

The Value of Mobility

John K. Stanley¹
Institute of Transport and Logistics Studies
Faculty of Economics and Business
The University of Sydney,
NSW, Australia, 2006

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Abstract

This paper considers two alternative policy approaches to evaluating public transport initiatives that improve mobility, particularly for people who are at risk of social exclusion. These approaches are a cost-benefit approach, which seeks to derive monetary values for increased mobility, and a social equity approach, in which minimum public transport service levels are provided to give most people the opportunity to travel for most purposes, most of the time. The cost-benefit approach has been hamstrung to date by the lack of explicit values for trips made on new services (as distinct from values of additional trips that are made on existing services). The paper reports Australian research that has estimated such values and further research into possible minimum service levels, suggesting where each approach might be appropriate.

1. Policy Evaluation Frameworks

Economic evaluation tools, particularly cost-benefit analysis (CBA), are usually highly regarded by governments to help guide decision making. CBA seeks willingness-to-pay measures of benefit, and comparable cost indicators, to suggest whether a particular course of action (e.g. policy or project) is likely to result in net economic benefits to a community over time. Much of the foundation of welfare economics is bound up in seeking to understand circumstances where judgements might be formed about such desirability, with the distinction between *efficiency* and *distributional* aspects of welfare optimisation, and the related need for *value judgements*, being central to these considerations.²

CBA is largely founded on the Hicks (1939)-Kaldor (1939) hypothetical compensation test, which suggests that provided the gainers from some particular action or policy *could* compensate the losers, then the change could be regarded as improving economic efficiency and *potentially* adding to economic welfare. Willingness-to-pay measures provide the basis for benefit estimation (and conversely, willingness-to-accept measures for estimation of costs).

¹ John.Stanley@sydney.edu.au

² See Nath (1969) for a comprehensive discussion of the relevant foundations of welfare economics.

This market-based approach reflected in CBA is recognised as being helpful in choosing between alternative possible courses of action on economic efficiency grounds but as often confronting difficulties in two key areas:

- a lack of direct markets in which to value particular costs/benefits in monetary terms; and,
- the distributional problems of valuing benefits/costs to people whose circumstances are different (for example, their income levels may vary considerably, they may have different physical capacities and/or they may live at different points of time). The general failure to pay compensation to losers from a course of action reinforces the need for value judgements about the desirability of the relevant distributional consequences to draw conclusions about the overall merit of the action(s) under consideration.

Various analytical approaches have been developed to impute monetary values to costs and benefits that are not directly traded through markets, to tackle the first of these problems. Relevant examples in the transport field include valuation of travel time savings, air pollution damage, carbon emissions and accidents.

With respect to distributional implications, various benefit/cost weighting techniques have been used to allow for the likelihood that the value of a dollar will differ as between groups of people (for example, whose income levels differ). Incorporating such distributional weights is, in effect, an attempt to specify a particular social welfare function that makes explicit value judgements about the relative worth of gains/losses to different groups. The UK Treasury Green Book on project evaluation discusses application of such approaches (UK Treasury 2003).

In contrast, a social policy perspective tends to be rights-based and argues that it is the role of government to reduce inequality and improve the wellbeing of all citizens in a country. Thus it is concerned with who gets what and under which circumstances (McLelland 2009). It is also argued that improving the ability of citizens to function fully and independently according to their capacity contributes to the public good (Manderson 2005).

People are born with differing capacities and live in different circumstances. Equality can be viewed as the facilitation of participation and inclusion, and the development of capability to participate within the economy (Jayasuriya 2006). Nussbaum's (2005) capabilities approach to welfare in a pluralist society states that there are a number of fundamental capabilities or entitlements which provide the foundation for people to make choices about how they will live their lives. She sees these capabilities as essential for a just society.

Monetary redistribution (such as through the taxation system and the provision of welfare benefits and pensions) has traditionally been an essential component of social policy. However, a minimum provision of services such as in the areas of health, housing and education, has also been an important element of much social policy. McLelland (2009) points out that social welfare policies of this kind are based on the idea of the achievement of a minimum standard of provision and, beyond this, the provision of equality of opportunity – reflecting the capabilities approach.

With recent thinking about social inclusion and a deeper understanding of what is needed for wellbeing, equity principles could also include issues such as access to information, social participation and opportunities to enhance social capital development and overall life satisfaction, which will increase personal resilience and allow people the freedom to choose their own goals (Jayasuriya 2006; Western et al. 1995).

The ability to be mobile has been a transport/social policy matter of concern for some decades (see, for example, Donaghy et al. 2005). Subsidised/free school bus services are a common and long standing example, as are fare concessions to particular target groups.

For the US, Rosenbloom (2007) points to three sets of legislative or regulatory provisions that link social exclusion and transportation requirements: the 1964 Civil Rights Act; statutes and regulations that create environmental justice mandates; and the 1990 Americans with Disabilities Act. US Federal public transport assistance through the Safe, Accountable, Flexible, Efficient Transportation Equity Act (2005), for example, targeted employment access, elderly individuals and individuals with disabilities. More generally, paratransit services have evolved in the US to meet travel needs of some target groups. The concept of evaluation in such settings is largely one of compliance, or otherwise, with mandated requirements and of cost-effectiveness in delivery.

In the UK, following the work of the Social Exclusion Unit (2003), there has been an emphasis on measuring and defining the quality of accessibility that is available to people to participate in key activities thought important to inclusion. Local Transport Plans include relevant measures that reflect local priorities and such measures are used to help define local transport improvement programs (DfT 2009). Project identification may occur, for example, by way of comparison between currently achieved accessibility levels and accessibility targets. Evaluation then measures how achieved accessibility outcomes are expected to change under improved arrangements.

Much UK work has been based on facilitating access to particular activities thought vital to inclusion, such as access to work and education. Drawing on social capital, community strengthening and capability agendas, Australian research is placing more emphasis on recognising the need to interact with other people and in a variety of circumstances in order to facilitate the acquirement of basic needs and maximise the achievement of capabilities (Stanley and Stanley 2007). Thus, for example, the ability to travel to achieve bridging social capital (a form of social capital which enables a person to 'get ahead') is facilitated by the improved capacity to travel. Stanley et al. (under review) shows the importance of the social capital and community perspectives.

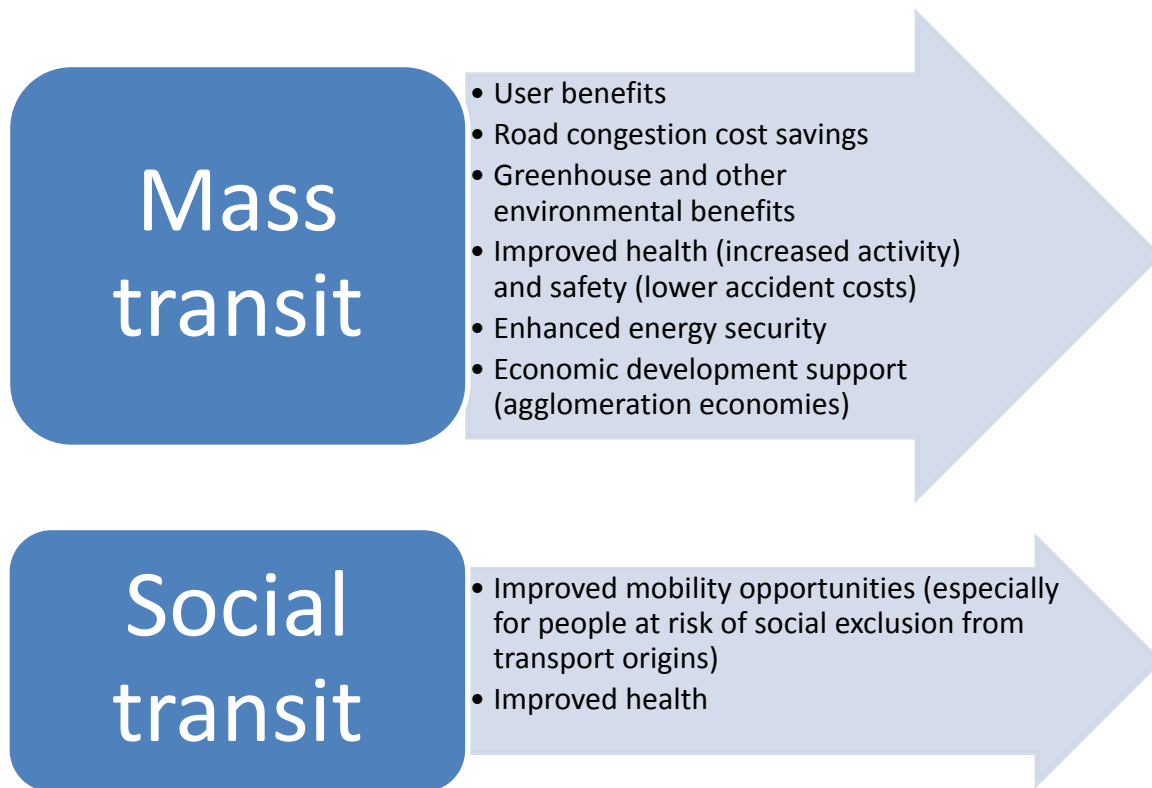
This paper considers the application of these two fundamentally different decision making approaches, the economic and social approaches, as they relate to provision of public transport services. In many locations, but most particularly in developed countries with low settlement densities, public transport service provision is frequently not commercial and relies primarily upon arguments about market failure for its societal justification. These market failure arguments include both efficiency and distributional elements.

Public transport service improvements can be largely classified as being for either ‘mass transit’ or ‘social transit’ purposes (Figure 1). The public or social benefits from ‘mass transit’ services largely derive from mitigating economic and environmental externalities relating to road congestion, pollution, the road toll and the like, derived from achieving modal shift from car to public transport. In terms of the efficiency/distribution dichotomy, these are efficiency benefits that are additional to the direct public transport users’ benefits from travel. The emphasis is largely on trunk services (with associated feeder services) operating during congested peak periods. They form a major part of the value proposition for public transport.

‘Social transit’ initiatives are largely distributional in nature, intended to improve mobility opportunities so as reduce the risk that people will be socially excluded. Feeder public transport services operating at lower frequencies than trunk services will be mainly ‘social transit’, even though they may also feed a trunk service.

If public transport services are being improved for ‘social transit’ purposes, how should they be evaluated? Should a social policy perspective be applied or should a cost-benefit (willingness-to-pay) approach be used? In the former case, a minimum service level approach could be taken. In the latter, the analyst would (inter alia) seek to explicitly value the user benefits of improved access or mobility to those who are ‘at-risk’ and compare the benefits thus derived with the costs of providing the services.³

Figure 1: The benefits to society from mass transit and social transit



³ The analysis might also extend to possible flow on economic and social benefits of reduced social exclusion, such as lowering the crime rate.

Section 2 of this paper overviews some recent work on the links between mobility and social exclusion. Section 3 outlines new Australian research into the value of mobility for ‘at-risk’ people and suggests how this can be used in an evaluation context. Section 4 reports on related Australian research that has been used to advocate a minimum metropolitan public transport service level on social justice/inclusion grounds. Section 5 discusses the two evaluation approaches as they relate to public transport improvements where the primary intention is to enhance a ‘social transit’ agenda and Section 6 presents the paper’s conclusions.

2. Mobility and Social Exclusion

The concept of social exclusion has grown from work which sought to better understand and represent poverty. While poverty and social exclusion are related, social exclusion describes the existence of barriers which make it difficult or impossible for people to participate fully in society. There is a growing body of evidence that poor mobility can increase the risk of social exclusion (SEU (2003), Donaghy et al. (2005), Currie et. al. (2007)).

A research project, partly funded by the Australian Research Council (ARC), has been examining links between mobility, social exclusion and wellbeing.⁴ This article focuses on the link between mobility and social exclusion, drawing extensively on that study, in which the present author has been closely involved.

Drawing on and extending international research (Burchardt et al. 2002), the Australian study used five dimensions to indicate a person’s risk of being socially excluded, with thresholds being set to indicate whether a particular risk factor was likely to be operative. These risk factors, with relevant thresholds, were:

- household income – less than a threshold of \$AUD500 gross per week;
- employment status – not employed, nor in education or training or looking after family or undertaking voluntary work;
- political activity – did not contribute to/participate in a government political party, campaign or action group to improve social /environmental conditions, to a local community committee/group in the past 12 months;
- social support – not able to get help if you need it from close or extended family, friends or neighbours; and,
- participation – did not attend a library, sport (participant or spectator), hobby or arts event in the past month.

Interview surveys were undertaken in both Melbourne and in a Victorian regional area (the Latrobe Valley) to gather data on these risk factors, with surveys including only people aged fifteen years or over.

⁴ Australian Research Council Industry Linkage Program Project LP0669046: “Investigating Transport Disadvantage, Social Exclusion and Well Being in Metropolitan, Regional and Rural Victoria”.

A separate special survey focused on people who were expected to be highly socially disadvantaged. The latter survey was required because travel diary data that was available from the metropolitan and regional surveys did not adequately represent highly disadvantaged people, who proved most unlikely to complete voluntary travel diaries. Analysis of the special survey data is at an early stage but some broad comparisons are reported in the paper, considering only respondents who exhibited two or more social exclusion risk factors.

Table 1 shows the proportion of survey respondents in the Melbourne (sample size 535), regional Victorian (N = 146) and special survey (N = 176), who exhibited various numbers of social exclusion risk factors. Only one person across the three surveys demonstrated five risk factors but one or two risk factors were common in the metropolitan and regional samples, with over half in each survey exhibiting at least one risk factor. There was a slightly higher risk distribution among respondents in the regional Victorian sample than in the Melbourne sample. Because the sample reported from the special survey only includes respondents with two or more risk factors, that sample has the highest risk distribution of the three samples.

Respondents to the Melbourne survey took an average of 3.5 trips a day, which also equates with undertaking an average of 3.5 daily activities (in the travel diary). However, people exhibiting no social exclusion risk factors in that survey undertook an average of 3.8 trips a day, this trip rate falling to 3.2 for those exhibiting one risk factor and to only 2.8 for those with two or more risk factors. This suggests a strong relationship between mobility and risk of social exclusion. This was investigated further across the three data sets and the combined data set (N = 1020), which also included an additional group from the special survey (those from that survey who had fewer than 2 social exclusion risk factors).

Table 1: Survey Proportions Exhibiting Various Numbers of Social Exclusion Risk Factors

Number of Risk Factors	% of Combined Respondents (N = 1020)	% of Melbourne Respondents (N = 535)	% of Regional Victorian Respondents (N = 146)	% of Special Survey Most “At Risk” Respondents (N = 176)
0	35	45	36	n.a.
1	34	35	37	n.a.
2	18	13	18	48
3	10	5	7	38
4	3	1	3	13
5	0.2	0	0	1

Source: Australian Research Council Industry Linkage Program Project LP0669046: Investigating Transport Disadvantage, Social Exclusion and Well Being in Metropolitan, Regional and Rural Victoria” Survey data.

Simple linear regressions show that trip rates (and hence activity rates) decline as the number of social exclusion risk factors increases, across all survey groups.⁵ In the Melbourne sample (equation (4) below), the rate of decline was almost 0.5 trips a day per unit increase in the number of social exclusion risk factors. The rate of decline was a little lower in the regional Victorian survey but still relatively high (at 0.39). The rate of decline among those in the special survey who exhibited two or more risk factors was also close to 0.4 per unit increase in SE risk factors (equation (6) below). When the typical person is making about 3-4 trips a day, one more or less trip/activity can be seen as a non-marginal change and can be expected to have a substantial impact on someone's welfare.

The combined survey samples (N = 1020), which also included those respondents from the special survey who had less than two social exclusion risk factors, showed a slower rate of decline in trip rate per unit increase in SE risk factors, at almost 0.2 trips per day (equation (1) below). Equations (2) and (3) show that the trip rate in this combined sample declined faster among those aged 65 or over, as SE risk factors increased, than among those below this age. The relatively high proportion of respondents in the metro and regional surveys who were aged 65 or over contributed to the relatively high rate of decline in trip rate in those surveys, as the number of SE risk factors increased. The combined surveys include a larger proportion of younger people, for whom the rate of decline is less as the number of risk factors increases.

$$T_c = 3.92 - 0.18 \text{ SE} \quad (1)$$

$$(t = -2.4)$$

$$T_{c<65} = 4.07 - 0.144 \text{ SE} \quad (2)$$

$$(t = -1.8)$$

$$T_{c65+} = 3.47 - 0.48 \text{ SE} \quad (3)$$

$$(t = -2.6)$$

$$T_m = 3.79 - 0.48 \text{ SE} \quad (4)$$

$$(t = -3.1)$$

$$T_r = 3.88 - 0.39 \text{ SE} \quad (5)$$

$$(t = -2.2)$$

$$T_s = 4.98 - 0.37 \text{ SE} \quad (6)$$

$$(t = -1.5)$$

where T_c = daily trip/activity rate from the combined samples (N = 1020)

$T_{c<65}$ = daily trip/activity rate from those aged <65 in the combined sample (N = 820)

T_{c65+} = daily trip/activity rate from the 65+ group in the combined sample (N = 200)

T_m = daily trip/activity rate for Melbourne survey respondents (N = 535)

T_r = daily trip/activity rate for regional survey respondents (N = 176)

T_s = daily trip/activity rate for special survey respondents (showing two or more risk factors) (N = 144)

SE = number of social exclusion risk factors exhibited (0-5).

⁵ While the proportion of the variance in trip rate that is explained by changes in social exclusion risk factors is small in each case, this risk factor variable has a significant influence on trip rates in each equation, except for the special survey.

Five of the six equations have t-values on the betas which are significant at the ten per cent level or better, except for equation (6), where significance is at the 15% level. These results suggest that trip rates do decline with an increased risk of social exclusion, confirming the likelihood of a link between mobility and risk of exclusion. The decline for older people and for those at most risk of social exclusion seems to be fastest as the number of risk factors increases.

People aged 65 or above also undertook fewer trips/activities per day on average (3.0 from the combined survey) than those aged under 65 (averaging 3.9 trips a day). This is a substantial difference. The lack of a work trip for older respondents and declining physical capacities are likely to be contributory factors.

The higher constant in equation (6) should not be read as suggesting a substantially higher trip rate for highly disadvantaged people, because that sample data excluded respondents with zero or only one social exclusion risk factor. However, the average daily trip rate for the disadvantaged sample (at 4 trips a day) was a little higher than the rates for the metro and regional samples (at 3.5 and 3.4 trips a day respectively) and for the combined sample of 3.7 trips per day.⁶ The suggestion is that, with more time on their hands, highly disadvantaged people (many of whom are unemployed) are likely to undertake more daily trips (e.g. to spend time with friends). While the lack of a job may contribute to lower trip/activity rates among older people, it does not appear to reduce trip rates among highly disadvantaged people.

Over half of the travel by the special survey group who exhibited two or more risk factors (N = 176) was made by public transport (26.3 percent of daily trips) or walking/cycling (28.2 per cent), with only 30.1 per cent travelling as a car driver and 12.2 per cent as a car passenger. The high mode shares for public transport, walking and cycling are not surprising, since 62 of the 176 respondents in this sample (or 35.2%) came from households without cars and 134/176 (or 76.1%) from households with one or zero cars.

Table 2: Mode Choices

Mode	Melbourne Metro 2007 (%)	Regional Victoria 2007 (%)	Special Survey 2009 (N = 176) (%)
Car driver/passenger	75.4	84.4	42.3
Public transport	9.1	3.1	26.3
Walking/cycling/other	15.5	12.5	28.2

Sources: Melbourne and Regional Victoria from Victorian DOT (2009), page 5. “Other” modes from that source, which are very small in share, have been included with walking and cycling; Special Survey from ARC Survey data.

Table 2 compares modal shares for participants in the special survey with the Melbourne and Regional Victorian averages from the on-going Victorian State travel surveys, showing a far

⁶ Average trip length was longer in the regional survey at 12.4 kilometres, compared to 10.0 kilometres in the metro sample, with average daily travel distances consequently being greater in the regional sample (as expected), at 42 kilometres, compared to 35 in the metro sample.

higher reliance on public transport, walking and cycling by those thought likely to be highly disadvantaged. Public transport is clearly very important for this group.

Factors Influencing Risk of Social Exclusion

The ARC research collected data on a range of variables that were thought likely to influence a person's risk of being socially excluded, with trip making being one of these variables. The key influencing factors which were examined for their relationship with risk of social exclusion were:

- personality variables – where outgoing personality types were expected to be less likely to be at risk of social exclusion;
- measures of social capital and sense of community - where high levels of social capital and a strong sense of community were expected to lower the risk of exclusion;
- household income – where a higher income level was expected to reduce the risk of exclusion; and,
- trip rate – the expectation was that a socially included person was likely to undertake more trips, reflecting that inclusion.

The hypotheses outlined for the dot points above were confirmed by the Melbourne data analysis, which shows that a person is less likely to be at risk of social exclusion if they (Stanley et al. forthcoming):

- have a strong sense of community;
- have contact with members of their close family more frequently than once a year (but this can be less frequent than monthly);
- have contact with members of their extended family;
- trust people in general;
- have medium or better household income;
- are relatively mobile (make more trips); and,
- do not feel obstructed by life's circumstances (they are concerned about personal growth).

The regional Victorian survey data and data on highly disadvantaged people have yet to be examined for such detailed relationships.

3. The Value of Mobility

Because the research indicates that both a person's household income and their trip rate are significant influences on risk of social exclusion, the relative influence of these two variables can be evaluated to impute the value of an additional trip. With logit modelling (as used in this study), this value is given by the ratio of the respective estimated co-efficients on the number of daily trips and the daily household income variables. This ratio measures the marginal rate of substitution between trips and income in relation to the risk of social exclusion. The resulting

value was \$AUD19.30 in 2008 for a person whose household income level was at the average, or about \$AUD20 in 2010 prices (Stanley et al. forthcoming).

What does this mean? Essentially, it means that anyone who is able to undertake an additional trip because of the availability of new or substantially improved public transport services, on average, implicitly values that trip at about \$AUD20. Thus, if a new or substantially improved bus or rail service leads to new trips being undertaken, a value of about \$AUD20 per trip can be ascribed to these new trips in evaluating the case for the improvement.⁷

What is Being Valued?

Two different interpretations have been put on this value, both consistent with a willingness-to-pay approach but differing in their assessment of who is doing the valuing.

Statistically, the dependent variable (risk of social exclusion) is measured on a utility scale. It can be argued that the resulting value for additional (or less) trips applies to the preferences of a representative individual, who chooses between various ways of engaging with their community, friends, mobility choices and the like, taking into account personality characteristics, to maximise utility in the face of the risks of social exclusion. Because the survey is personally administered (one-on-one) and is specifically about transport problems and activities that relate to social inclusion/exclusion, people can be presumed to be giving answers that (partly at least) reflect life decisions they make that bear on this issue (e.g. decisions about how much they invest in social networking, travelling). As a consequence, the dependent variable (risk of social exclusion) can be interpreted in utility terms, just as mode choices are so-interpreted in value of travel time savings work (where probability of choosing a particular mode, not utility as such, is the dependent variable but interpretation is via a utility maximising hypothesis).

This view that the value is an individual willingness-to-pay measure is reinforced by separate (but currently unpublished) modelling in which the dependent variable is changed from Risk of Social Exclusion to Satisfaction with Life Scale (a measure of self-reported wellbeing) but the independent variables are unchanged. The implied value of a trip from that analysis is close to the \$AUD20 value, suggesting similar choice characteristics influencing the values.

Professor Chris Nash (pers. com) has offered an alternative interpretation, suggesting that the marginal rate of substitution between income and trips could be taken as showing the political trade-off between income and trip making in terms of seeking to reduce risks of social exclusion. This would not be an individual willingness to pay, based on a utility maximising individual's choice function, so much as a political WTP, which could still be used in project/program evaluations.

Because of the context within which the surveying was undertaken, the current author prefers the individual willingness to pay interpretation, based on an individual utility maximising decision model, which provides a consistent basis for defining benefits and costs (based on individual

⁷ The value would also apply to new trips by any other mode becoming available on a very much improved basis, since the value attaches to a trip rather than to a mode per se.

WTP). The practical difference in interpretation, however, may make no real difference in the actual benefit value ascribed to additional trips in real world project evaluations.

Comparison to Existing Values

Economists frequently use the “rule of a half” to value user benefits from trips that are “generated” by a transport improvement, such as an improved public transport service. Generated trips might be (for example) new trips, trips that are now longer than before, or trips that involve a mode change. These “generated” trips are usually credited with half the unit benefit that is attributed to trips that were made both before and after a particular improvement.

The \$AUD20 figure is about four times as high as this generated traffic benefit measure, if travel by car or public transport had been a prior possibility for the individual (for the same trip length). It is, however, broadly similar to (in fact slightly higher than) the value that would flow from applying the rule of a half on the assumption that the option of a taxi was the only available alternative before the improvement. Given the absence of alternative travel options for many public transport users (discussed further below), it is likely that a taxi will in fact be the next best alternative for many new users of substantially improved or new bus services. The closeness of the half value that would result from a taxi as the next available alternative to the \$AUD20 value is also some confirmation that the resulting \$AUD20 value is in fact the result of an individual utility maximising decision approach.

It is argued below that, for many bus users, the next best alternative may not be a taxi but a lift provided by another person. A new or substantially improved bus service will remove the need for this lift-giving and deliver benefits to the new bus traveller and also to the prior lift-giver, who will now have time freed up for other activities. The latter benefit is usually ignored in the evaluation of substantial public transport improvements but may double, or more, the relevant benefit level.

Interestingly, the Australian analysis has suggested that the value of an additional trip increases strongly as household income falls⁸. This is not entirely unexpected, because lower income people tend to undertake fewer trips. To the extent that some public transport services are used by lower income households, the value of substantially improving such services is likely to be high.

4. Minimum Service Levels

The preceding discussion has developed a ‘willingness to pay’ approach to valuing the benefits of substantial improvements in mobility/trip making. This is in accord with the dominant benefit-cost analysis paradigm. Value judgements about the distributional consequences of particular courses of action are still needed, however, to form overall judgements about policy/action desirability.

⁸ It suggests that halving household income levels doubles the value of an additional trip.

A social policy approach might pursue this matter differently. Recognising that the capacity for mobility is a fundamental input into many of the activities that constitute daily life in our society, a social policy approach might start from a value judgement that everyone has a right to a decent basic level of mobility, whatever their personal circumstances, since this is a pre-condition for being socially included. The question then becomes one of determining the appropriate level of mobility and how to deliver it.

Stanley and Stanley (2007) examined transport disadvantage in the Victorian regional community of Warrnambool (population about 35,000), noting lower trip rates among groups thought likely to be transport disadvantaged. Surveys of a sample of these groups suggested that extending the span of weekday operating hours of the town’s bus service and adding a service on Sundays and Saturday afternoons (which did not exist at the time of the study) would enable most people to undertake most activities they desired, most of the time. An hourly service frequency was thought sufficient to meet most needs, in terms of providing what might be considered ‘a social safety net’.

Following that research, the Victorian bus industry argued that this finding should be extended to suburban Melbourne (especially the under-serviced outer suburbs), with later finishing hours but retention of the target minimum hourly frequency, to provide a metropolitan minimum service level (MSL) for built-up areas, as in Table 2.

Table 2: Minimum Public Transport Service Levels for Melbourne

Time Period	First run start	Last run start	Frequency
Mondays to Fridays	0600	2100	60 minutes
Saturdays and Public Holidays	0800	2100	60 minutes
Sundays, Xmas Day, Good Friday	0900	2100	60 minutes

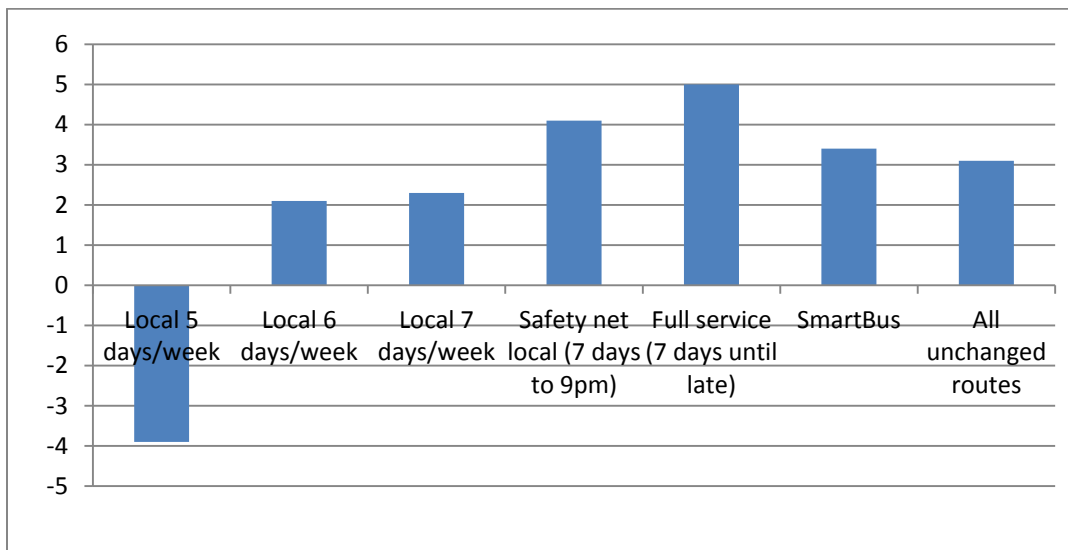
Initial implementation of this service level by the Victorian Government (which has responsibility for public transport service contracts) on a trial basis in some outer suburban areas of Melbourne showed positive results in terms of patronage growth, which led to the Victorian Government establishing a program to roll-out this minimum across the city, through the *Meeting Our Transport Challenges* (MOTC) program. Buses have been the mode where these service improvements have been focused, since train and tram service levels already exceed the MSL.

Loader and Stanley (2009) have reported on the success of the roll-out in terms of growing patronage. One case study of the patronage impacts of night-time service improvement, reported by Loader and Stanley, revealed 64 per cent of full fare paying passengers and 74 per cent of concession travellers ‘rarely’ or ‘never’ had access to a car for their travel. Concession travellers, in total, account for just over 60 per cent of bus users in Melbourne. The improved

bus services enabled increased trip making, in total, by these people (and others). The service improvements reduced the reliance of some new users on lift-givers.

Recent analysis of patronage trends on Melbourne bus services confirms that the adopted MSL is continuing to perform well in attracting bus users, which suggests that needs are being met and the relevant service level may be achieving its purpose of providing a mobility alternative. Figure 2 shows patronage growth on a range of service types in Melbourne over the year to 9th January, 2010. It shows that patronage on ‘safety net local’ services grew 4.1 per cent over this period, much faster than the growth rate on services which did not achieve this MSL standard (the three bars to the left of the ‘social safety net’ bar in Figure 2). Services that achieved higher frequencies showed even faster passenger growth.⁹

Figure 2: Patronage growth on unchanged Melbourne bus routes year on year to 9th January 2010 (%)



Source: Bus Association Victoria.

Given the nature of the Melbourne bus market (69 per cent of users have no driving licence, 43 per cent have very low household incomes, 54 per cent are students, over 60 per cent are concession travellers), Loader and Stanley suggest that it is a reasonable presumption that the patronage gains will primarily accrue to people who might be regarded as transport disadvantaged and as likely to be at relatively greater risk of social exclusion from mobility sources than the typical Melbourne resident. Small on-board surveys undertaken by Bus Association Victoria on several new/improved bus services suggest that over half the users of the new/substantially improved bus services were either (1) taking new trips, (2) changing mode from taxi to bus or (3) had previously relied on others for a lift. Each of these categories of user would seem to be candidates for the \$AUD20 benefit figure.

⁹ SmartBus, shown in Figure 2, is a premium trunk service that showed very high patronage growth over the preceding three years, with growth easing in 2009.

In short, while the MSL adopted for Melbourne is modest, the patronage response suggests that it is meeting important mobility needs and is possibly a fair approximation to a social safety net MSL. Testing of later service finishing times and increased frequencies is needed to further confirm this conclusion.

5. Discussion

The paper has suggested that additional trip making by people at risk of social exclusion delivers significant benefit to the trip maker and a unit value for additional trips has been presented, derived from a willingness-to-pay framework. Victorian research suggests that this value would be applicable to a substantial proportion of the trips undertaken on new/substantially upgraded bus services, because a substantial proportion of such trips will be either (1) new trips or will be (2) trips that now free up a lift-giver as well as delivering a user benefit to the traveller who switches from car passenger to bus passenger or, in some cases, will be (3) trips that were previously undertaken by taxi. By way of indication, if half the users of ‘social safety net’ or MSL bus services are in these categories, which may be conservative given the market profile of bus users, then the aggregate user value of such services in Melbourne would be at least \$AUD400m p.a., well above the cost of providing the relevant services. The \$AUD400 million is the product of:

- 40 million annual trips on MSL services;¹⁰
- half of these being trips that would not be made in the absence of the service or would otherwise be made with the assistance of a lift-giver, who is now free to pursue other activities, or by taxi; and,
- each such trip being valued at \$AUD20/trip (this value could reasonably be even higher, given the lower income levels of bus users and higher unit trip values at lower income levels reported by Stanley et al. (forthcoming)).

User benefits to the other 50 per cent of bus users, from service enhancements, need to be added to this sum to estimate total bus user benefits. If the rule of a half is conservatively used¹¹, the value to the other 50 per cent of bus users would be about \$5 per trip, which would add a quarter (or \$AUD100m) to the total user benefit estimate. Externality benefits (e.g. congestion reduction, reduction in carbon emissions, accident savings) would also need to be considered in a comprehensive CBA.

Alternatively, a social policy approach might be taken which argues for provision of a service level that supports social inclusion. Empirical work in Melbourne has suggested a service level that is likely to meet this intention. If this is the value judgement taken to determine a base service level (or MSL), then the unit benefit values estimated in this study would be set aside in the selection of this MSL but would still be applied in seeking to identify places where *higher* service levels appear worthwhile investments on economic grounds (an efficiency argument). In

¹⁰ Bus Association Victoria’s estimate is 43 million, so 40 million is slightly conservative.

¹¹ In the case of upgraded services, some benefitting users would be existing users, whose benefit would be valued at more than half.

this case, there is a ‘social safety net’ floor to service provision and an economic approach taken to further service enhancements.

Interestingly, the approximate estimation of the value of MSL services presented above (\$AUD400-500m plus externality benefits) suggests that there may not be great tension between the economic and social policy approaches in the Melbourne context of low patronage services, since this sum should easily exceed the cost of service provision. This can be shown by using the unit benefit value of \$AUD20/trip, or higher for low income users such as typical bus users, at a service level. It costs about \$AUD100 per service hour to provide bus services at the MSL in Melbourne. If a value of \$AUD20/trip applies to half the passengers, this suggests that eight passengers per hour will be needed for a break-even volume (valuing the user benefits to the other half of the users (as above) at one quarter the unit value ascribed to the ‘high value’ group)¹². This patronage level would be exceeded by most MSL services, easing the potential tension between economic and social criteria in defining suitable service levels for services that will primarily be of a social safety net variety, at least in the current Melbourne context. As noted above, externality benefits would reduce this break-even number.

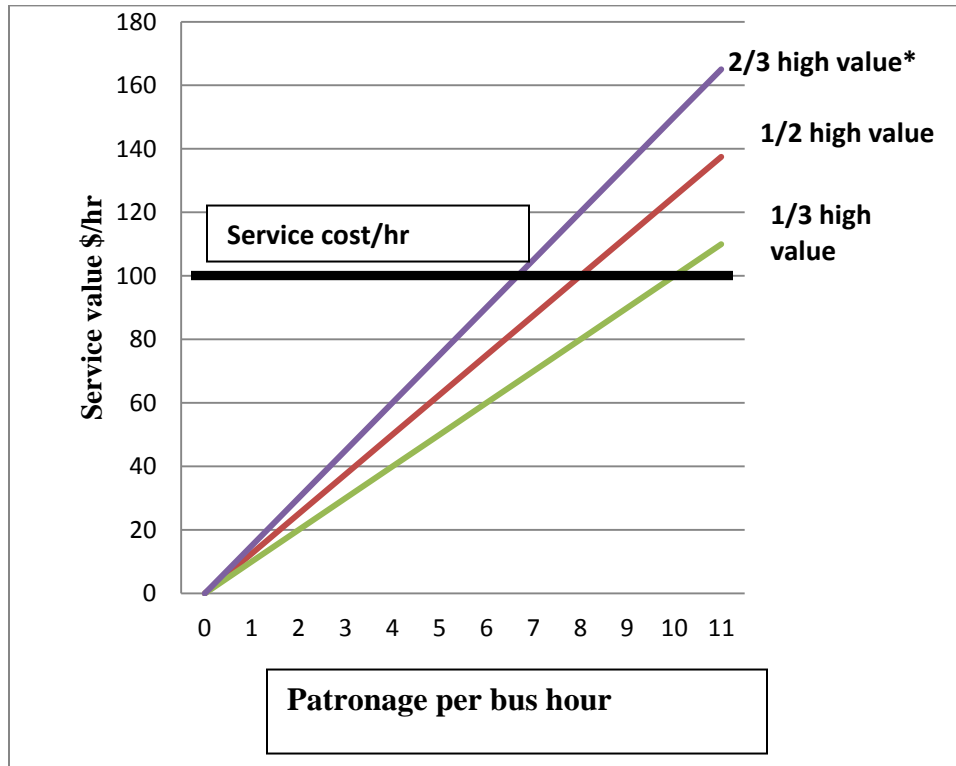
Figure 3 illustrates how break even numbers would change if the proportion of users to whom the \$AUD20 unit value is varied from the assumed 50 per cent. If the relevant proportion is reduced from half to one-third, the break-even patronage numbers increase from eight to ten per service hour. Conversely, if two-thirds of bus users in a particular setting are ‘high unit value’ users, then the break-even loading falls to just under seven per hour (again ignoring externalities).

In applying this logic, care needs to be taken because of the interdependence between the span of service hours and travel patterns. Few people typically use the last run of a day but, if it is removed, Loader and Stanley (2009) show that patronage on earlier services will also fall. Patronage numbers at the level of the individual service thus need to recognise possible knock-on effects, if a cut-off target of about 8 passengers per hour is taken as an economic hurdle for service provision of safety net services.

Recognising that the unit trip value estimated by Stanley et al. (forthcoming) rises in inverse proportion to the fall in household income falls, then the lower household incomes of bus users suggests a higher value than \$AUD20 per trip should apply, with lower break-even numbers for economically justified safety net (or MSL) service levels.

¹² At a conservative speed of 20 kph, this implies a boarding rate of 0.4 passengers per kilometre.

Figure 3: Value of Melbourne safety net bus services under varying assumptions about the proportions of ‘high value’ users



Note: * “High value” users are those who would either have not travelled before the improvement initiative or who would have relied on a lift-giver or used a taxi to travel in the “before” situation.

6. Conclusions

Current Australian research is helping to build understanding of the importance of mobility in terms of reducing a person’s risk of social exclusion. It shows that there is a clear and significant association between trip/activity levels and risk of social exclusion, allowing for a number of other factors that also influence this risk. Improving mobility is likely to reduce risks of social exclusion. The association between trip making, household income and risk of social exclusion, has enabled a value to be estimated for increased trip making and this has been shown to be higher than is currently assumed in conventional transport cost-benefit studies. The important consequence is that public transport improvements which enable new trips to be undertaken (and which may also free up lift-givers and/or reduce the need for a relatively costly taxi trip) should be rated more highly than at present.

Analysts occasionally seek to estimate the value of public transport to society. The “mass transit” argument leads to efforts to quantify the “externality” benefits such as congestion cost savings, greenhouse gas reductions, a lower road toll and cleaner air. Some estimates also seek to measure agglomeration benefits attributable to public transport service provision (primarily radial rail services to a CBD). To these items should now be added the value of trips that would

not be undertaken if public transport services did not exist and the added costs to lift-givers that would flow from service removal. This “social transit” value is likely to be very high relative to the other benefit components and is likely to provide economic justification for social safety net bus services in many circumstances, as demonstrated in the paper.

If the user economic benefits thus derived prove to be inadequate to economically justify provision of social safety net public transport services, there are still social policy grounds for such minimum service levels to be developed and applied, because of the links between mobility and prospects for social inclusion. It is a political judgement what such service minima might be, reflecting the continuing tension between economic (efficiency) and social (distributive) criteria in social choice settings.

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