Ongoing Research: results from GRACE and Imprint-net

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Outline of Presentation

1. The projects
2. Principles
3. Measurement
4. Impacts
5. Conclusions
GRACE Overall Aim

• GRACE aims to support the development of sustainable transport systems by facilitating implementation of transport pricing systems that reflect the costs of infrastructure use.

• It does this by a set of new studies of unresolved issues in measuring marginal social cost, further studies on the use of accounts and on modelling social impacts of prices, and by studying factors influencing the optimal complexity of charges.
to bring together researchers, policy makers and stakeholders (including both industry and environmental groups) in a series of seminars, in order to bring together research and practice and build consensus on the issue of pricing the use of rail infrastructure.
• The issue
  • how to give appropriate incentives to train operators (and subsidy providers) re how many trains to run and when to run them
  • how to give appropriate incentives to infrastructure managers re expansion or contraction of capacity
  • how to promote competition
  • How to finance infrastructure

• Prerequisite
  • willingness to pay of train operator represents social value of the train.

• Requires
  • subsidy per passenger or freight tonne kilometre, differentiated by time and place, to reflect benefit of diversion from road
  • subsidy per passenger train km, differentiated by time and place, to represent benefits to existing users
Options

- **LRMC pricing** encourages appropriate investment and provides non discriminatory access
- **SRMC pricing** encourages efficient use of existing infrastructure and provides non discriminatory access
- **AC pricing** recovers cost and provides non discriminatory access
- **Two part tariffs** may achieve all other objectives but discriminatory
- **SRMC plus mark-ups according to Willingness to Pay**

The best compromise?
LRMC pricing

- Incremental cost of additional capacity (NB Wide variety of options – resignalling; passing loops; additional running lines)
- Capital cost spread over
  - life of assets
  - number of (peak) paths created (or sold?)
- For correct incentive to IM, must only charge if scheme goes ahead
- If scheme doesn’t go ahead (or after it has!) for correct incentive to TOC should consider avoidable cost of reducing capacity.
- Problems due to
  - sunk costs
  - stepped cost function with major indivisibilities
  - widely varying capital cost per path
  - long time lags for implementation of major changes
  - Will not give correct incentives as to use of available capacity in the next timetable
SRMC pricing:

- gives incentives to TOCs to make best use of existing capacity
- reveals value of creating additional slots
- SRMC (calculated) includes opportunity cost of capacity in its next best use
  - need to optimise allocation of capacity to calculate!
  - May be very variable; can it be made into a tariff?
- SRMC (auction)
  - Complicated to organise (bidding for each individual slot?)
- Value of a slot depends on:
  - what other slots the TOC gets
  - what slots other TOCs get
Two part tariffs
- appropriate where long term access agreements are entered into

Fixed element: avoidable capacity cost of the set of services

Variable element: short run marginal cost (excluding scarcity element?)

Problems:
- Still may not cover total cost
- Incentives to free ride
- What to charge new entrants?
Marginal Social Cost Components

- Additional operating cost
- Additional wear and tear costs (maintenance and renewal);
- Additional congestion and scarcity costs;
- Additional accident costs; and
- Additional environmental costs
- No capital costs (SRMSC)
- GRACE includes 20 new case studies ranging across road, rail, air and water
Infrastructure Costs

Approaches

1. Econometric approach
2. Engineering approach
3. Cost allocation approach
## Rail Scarcity Costs - Illustrations

### Value of a Slot to the Franchisee
(Leeds – London slots, £, % of 09.05 slot)

<table>
<thead>
<tr>
<th>Time</th>
<th>Existing slot</th>
<th>New Slots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operators profits</td>
<td>09.05: +44, 08.35: +5, 09.35: -12, 15.35: -1</td>
<td></td>
</tr>
<tr>
<td>Consumer surplus</td>
<td>09.05: +25, 08.35: +7, 09.35: +4, 15.35: +3</td>
<td></td>
</tr>
<tr>
<td>Tax revenues</td>
<td>09.05: -27, 08.35: -8, 09.35: -1, 15.35: -2</td>
<td></td>
</tr>
<tr>
<td>Congestion</td>
<td>09.05: +50, 08.35: +25, 09.35: +38, 15.35: +21</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>09.05: +8, 08.35: 0, 09.35: -4, 15.35: -3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>09.05: +100, 08.35: +29, 09.35: +25, 15.35: +18</td>
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Other Cost Components

1. Environmental costs should be used to differentiate charges (e.g. diesel vs electric; noise levels) even when not charged on other modes
2. External accident costs mainly an issue at level crossings
3. Evidence on marginal costs of train planning and at modes lacking
Cost Recovery and Mark-ups

1. Where exclusive franchises, 2-part tariffs are best
   (fixed charged may reflect long run avoidable cost plus mark ups)

2. Where on track competition, mark-ups must be on variable cost and should vary in accordance with market segments.
   (but infrastructure manager has limited knowledge of traffic carried)
Impacts

• Poorly differentiated charges have encouraged use of damaging rolling stock

• Infrastructure charges have limited impact on levels of passenger services under PSOs (but may be important where regionalisation)

• Biggest impact on freight and commercial passenger (especially international freight and high speed passenger)
Conclusions

1. Short run marginal social cost can be measured and is low (except where scarcity is a big issue)

2. Two part tariffs desirable where monopoly franchises (fixed part can reflect long run avoidable cost)

3. Dilemma of open access competition; short run marginal social cost pricing best for efficient infrastructure use, but:
   - No incentive for efficient development of the network
   - Difficult to achieve high cost recovery
   - Is short run marginal social cost pricing with mark ups the best compromise?