

---

# Mitigating and minimising the distributional impact of road pricing

Scott Wilson, Director – 30 November 2017, Auckland



# Time/location based charging context

---

- Arguably only nine major cities internationally have introduced urban road pricing on existing roads.
- Excluding urban access control schemes, purely environmental charges (which still allow full access by electric cars). Excluding very small charging schemes (Valetta, Durham).
- Excluding network based heavy vehicle charging.
- Excluding US piloting full network charging of light vehicles to replace fuel tax (Oregon, California, Washington).



# Major urban pricing schemes

---



# Urban road pricing schemes have three primary impacts

---

1. Shift travel by time of day (lower charge periods, uncharged periods).
2. Shift travel by mode (public transport and active modes).
3. Shift travel by route (to uncharged bypass or parallel routes).
4. Consolidate or reduce total travel demand.

Evidence on mode and route shift easy to obtain, time of day less obvious, total trip suppression may not be easy to fully understand.



# Fundamental challenge of urban road pricing is benefits vs. what is paid

---

## Those who pay

### Either:

- **Benefit explicitly**
- **Benefit implicitly**
- **Don't benefit but pay anyway**

## Those who don't pay

### Either:

- **Continue trip, but changed "acceptably"**
- **Cancel discretionary trips.**
- **Cancel high value trips.**



# Some users pay regardless of no net benefits

---

- Conventional BCR averages value of time, so commercial users have net benefits, others may not.
- Imputed values of time are not “real”, in practice some are willing to pay for travel time savings based on specific trip characteristics (urgency, comfort, scarcity of time). US toll lanes demonstrated this.
- Scheme design can mean some pay with no net benefits, because uncongested locations/times are charged. All schemes except Singapore have this limitation to some extent.
- Simple schemes will tend to overprice shorter trips over charging points compared to longer trips, particularly if scheme is designed spatially for operational rather than policy reasons.



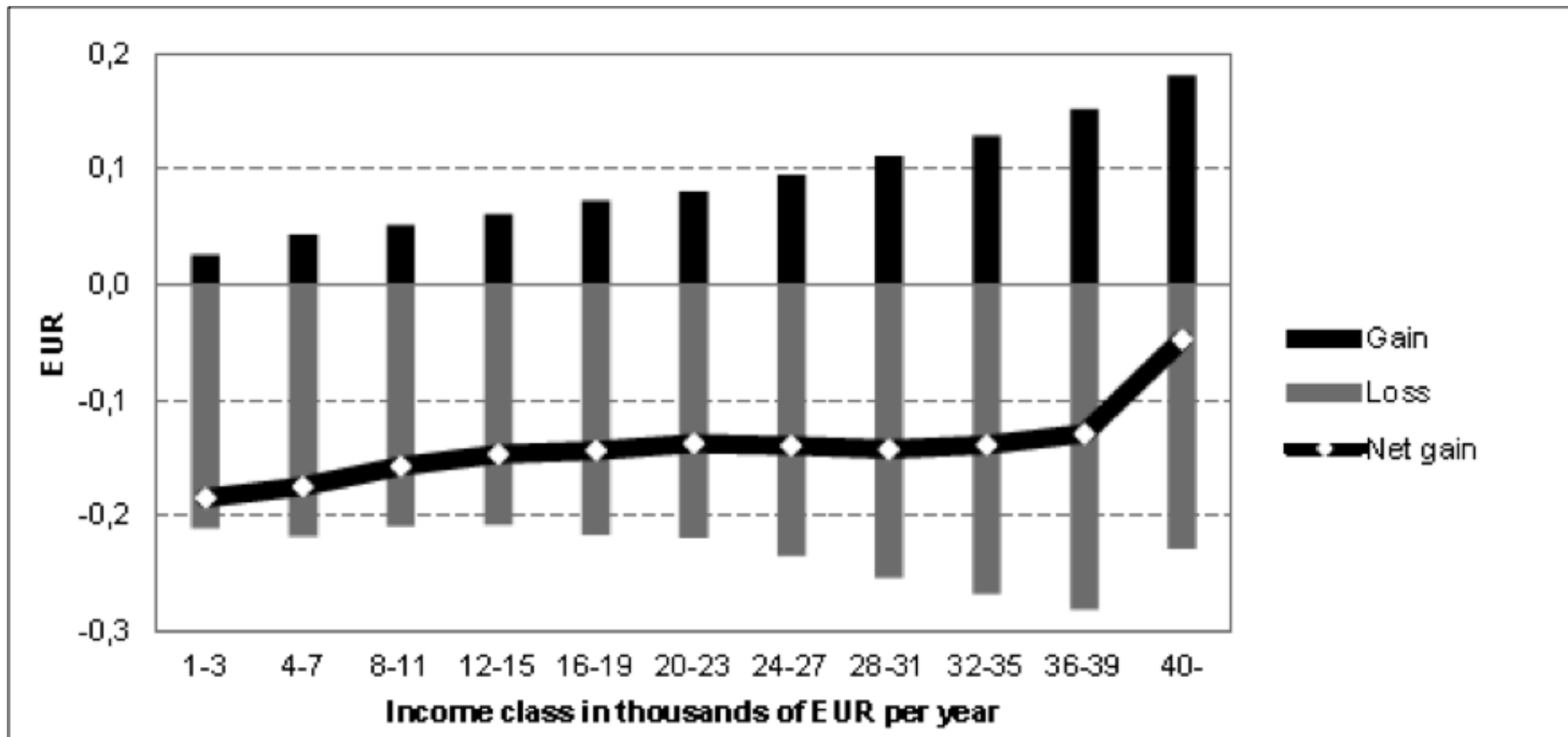
# Gothenburg charges many uncongested trips

- Congestion focused on north-eastern area in the peaks.
- Cordon designed much larger for revenue generation targets
- Scheme operates all day long with peak and off-peak charging.
- Little evidence of a need off-peak



# No income group in Gothenburg has had net economic benefits

- Scheme resembles a tax that has particularly regressive impacts.
- Major transport scheme to be funded by scheme are not yet completed.





# Of those who don't pay concern is around lost trips

---

- Modal, route and time of day shifts that produce modest losses to users are treated as acceptable.
- Key focus is to remove discretionary trips at times/locations of peak congestion, because they *should* have a relatively low economic loss compared to the benefits in improving mobility for others.
- However, major concern around some affected by pricing have no reasonable alternative for essential trips, particularly during initial years.



# Four main mitigation approaches

---

- Refine scheme design: Target the problem, minimise charging routes, directions and times that are not congested. Singapore easily the best example of this to date.
- Enhance supply of alternatives: Public transport, active modes, bypass routes, encourage time shift.
- Targeted discounts and exemptions for those particularly disadvantaged.
- Reduce other forms of charges or taxation (e.g. car ownership taxes).



# What schemes adopt which measures

- Singapore most focused on targeting locations and times of day for each point on the network being charged.
- Most schemes put considerable effort into alternatives.
- London has high proportion of discounted/exempt vehicles, but this appears largely to not be for distributional purposes.
- Only Singapore has reduced other charges in exchange for introducing urban road pricing

	Target problem	Alternatives	Discounts/ exemptions	Reduce other charges
Singapore	✓✓✓	✓✓✓		✓
London	✓	✓✓✓	✓✓✓	
Stockholm	✓✓	✓✓✓	✓	
Gothenburg	✓	✓	✓	
Dubai		✓		
Milan	✓	✓✓✓	✓✓	



# What worked and what didn't?

---

- Singapore and Gothenburg are almost opposites in terms of targeting the problem. The more refined the scheme, the fewer users will be inadvertently charged for little to no travel time savings for them.
- Most schemes to date have focused on radial trips to central areas, so public transport alternatives have been important. Importance of bypass routes depend on scheme geography, non-radial trips have fewer modal alternatives.
- Discounts and exemptions can be highly effective in targeting small, easy to define/control groups (e.g. disabled), but care to minimise risk of fraud or undermining scheme objectives.
- Little experience in offsetting other charges/taxes. Closer parallel is the US piloting of distance charging to replace fuel tax (on equity and revenue sustainability grounds)



# Unintended consequences

---

- Targeting of congestion inevitably has dynamic impacts. Time of day and charge levels need to change regularly to maintain benefits.
- Supply of alternatives can take away road space from those paying, reducing benefits to them. E.g. London cycle and bus lanes.
- Around 50% of London zone trips now by discounted/exempt vehicles. Their behaviour is not effectively managed. Those paying are now experiencing pre-charge levels of congestion
- Discounts and exemptions can create precedence for more through lobbying (Manchester project), and have considerable scope for fraud.



# Would these strategies work elsewhere?

---

- Each city is different and complex. Need to understand geography, demography, trip patterns and economic, social equity issues.
- Technology capability and cost are enabling scheme design to be more targeted.
- Public transport alternatives crucial for schemes focused major attractors, but unlikely to be important for wider corridor or network schemes. Lower density, decentralised metropolitan environments less likely to be able to offer many users useful modal choices.
- Discounts and exemptions useful, but should distinguish between those that are long term and those that are transitional (targeted discounts accepting longer term changes in land use patterns and user choices).
- Limited experience in using urban road pricing to replace other charges/taxes, likely to be considerable merits in exploring this further.



---

# Thank You!



D'ARTAGNAN CONSULTING

*The cutting edge of transport thinking*

