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# LONDON CONGESTION CHARGING & URBAN TOLLING IN CHILE: Contrasts and lessons on fairness and project finance

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**Steer Davies Gleave**

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- Road user and congestion charging
- Congestion charging in London
- The Santiago urban toll roads
- The future of Congestion Charging in emerging countries?
- Conclusions

## Road user charges

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- Travel costs perceived by the driver
  - Tolls, own time
  - own risk? Own stress, fuel costs, part of other costs
- Not usually perceived by driver
  - Full vehicle operating costs
  - Accident risk to self and others (& treatment/discapacity)
  - Delays induced on others (congestion)
  - Pollution: emissions, noise, visual intrusion
  - Climate change gases
  - Policing, enforcement costs
- Corresponding charges do not match these very well

## Road user charges, especially urban transport

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- Road Licence
- Vehicle testing fees
- Insurance premiums
- ✓ Parking charges
- ✓ Fuel tax
- ✓ Tolls (inter-urban and urban)
- ✓ Congestion charges/road pricing/road user charges (since 1961, Alan Walters)

**Marginal versus Average Costs**

**Private versus Social Costs**

**Human being versus Homo Economicus**

## We are here because

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- Marginal private cost  $\neq$  Marginal social cost of travel
  - Externalities: emissions, accidents, **congestion**
- Marginal private cost  $<$  Marginal social cost of travel
- Individuals and governments make poor choices
- Need to correct prices so that they reflect marginal social costs better
  - Greater correction where greater gap between private and social costs
- Corrections related more closely to usage
  - Where & when
- Congestion externalities depend on time and location

## Congestion charging is not new

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- The Smeed Report (1964) set the principles and recommended its adoption for London.
- Internalizing congestion costs is fair and efficient from behavioural and economic perspectives.
- Singapore introduced in 1975 a charging scheme when entering the centre (Area Licensing Scheme). It started as a daily payment with paper stickers. Today's technology allows to adjust the tariffs to demand/congestion levels.
- Oslo and other Norwegian cities have used tolls for more than 10 years to charge when entering the city.

## Congestion charging: pros and cons

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**Congestion charging  
has significant  
economic and demand  
management  
advantages.....**

**..... Buts must  
overcome numerous  
obstacles**

- Better pricing of externalities
- Fairer competition between modes of transport
- More efficient use of limited space
- Revenues may be used to invest in other projects instead of wasting time
  
- It is unfair to those who cannot afford to pay
- Voters cannot be persuaded
- People will not change behaviour
- It takes a long time to generate enough revenue to invest in worthwhile projects
  
- Linking to public transport investment makes it more acceptable
- A package of measures is needed

## Toll roads

- A more than 300 years old idea
- The Turnpike Trusts set up in Britain in 1706 led to extensive rioting but ended up a success. London to Edinburgh 4 days instead of 12.

- Real tolls

- Interurban
- Urban

- Shadow tolls excluded

### Developed countries

USA, Canada, France, Italy, Spain,  
Australia

### Emerging countries

Mexico, Brazil, Argentina, Chile  
South Africa, Indonesia



## Toll road frame of mind

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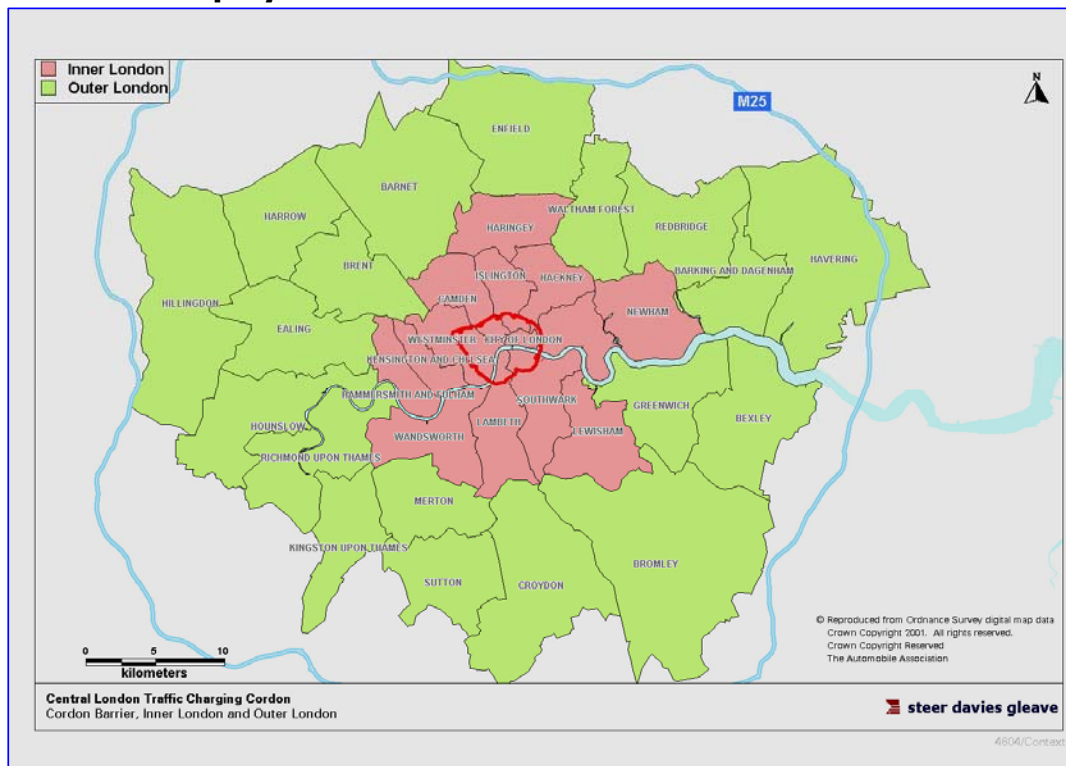
- Mostly to pay for investment and operating costs
- Externalities not included
- The cost of collecting revenue (especially land in urban areas) limits its use
- Equity (vertical and horizontal) issues arise
- Many cases of public opposition to tolling
- Toll collection technology has improved recently
  - Open road ETC plus video enforcement/billing
  - Interoperability

# London Congestion Charging – Context Map

Greater London London population in 2001 was over 7 million

Around 150,000 live within the central congestion charging cordon

Total employment in the central area exceeds 1 million



## Objectives of London Congestion Charging scheme

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- One element of the London Transport Strategy of his Mayor: Ken Livingstone
- Contributes to some of the Strategy's key objectives:
  - Reduce congestion
  - Make radical improvements in bus services
  - Improve journey reliability of car users
  - Make a more reliable distribution of goods and services



## Revenues

- Net revenue around £68m en 2003/4 increasing to £80-£100m
- Original estimates were of £120m first and then £130m.
- Fewer cars enter the CCZ

### Forecast scheme revenues and costs for financial year 2003/04 (£ million)

<b>Revenues</b>	
Residents (at 50p per day)	2
Vehicles (at £5 per day)	102
Fleet vehicles (at £5.50 per day)	11
Total Congestion Charge Payments	115
Penalty Charge Payments	50
<b>Total Gross Revenues</b>	<b>165</b>
<b>Costs</b>	
Operating costs 2003/04 (reduces in subsequent years)	97
<b>Net revenues</b>	<b>68</b>

Source: "6 Months on", Transport for London, October 2003

# Cost Benefit Analysis

- Annual benefits of some £50m per year.

Preliminary estimates of costs and benefits  
of the Central London Congestion Charging Scheme (£ million per year, rounded)

<b>Annual Costs</b>	
TfL administrative and other costs	5
Scheme operation	90
Additional bus costs	20
Chargepayer compliance costs	15
<b>Total</b>	<b>130</b>
<b>Annual Benefits</b>	
Time savings to car and taxi occupants, business use	75
Time savings to car and taxi occupants, private use	40
Time savings to commercial vehicle occupants	20
Time savings to bus passengers	20
Reliability benefits to car, taxi and commercial vehicle occupants	10
Reliability benefits to bus passengers	10
Vehicle fuel and operating savings	10
Accident savings	15
Disbenefit to car occupants transferring to public transport, etc.	-20
<b>Total</b>	<b>180</b>

## Original concerns ... and what happened to them

<b>Car drivers wouldn't change behaviour (no choice or not price sensitive)</b>	<b>Not realised – in fact, people have been more sensitive than predicted</b>
<b>It wouldn't reduce congestion</b>	<b>Not realised</b>
<b>It may reduce congestion inside the Zone, but outside it would get much worse</b>	<b>Not realised – capacity of inner ring road was increased sufficiently</b>
<b>There would be chaos at 6.30pm as people wait to enter the Zone</b>	<b>Not realised – does happen, but not to the extent that it has an impact</b>
<b>Public transport wouldn't be able to cope</b>	<b>Not realised, extra bus capacity more than sufficient. Background of underlying fall in Tube travel.</b>
<b>Lots of new motorcycle / scooter users would lead to increase in accidents</b>	<b>No hard evidence yet, but anecdotally, this has not occurred</b>
<b>Retailers, particularly small ones near the boundary, would be forced out of business</b>	<b>Under investigation – there is some effect but quite small. Has combined with a number of other negative influences</b>

## Surprises

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- The speed with which traffic levels settled down
- The speed with which the Congestion Charge became an accepted part of London life
- Extent of effect on car drivers
  - did the modelling under-estimate the “hassle” factor, or were the elasticities too low?
  - What have we learnt about modelling for congestion pricing?
- The low level of traffic displacement ( boundary effects)
- The lack of a major IT failure

## Success factors

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- Political leadership
- Project management
- Clear & simple vision
- Groundwork (models and coms)
- Complementary measures
  - bus service improvements
  - traffic management
- Refusal to be seduced by sexy technology
- The characteristics of the Charging Zone
  - Car already a minority mode
  - Uniquely attractive to businesses & visitors





## Limitations of London Congestion Charging

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- Very coarse pricing, far from marginal cost pricing
- Very coarse pricing area, and charging period, **on/off only**
- ANPR is an expensive way of collecting revenue
- The special case of London (dynamic centre, low use of cars)
- Other cities actively considering Congestion Charging: Milan, Stockholm, Sao Paulo, etc.
  - Mostly Area or Cordon charging
  - VPS holding interesting promise for more sensitive charging
    - What about perception?

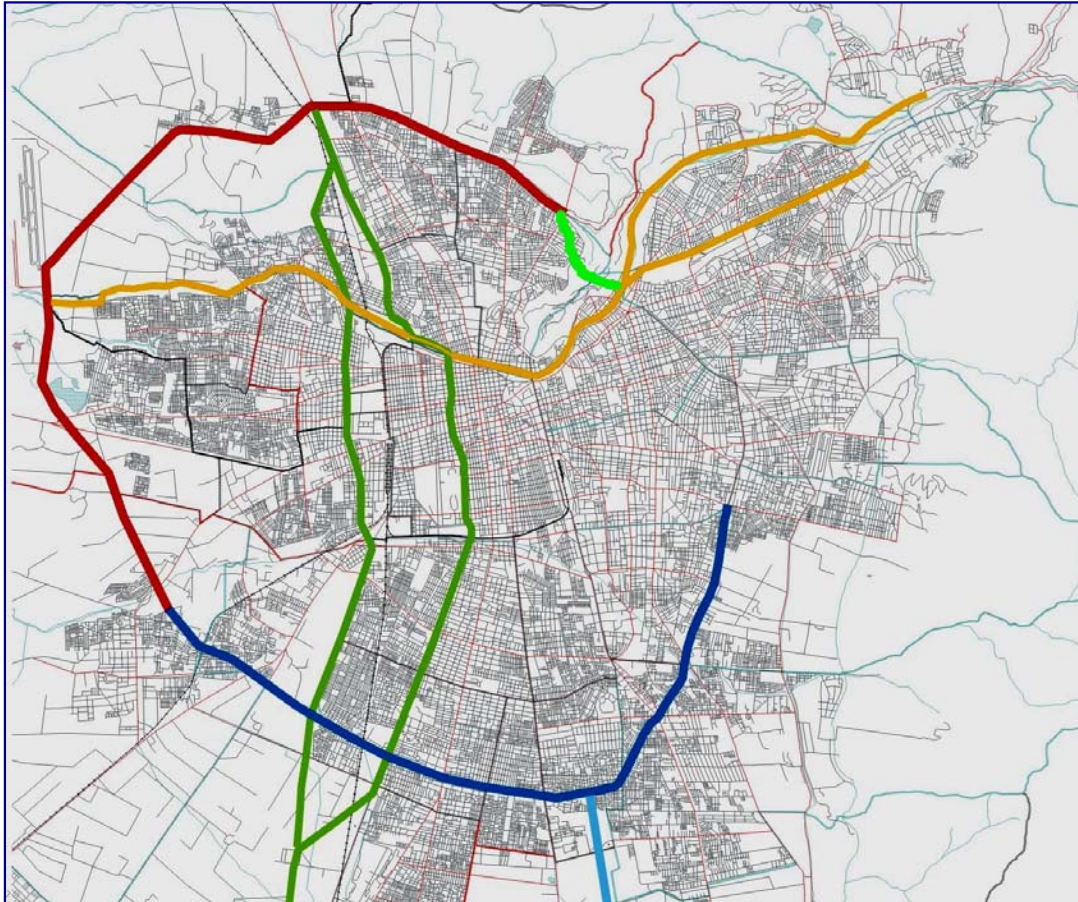
## Santiago, Chile

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- 5 million people
- Congestion hot spots
- Severe air pollution problems
- Relatively low car ownership levels but growing fast
- Have considered the idea of Congestion Charging for some 15 years but failed to implement
- Introduced “hardish” number-plate restrictions on car use
- And a system of urban toll roads with open-read electronic toll collection, private concessions
- Part of a more extensive system of national toll roads

## Santiago Toll Roads

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**5 + 1  
concessions**

**All with three  
level pricing:  
6/12/18 US  
cents/km**

**Interoperable  
tags**

**~ 1 million tags  
in 2007**

**Partial toll  
collection  
started Dec  
2004**



## Example of expected charging schedule

Section	Direction	2007					2010					2015				
		AM	FP	PT	SA	DO	AM	FP	PT	SA	DO	AM	FP	PT	SA	DO
1	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
1	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
2	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
2	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
3	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP
3	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TBFP
4	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP
4	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBFP
5	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP
5	SN	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TBFP
6	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBP	TS	TBFP	TBFP
6	SN	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TBFP
7	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TS	TBFP	TBP	TBFP	TBFP	TBFP
7	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBFP
8	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBP	TS	TBFP	TBFP
8	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
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9	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
10	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP
10	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TBFP
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13	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP
13	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBFP

## Implications

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- By end of 2006, 90% of cars in Santiago will have Tags
- Most drivers will be used to a complex charging system and accept that their money is used for transport investment
- Interoperability and additional use of tags creates an opportunity
- ETC is much cheaper than ANPR billing/enforcement
- There are many good candidates for transport investment in Santiago




## The Santiago CC

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- Based on open road ETC technology
- Operated under concession PPP
- Congestion hot spots or area based?
- Use consistent pricing for improved understanding
  
- The communication task is very significant
  - The public
  - Decision makers
- Investment in Public Transport infrastructure for surface modes a key

# London and Santiago

LCC and Santiago ETC

	London	Santiago toll roads	Santiago tolls + CC
Objective	Reduce congestion	Finance roads	Both
Generates new traffic ?	No	V. Likely	?
Efficiency in revenue coll.	No	Yes	Yes
Policy impact			
Destination of funds	Revenue collection, buses	roads	Roads and PT infrastructure



# London and Santiago

LCC and Santiago ETC

	London	Santiago toll roads	Santiago tolls + CC
Gainers	HI drivers, residents, bus users, etc	HI drivers, others	HI drivers, PT users
Losers	LI drivers, commerce	Mostly some drivers	Some drivers, some local residents
Environmental gains	😊	😞	😊
National efficiency	😊	😞	😊

## Congestion Charging and Tolling

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- There will be more Congestion and Road Charging schemes
- Each city is different. Learn from Singapore, Oslo and London but not copy
- Several cities have introduced open-road ETC tolling: they have interesting opportunities, offer an interesting opportunity
  - Toronto, Melbourne, Sydney, Santiago, .....Sao Paulo
- Convergence of:
  - Technologies: VPS, Tags, mobile phones
  - Work and lifestyles changes will help
  - Technical thought
  - Public opinion (making)
- The communication task is very important and should be addressed from the outset
- Take the long term view