

Traffic Congestion and Congestion Pricing:

Recent Peer-Reviewed Literature, Oversea Cases, and
Their Policy Implications for Chinese Cities

By

Jiangping Zhou, PhD

Research Scientist and Principal Transport Planner

University of California, Los Angeles

555 Westwood Plaza, 185J

Phone: 310-206-8564

Email: zjp@ucla.edu

Los Angeles, California, USA, 90095

Context



- Congestion has become an epidemic facing Chinese cities, especially cities with population over one million
- Estimated direct costs of congestion to Chinese cities: RMB 72B
- Estimated total costs of congestion to Chinese cities: RMB ?00 billion



Congestion w/ Chinese Characteristics Mandates Special Countermeasures?

- Economy, urbanization, and motorization are still on the rise
- Dense/compact urban forms + huge population base
- Historical road systems
- Congestion on inner-city roads rather than on inter-city freeways
- Mixed traffic contributes to and suffer congestion
- Commuters' love for cars is growing
- A strong government...

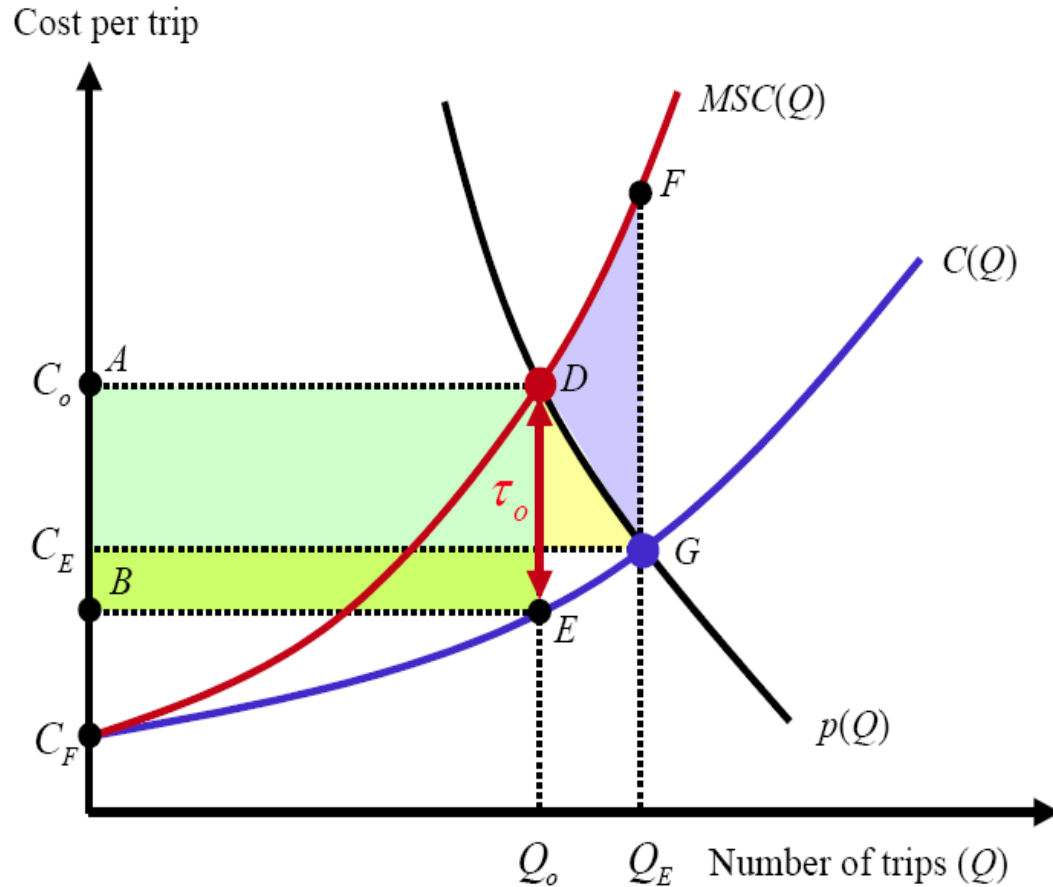
Popular Countermeasures by Chinese Cities

- Increase road supply
- Improve public transit, esp. rail rapid transit
- Modernize traffic management systems
- Flexible work schedules
- Odd/Even plate number rules

Let Drivers Pay for the Full Costs?

- Congestion pricing has been adopted in Singapore, London, and Stockholm
- Seriously considered in New York
- Will/Should Chinese cities follow suit?

Marginal-cost Pricing Principle



Chinese Literature on Congestion Pricing

- 1994-2008: 47 peer-reviewed publications
- Describe and agree on the marginal-cost principle underlying congestion pricing
- Confused with goals of curbing congestion and optimizing overall social welfare
- Feasibility studies of congestion pricing in selected cities: Beijing, Guangzhou, Shanghai and Kunming
- Introduce foreign cases

English Literature on Congestion Pricing

1998-2008: 100+ peer-reviewed publications, focusing on six aspects:

- Different forms of congestion pricing
- Goals of congestion pricing
- Distributional effects of congestion pricing
- Performance evaluation of existing cases
- Public acceptance of congestion pricing
- Mathematical models for congestion pricing

Different Forms of Congestion Pricing

More cities have adopted or explored various forms of congestion pricing, some were not covered in the Chinese literature:

- Credit-based in Dallas, USA
- Tolloed express lane in Orange County, USA
- Social experiment of congestion pricing, Stockholm
- PierPASS in Los Angeles
- Toll rings in Norwegian cities

Goals of Congestion Pricing

- Economists alone could not determine which goals that should be pursued in congestion pricing
- Economists are or should be good at: optimize the resources needed to realize various goals agreed upon
- Commonly-seen or agreed-upon goals: efficiently allocate existing road resources, redistribute income, reduce unemployment, decrease inflation (decided via a political process)

Distributional Effects

- Mobility is a basic right of people
- Congestion pricing affects the right of people from all walks of life
- Congestion pricing also affects different sectors
- The English literature has done more research on the effects from different perspectives, categorizing people and sectors into meaningful groups

Performance Evaluation

About 40% of the literature is evaluating the performance of congestion pricing

- Political process
- Economic costs and benefits
- Evolution of congestion pricing and performance
- Performance evaluation is related to: political, economic and policy milieu as well as framework applied
- Continued evaluation is required for evaluation to be useful

More Cases of Congestion Pricing

国家	城市	项目	起始年份	主要做法、经验	绩效	相关文献
比利时	布鲁塞尔	两级政府如何实施城市交通收费改革研究	2005	改革的目标应定位于社会福利的最大化；停车费和其它交通收费包括拥挤收费必须配合使用；不同层次的政府之间应分工合作	-	Proost and Sen 2006
美国	达拉斯	基于信用的交通拥挤收费项目研究	2005	通过政府的信用分配，确保合格的出行者能够承受交通拥挤收费	模型预测绝大多数出行者将受惠，交通拥挤有所缓解	Gulipalli and Kockelman 2008
	橙县，河滨县	城际高速公路的收费车道	1995	在高度拥堵的公路上，额外建立收费车道	越来越多的出行者原意使用付费车道；整条道路交通状况有所改善；道路沿线事故减少；	Sullian 2000
	洛杉矶	PierPASS	2005	对在高峰期进出港口的、公路运输集装箱收取交通拥堵费；延长港口作业时间，对非高峰期进出港口的集装箱免费	高峰小时运载集装箱的大货车数量显著下降，连接港口和城市的主要道路交通有所改善	Giuliano et al 2008
	纽约	市中心区交通拥挤收费提案	2007	借鉴伦敦做法	未能实施	http://www.nyas.org/ebrief/miniEB.asp?ebriefID=644 ; http://www.rpa.org/pdf/Spotlight40.pdf
	多个	Urban Partnerships	2007	联邦政府提供10亿美元，对实施交通拥挤收费的若干城市进行项目资金补助；公开遴选有关城市	实施中	http://www.upa.dot.gov/
挪威	奥斯陆等	Urban Toll Rings (城市环形收费)	1986	在城市各主要进出口，对高峰车辆进行收费，获取资金用于补助交通项目建设	获得了支持城市交通建设的资金	Ieromonachou et 2006
瑞典	斯德哥尔摩	对城市中心交通拥挤收费进行半年期实验	2006	在获取公众支持后，大规模试验交通拥挤收费；对实验前后的数据进行系统收集、科学分析	公众能感受到出行时间节省；试验的经济效益和环境效益也非常显著	Eliasson et al 2009
法国	巴黎	对大巴黎地区实施道路拥挤收费进行模拟	2006	利用数学模型对交通拥挤收费进行分析	模拟结果显示，在路段或者划片进行道路拥挤收费，社会福利增加不明显；基于出行时间的交通拥挤收费经济效果更大。	de Palma and Lindsey 2006
英国	伦敦	伦敦内城交通拥挤收费	2003	对于高峰期进入伦敦内城的小汽车进行收费；项目实施前后开展大量基础研究	内城交通明显改善；公共交通乘客增加；项目在技术和政治上取得了成功，但对于项目实施的经济效益估算，学者尚有争议	Prud'homme and Bocarejo 2005; Raux 2005; Schmocker et al 2006; Dix 2002; Quddus et al 2007
	爱丁堡	市中心区交通拥挤收费对购物者的影响研究	2005	研究市中心区交通拥挤收费后，购物者行为有何变化	购物者最关心的是停车问题；交通拥挤收费可能减少拥挤，改进公共交通服务	Hu and Saleh 2005
新加坡	新加坡	对高峰期进入市中心的车辆收费；对小汽车牌照数量进行总量控制	1976	采纳多项最新技术	城市道路交通拥挤始终处于低水平；大量出行使用公共交通	Barter 2005

Implications from Existing Studies/Cases

Benefits of congestion pricing:

- Economic efficiency and curb congestion
- Fewer real engineering projects, relocation of residents, and less relocation compensation
- “Revenue” for the tolling authority
- Speed/option for people who have emergent needs
- Adjustments of spatial, temporal, and modal distribution of trips, which could produce positive effects on energy use, resource allocation, environment, and public health
- Employment (minor, though) and political reform

Implications from Existing Studies/Cases

Disadvantages of congestion pricing:

- Public acceptance: personal benefits Vs social benefits (Recent studies of the failed NY case)
- How to allocate the “revenue” generated?
- New agencies established to implement congestion pricing: Their efficiency, costs, and relationships to governments
- It needs supporting/systematic policies and countermeasures to be efficient and effective
- It may require sophisticated technologies
- It may involve infringement of privacy

Policy Recommendations

- “Basic studies” prior to policy proposals or implementation
- Customized congestion pricing according to local conditions/situations
- Treat congestion pricing as a component of the comprehensive system of transport-land use-environment sustainability
- Innovation: e.g., congestion pricing is not just about passenger transport; credit-based “pricing”
- Economic incentives from central governments
- Public acceptance Vs. mathematic models

Comments and Questions?



zjp@ucla.edu