The Journey to Work in Melbourne

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1 Introduction: Why study the journey to work?

In common with other large Australian cities, Melbourne has seen the share of trips made using public transport, walking and cycling fall dramatically from its peak in the mid-1940s. Today, we can no longer complacently accept this decline in alternatives to the car. Both because of depletion in key Middle-Eastern fields, and continued growth in rapidly industrialising Asian countries, serious problems could occur in global oil supply as early as 2010 (Campbell 2006). Global climate change is a further problem requiring a near-term response in order to avoid irreversible changes (IPCC 2001). Given Australia's disproportionate use of fossil fuels per capita (BP 2005), the reductions in use needed could be large. Because it is a major source of greenhouse gas emissions and is almost totally reliant on oil, transport cannot avoid change. Technical fixes to these twin challenges—such as alternative fuels and propulsion systems—are likely to be 'too little, too late' (Moriarty and Kennedy 2004a).

Governments have publicly committed to reversing the trend to car use on many occasions over past decades, but with little apparent success. In order to understand the reasons behind the apparent lack of progress, it is first necessary to examine changes in travel mode over time and possible reasons for these changes. Surprisingly, there have been few such studies, at least in Melbourne, since that of Ian Manning (1984). We have therefore attempted to rectify this deficiency, by combining journey-to-work mode share data collected by ABS since the 1976 census (the first to include a question on the mode used for the journey to work) with data from the survey conducted in 1964 for the Melbourne Transportation Plan (MTC 1969) and the pioneering travel survey conducted in 1951 by the Opinion Research Centre (now the Roy Morgan Group) for the Melbourne and Metropolitan Board of Works as part of preparation for the MMBW's 1954 metropolitan planning scheme (ORC 1951). This enables us to chart the changes in the half-century following the end (in February 1950) of wartime petrol rationing.

Although this study restricts itself to analysing the work trip in Melbourne over the past half century, the findings have relevance for other Australian capital cities, given that in all these cities, the car has also replaced alternative modes as the dominant form of travel to work. Further, our findings can provide insights into what is needed to encourage more use of environmentally friendly travel modes for other urban travel trip types.

2 Data sources and limitations

Journey to work data was used to analyse travel patterns in Melbourne for several reasons. First, the ABS Surveys of Motor Vehicle Usage, regularly conducted since 1963, are of doubtful accuracy, as the ABS itself implicitly acknowledges (ABS 2005). Even the recent shift from recall of travel behaviour by the sampled vehicle owners to oedometer readings has not solved all the problems. Evidence of this is the data on total Australian road petrol consumption. The ABS survey figures vary from 86 % to 100 % of the figures based on petrol sales. Even in the latest survey, in 2004, the figure was only 88.5 % of the petrol sales figure. Non-road uses of petrol (e.g. by lawn mowers) are known to be negligible, so the two sets of figures should be identical.

Second, the Surveys of Motor Vehicle Usage do not provide any information on rail or tram travel, and even the road travel data is only collected for capital city Statistical Divisions (SDs) overall. In contrast, the ABS census journey to work data provide details of travel

modes, including non-motorised travel, not only for metropolitan SDs overall, but at all area levels down to collector district. Third, this trip type determines both public and private transport infrastructure needs in large cities such as Melbourne. The ABS journey to work data for whole populations was supplemented by sample survey data from the 1951 and 1964 transport plan surveys.

Even though journey to work data is superior to other transport data sources, some problems still remain. The 1951 and 1964 surveys employed somewhat different transport mode categories than the ABS census categories. Even the ABS categories can change over time—for example, the category 'truck' was first introduced in 2001. Another change has been in the classification of multi-modal journeys: the two surveys and the censuses all employ the concept of 'main mode', but define this differently. In 1951, those surveyed were simply asked to nominate the 'main transport' used, plus 'any suburban feeders' (ORC 1951, p. 3); in 1964 and subsequently, those surveyed were asked to list all modes used and the main mode was assigned using a set hierarchy. In 1964, this ran as follows: train, tram, bus, car, but the subsequent census data reverses the order of tram and bus (possibly reflecting the relatively lower significance of trams outside Melbourne). Fortunately, this change has only a small effect, as there are relatively few trips made by both tram and bus.

In most of the graphs that follow, a general category 'non-car' is used. 'Non-car' excludes only car and truck travel. For convenience, taxi and motor bicycle are included in non-car modes; together, they only presently account for only about 0.7 % of commuter trips. Fortunately, this broad non-car grouping overcomes many of the difficulties of definition change over the 50 years time frame of this study.

An additional problem is changing boundaries, both for the MSD overall and for individual municipalities. The 1951 and 1964 surveys used an area smaller than the MSD. In the 1964 survey about 5% of the then-MSD population were outside the study area (MTS 1969). The resident workers in this excluded area would have had higher than average car use for the work trip—but also higher than average use of non-motorised modes. Their inclusion—were the data available—would change the overall non-car share of work trips very little. A final issue, affecting the 1951 survey only, is that all the more recent surveys asked about travel on a particular survey or census date, whereas the 1951 questionnaire asked about 'usual travel to work'.

3 Journey to work travel patterns in Melbourne

The total Melbourne workforce has risen several-fold over the past 50 years, due to a combination of population growth and a rising share of the total population with jobs. In 1951, 592,400 had jobs, whether full-time or part-time (ORC 1951); by 2001, this had grown to 1,544,300, of whom 1,290,500 travelled to work on census day, the remainder either not going to work, working from home or failing to answere the 'mode used' question (ABS 2001).[1] The following two subsections examine the changes in how workers commuted first by year, and then by region of residence.

3.1 Work travel patterns: change over time

Figure 1 shows how the journey to work trip by all non-car modes has varied over the years 1951-2001. The figure shows that after decreasing steadily over most of the period, non-car travel bottomed out in 1996 at 18.0 % of work trips and rose to 18.6 % in 2001.

[1] As indicated above, the 1951 survey did not ask how many workers travelled on a particular day, so when comparing absolute numbers, it should be noted that 1951 figures are probably overstated relative to those for later years.

Figure 1 shows all non-car modes together. But it is also useful to look at the individual modes, in so far as this is possible with the data—the categories used vary somewhat over time. Figure 2 shows how total trips by walking and cycling has varied over the years. Both walking and cycling trips are for 'walk only' and 'cycle only'. For cycling, the mode share fell from a peak of around 10 % in 1951 (about 56 000 work trips) to around one percent in 1964, and since then has varied little. In 2001, about 12,800 trips were cycling only, with an additional 2400 bicycle trips combined with other modes.The decline for walking appears to have been slightly less severe, but more uniform.

The share of work trips for the three public transport modes has also declined, with that for train and tram being especially steep during the three decades after 1951 (Figure 3). Both tram and train have had a small recovery since 1996, but the share for bus travel continues to decline.[2] Absolute numbers of train, tram and bus commuters have also fallen. Train commuters, for example, fell from 152,800 in 1951 to 118,600 in 2001, despite an upturn from 1996.

Although overall commuter travel by car steadily rose over the period 1951-1996, there was a marked divergence between car driver and car passenger travel. Absolute numbers of car/truck drivers and passengers rose steeply over the period, from roughly 110,000 to about 1,050,000. Their share of commuters likewise increased. In contrast, car passengers fell, both as a share of commuters, and, at least since 1976, in absolute terms. Over the period 1951-2001, the occupancy rate for the average commuter car fell from 1.37 to 1.08 (ORC 1951, ABS 2001). What this means is that the typical commuting car has lost nearly 80 % of its passengers over the period. Increasingly, Melbourne is building more freeway capacity to move vehicles, not people, to and from residences and workplaces. Figure 4 shows how this happened: the occupancy rate for the journey to work correlates very highly with household car availability over the entire period 1951-2001, as perhaps expected. Clearly this trend must change if car ownership continues to grow—the occupancy rate cannot fall below 1.0.

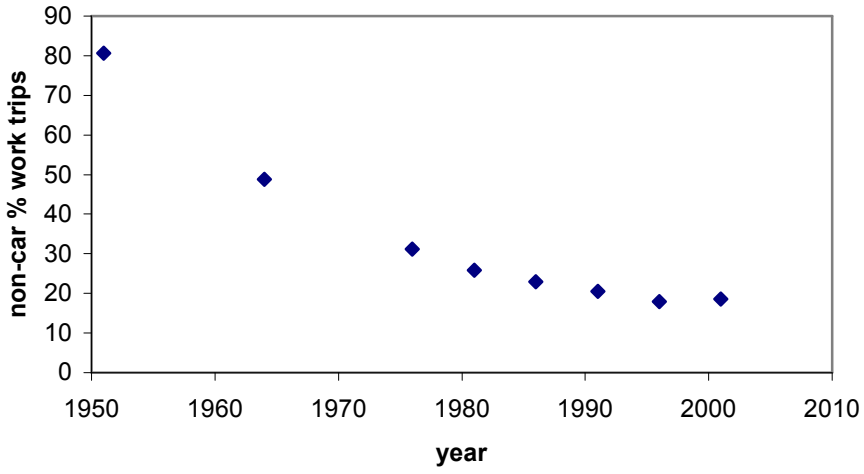

Figure 1. Journey to work by non-car modes, Melbourne, 1951-2001 (sources: ABS census data 2001, Manning 1984, MTS 1969)

[2] As indicated above, because ABS codes tram-bus trips to 'bus' as the main mode, the figures for the years since 1976 slightly overstate bus travel at the expense of tram trips.

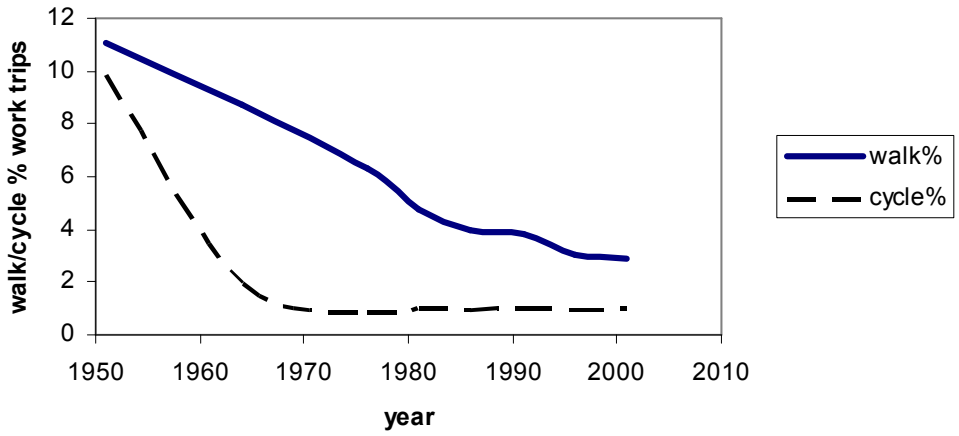

Figure 2. Journey to work by walking and cycling, Melbourne, 1951-2001 (sources: ABS census data 2001, MTS 1969, VicRoads n.d.)

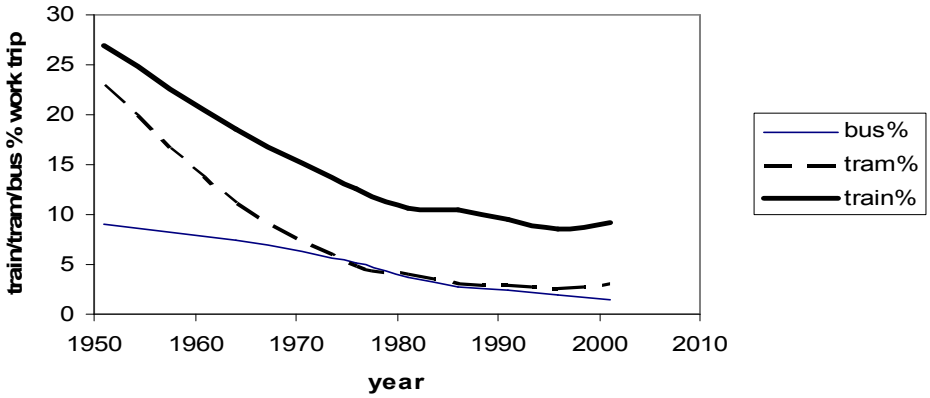

Figure 3. Journey to work by train, tram, and bus, Melbourne, 1951-2001 (sources: ABS census data 2001, MTS 1969)

The commuter trip was also very different for male and female workers. Table 1 gives a percentage breakdown of the modes used for the work trip in 1976 and 2001 for males and females, and shows that female commuters are more likely than men to use non-car modes.

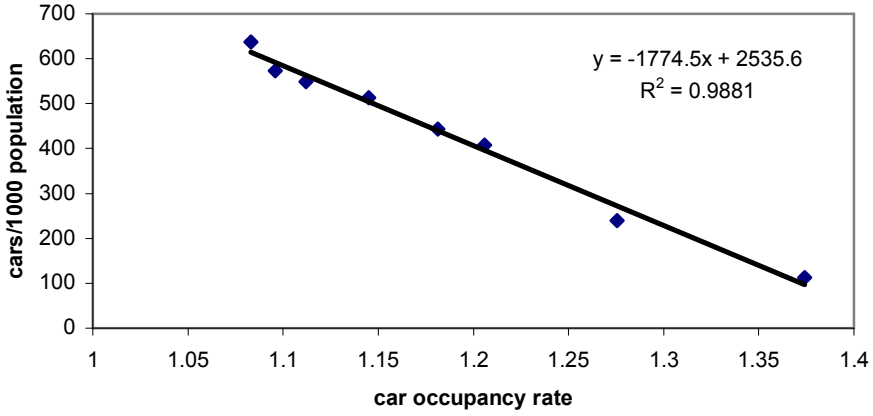

Figure 4 Journey to work car occupancy rate vs. car ownership, Melbourne, 1951-2001 (sources: ABS census data 2001, ORC 1951, MTS 1969)

Table 1. Journey to work by sex and mode (in %), Melbourne, 1976 and 2001 (sources: 1976 and 2001 census data)

Mode	Males 1976	Females 1976	Males 2001	Females 2001
Public transport	17.6	31.5	11.5	15.3
Car driver	67.8	38.0	78.2	71.5
Car passenger	7.6	19.4	4.6	8.2
Taxi/motorcycle	1.4	1.0	1.0	0.3
Cycling	1.1	0.4	1.3	0.5
Walking	4.5	9.7	2.6	3.4
Other	0	0	0.8	0.8
All modes	100.0	100.0	100.0	100.0

Although females rose from 35.6 % of total commuters in 1976 to 45.6 % in 2001, this rise did not help boost non-car travel, as females have disproportionately deserted the non-car modes, as well as car passenger travel, with their share of trips as care drivers rising correspondingly. Nevertheless, in 2001, their propensity to walk, use public transport or travel as car passengers was still significantly greater than for males, with the opposite the case for the car driver and cyclist modes.

3.2 Work travel patterns: variation over the metropolitan area

Average figures for Melbourne SD overall hide wide variations between different areas of the city for any given year. Figure 5 plots use of non-car modes for the 2001 journey to work for each of the 75 Statistical Local Area (SLAs) in the SD as a function of the distance each SLA centroid is from Melbourne's CBD. Use of non-car modes falls off steeply with distance from the CBD (note the high correlation coefficient, R^2 = 0.86). In the next section we will look more closely at why this decrease with CBD distance occurs.

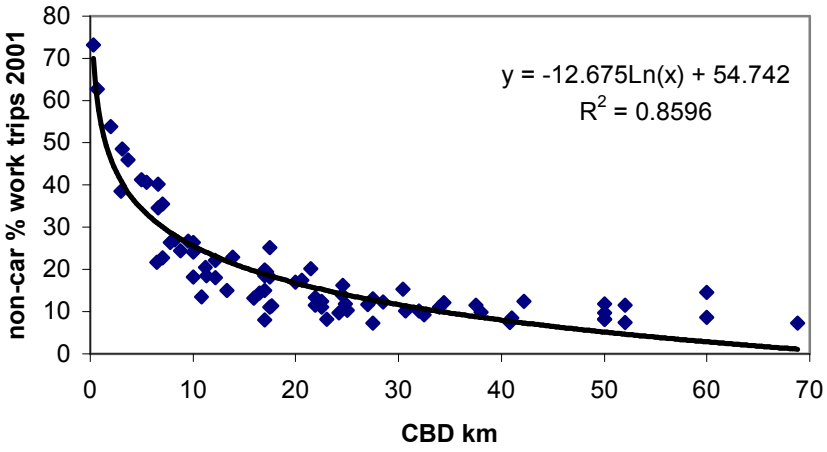

Figure 5. Journey to work by non-car modes vs CBD km, Melbourne, 2001 (source: ABS 2001 census data)

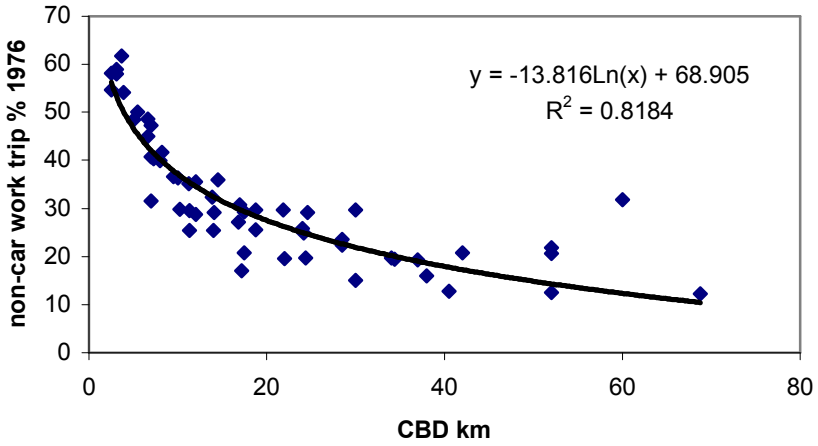

Figure 6. Journey to work by non-car modes vs CBD km, Melbourne, 1976 (source: ABS 1976 census data)

The general shape of this decay curve has changed little over at least the past 25 years. Figure 6 presents the same data as Figure 5, but for the year 1976. Melbourne was by then already a largely car-oriented city, with 82 % of all households having at least one car or light commercial available (ABS 2001). The data points refer to the then 56 Local Government Areas (LGAs) of the MSD (the 2001 data includes sub-municipal areas such as 'Melbourne-Inner', which explains why there is a figure that is zero km form the CBD in 2001, but not in 1976). What has changed over the years is the the *position* of the curve; the y-axis intercept (see the logarithmic equations in figures 5 and 6) steadily decreased from 68.9 in 1976 to to 52.2 in 1996, before rising to 54.7 in 2001. In contrast the slope of the curve (with the x-axis logarithmic scale) increased from –13.8 in 1976 to a high of –11.9 in 1996, before falling again to –12.7 in 2001. In other words, when non-car commuting was at its lowest, the curves like those in Figures 5 and 6 were both closer to the x-axis and flatter, meaning that the tendency for non-car use to fall off with distance from the CBD was less pronounced than it is now.

4 Analysis of journey to work travel

The journey to work in Melbourne has seen a steady fall, then a small recent rise in the use of non-car modes, as shown in Figure 1. What are the reasons for this variation? A variety of factors are at work, and are discussed in part 5. This section focuses on the location of both the workforce and the workplaces.

Figure 7 shows that the share of the resident workforce in a given LGA/SLA (the ABS used a mixture of SLAs and LGAs for the origin-destination matrix) falls off strongly with distance from the CBD. This plot, for 2001, is very similar to that in Figure 5, implying that a strong correlation exists between the share of the workforce in a given area using non car modes for work trips and the share of the same workforce travelling to CBD jobs. Figure 8 makes this relationship clear: most of the variation in non-car work travel over Melbourne can be explained by the share of the resident workforce working in the CBD. This relationship is now much stronger than it was in 1976 or earlier.

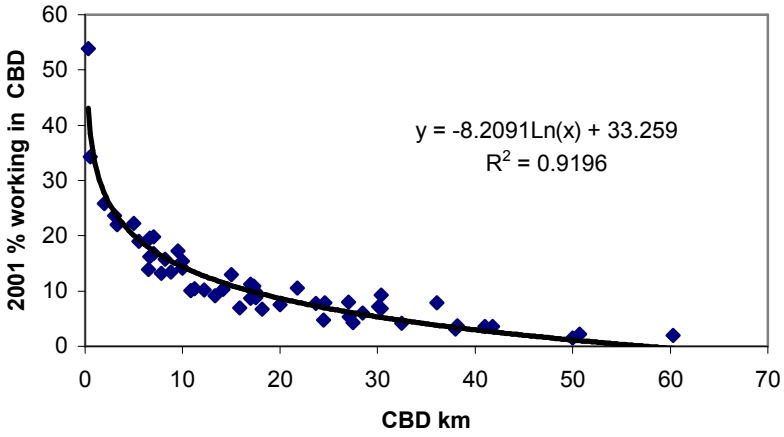

Figure 7. LGA/LSA % working in CBD workplaces vs CBD km, Melbourne, 2001 (source: ABS 2001 census data)

Figure 9 examines the change from 1996 to 2001 census results of the non-car modal share for each Melbourne LGA. It is clear that the municipalities closer to the city centre enjoyed the largest rise in the use of alternative modes for the work trip. In contrast, all of the municipalities with centroids greater than about 27 km out saw a decline in non-car share even though growth in total commuters meant that only two LGAs had absolute declines in non-car commuters. As expected from the high correlation shown in Figure 8, the share of workers with CBD jobs also fell between 1996 and 2001 for municipalities further out than 27 km. In summary, the data for 1996 and 2001 suggests that the inner suburbs experienced the greatest changes in both mode share and CBD job share. The remainder of this section will explore the importance of the inner suburbs for modal share.

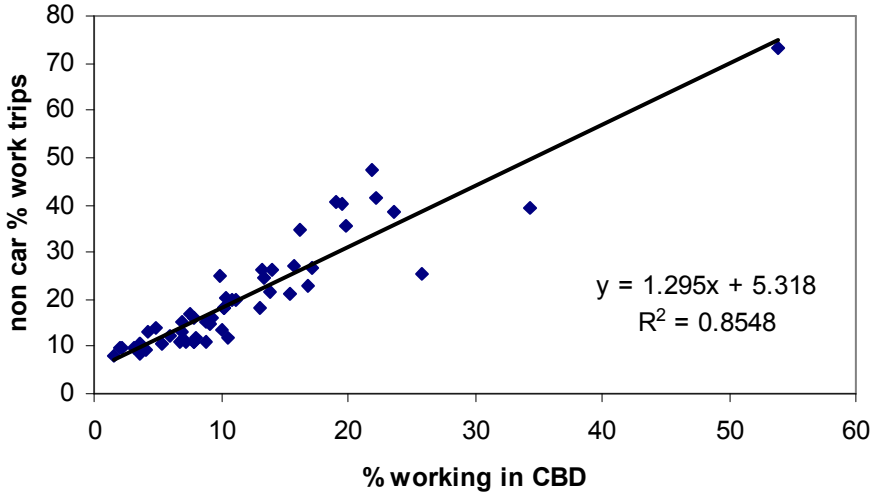

Figure 8. Journey to work by non-car modes vs LGA/LSA % workforce at CBD workplaces Melbourne, 2001 (source: ABS 2001 census data)

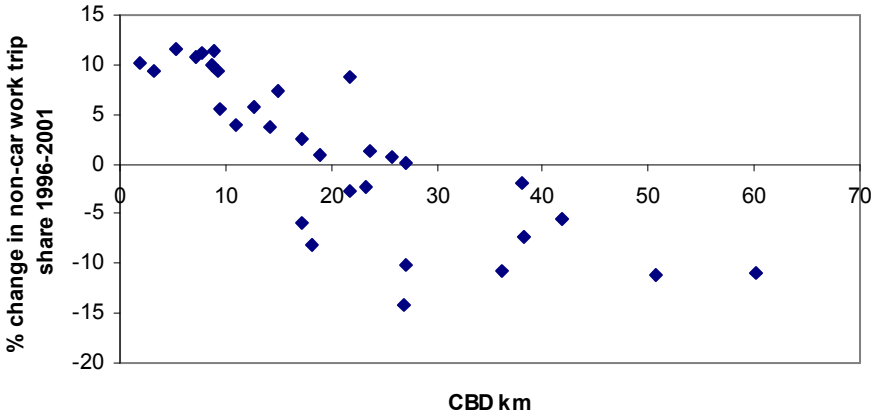

Figure 9. Change (%) in non-car work trip share LGA % CBD km Melbourne, 1996-2001 (source: ABS 1996 and 2001 census data)

The MMBW (1977) defined an Inner Core for Melbourne, consisting of the then eight LGAs of Collingwood, Fitzroy, Melbourne, Port Melbourne, Richmond, Prahran, St. Kilda and South Melbourne. Data for the same grouping is available for the 1951 and 1964 surveys as well (zones 1, 2 and 8). Today the same area is called the Inner Melbourne Statistical Subdivision (SSD), with a total area of 85.9 km^2, or 4.0 % percent of the Melbourne urbanised area (ABS 2001). Because of this continuity, the Inner Melbourne SSD will be used here to explore the importance of both the inner suburban labour force and workplaces for the journey to work mode share in Melbourne.

In 1951, 31.0 % of all who travelled to work in Melbourne lived in the Inner Melbourne SSD. The proportion bottomed out at about 7.2 % in the mid-1990s, and has risen since then, reaching 8.6 % in 2001 (ORC 1951, ABS 2001). What these figures show is that in 2001 a higher proportion of Melbourne's commuters lived in areas with good access to public transport—particularly trams—than was the case a few years earlier. The same relative shift also occurred in Perth and Sydney, the other two capital cities with an ABS-defined inner city SSD. Again, the inner areas of both these cities also recorded rises in overall non car use for the journey to work (Moriarty and Kennedy 2004b).

As expected, a large proportion of Inner Melbourne SSD resident workers also work in this region—74.3 % in 2001, up from 69.9 % in 1996 (ABS 2001)—and so have good public transport access at both ends of their work trip. Their work trips are also much shorter than average (ABS 1995, 2001), making walking and cycling an easy option for many resident workers—over 22 % of MSD cycling commuters in 2001 were from the Inner Melbourne SSD (VicRoads n.d.). Further, the share of total MSD workplaces in the CBD, and in the larger Inner Melbourne SSD as well, has risen since 1996, reversing a decades-long decline (ABS 2001). (In 1996 9.5 % of workplaces were in the CBD, rising to 10.1 % in 2001.) But does this Inner Melbourne non-car increase result from the relative shift in the location of resident workers/workplaces, or is it caused by a shifting preference for non-car modes by Inner Melbourne SSD commuters for a given origin-destination pair?

A calculation makes clearer the relative contributions of the two factors for the Inner Melbourne SSD resident workforce. Total commuters numbered 95,460 in 1996, 110,680 in 2001, a 15.9 % total increase. In 1996, 39,200 commuters (41.1 %) used non-car modes, compared with 51,000 (46.1 %) in 2001, a rise of 30.1 %. This absolute rise of 11,800 accounts for about half of the total MSD increase of 23,400. If the use of non-car modes for commuting had stayed at the 1996 value of 41.1 %, total commuters would have been only about 45,400, rather than the 51,000 actually recorded. So roughly half the rise in non-car commuters can be attributed to increased numbers of commuters.

The other half is the contribution of the rising share of non-car modes for commuting. But do we need to invoke attitude changes to explain this rise? The following calculation suggests that this is a minor factor at best. From 1996 to 2001, the share of Inner Melbourne SSD workers with CBD jobs rose from 18.7 % to 22.7 %. Figure 8 shows that increased share of CBD jobs in 2001 is strongly associated with rising use of alternative modes, which suggests that the tendency of CBD workers to use non-car modes is similar across Melbourne, regardless of how far they live from the CBD. Using the correlation equation in Figure 8 gives a rise in non-car modes from 30 % to 34.7 %—an increase of 15.7 %. Hence this exploratory calculation suggests that the rise in observed share from 1996 to 2001 of 12.2 % can be readily explained by changes to a more central orientation in the workplaces of Inner Melbourne commuters.

5 Discussion of findings

Our overall finding of a dramatic shift from all other modes to the car over the last half-century is hardly surprising: many others have reported on this trend. However, we believe the detailed data and analysis we have presented provides some evidence about the usefulness of various explanations offered for this trend, and therefore about appropriate policy responses, discussed in the following section.

Many commentators have attributed the decline in non-car travel modes to suburbanisation of employment to destinations beyond the CBD and inner city (e.g. Victoria 2006, p. 15). But although the share of employment in Melbourne's CBD and inner city did not decline between 1981 and 2001, the share of work trips by non-car modes still fell from 26% to 19% (Figure 1). What has happened is that people employed outside the CBD and environs have essentially stopped using non-car modes, which are now patronised almost exclusively by central city workers, plus the small minority of suburban workers who are 'captive' to public transport. This contrasts with the situation in 1951, where non-car use was high for both CBD and suburban work destinations.

The negligible us of non-car modes by suburban workers also casts doubt on explanations based on demographic change (such as a decline in the proportion of workers in the 15-24 year age group), or the supposed unsuitability of public transport to women's lifestyles and travel needs (e.g. Dowling and Gollner 1997). Although the difference has narrowed since 1976, women remain more likely than men to use all modes of public transport, while men are over-represented as car drivers and cyclists (Table 1).

Another widely-held view attributes the decline in non-car modes to population dispersal, and some commentators have attributed recent increases in the use of these modes to urban consolidation policies, which have finally reversed many decades of inner city population decline (e.g. Newman, Laird, Bachels and Kenworthy 2001). While it is true that the use of non-car modes declines with distance from the CBD, inner-city residents who work in the CBD are no more likely on average to use non-car modes than those who live in outer areas: it is the location of the *workplace*, not the residence, that is the dominant influence. So the strong trend in recent decades for CBD workers to live in inner-city locations has not contributed to changes in overall non-car use. The trend has, however, influenced the choice of non-car mode by those employed in the CBD, with trams and cycling increasing at the expense of buses and trains (and possibly walking).

The spatial pattern of demand for travel by train, the most important non-car mode, has also changed in recent decades as a result of these shifts in the residences of CBD workers. Train trips from inner and middle suburban locations have increased at the expense of those from outer suburban locations, as the share of outer area workers employed in the CBD declines (ABS 2001). In some rapidly growing outer areas, large increases in the absolute numbers of workers have masked this trend, but overall, the number of outer suburban train

commuters has begun to decline absolutely as well as relatively (although numbers coming from areas beyond the MSD continue to grow).

The change in the spatial pattern of cycling trips has been more dramatic: in 1951, the CBD was not an important destination for cycle trips, most of which were made to suburban jobs by suburban residents. By 2001, the CBD had become the dominant destination, with most cycling trips made by inner city workers. The share of suburban trips made by bicycle fell from 13% in 1951 to less than one per cent in 2001, while the share of CBD workers cycling actually increased, from 0.7% to just over two per cent (ORC 1951, Vicroads n.d.).

In summary, then, there have been two key trends at work. The first is that non-car modes have become largely the preserve of workers employed in the CBD and adjacent areas. The second trend is for an increased share of CBD workers to reside in inner city areas, and for the share of suburban-resident CBD workers to decline. The combined effect of these trends has been an early and dramatic reduction in the Melbourne-wide mode share of cycling, which used to be most strongly dominated by suburban journeys, followed by a later and less severe, but still substantial, fall in the mode share for public transport and walking. The small recovery in non-car modes between 1996 and 2001 appears to be a result of absolute and relative increases in CBD employment, with larger increases in cycling and tram use than train or bus use. So the increase in the share of CBD workers cycling has come mainly at the expense of trains, not cars.

6 Policy implications

The implications for public policy depend on the cause of the evaporation of suburban non-car work trips, and the continued usage of these modes by CBD workers. If the trends are due to factors beyond the influence of transport planners, then the most effective strategy for reducing car use is via a further increases in the CBD's share of the metropolitan workforce. However, really significant increases in the CBD workforce are both unlikely (given factors such as the high cost of inner city real estate and the relatively narrow range of jobs that now concentrate in this area) and are potentially undesirable from a social equity point of view (given the increasing tendency for low-income residents to be 'priced out' of the inner city).

Our view, however, is that the evidence is consistent with an alternative explanation, namely that suburban workers have responded relatively rationally to the extremely poor performance of the public transport system in catering for suburban workers. The CBD focus and lack of integration of trains, trams and buses have been noted by commentators over the decades (MMBW 1954 p. 265, Davison 1978 p. 170, Mees 2000). It is noteworthy that even in the low-car-ownership environment of 1951, public transport did not serve suburban work travel very well, a deficiency reflected in the high share of suburban cycling trips (see above). And through to this day, relatively few train passengers use buses to access stations, with the majority walking or travelling in cars.

While the use of non-car modes is lower for suburban trips than CBD trips in most cities, owing to factors such as cheaper or free parking and radial rail networks, it is rare to see such an extreme polarisation as found in Melbourne (Mees 2000). Melbourne's public transport appears to be an example of what Thompson and Matoff (2003 p.311) call 'a flawed system that tries to optimise service to a single destination (the CBD)'.

The Victorian Government's recent transport statement *Meeting Our Transport Challenges* concedes the importance of this problem (Victoria, 2006, p. 15), but the government's proposals are unlikely to remedy it. The most expensive infrastructure projects, such as triplication of the Dandenong rail line and a 'rapid bus' service along the Eastern Freeway, are designed to permit express services from outer suburban areas to the CBD. But as

noted above, demand for travel to the CBD from the outer suburbs is falling absolutely as well as relatively; it is demand from inner areas that is growing most strongly.

The other major feature of the government strategy is four orbital 'smart bus' routes (Victoria, 2006) catering for long-distance circumferential trips. But most work trips to suburban destinations are local or radial in nature (i.e. they are made towards the CBD, even if not the whole way: see Mees (1995)), so the emphasis of the program appears misconceived. What is needed is not a few isolated, non-integrated circumferential bus routes which replicate the lack of comprehensiveness of the radial tram and train lines; rather, what is required is a 'multidestinational network' planned using a 'whole system or network approach' (Thompson and Matoff 2003).

The government strategy also proposes significant expansion of park-and-ride provision, possibly including multi-storey car parks at stations (Victoria 2006, p. 59), but this is unlikely to be an attractive option for workers employed outside the CBD. If a car is required simply to reach the station, workers employed in locations with cheap or free parking are likely to drive the whole way to the destination, instead of to the station. Fully integrated multidestinational public transport systems generally do not rely significantly on park-and-ride; instead, most rail passengers use buses (or walking) to access stations (Mees 2000).

Such a public transport system could be implemented in Melbourne, but not under the current privatised institutional arrangements (Mees 2000, 2005). Its effectiveness would be enhanced if supportive policies were adopted in other areas, notably land use policies (particularly those affecting the location of suburban employment) and restraint in the provision of new roads and car parking. The likely continuing rise in oil prices and absence of viable alternative fuels would provide further incentive—and urgency—for mode shift.

7 Conclusions

The use of non-car modes for the journey to work in Melbourne fell steadily from around 80 % in 1951 to 18 % in 1996, then rose slightly in 2001, with the increase mainly the result of rising train and tram commuting. In contrast to 1951, use of alternatives to the car in 2001 varied widely across the city, from over 70 % for the few thousand workers resident in the CBD to under 10 % for outer Melbourne SLAs.

For Inner Melbourne SSD resident workers, use of non-car modes rose 30% from 1996 to 2001, accounting for half of the Melbourne-wide absolute growth. In the outer areas, non-car mode share continued its decades-long fall. But it is not necessary to assume that the Inner Melbourne workforce has experienced a shift in attitudes in favour of environmentally friendly modes: the growth resulted from an increase in both the number of resident workers, and the proportion of this workforce who also worked in the CBD. All workers, whether they reside in the inner or the outer suburbs, are much more likely to use alternative modes for commuting to jobs in the inner suburbs, and particularly the CBD.

Given the growing environmental and resource problems facing Australia and the world, changes back to non-car modes seem necessary. But official policies to achieve this aim will not help much. Given the small and declining number of CBD jobs filled by outer suburban workers, projects designed to further cater for this group are misplaced. Instead what is needed is a network approach that will give all workers, not just those with CBD jobs, a viable alternative to car commuting.

Acknowledgements

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