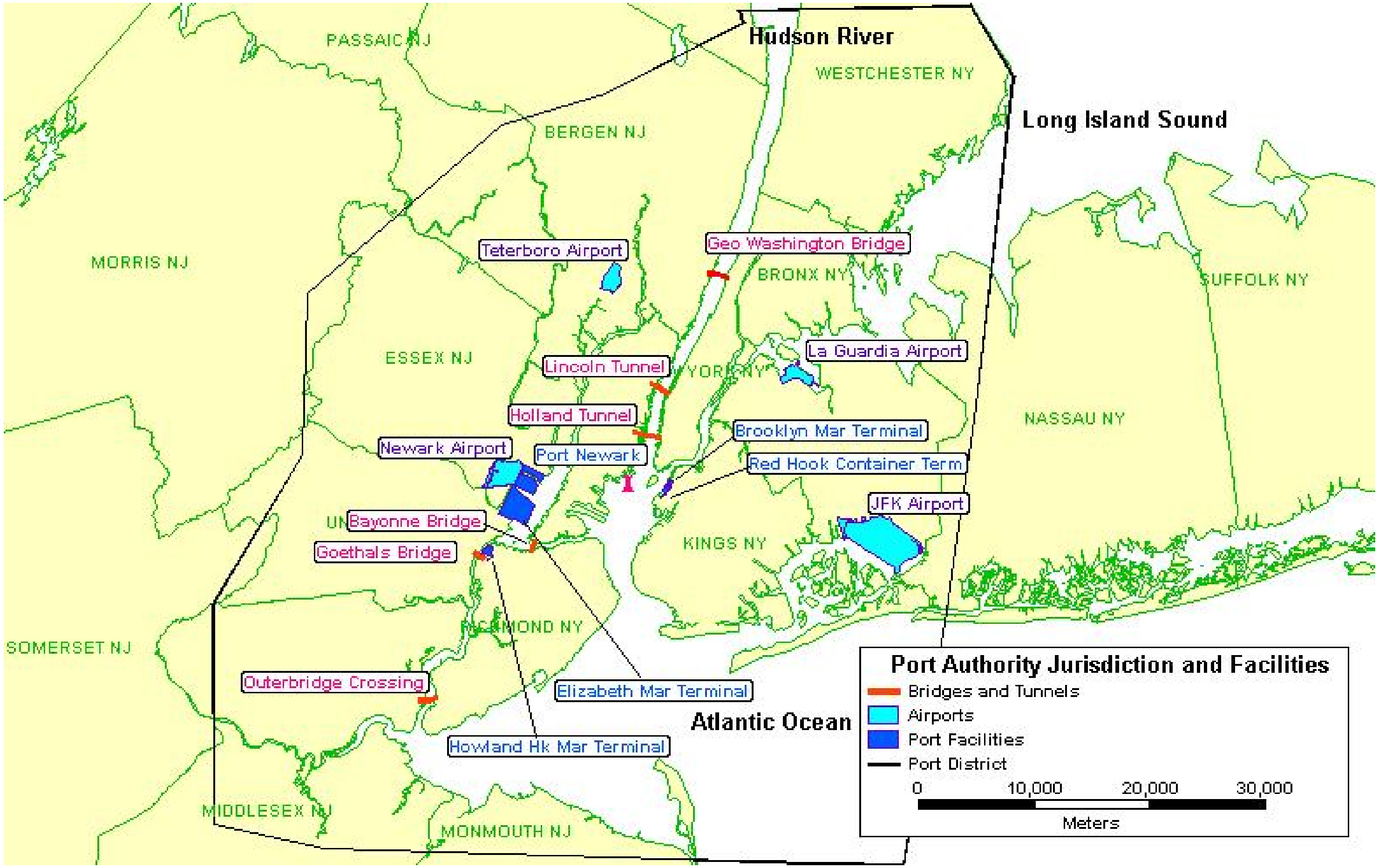
The PANYNJ 2001 time of day pricing initiative

- Implemented a time of day pricing policy
- Provided an opportunity to assess behavioral impacts
- Rensselaer conducted the evaluation for FHWA, and collected behavioral data before/post pricing

Type of vehicle	Passenger cars		Trucks	
	Before	After	Before	After
Cash peak	$4.00 / car	$6.00 / car	$4.00 / axle	$6.00 / axle
Cash off-peak	$4.00 / car	$6.00 / car	$4.00 / axle	$6.00 / axle
E-ZPass peak	$3.60 / car	$5.00 / car	$3.60 / axle	$6.00 / axle
E-ZPass off-peak	$3.60 / car	$4.00 / car	$3.60 / axle	$5.00 / axle
E-ZPass overnight			$3.60 / axle	$3.50 / axle

Note: (1) Tolls are collected in the Eastbound (New York bound) direction only; (2) the peak hours are 6-9 AM and 4-7 PM on weekdays and 12 noon-8 PM on weekends; (3) the overnight period (trucks) is from midnight to 6 AM on weekdays; (4) the remaining hours are classified as off-peak hours (PANYNJ, 2005e).

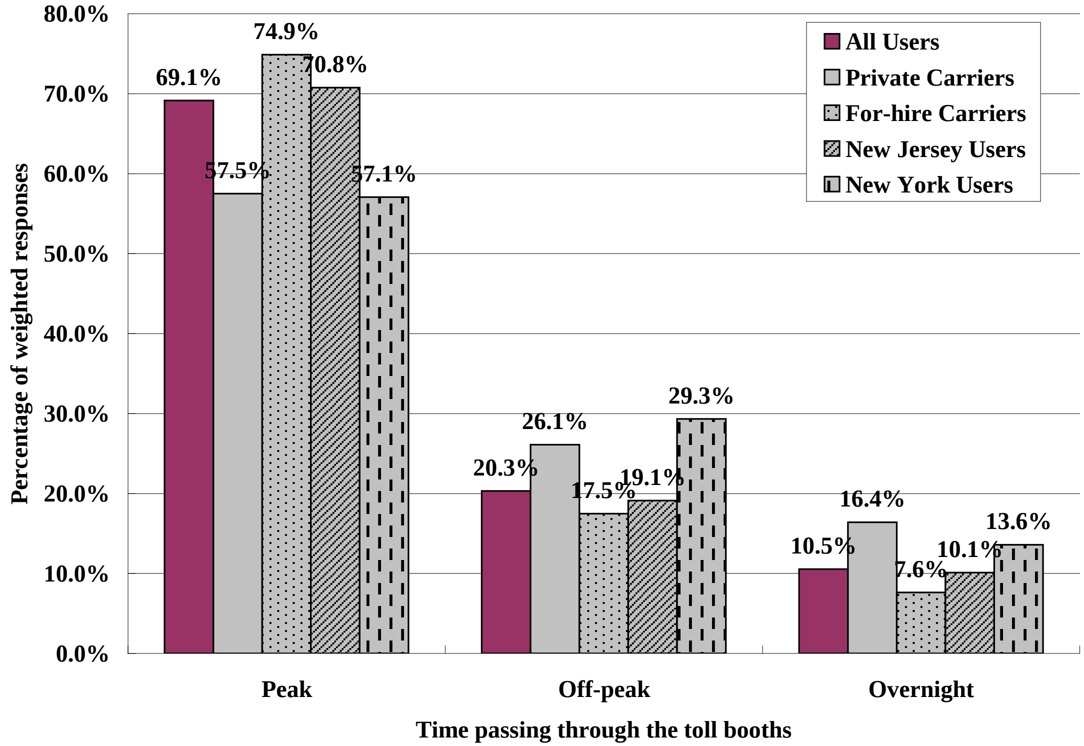
The PANYNJ Facilities



Operational patterns

Carriers	Number of truck trips/day	Number of stops per tour	Tour time (minutes)
By carrier type:			
Private carriers	4.20	7.10	337.00
For-hire carriers	8.60	15.70	448.00
By Geography:			
New Jersey regular users	6.80	13.70	418.00
New York regular users	4.30	6.00	341.00
All current regular users	6.40	13.00	409.00

Many delivery stops = many customers to coordinate with

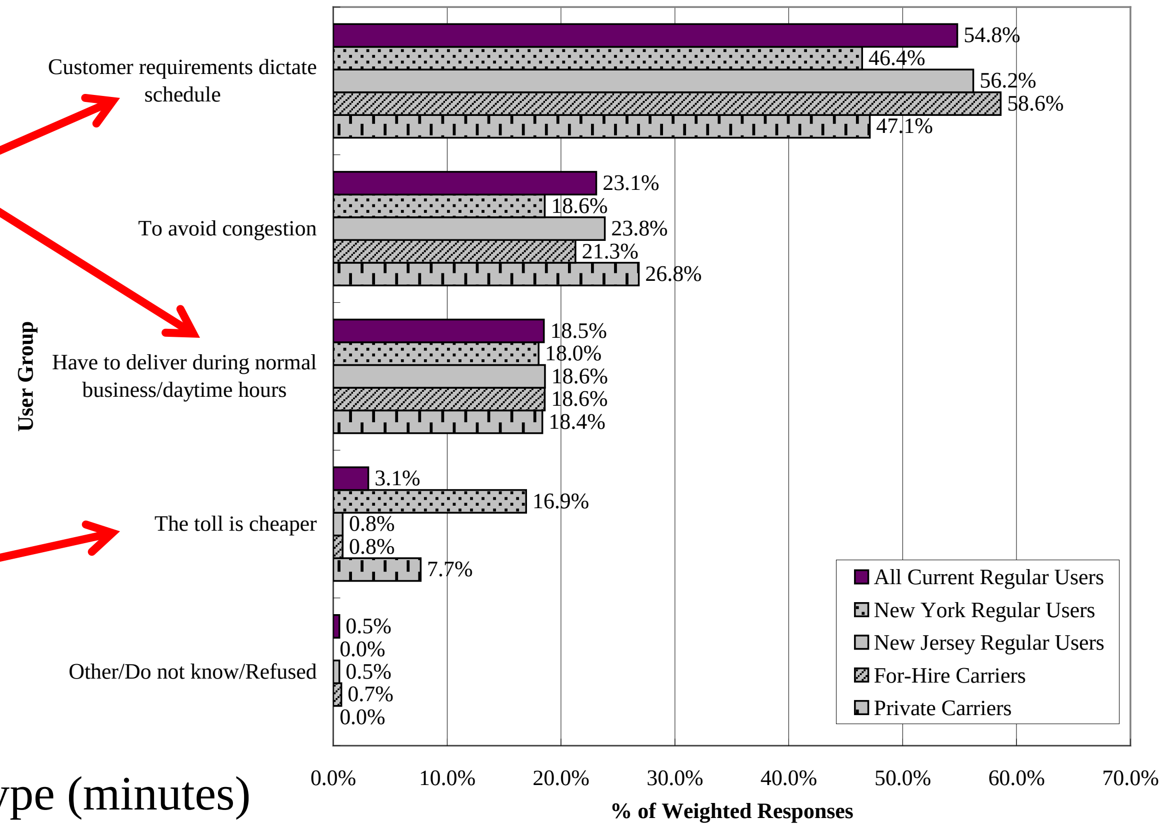


Reasons for travel at stated times

External constraints mandate time of travel in 65%-73% of cases

Tolls are not the primary factor

Reasons for travel at stated times

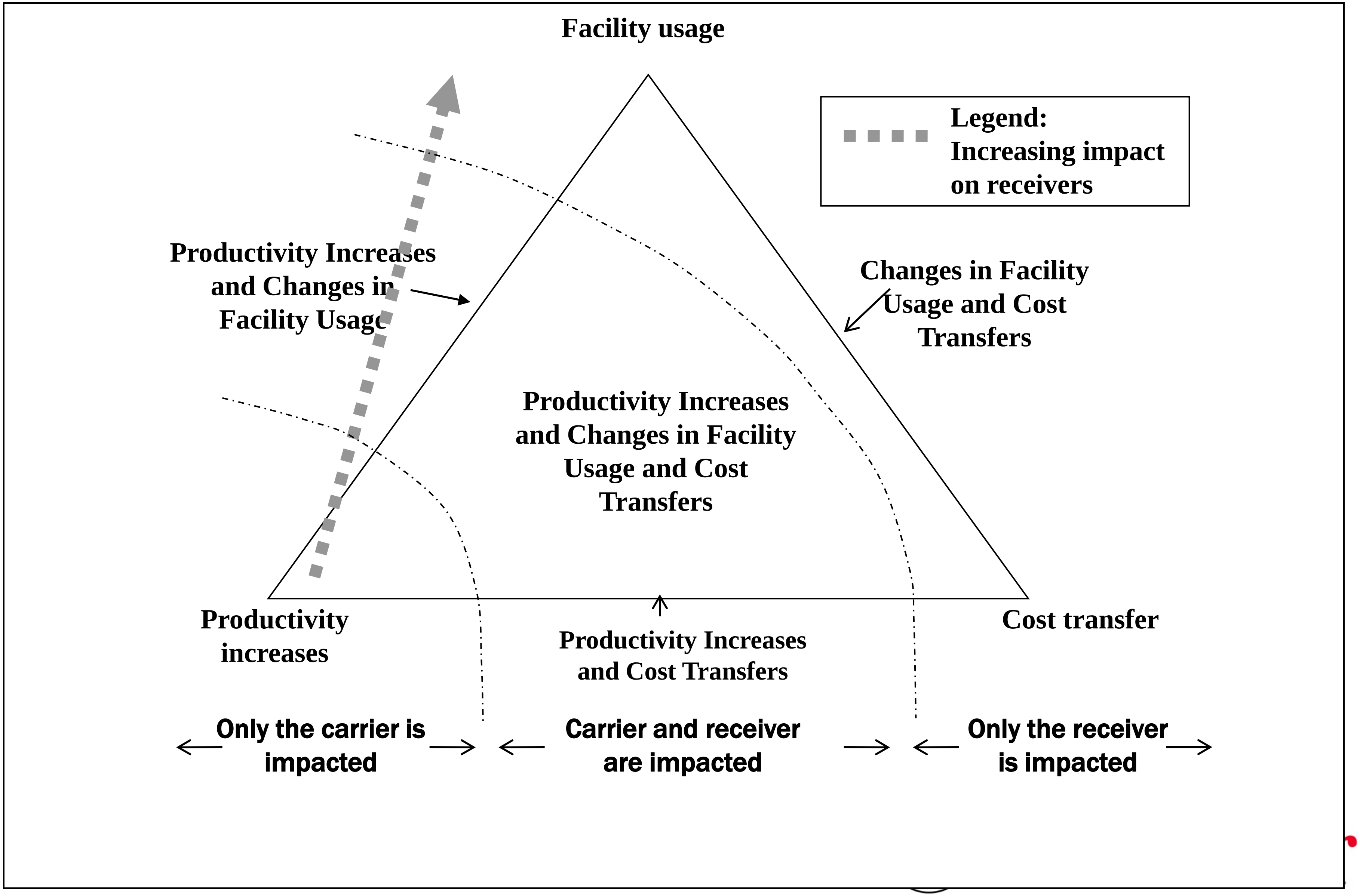


Time of travel flexibility by carrier type (minutes)

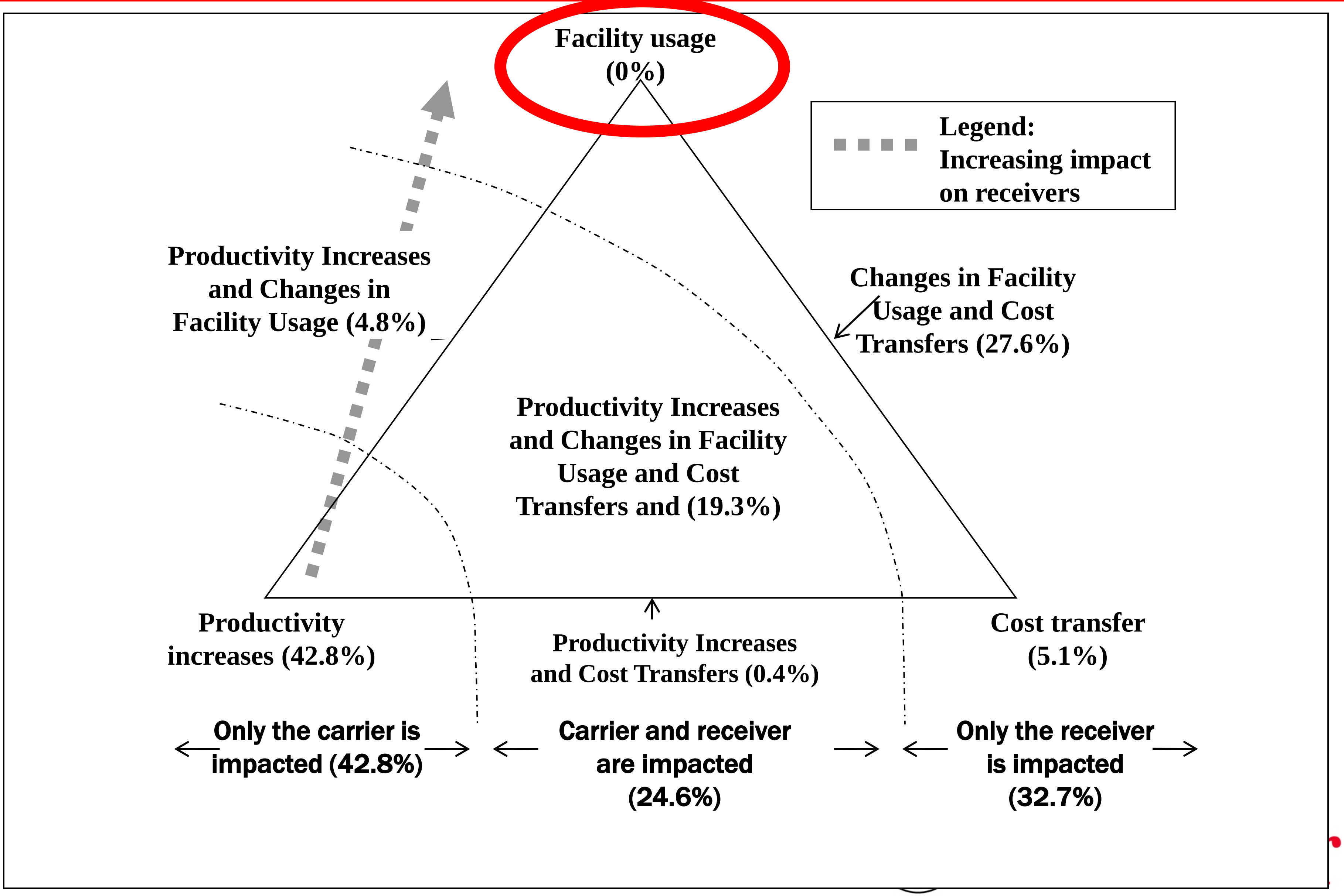
Carriers	Late Arrival Flexibility	Early Arrival Flexibility
Private Carriers	79.0	55.1
For-Hire Carriers	26.1	23.7
All Current Regular Users	48.8	37.3

Customers impose tight constraints (particularly on for-hire carriers)

The PANYNJ 2001 time of day pricing initiative



Behavioral Changes Reported by Carriers (cont.)



Empirical evidence: Summary

- 20.2% of the sample changed behavior (implementing productivity increases, changes in facility use, and cost transfers)
- 69.8% of the carriers that did not change behavior indicated it was due to “customer requirements”
- Only 9.0% of the sample increased rates
  → cost transfers were relatively small, about 15%

Reasons for not changing behavior

Reasons offered about why could not change time of travel	For-hire carriers	Private carriers	Carriers that did not change
No flexibility:			
Cannot change schedule due to customer requirements	72.3%	61.0%	68.9%
Must use quickest route	3.3%	13.6%	6.4%
Cost paid by others:			
Customers absorb costs	19.1%	15.9%	18.2%
Cost paid by shippers	0.0%	0.4%	0.1%
Cost paid by receivers	2.1%	0.0%	1.5%
Small price difference/can afford it	0.2%	6.1%	2.0%
No change in off-peak travel cost	0.3%	0.4%	0.4%
Do not know/Refused	2.6%	2.5%	2.6%
Total	100.0%	100.0%	100.0%
Total truck trips	**573**	**245**	**817**

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Breakdown of carriers that passed toll costs

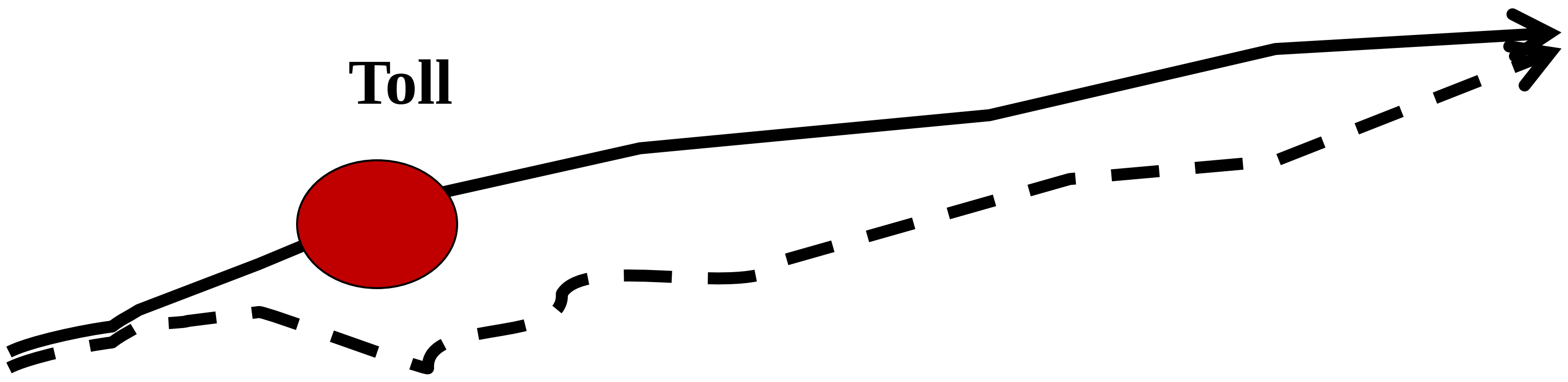
Commodity type transported	% of carriers that passed costs	% of overall sample	Representation ratio	Average increase in rates (%)
Stone/concrete	28.69%	3.29%	8.725	15%
Wood / lumber	6.56%	1.82%	3.598	20%
Food	38.52%	15.35%	2.510	5%
Electronics	9.02%	4.10%	2.201	n.a.
Beverages	4.10%	3.03%	1.355	n.a.
Plastics / rubber	1.64%	2.25%	0.727	20%
Household goods/various	4.92%	19.00%	0.259	10%
Machinery	2.46%	11.14%	0.221	7%
Metal	0.82%	4.11%	0.200	10%
Paper	0.82%	4.87%	0.168	5%
Textiles / clothing	2.46%	17.00%	0.145	7%
Other, specify	0.00%	5.22%	0.000	n.a.
Furniture	0.00%	3.59%	0.000	n.a.
Chemicals	0.00%	2.78%	0.000	n.a.
Agriculture, Forestry, Fishing	0.00%	1.39%	0.000	n.a.
Alcohol	0.00%	0.67%	0.000	n.a.
Tobacco	0.00%	0.26%	0.000	n.a.
Petroleum / coal	0.00%	0.13%	0.000	n.a.

Only industry segments with some degree of market power passed toll costs

Rensselaer

What is the difference between intercity and urban?

Intercity case



Facing a toll, the carriers could change routes and still meet the customers' constraints

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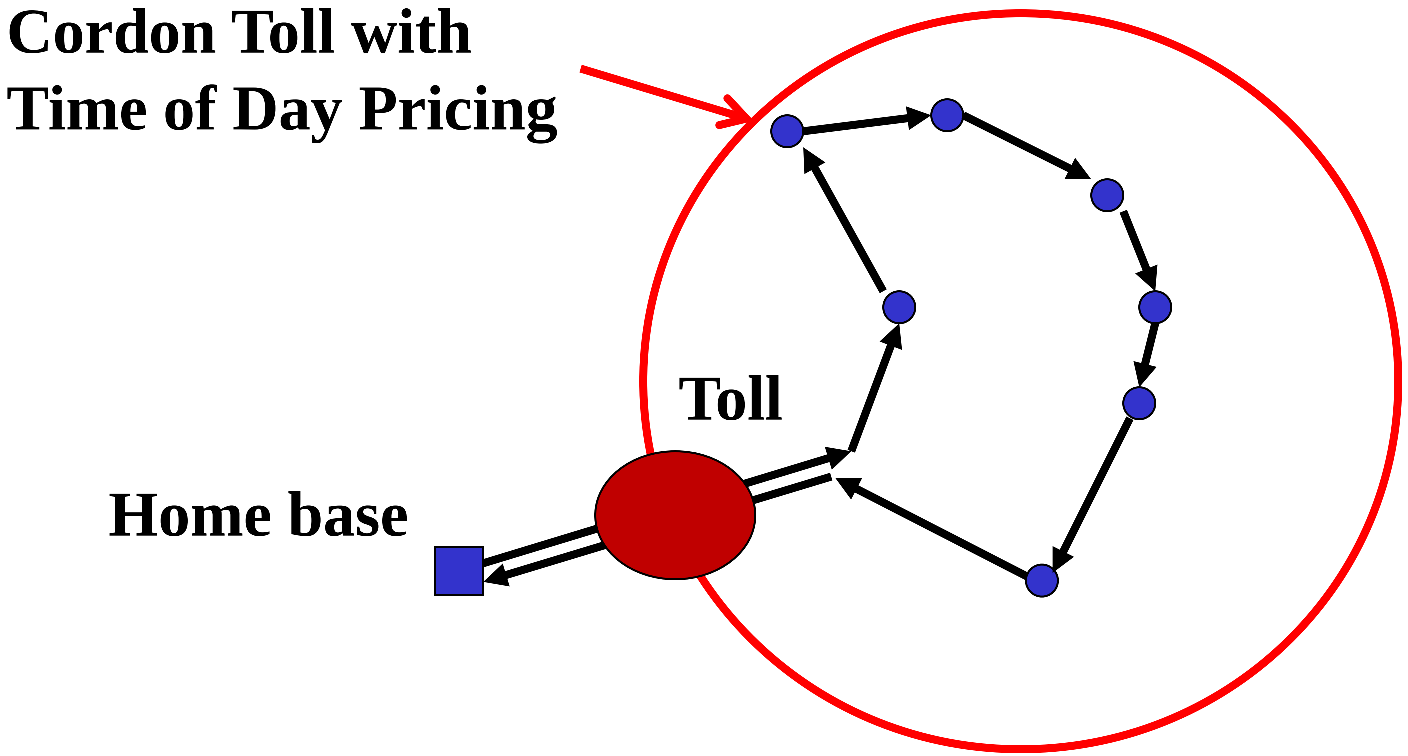
Urban deliveries



The only way to avoid a toll is to change time of travel →

Will impact delivery times

Will not be accepted by the receivers

Impacts on businesses

Impacts are mixed...

- Two sets of agents are involved:
  - Carriers
  - Receivers
- Carriers are the weakest element of the supply chain
  - After years of deregulation, there is over supply
  - This limits their market power
- In essence, which agent is impacted depends on:
  - Who has more clout (market power)
  - Availability of alternatives to the carriers

Key cases

- There are alternatives to the carriers (e.g. intercity):
  - If tolls are “small” carriers would use tolled alternative
  - If tolls are “large” carriers would use alternative routes
    - Leading to increase traffic in alternative routes
  - Those with market power will pass toll costs to others
  - Those without market power will swallow the tolls
- There are <u>no</u> alternatives (e.g., urban):
  - Those with market power will pass toll costs to others (11% in NYC)
  - Those without market power will swallow the tolls (89% in NYC)

In summary

- The very limited empirical evidence available indicates that:
  - The bulk of the impacts of tolls fall on the carriers
  - Other agents (e.g., shippers, receivers) impacted much less
- This implies that:
  - No major impacts reach end consumers
  - Carriers' profitability suffer
  - The constraints imposed by receivers limit the effectiveness of freight pricing for demand management purposes
  - Careful consideration of these factors is needed to ensure that the impacts of pricing are equitable shared among all participants in the supply chains

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Thanks!

London's Congestion Charge

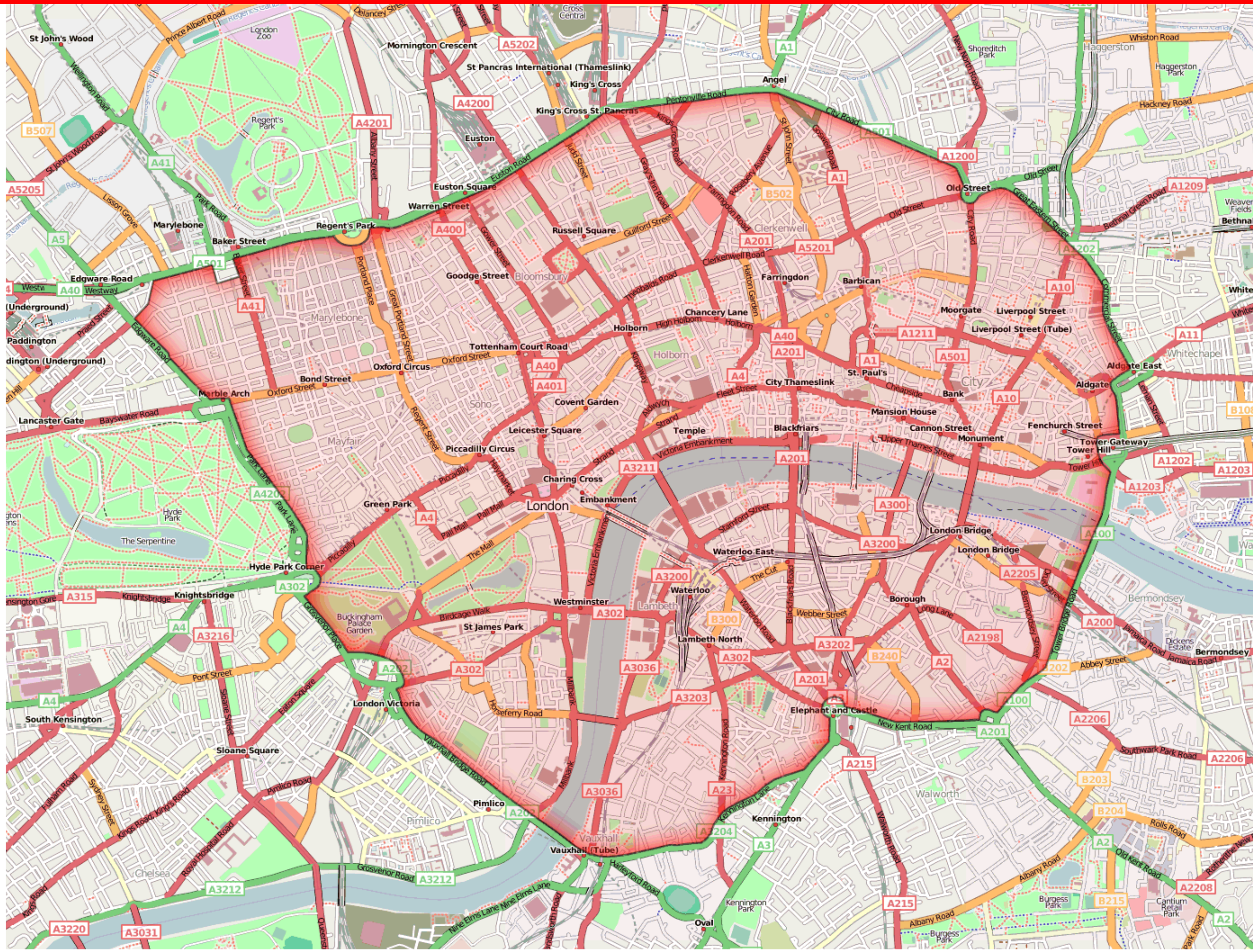
Leape, J. (2006). "The London Congestion Charge." Journal of Economic Perspectives 20(4): 157-176.

Transport for London (2010) "Travel in London Report 2" http://www.tfl.gov.uk/assets/downloads/corporate/Travel_in_London_Report_2.pdf

Background

- Introduced in Central London on February 2003
- Extended into parts of West London on February ’07
- West London extension reduced in May 2010
- Toll
  - Originally GB5, then GB8, and now GB10

London’s Congestion Charge Zone



http://upload.wikimedia.org/wikipedia/commons/1/15/London_congestion_charge_zone.png

http://en.wikipedia.org/wiki/File:London_Congestion_Charge,_Old_Street,_England.jpg

Table 1

Impact of the Congestion Charge on Traffic in the Congestion Charging Zone

(in thousands of vehicle-kilometers and percent)

	2002		2003		Percentage change
Cars	771	(47%)	507	(35%)	−34%
Vans	287	(18%)	273	(19%)	−5%
Trucks	73	(4%)	68	(5%)	−7%
Taxis	256	(16%)	312	(21%)	22%
Buses	54	(3%)	65	(5%)	21%
Motorcycles	129	(8%)	137	(9%)	6%
Bicycles	69	(4%)	89	(6%)	28%
All vehicles	1,640	(100%)	1,451	(100%)	−12%

Source: Transport for London. Data provided to the author, May 2006.

Notes: The first column for each year shows the number of vehicle-kilometers driven (in thousands), by type of vehicle, within the congestion charging zone. The second column for each year shows the proportion of total vehicles within the congestion charging zone represented by each type of vehicle.

Small drop in freight traffic

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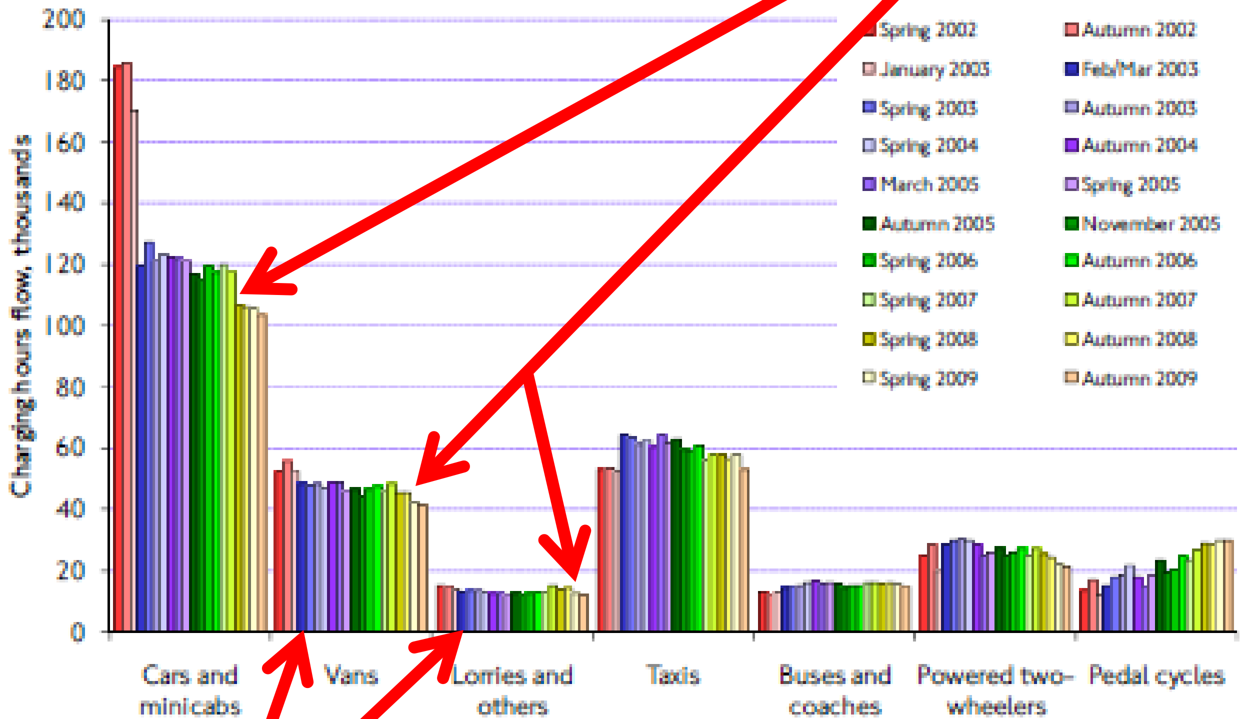
Economic slowdown started in 2008

Figure 11.9 Traffic entering the Central London charging zone (across all inbound roads), charging hours, 07:00-18:00, 2002 to 2009.



Source: TfL Planning

Small drop in freight traffic

Key finding

- Congestion pricing did produce a small impact on freight traffic
- Not sure what was the actual behavioral response, it cannot be elicited from traffic data