

Road pricing with complications

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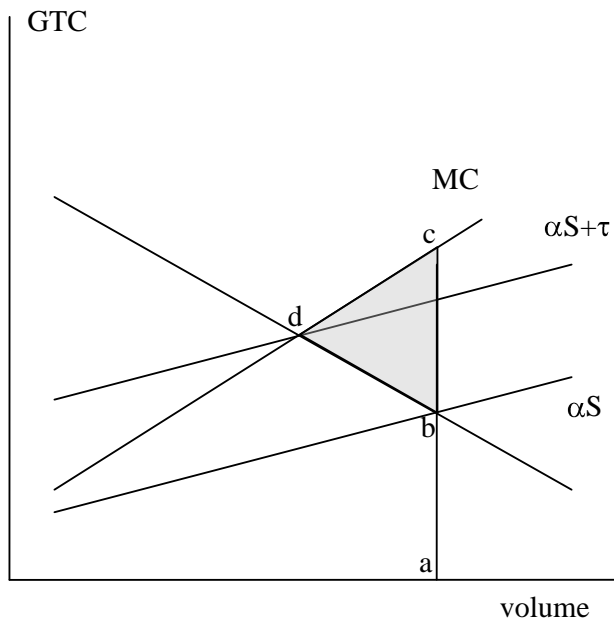
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Marginal cost pricing

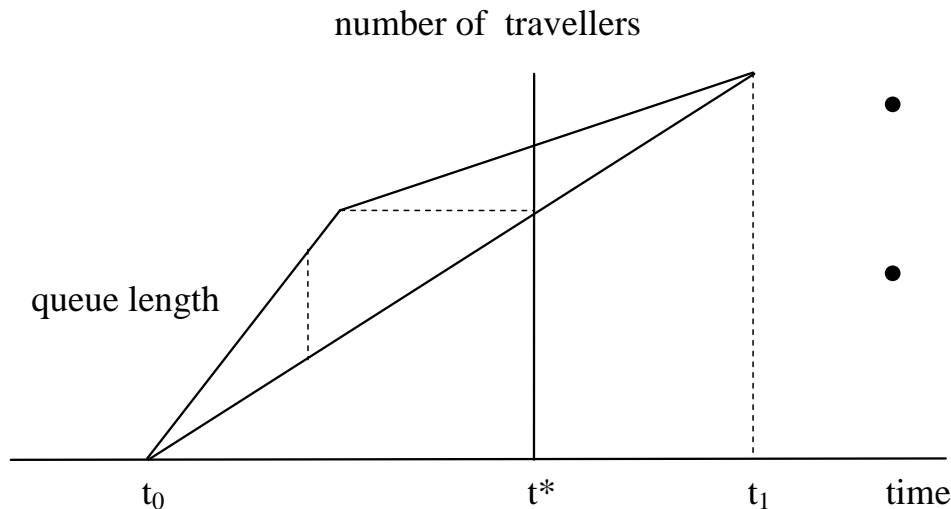
- A familiar picture
- Easily understood: $MECC = S'(D) \cdot D \cdot \alpha$



- No dynamics
- Travellers are identical
- Supply curve is known
- No network and no second best constraints
- No distortions outside transport system

Trip timing – bottleneck queueing

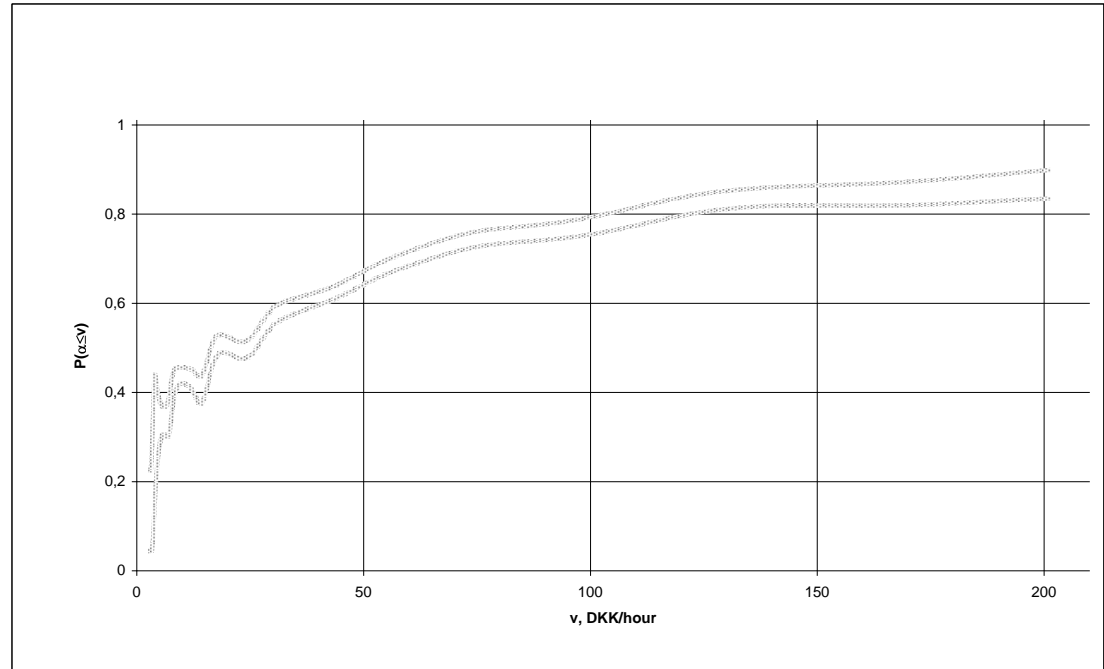
- Redistribution of trips across time can remove congestion completely



- Time varying tolls induce rescheduling
- Queueing can be reduced without making travellers worse off
- Feasible alternatives to pricing?

Heterogeneous travellers

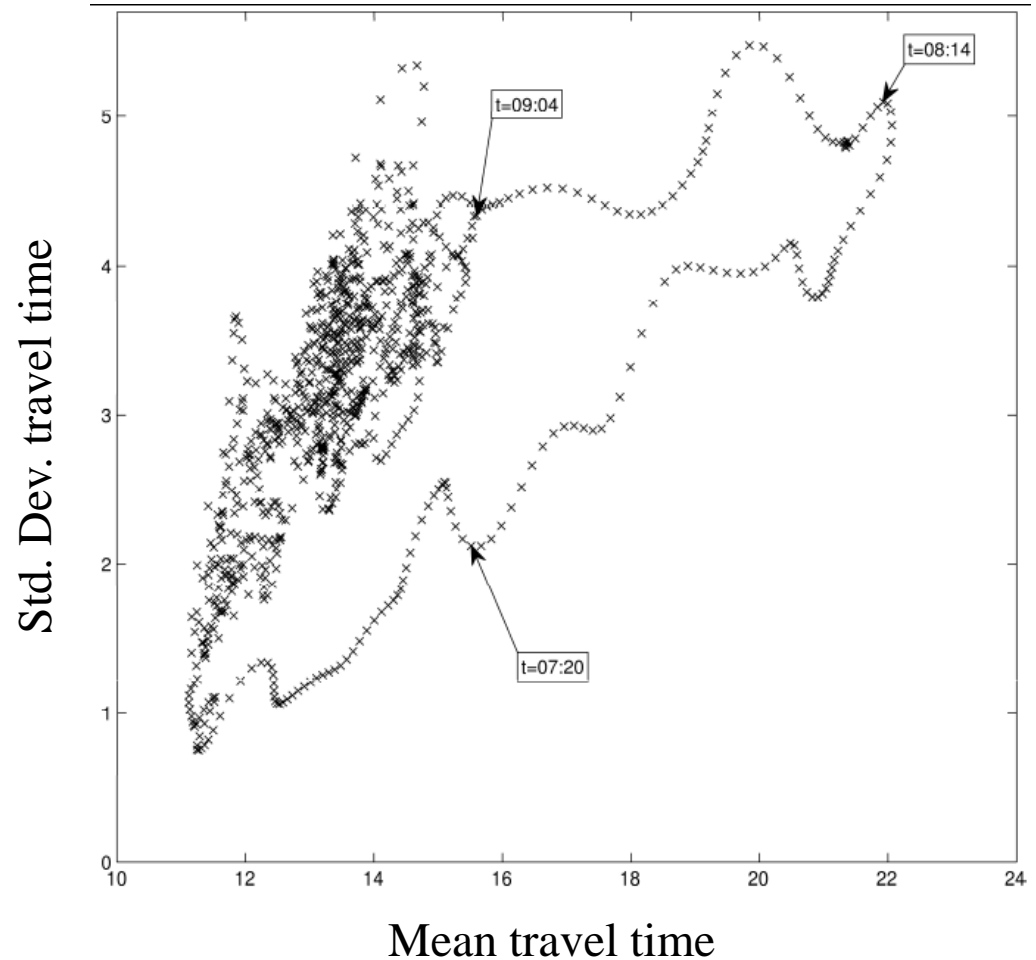
- Travellers are very different
- Value of travel time ranges over more than one order of magnitude
- Distribution has long tail



- Pricing is likely to increase the average value of travel time noticeably and hence the efficient toll
- Benefits can be gained from differentiated tolling, allowing users to sort

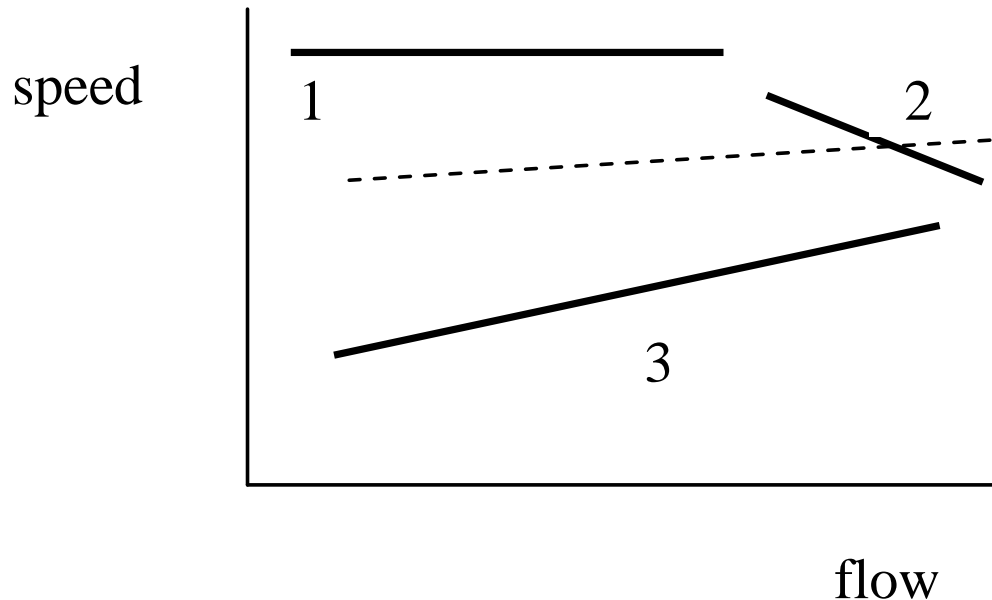
Travel time risk

- A significant cost
- Methods exist to quantify this cost
- Strongly related to the timing of trips
- Adds to mecc



Supply

- Describing the supply adequately is not easy
- Naive measurement may fail badly
- Should account for travel time variability



1. Free flow
2. Congestion
3. Hypercongestion

Implementation

- Intuitive rules for optimal design under realistic constraints are not available
- Traffic models are indispensable
- Models are not perfect – ask questions
- Models should consider not only route and mode choice, also trip timing

Evaluation

- Economic evaluation of RUC schemes may seek to address issues that arise because of interactions between the transport system and the wider economy
 - Labour market imperfections
 - Distortionary taxation
 - Agglomeration
- Use of revenues is often part of policy package. It is important to evaluate alternative uses of revenues as part of the package

Conclusion

- RUC is amenable to economic analysis
- Such analysis can assess whether a particular scheme is likely to be welfare improving
- RUC is well motivated by simple economic analysis
- Paper has reviewed a number of complications that arise as important features of reality are taken into account
- These tend to strengthen the case for RUC
- Complications can generally be addressed: conclusions may change substantially