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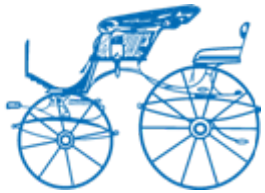

# Is congestion charging efficient? An assessment of experiences in Europe

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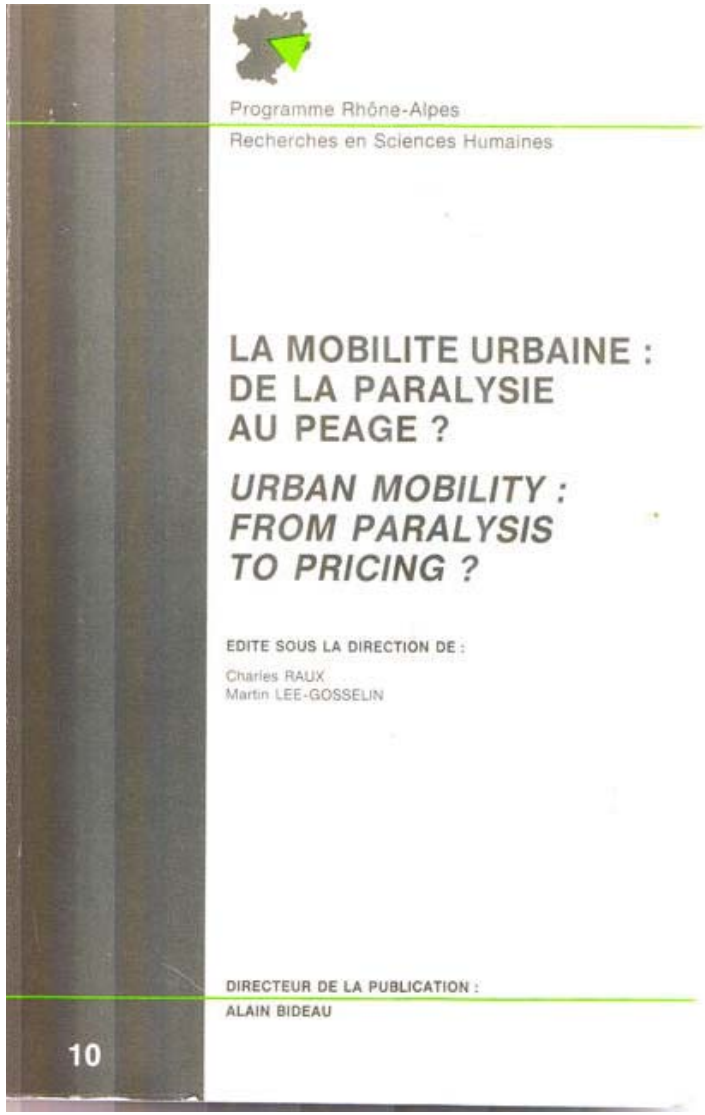
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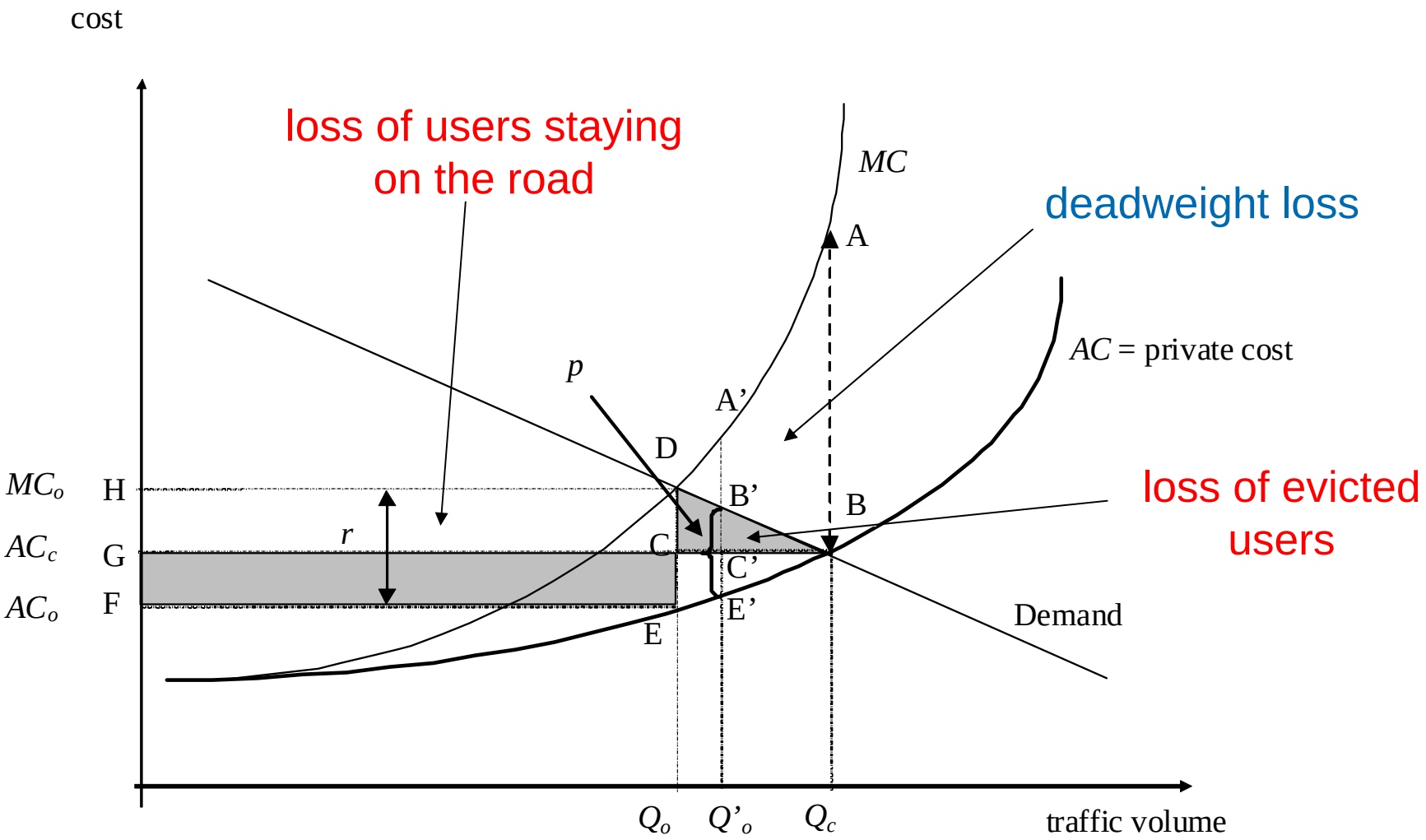
# Motivation

- Congestion charging (esp. in urban areas) advocated by the economists… but numerous caveats of SRMC (Rothengatter, 2003)
- Both efficiency and equity issues
- Recent controversies on efficiency in the light of field implementations
- Address this issue of efficiency
  - by assessment of two recent experiences of "congestion charging": London (2003) and Stockholm (2006)…
  - and compare them with an (older) road pricing scheme: Oslo (1990)

# The static short run congestion model



# Main issues

- Sensitivity to speed measurement
- Inclusion of marginal time savings
- Taking into account the reliability of travel times
- Evaluating amortization costs (for the record)
- Issue of transaction costs
- Impacts on public funds

# Sensitivity to speed measurement

- Estimation of time savings, based on aggregate demand / supply curves
  - based on data on before/after traffic and speed
- London: car & bus users time savings ~ 95% of externalities benefit, Stockholm ~ 75%

| London | reference value | variation | Impact on time savings |
|---|---|---|---|
| speed before CC (km/h) | 14.10 | +10%<br>-10% | -79%<br>+102% |

# Marginal time savings

- London case

| | unit | Charged area | Inner area | Outer area | Total |
|---|---|---|---|---|---|
| Post-charge veh km | 1000 per day | 1 276 | 14 722 | 32 708 | 48 706 |
| Time saved per veh km | minutes | 0.59 | 0.06 | 0.01 | |
| value of time vehicle | € per hour | 44 | 32 | 25 | |
| time gains | million € per year | 135 | 117 | 37 | 290 |

*(source : Tfl, 2007 and authors' calculation)*

- up to what level take them into account?

# Reliability of travel time

- Add to time cost the cost of delay or advance to preferred arrival time
- London case (TfL)
  - Car: decrease by 1/3 of time spent in jam or stopped traffic, ~+13% added to time savings of car users
  - PT: improvement in bus punctuality ~+24% added to time savings of bus users
- Active field of research, methodology not stabilized

# Transaction costs

- Ratio costs of charging system (operation + amortization) / revenues
  - London 90%
  - Stockholm 53%
  - Oslo 10%
- Depends on geography of pricing area (cordon or zone) and local topography (natural or artificial obstacles)…
- and on technology: (in decreasing cost order)
  - video (LPR)
  - GPS / GSM
  - gantries / DSRC

# Public funding

- Opportunity costs
  - taking account other uses of public money
  - various rate according to budgetary constraint
  - applied to new expenses related to user charging
  - from 5% to 23% (Sweden)
- Marginal costs of public funds (MCPF)
  - distortive effect of public money obtained by taxation
  - “wiped out” when taxing an externality
  - additional cost for new expenses, benefit for revenues from pricing
  - about 30%
  - should be omitted (Jansson, 2006, 2008)?

# Results

- London, Stockholm: small positive/negative net benefit, depending on
  - uncertainties in estimation of time savings + VOT
  - whether to include the *social* incremental costs of public transport extension
  - levels of cost of public funds
- Oslo
  - no time savings, no evicted car users
  - only revenues (transfer) but with MCPF impact
  - net positive benefit

# Conclusion

- High level of uncertainty in the amount of time savings + other source of variation in CBA
  - support for *intervals* of values in the balance sheet
- Transaction costs of charging may damage the balance significantly
  - avoid costly technology (increase R/C ratio): e.g. Oslo, Singapore
- Pragmatic recommendation
  - secure funding… by charging (rather than taxation) = incentive to reduce car use
  - find institutional arrangements (local neighbouring governments) to increase acceptability