

Public Transport Fare Structure

Some Comments related to IPART “Transport— Issues Paper”, July 2015

Peter Abelson
August 2015

The following are some observations on an optimal public transport fare structure focusing on mode cost differences and distance fares. The note has short sections on public transport pricing principles, public transport costs, practical pricing implications and responses to IPART (July 2015) *Transport— Issues Paper*. The note does not address efficient pricing allowing for possible externalities and under-pricing of private motor vehicles which I have discussed in a separate note and submission to IPART.

1 Public Transport Pricing Principles

When setting prices for a period of a year or more, the most generally accepted efficiency principle is that prices (P) should reflect the marginal costs incurred over that period, which may be called long run marginal costs (LRMC). Setting $P < LRMC$ would result in inefficiency (a deadweight loss) from over use of the transport service. Setting $P > LRMC$ would risk inefficiency from under use.

LRMC would include costs (depreciation) of rolling stock and full operating costs. They would not include the cost of transport infrastructure (unless there were a clear short-term cost impact) or general administration overheads.

If government wishes to subsidise public transport for some sectors of the community, the subsidy would be provided by income or price concessions to these sectors rather than by moving away generally from the underlying efficient price principles.

This leaves open the issue of who pays for the fixed costs: the transport user or the taxpayer? This is an efficiency and equity issue. Inefficiency arises both from setting $P > LRMC$ and from the impacts of taxation on labour supply and consumer choices. Equity may suggest that users should pay for services rather than non-users. On the other hand, some users may be lower income than the average taxpayer.¹

There is no definite solution to these issues, especially to judgements about equity. Given that demand for public transport is relatively price inelastic, a fair compromise could be that prices be set equal to LRMC plus some allowance for fixed costs. And that individuals deemed to need subsidised travel be directly supported.

¹ This may be why IPART considers that fares should be set to equal only efficient prices and that taxpayers should pick up the full cost of any public transport inefficiencies. In this writer’s view, this tends to encourage inefficiency.

2 Cost Differences

Starting assumptions of this note are that:

- LRMC rises broadly linearly (in proportion) with vehicle km for buses, rail and ferry.
- There are significant differences in the vehicle km costs of the different modes.

This is depicted in Figure 1 which shows total LRMC as a function of vehicle km, with buses being the lowest cost per vehicle km and trains the highest cost.

However, for the purpose of developing pricing, these LRMC per vehicle km have to be translated into \$ cost per passenger km (pax km).

Figure 2 shows LRMC per passenger km. In each case, LRMC is shown as constant per pax km. This reflects the linear schedule for total LRMC shown in Figure 1. In Figure 2, the lowest cost is still bus travel, but trains are lower cost per pax km than ferries because of the higher capacity of a train.

Two important assumptions underlie Figure 2.

- For practical purposes, the cost of servicing the first hundred or thousand passengers is similar to the cost of servicing the marginal one hundred or one thousand passenger. This LRMC is effectively constant.
- There are significant differences in costs per pax. km between the three modes.

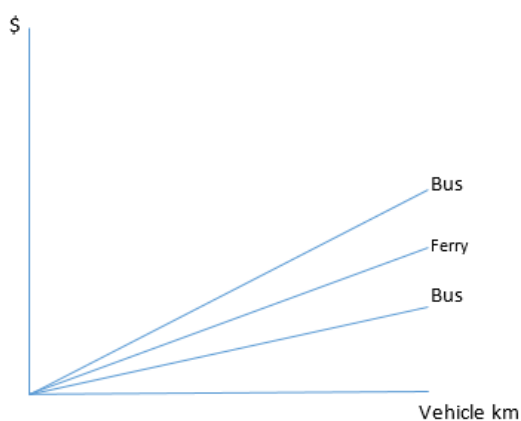


Figure 1 Total long-run marginal cost per vehicle km

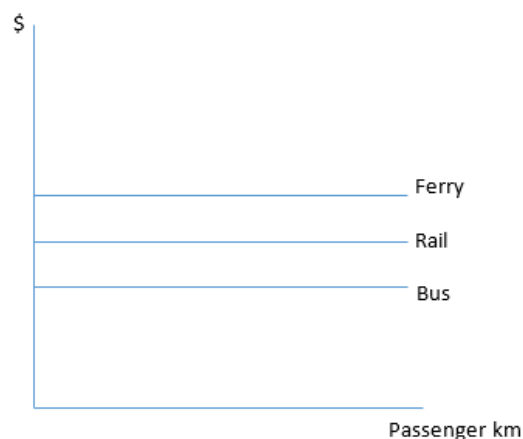


Figure 2 Long-run marginal cost per passenger km

3 Practical Pricing Implications

To derive practical pricing outcomes, we make the following related assumptions.

- There is no clear marginal consumer. Any trip maker may be regarded as marginal. Thus, other than for equity reasons, all customers should be treated equally.

- Vehicle costs (and hence cost per pax km) are effectively linear with distance. Other things being equal, such as the level of congestion and the frequency of stopping, a bus that makes two 20 km trips would have similar costs to a bus that makes eight 5 km trips.

It follows from the principles of efficient pricing and these various assumptions that public transport pricing should:

- Reflect modal differences in LRMC.
- Be broadly linear with distance.
- Should not penalise modal transfer.

4 Responses to some IPART Questions

The following responses to selected IPART's questions follow.

- 1 Yes, criteria should include efficient use and delivery of public transport. This should allow for externalities in the assessment (which have been discussed in a separate submission). However, it is not clear why public transport use should be encouraged beyond this point, unless for some specific equity objective.
- 2 If LRMC are significantly different (say 15 % or more) for different modes, as appears to be the case, then fares should reflect this.
- 3 There should not be penalties for mode changes.
- 5 Fares should reflect LRMC and this appears to mean that they should reflect distances travelled. This would encourage efficient housing decisions as well as efficient transport.
- 8 Though not discussed in this paper, arguably LRMC are lower for off-peak trips because they do not include costs of rolling stock (the demand for which is driven by peak demand) and there is spare capacity. If LRMC are lower in off-peak, fare differentials would be efficient.