ITF Roundtable

Social Impact of Time and Space-Based Road Pricing

30 November – 1 December 2017 Auckland

NZ context and lessons from the literature

Acknowledgement:

- NZ Transport Outlook team for graphs and statistics
- MR Cagney for literature review materials and draft framework/principles
What do kiwis like?

We love

... to travel by car

Light vehicles account for 75% of total distance travelled p.a.

... cars

In 2013, 54.5% of households own two or more vehicles
- Australia = 50.3% (2011)
- UK = 30% (2015)

Less than 8% of households do not own any vehicles
- Australia = 8.4% (2011)
- UK = 24% (2015)

... our old cars

Average age of the light vehicle fleet in 2016 was 14.3 years
- USA = 11.6 years
- Canada = 9.3 years
- Australia = 10.1 years
- Europe = 7.4 years
Although PT use has increased, we are still using cars more.
National Land Transport Fund (NLTF) revenue

About $3.6 billion total revenue per year

Fuel excise duty (FED) (54%)
- 59.524 cents per litre on every litre of petrol
- Small amount of revenue from other fuels (LPG and CNG)
- $1.94 billion revenue per year

Road user charges (RUC) (distance-based) (40%)
- Per km charge for vehicles that use fuels that don’t pay FED (diesel)
- Diesel car = $62 per 1,000km, 44 tonne truck = $641 per 1,000km
- $560 million from light vehicles, $880 million from heavy vehicles per year

Motor vehicle registration and licensing fees (6%)
- $43.50 from each licence goes to the NLTF (most of the rest to accident compensation)
- $225 million revenue per year
NLTF and NLTP

Land Transport revenue sources

- FED $1.96b
- RUC $1.4 b
- MVR $225m

National Land Transport Fund

NZ Transport Agency

Financial Assistance Rate

Approved organisations

NZ Police

Road policing

Local roads

PT fares

Walking & cycling

State Highways

Other

Approved organisations

Rates

Users contribution

Rates

Rates

Rates
Auckland and National perspective

“Golden triangle” regions account for half of NZ’s population

Auckland alone ~ 40%

With changing trends, we need to change our revenue mechanisms.

Source: New Zealand Transport Outlook Future states
Rapid Transit Lanes and performance

Roads suffer from wide variability while the Northern Busway and rail lines – which have accounted for most of the PT growth to the city over the last 15 years – have fairly reliable times.
Auckland’s proposed Rapid Transit Network

Source: Auckland Transport website
Road pricing

Past and current investigations
• Auckland Road Pricing Evaluation Study (2006)
• Auckland Road Pricing Study (2008)
• Future Auckland Transport Funding (2014)
• Auckland Smarter Transport Pricing project (current)

One of the critical success factors
• Public acceptability (D’Artagnan Pacific, 2017)

Key issues:
• Perceived potential adverse impacts
• Lack of / insufficient consideration of social / distributional impacts
## Modelling of social and distributional impacts

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<thead>
<tr>
<th>Approach</th>
<th>Example of study</th>
<th>Key features</th>
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<tr>
<td>Bottleneck congestion model</td>
<td>Arnott et al (1994)</td>
<td>Compares outcomes for user groups with different VOTs and costs of scheduled delay</td>
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<tr>
<td>Transport model (some with integrated land use)</td>
<td>AFFORD (Fridstrom et al, 2000) RFF (Safirova et al, 2006)</td>
<td>Disaggregated by zones to identify impacts across zones</td>
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<td>Simulation model</td>
<td>Bonsall and Kelly (2005)</td>
<td>Ability to identify impacts on various at-risk groups</td>
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<td>Microdata modelling</td>
<td>Bureau and Glachant (2008)</td>
<td>Model accounts for variations between individuals</td>
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<tr>
<td>Computable general equilibrium model</td>
<td>De Palma and Lindsey (2004)</td>
<td>Model accounts for multiple modes, routes and fiscal impacts for government</td>
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...and combinations of the above

Source: MR Cagney (research in progress) and other individual references cited
Social impact assessment process

- Analyse context of the intervention
- Identify stakeholders and perform stakeholder analysis
- Identify factors affecting outcomes
- Analyse data and assess priorities for mitigation
- Consult stakeholders and develop mitigation plan
- Implement mitigation plan
- Evaluate and monitor outcomes

What are the pricing and equity objectives? Who will be better off and who will be worst off? Why and How are they affected? What are the impacts? Can effects be mitigated? How? When? Where? Who? What are the actual impacts?

Assessment framework Modelling tools
What are the equity objectives?

Equity objectives:

• Market related – user/polluter pays (time of day and location are important)
• Income related – Horizontal (within income group) and vertical (between income groups)
• Territorial related – Spatial distribution of winners and losers
• Temporal related – Time of day and intergenerational

Key dimensions:

► Time of day – peaks and off-peaks, every hour, half-hour or minutes
► Location – inside/outside charging zones, meshblocks or area units
► Income – household vs individual, household type adjusted, DepIndex etc

➢ modelling implications
Who, why, how and what

**WHO**
- Income groups
- Household types
- Ethnic groups
- Travel origin
- Travel destination
- Other circumstances (e.g., disability)

**WHAT**
- Travel time
- Financial costs
- External impacts
- Accessibility impacts

**WHY/HOW**
- Ability to pay
- Ability to consolidate trips
- Needs to avoid trips
- Ability to switch time, modes or routes
- Physical constraints (e.g., disability)
- Ability to switch locations

Ministry of Transport
Proposed framework

Segmentation of households
- Household composition
- Income levels (grouped to bands)
- Location within city
- Other circumstances (e.g., disability)

Impact measures
- Financial costs
- Travel time impacts
- Generalised cost impacts
- Changes in accessibility

Relative to incomes
Questions for discussion

• Which equity objective(s) is/are the most relevant?
• What dimensions should the assessment framework covers?
• How best to identify those who are better off and those who are worst off?
• How do we best assess equity/distributional impacts?
  • How do we best accommodate data requirements?
  • What should be the right tools/models to use?
• How do we best communicate the above to decision-makers?