IPART Independent Pricing and Regulatory Tribunal | NSW

Summary

Date

Workshop 1 – 13 February 2024

Workshop 2 – 26 February 2024

Workshop 3 – 14 March 2024

Workshop 4 – 28 March 2024

Event

Opal technical workshops

Purpose

The technical workshops were designed to allow transport practitioners, policy-makers and experts to consider and critique the main choices underpinning the fare optimisation approach and make suggestions for improvement.

IPART staff in attendance

Mike Smart

Claudio Campi

Lawson Spencer

Carol Lin

Jessica Hanna

Jennifer Vincent

External stakeholders

University of Sydney

Chinh Ho, University of Sydney

John Stanley, University of Sydney

David Levinson, University of Sydney

Transport for NSW

Ann Fong, Transport for NSW

Aaron Murray, Transport for NSW

Jeff Seeney, Transport for NSW

Jamie Quaintance, Transport for NSW

Angela Qian, Transport for NSW

Consultants

Adrian Kemp, Houston Kemp

Richard Tooth, Sapere Research Group

Robin Sandell

Euan Morton, Synergies Economic Consulting

Other organisations

Justin Tran, NSW Treasury

Jacqueline Hicks, City of Newcastle

Matthew Hounsell, University of Technology Sydney

Workshop 1 – optimisation method

IPART presented the slides in the Powerpoint slide pack 'OPAL workshop 1_optimisation method' to explain the approach to optimisation taken in 2016. IPART proposes to continue this approach for the current fare review, subject to feedback from this group and other stakeholders.

Following the presentation questions from participants sought to clarify elements of the optimisation model.

However, the following points of potential criticism were also made:

1. Important transport externalities, including agglomeration benefits and social inclusion, are not accommodated within the optimisation model.
   - Arguably they should be.
   - How will that be done?

   Noted externalities would be discussed further in Workshop 3
2. The method assumes a fixed demand curve, but COVID has led to significant shifts in demand patterns. How does this impact the equilibrium in this model?

Workshop 2 – Marginal costs of public transport

IPART presented the approach taken in 2016 using the Powerpoint slide pack 'OPAL workshop 2_marginal costs of public transport'. The approach was discussed under the headings below.

Why an econometric method of estimating marginal cost (MC) is not proposed

IPART does not plan to apply econometric methods to estimate of public transport marginal costs for the following reasons:

- The prime data source is annual accounts of PT agencies, but inter-year comparability of costs is difficult due to frequent structural changes within PT delivery organisations
- The distinction between opex, Major Project Maintenance (MPM) and capital expenditure in the annual accounts is not always consistent with the objective function of interest: total annual costs of delivering PT services on a steady-state, life cycle average basis
- Bus contracts contain useful information, but it refers to contract payments, which may differ from resource costs of delivering bus services
- Assessing annualised vehicle capital costs from annual accounts is complicated by the fact that some vehicles are purchased and owned outright by the Government, but others are the subject of complex leasing arrangements
- For Light Rail and potentially Metro services, turnkey contracts may hinder the transparency of key inputs and outputs

Instead, IPART suggested using an **Average Incremental Cost (AIC) approach**. Actual costs of public transport delivery organisations would be collected for a representative year in specific categories that can be related either to providing capacity for peak services or providing for usage at any time of day.

These would be divided by a relevant quantum of demand—either peak passenger journeys, peak passenger kilometres travelled, total passenger journeys and total passenger kilometres travelled. These averages across these incremental cost categories would form the basis of the marginal costs used in the optimisation.

The group agreed with that approach, noting it is very hard to do econometric analysis with the available data. One issue was noted:

- finding a representative year could be difficult due to the impacts of COVID. There are so many factors in any given year.

Separate marginal costs for peak and off-peak times

IPART explained approach for peak v off-peak marginal costs by referring to a study **The Theory of Peak-Load Pricing: A Survey**, Michael A Crew, Chitru S Fernando and Paul R Kleindorfer, Journal of Regulatory Economics, 1995, vol. 8, issue 3, 215-48.

This approach allocates capacity costs only to peak customers, but usage costs allocated to all.

Total capacity costs divided by quantum of peak usage to determine the average incremental cost of capacity. Total usage costs divided by quantum of all usage to determine the average incremental cost of usage at all times.

- **Peak MC** = AIC of capacity plus AIC of usage
- **Off-peak MC** = AIC of usage only.

The shift in peaks in post pandemic travel patterns (Tuesday to Thursday) was noted by the working group.

One comment was made on maximum capacity.

> For instance in Newcastle, maximum capacity is rarely utilised. But that doesn't mean providing services is inefficient. That system is always in an 'off-peak' scenario according to the model. There is a peak, but in that peak, usage is not nearly close to capacity. Level of service is based on the need of the community.

Allocating costs between the number of passengers (PJ) and distance travelled (pkm)

IPART explained the approach taken in 2016 of allocating costs among separate drivers: PJ and pkm, noting that vehicle costs depend mainly on distance travelled (pkm) whereas ticketing and station staff-related costs depend mainly on the number of travellers (PJ). For other cost categories (including maintenance of path infrastructure, e.g. train tracks, and network control, signalling and communications) it is not so clearcut how to allocate, and IPART would appreciate suggestions from this group.

A question was raised about sensitivity of the optimal price to the allocation between PJ and PKM?

- The answer is, potentially very sensitive, especially for externalities. Allocation of external costs to PJ and PKM had big implication on the overall result in 2016. This highlights the importance of

conducting sensitivity tests. To the extent possible we will try to make allocation decisions based on empirical data

- A comment was made that It is important to distinguish between costs and patronage for metro v Sydney Trains in Metro, given very different capital expenditure.
- A question was raised about the assumptions of the modelling. Should we assume the supply is fixed and we are trying to find the optimal Opal fare given the supply? The answer is that, for vehicle fleet capacity, we assume it can expand or contract with patronage and we calculate the contribution of this cost to the overall marginal cost. We do assume infrastructure is fixed.

Workshop 3 – marginal external costs for all transport modes

IPART presented the approach taken in 2016 using the PowerPoint slidepack 'OPAL workshop 3_marginal external costs of passenger transport v4'. The approach was discussed under the headings below.

Why don't we include the agglomeration externality in pricing?

Transport plays a key role in obtaining agglomeration benefits in a city by allowing for a denser form of urban settlement. However, it is largely transport infrastructure investments, rather than fares policy, that induces other private firms to make the complementary investments needed for agglomeration to occur. Therefore, we propose not to make any allowance in our optimal price calculation for the agglomeration externality. To the extent that public subsidies are useful for promoting agglomeration, those subsidies are best applied to building transport infrastructure. Ideally, the quantity of infrastructure subsidy would be commensurate with the value of agglomeration that it helps to achieve.

Should the social inclusion externality be included and if so, how?

Transport plays a key role in obtaining social inclusion benefits in a city by providing opportunities for equitable access to economic and social life. However, it is largely transport service planning and timetabling decisions, rather than fares policy, that provides these opportunities. While reduced fares might play some role at the margin, it is important that any fare subsidies for the purpose of social inclusion are targeted by means of fare concessions to at-risk groups.

While it may be hard to identify individuals as belonging to the at-risk group (because doing so may create privacy problems), it is sometimes possible to identify local geographies where social exclusion risks are high enough to justify a policy intervention. Reduced fares could potentially be offered on a concession basis to those geographical areas.

Alternatively, a more effective intervention may be to increase bus frequencies in those at-risk areas to improve transport accessibility for those who might need it. Ideally, the quantum of subsidy required to increase bus frequencies above the level that would achieve an efficient target vehicle utilisation would be commensurate with the social inclusion external benefit achieved by doing that.

Treatment of the accident externality

IPART presented some evidence from 2012 that suggests the rate of car crashes per Vehicle Kilometre Travelled (VKT) is fairly constant across a wide range of traffic densities. The same conclusion applies for crash fatalities per VKT. A question about the age of the data was raised and the possibility that the 2012 findings may not hold in more recent data. IPART is repeating that analysis using more recent 2020 data.

This conclusion strongly suggests that the value of the accident externality for automobile occupants is negligibly small. That is not to say that the external costs of accidents in which pedestrians or pedal-cyclists are injured can be ignored. These will be quantified.

Pollution/emissions externalities – how to estimate them?

IPART explained how Transport for NSW's Strategic Travel Model (STM) runs were used in 2016 to quantify the relationship between vehicle emissions and traffic volumes, and how these are affected by public transport prices. We expect to use that approach in the current fare review.

Congestion externality – how to estimate it?

IPART explained how STM runs were used in 2016 to quantify the relationship between road congestion and traffic volumes, and how these are affected by public transport prices. We expect to use that approach in the current fare review.

> Some additional sources of data on vehicle travel time under congested conditions were suggested by one participant.

Attributing congestion to journeys or passenger-kilometres?

IPART presented some preliminary statistical analysis to support a specific attribution of congestion externality costs between passenger journeys and passenger kilometres travelled.

WORKSHOP 4 – cars, elasticities and recommended prices

IPART presented the approach taken in 2016 using the Powerpoint slidepack 'OPAL workshop 4_cars elasticities and recommended prices'. The approach was discussed under the headings below.

Integrating cars into optimisation

While we do not calculate optimal prices for automobile use, we need to know the difference between the price paid by a motorist for a car journey and the marginal cost of that journey in order to calculate optimal fares for other transport modes. This difference (p – c) will be approximately equal to the taxes on motoring if we make the assumption that all inputs to car travel are supplied in workably competitive markets. If that assumption is valid, then prices paid for fuel, repairs and the vehicle itself will be approximately equal to the long run marginal cost of supplying those inputs. Hence p – c = 0 for those inputs.

However:

- the parking space levy
- the fuel excise tax
- the difference between road tolls and the marginal pavement damage done by road use

represent taxes that account for a positive value of p – c. Each of these things can be estimated using the Strategic Travel Model (STM).

Estimating demand elasticities

IPART explained how all the relevant demand own-price elasticities and modal cross-price elasticities can be calculated using the STM runs. The following points requiring clarification emerged from the discussion:

- Is the car ownership decision endogenous or exogenous within the STM?
  - A view was expressed that the cross-elasticities derived from the STM would be more realistic if that decision was endogenous within the model. Action: confirm what assumptions about this the STM makes.
- The implied rates of switching to different modes derived from the STM appeared unrealistic to several participants.
  - In particular, the result that most foregone ferry trips would become train trips was considered unrealistic in light of the small number of ferry wharves adjacent to train stations. Action: test the mode switching logic in STM for the cases mentioned by the group.
- To what extent is the assumption of no substitution between trips of different distances valid? Action: review relevant literature and test the hypothesis with STM modellers.

Translating optimal fares into recommended prices

IPART explained how optimal fares were used in 2016 to base our then recommended fares, and how the optimal fares compared to the actual fares prevailing at that time.