

Congestion Pricing: Moving from theory to practice

Jitendra N. Bajpai



1

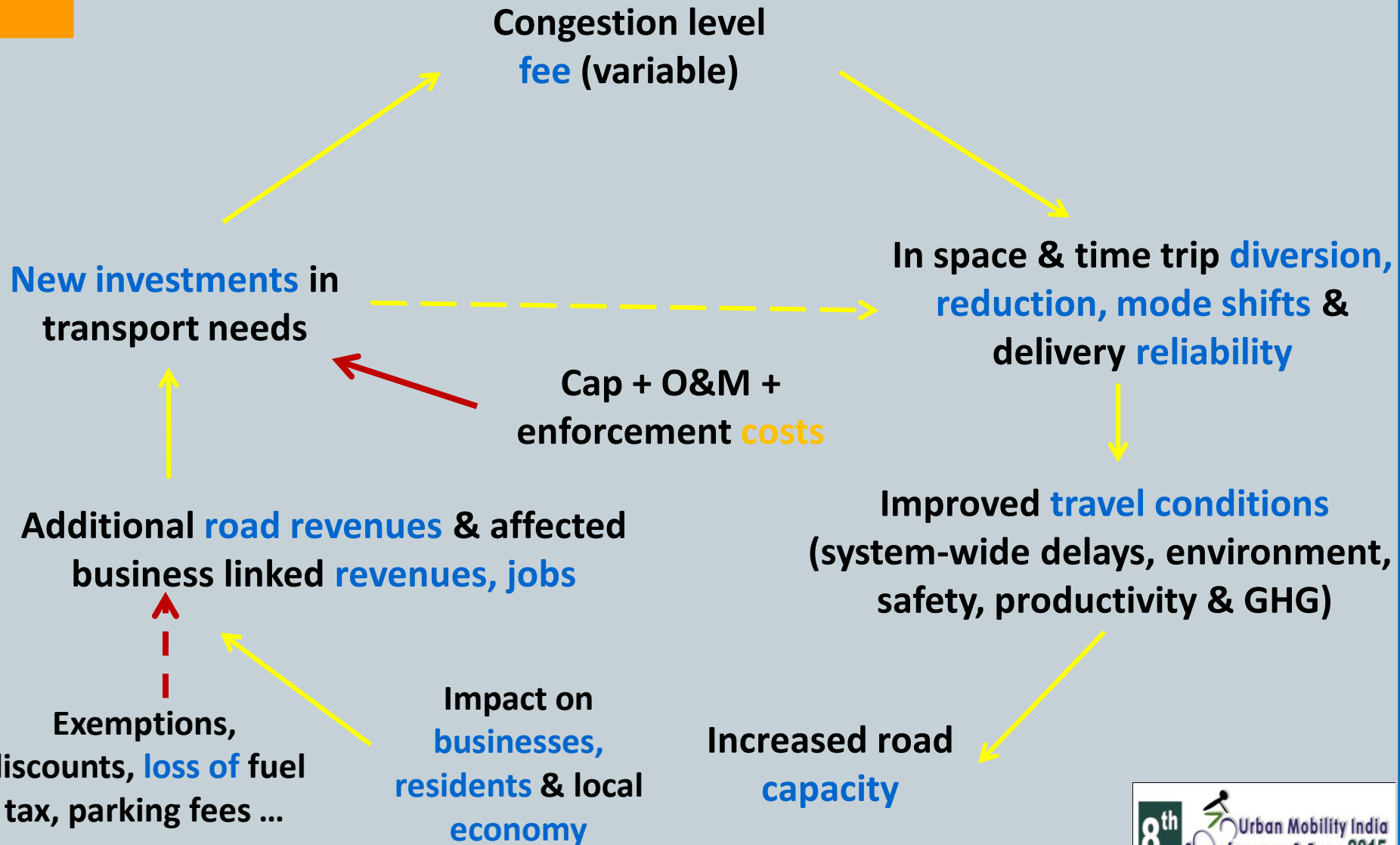
Why charge road users for congestion?

Economic rationale for congestion pricing

- By charging a fee for driving a motor vehicle at times and places where demand exceeds road capacity, people alter travel behavior & reduce congestion (a social waste or – ve externality).
- Fee = marginal cost of delay imposed on others & less than the cost of building new road capacity
- Implemented with improved travel options & road conditions (e.g., transit, ride sharing, traffic mgmt. etc.)
- Pricing Modalities:
 - Variable Pricing of road way or lanes (time based)
 - Zone or Cordon pricing (area entry time)
 - Area or system-wide pricing (distance, time & place based)
- Technologies are enabling the transition of theory into practice

Congestion pricing: A schematic view

A measure to enhance effective use of road capacity



2

What are the key findings of international practices?



Singapore



Stockholm

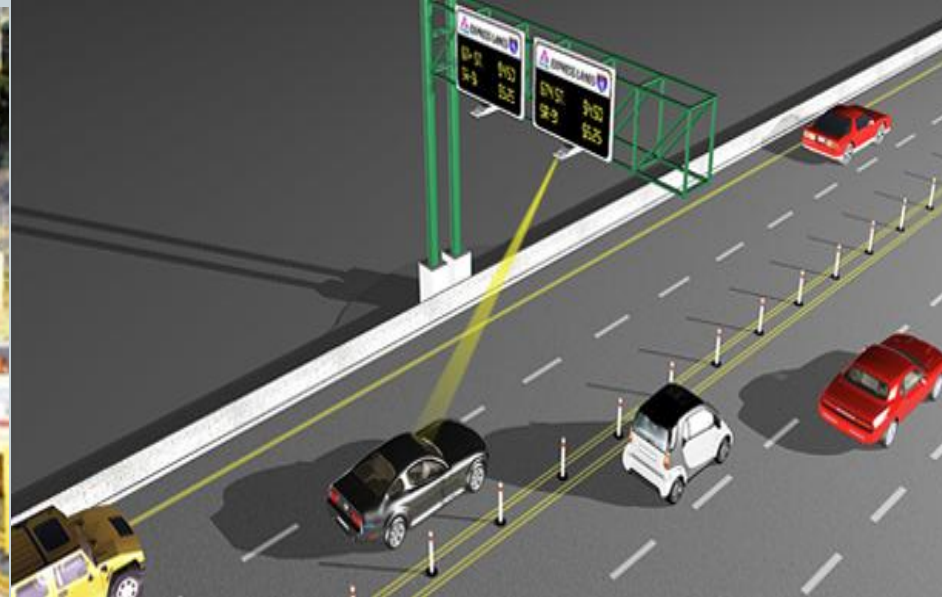
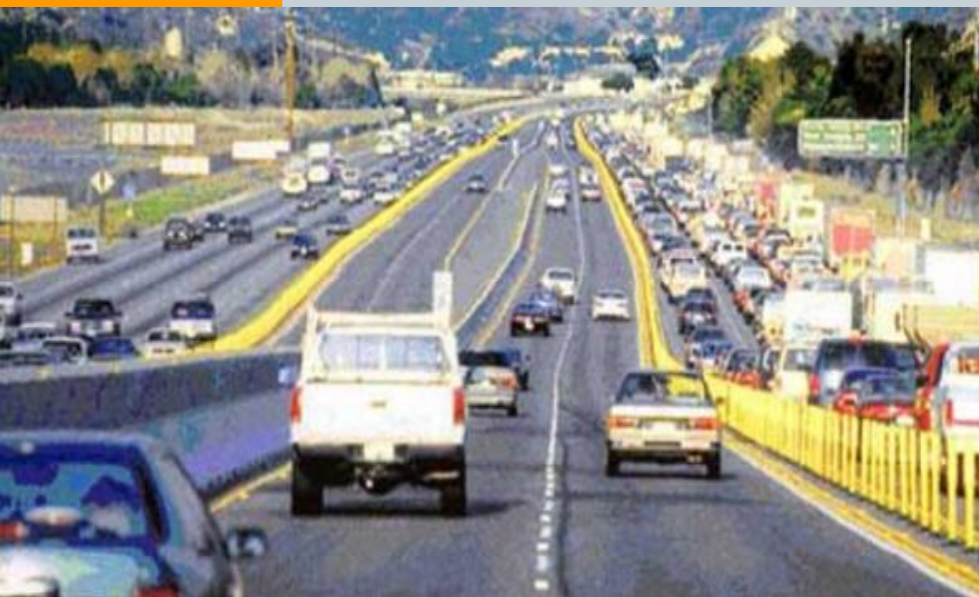


Milan

Zone or Area based Pricing

Cities	Technologies	Car trips	Travel conditions	Annual Revenue
Singapore (ALS 1971) 4.6m pop. 3.2 sq.km	1998 DSRC/Camera, 37 in zone + 27 roads	Overall -24%	Travel speed +10 kmph	US \$60 m 20-30% O&M
London (2003) 7.5 m pop. 21 sq.Km	Camera 348 sites; Charges for driving within area, not only crossing	-36% all -16%, truck/van -13% (2006 vs. 2002)	+25% Bus use, +49% Bikes -40 to -70% casualties; -16% CO2, -15% PM10, -13% NOx	US \$400 m (2014-15) 30% O&M
Stockholm (2007) 1.9m pop. 30 Sq.km	Transponder & camera 18 control pts.	-20%; -24% car commuters during trial	99% diverted users in PT -13% CO2,-13% PM10, -8% NOX	US \$100 m 28% O&M
Milan (2008 & 2012) 1.3 m pop. 8 sq.km	Camera 43 entrances	-30% all (2013 vs 2011)	Ecopass & then Area C -15% PM10 -24% accidents	US \$40 m 65% O&M

Sources: Croci E & Douvan A. R. (Feb. 2016). Urban Road Pricing: A Comparative study on the experiences of London, Stockholm and Milan, IEFE, Bocconi University; Menon, A.P. & Loh N. Singapore's Road Pricing Journey- Lessons Learnt and Way Forward., Journeys 2015



Variable pricing of lanes or facilities



Variable pricing of lanes or facilities

Schemes	Pricing Strategy	Travel Impacts	Revenue
Hot Lane I-15 in San Diego, US (1998)	Dynamic toll on single occupant vehicles	+25% ridership in PT & increased carpoolers	\$ 2 m/yr. 50% for PT services
SR 91 Express Lanes in Orange County, US (1995)	Variably priced 4-express lanes with toll rates reviewed every 3 months	60-65 mph in Express lane & 15-20 mph in free lanes Express lanes carry twice veh./lane than free lanes	Covered construction & O&M Private company sold the project to County in 2003
Bridge Pricing in Lee County, Fl, US	50% discount for Off-peak users	Reduced peak demand	
Nam San Tunnels in Seoul, Korea (1996)	Peak and Off-Peak tolls for single occupancy vehicles in tunnels 1 & 3	After a year -13.6% traffic, +38% speed (22 to 30 kmph), increased carpooling & use of PT & taxis	
Oregon (test)	Mileage based pricing to replace fuel based tax using GPS technology	Confirmed expected behavioral changes	Potential for substantial revenue generation

3

What kind of issues/risks such schemes raise in a city?

Lessons from successes & failures

Rejected Congestion Pricing Proposals

New York
Edinburg
Manchester
San Francisco
Kuala Lumpur

....

Potential concerns & risks

- **Public Perceptions**
 - How will it benefit my car travel?
 - Is it double taxation?
 - Will the scheme reduce congestion or simply raise revenue?
 - What will happen to toll revenues?
 - How will a technology protect privacy of users?
- **Inequity** towards low income users
- **Impact** on **businesses, residents & development** within the project area (employees, deliveries, sales, land value & uses)
- Traffic conditions on roads serving **diverted traffic**
- **Toll collection** from the out of town & within project area motorists
- **Cost recovery** & surplus generation
- Institutional & **legal barriers** to implementation
- **Political economy** within & across jurisdictions

4

What could be a road map for moving forward?

Success factors for moving forward

- Effective **leadership** & supporting team
- Visible **benefits** of the scheme **with quality options**
- Enabling environment & **legislation**
- **Organization** & inter-agency co-ordination
- **Planning** process, **quality & integration with city level** comprehensive transportation **plan** (defining objectives, geography, technology, pricing, winners & losers)
- Education, outreach & **public, business & civic org. involvement**
- **Cost & revenue** management (sharing across agencies & jurisdictions, short fall management)
- Begin with **easy, convenient, transparent & predictable pricing structure but prepare for location, time & distance based**
- **Implementation** (pilots to learn & build support, technology choice & testing, flexibility, enforcement approach)
- Monitoring for **mid-course corrections & maintenance**

Thanks

Jitbajpai@gmail.com