

Final Report

Is there a spatial mismatch between housing affordability and employment opportunity in Melbourne?

authored by
Jago Dodson

**Australian Housing
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Urban Policy Program, Griffith University

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EXECUTIVE SUMMARY

This project investigates the extent of any spatial mismatch between locations of greater housing affordability and locations of employment opportunity in Melbourne. The project then investigates any tenure effects in this relationship, and the importance of the transport system in mediating between divergences in housing affordability and employment opportunity. The project concludes with discussions of State and Federal government policies and potential directions for future change.

Findings of the research:

- Housing affordability was strongly spatially differentiated across Melbourne in 2001, with the most affordable locations situated in the outer suburbs.
- There were few differences in the locations of greatest housing affordability between housing tenures.
- Unemployment was spatially concentrated in 2001, with outer suburban locations, particularly those in declining industrial areas remaining at a labour market disadvantage.
- Decline in unemployment rates between 1996 and 2001 favoured areas with higher rates in 1996.
- Employment growth was strongest in the central city and in large tracts of outer-suburbia.
- Employment growth occurred in or nearby locations where unemployment was high.
- For selected case study areas, new employment opportunities over the 1996-2001 period, within a ten kilometre radius exceeded the number of unemployed by a factor of between five and ten times.
- Spatial mismatch is not considered to be a strong phenomenon in Melbourne.
- Public transport services were found to be inadequate to provide high quality access to temporally flexible regional employment opportunities for households in the case study areas.
- The unemployed were more likely to be located in areas with relatively good public transport services.
- Households with relatively good public transport access were approximately twice more likely not to own motor vehicles as those without such access to public transport.
- Workers in areas with good public transport access were more likely to use this mode for work travel than those with poor access.
- Workers in areas with good public transport access were less likely to use private motor vehicles to travel to work than those in areas with poor public transport.

- The links between housing affordability, employment status and transport costs are difficult to assess, however it is likely that poor public transport services imply a financial burden on low-labour market status households due to the necessity of owning private motor vehicles.
- State and Federal government policy makers need to give closer attention to the role of transport services and access in mediating between the locations of affordable housing for low labour market status households and locations where employment growth is occurring.

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1 INTRODUCTION

Context for the research

The research reported in this project is situated within a set of contemporary literatures concerning the spatial development of large urban areas, and within the context of the ongoing restructuring of urban employment and housing markets. These restructuring urban markets are themselves responding to processes of increasing globalisation and inter-metropolitan integration, but are also throwing up new problems for urban and social policy makers.

The spatial dispersion of high employment opportunity within urban regions does not necessarily match the way in which lower socio-economic status households are spatially allocated to locations within cities through the operation of residential housing markets. The lack of sufficient means of transport by low income households which would enable them to bridge this spatial divide to access employment opportunities within the city, could have serious implications for issues of economic and social development, and social equity.

Aims of the Project

The AHURI research project on which this paper is based examines the links between spatial labour markets and spatial housing markets in terms of whether there is a 'spatial mismatch' between locations of high housing affordability for low-income households and locations of high employment opportunity. The specific question posed is: are households with lower labour market status pushed into locating in areas with limited employment opportunities due to the interaction between metropolitan housing and labour markets?

A specific further concern of the project is the role that urban transport systems have in mediating between areas of high housing affordability (or low housing cost) and areas of high employment opportunity. If, for example, areas of high housing affordability are served by poor public transport, then other modes such as car ownership can result in high relative costs for low-income households who are travelling to high-employment opportunity destinations. In this context urban transport services are a crucial dimension of the likely outcomes faced by lower labour market status households.

By investigating these issues, the project traverses a series of government policy interests. The main Federal government interest with which this project connects is the desire to ensure that individuals receiving income support are encouraged and enabled to access employment opportunities. The more easily people can access employment, the lower the potential assistance burden on the government. By assessing the extent to which urban structure mediates between housing affordability and employment opportunity, the project will assist in identifying avenues for adjustment or reconsideration of federal income assistance.

Likewise, state governments have an interest in ensuring equitable outcomes from their urban spatial planning policies. Where these policies can be identified as creating socially inequitable outcomes, whether from the unfettered operation of spatial housing and employment markets, or through spatially uneven levels of transport service provision, then it would appear to be incumbent upon these state governments to undertake policy re-adjustments to ameliorate these adverse socio-economic consequences.

This paper focuses primarily on the first element in the discussion of spatial mismatch, which is the way affordability in housing markets and opportunity in labour markets are distributed across the metropolitan area. Accordingly, the paper seeks to achieve three objectives. The first is to identify recent patterns and processes of urban socio-spatial change in Melbourne as these have been reported by urban researchers. The second is to consider the literature on spatial mismatch and the extent this is relevant to the Melbourne context. Finally, the paper examines some empirical evidence that assists in understanding the relationship between housing affordability and employment opportunity in Melbourne. The paper then discusses potential policy implications of the findings, and concludes with some observations concerning future research directions.

Research Questions

This project will address a set of six interrelated research questions focusing on the location of housing affordability and employment in Melbourne and associated transport and policy issues.

1. What are the spatial patterns of housing affordability, unemployment concentration and employment location in Melbourne?
2. What tenure effects are present in the spatial patterns of housing affordability and employment location?
3. Is there evidence for a spatial mismatch in Melbourne between the locations of affordable housing and the location of employment opportunity, and if so, how is this associated with housing tenure?
4. What transport modes are available in locations of higher unemployment, and conversely, in locations of employment concentration?
5. What transport modes are used by households in locations of higher unemployment or higher housing affordability, and conversely, in locations of employment concentration, and what financial burden do alternative transport modes imply for low-income households.
6. How might Federal and State governments better respond to issues of locational disadvantage and affordability relative to employment opportunity, housing affordability and transport provision

Method in responding to the research questions

Limits on resources and time mean that the project will rely primarily on readily available data sources. The project has not therefore sought to procure any major new primary data sources such as surveys of local areas potentially affected by spatial mismatch. It is hoped however that the project will stimulate further research in this field that may undertake such more extensive data collection.

The primary data for the project will be 1996 and 2001 ABS Census data concerning unemployment rates, housing expenditure, housing tenure, and transportation behaviour. This data has been supplemented with Victorian Office of Housing Rental Bond Authority data concerning rental prices, and Victorian Valuer General data regarding housing prices.

The project responds to Research Question 1 using ABS Census data to map the distribution of housing affordability, unemployment concentration and employment location in Melbourne at the Statistical Local Area (SLA) scale. Employment concentration is assessed using specially purchased ABS Working Population Profile tables for both the 1996 and 2001 Census. This also enables the relative extent of employment growth per SLA to be determined and provides insight into temporal changes in spatial employment patterns, including spatial employment growth.

The project attends to Research Question 2 by mapping Census data to establish the extent to which unemployed and low-income households are concentrated in areas of lower housing cost, for both rental and home-ownership tenures.

Research Question 3 is addressed through the selection of a set of case study SLAs which exhibit both high levels of housing affordability and high levels of unemployment. GIS mapping is then used to identify the spatial relationship between these locations and areas of metropolitan employment growth. The geographical distance between the affordable housing areas and employment areas is assessed based on a standardised assumption of commuting distance.

The project responds to Research Question 4 by examining which transport modes are available to residents within the selected affordable housing SLAs. The project assesses the quality of the public transport available, relative to international public transport service standards, and relative to the need for contemporary flexibility in working hours.

Research Question 5 is tackled via an analysis of ABS census journey-to-work data for the SLAs with high housing affordability, to assess the modal split in the journey to work. The response to this question will also involve an assessment of the level of household car ownership, relative to the availability of public transport. Further analysis using ABS income data assesses the financial burden of alternative transport modes for households in these locations, based around a standardised calculation of weekly travel costs for individual modes.

Insights developed in the literature review portion of the project Positioning Paper and the empirical findings for Research Questions 1-5 are drawn on to address

Research Question 7 which concerns how current Federal and State policy influences the observed geographical and behavioural patterns.

The structure of this research report

The report is structured around three main parts. Part I of the report reviews the literature concerning the links between urban labour markets, urban housing markets, social status and transport. This part of the report recognises that there has been substantial scholarly interest in the links between overall urban restructuring, and the links between housing and labour markets in recent decades, both in Australia and internationally. The discussion notes that issues of polarisation and marginalisation of lower socio-economic status households has become a major concern of both researchers and policy makers. Spatial mismatch has emerged as a potential urban dynamic contributing to exclusionary socio-spatial restructuring. However, the discussion shows that the importance of transport in mediating between the spatial separation of affordable housing locations and employment opportunities has not yet been sufficiently investigated in Australian urban studies. This part of the report concludes that empirical investigation of the issue of spatial mismatch in Australian cities is desirable.

Part II of the report selects Melbourne as a case study and investigates the socio-spatial links between localities where housing is affordable and the locations where employment opportunities are expanding. The analysis uses both ABS and Victorian government data on housing costs to identify three locations where housing is most affordable. The analysis also assesses the spatial patterns of unemployment across Melbourne, and identifies three localities that exhibit both low housing cost and high unemployment. The report then considers the spatial relationship between these localities and locations where employment is growing, and assesses the regional availability of employment for individuals within those areas.

Part III of the report addresses the relationship between housing affordability and employment accessibility in terms of transportation options. The availability of public transport for the three case study localities is evaluated, in terms of the level of service quality necessary to provide employment access in the context of temporally flexible working conditions (eg shift, part-time or casual work). The report then considers the relative burden of different transportation modes on households and individuals' capacity to travel to access work opportunities.

Part IV of the report presents conclusions arising from the research, assesses the relevance of the findings for government policies and identifies issues and questions that require further investigation.

PART I - METROPOLITAN SOCIO-SPATIAL CHANGE

Patterns of urban employment

This section of the paper reviews international literature on urban labour market shifts: in particular the evidence on where employment is growing in cities, where it is declining and the extent to which different groups are advantaged or excluded by these patterns. The extent and character of labour market change has been covered in substantial detail in the AHURI Positioning Paper associated with this project. Accordingly this report reviews rather than rehearses that material, in order to provide the context for the presentation of the empirical investigations undertaken as part of the project.

Globally during recent decades there have been a number of prominent shifts in the way labour markets operate at the metropolitan scale. The most prominent of these changes has been the re-emergence of the central city as a valued location for employment, as Sassen's (1988; 1991; 1994) work on the 'producer services' employment sector within the core areas of 'global cities' has demonstrated. Conversely, the development of the suburban 'edge city', as identified by Garreau (1991), has highlighted another major trend in urban labour markets, towards a growing share of metropolitan employment being located in suburban areas.

This phenomenon appears to have been partially replicated Melbourne, as O'Connor and Healy (2002) report that, at least in percentage terms, employment growth has been most substantial in the outer suburban areas. Hence while the number of jobs in Melbourne's core rose by 19.4 per cent during 1986-1996, jobs growth in the outer north, outer east and outer west was 54.2, 58.4 and 66.6 per cent respectively (O'Connor and Healy 2002).

Sectoral restructuring

There are distinctive spatial labour market patterns associated with industry sectors. Brain (1999) found that Melbourne's core exhibits a distinctive concentration of high labour market value '21st Century' employment (similar to Reich's 'symbolic analytical' work). By comparison, middle and outer suburban areas have 'medium' to 'very low' concentrations of such employment, by Brain's calculations. O'Connor and Healy's (2002) findings support Brain's contentions, finding that in Melbourne's central region the 'new economy' group of workers had the highest level of 'self containment' and the highest location quotient (the proportion of such of jobs in that region relative to the proportion across all regions) of all sectors.

O'Connor and Healy's (2002) work demonstrates that outer suburban areas were overly represented in terms of 'old economy' or 'routine production' work. For example, Melbourne's outer northern region had a location quotient of approximately 1.8 for 'old economy' jobs and a location quotient of approximately 0.35 for new economy jobs. This compares markedly from Melbourne's core where the respective location quotients for 'old economy' and 'new economy' jobs were approximately 0.6 and 1.5 (O'Connor and Healy 2002).

Regional self-containment for 'new economy' jobs was also found to be a low 14 per cent for fringe suburban areas such as Melbourne's outer north, when compared to old economy jobs in these areas of approximately 30 per cent (O'Connor and Healy 2002). Generally stated, outer suburban work is tending to be of a type that is of lower labour market status than employment that is located within Melbourne's central city.

Given that 'old economy' employment is typically viewed as vulnerable to shifts in the organisation of global production, urban areas with a high dependence on this sector for employment are subsequently likely to have a workforce that is more vulnerable to such shifts. These patterns have implications for community sustainability: households located in middle and outer suburban areas are likely to face modest local job opportunities, or are likely to face long commutes to access higher status employment in central city areas. Areas with a dependence on 'old economy' employment have been most vulnerable to adverse economic shifts during the past two decades (Baum *et al.* 1999; Beer and Forster 2001). A previously uneven distribution of manufacturing employment, for example, resulted in some areas of Melbourne suffering to a greater extent from adverse economic conditions during the late-1980s and early-1990s (Dodson and Berry 2004).

The spatial distribution of employment opportunity is closely connected to the operation of the spatial housing market, as the capacity of individuals and households to purchase housing, whether rental or via home ownership is largely dependent on their income status. The following section reviews recent research on Melbourne's housing markets in terms of the distribution of costs and socio-economic opportunity.

Changing housing markets

Since the mid-1990s, Melbourne's housing market has experienced similar high levels of house price inflation similar to other large Australian cities, particularly Sydney and Brisbane. Burke and Hayward's (2000) review of the Melbourne metropolitan housing market for the recent Melbourne 2030 Metropolitan Strategy demonstrated that there were strong spatial patterns of house price inflation. Between 1990 and 1999, Burke and Hayward calculated, the real median price rises for the top twenty suburbs exceeded 50 per cent. By comparison, in the bottom twenty suburbs real median house prices declined by at least 14 per cent.

The highest price rises during the 1990-1999 period favoured inner metropolitan locations, while outer urban locations were prominent among the suburbs with the lowest house price gains (Burke and Hayward 2000). Burke and Hayward suggest that the spatial differentiation in the inflationary house price gains indicates that the housing market is acting to accentuate the inequalities arising from the operation of the labour market. The high-income areas, particularly those in the inner city that are associated with the high-status informational employment sector, have recorded

higher rates of inflation than lower income areas, and have thus generated greater wealth for owners.

Socio-economic patterns and housing

These housing market price shifts described above are reflected in the changes to socio-economic patterns that have been observed in Melbourne. One of the clearest depictions of these patterns was Baum et al's (1999) study of 'community vulnerability' in Australia. Baum et al demonstrated that the changes in Melbourne's urban economy had resulted in particular areas experiencing diminished opportunities in the metropolitan labour market. Among the most vulnerable were areas that Baum et al (1999) categorised as 'extremely vulnerable old manufacturing economy clusters'. Such areas included the Sunshine-Maribyrnong areas in Melbourne's west, the Broadmeadows-Thomastown-Preston areas in the outer north and the Springvale-Dandenong area in the outer southeast.

Conversely the spatial locations of high 'opportunity' as ordered through the residential housing market in Melbourne were largely located in inner areas (Baum et al 1999). These included the 'transitional/gentrifying' areas covering much of Melbourne's inner city, including the municipalities of Yarra, Port Philip, Melbourne and southern parts of Moreland and Darebin, as well as inner eastern areas of Kew, Camberwell, and Prahran.

A further more recent phenomenon reported by Dodson and Berry (2003) in Melbourne - and by Gwyther (2002) in Sydney - has been the emergence of new 'suburbs of opportunity' on the metropolitan fringe. These new residential areas, often consisting of master-planned privately developed estates are attracting successful middle and outer suburban households who have sufficient income and wealth to afford housing priced at the middle to upper end of the market. These new communities are socio-economically divided from the older outer suburban areas such as those described in the Baum et al (1999) study, which remain disproportionately beset by problems of labour market disadvantage (Dodson and Berry 2003). Dodson and Berry (2003) also noted that the disadvantaged 'old economy' areas were largely being bypassed by any regenerative effects arising from the emergence of the new, wealthier, fringe estates.

The findings reviewed above demonstrate that Melbourne's spatial socio-economic patterns are clearly associated with the housing market. The housing market appears to be acting as a mechanism through which socio-economic status, as determined by the metropolitan labour market is distributed, and in many cases concentrated. The implications of these patterns have also been made clear. While central and inner areas remain job rich high skill and high housing cost locations, middle and outer areas face a less secure employment context and limited housing advantage (O'Connor and Healy 2002).

Spatial affordability

Housing affordability patterns reflect the socio-economic and house price patterns described above. Burke and Hayward (2000) for example calculated affordability ratios for both the private rental market and the home ownership market. They found that there had been a decline in low-cost rental stock between 1986 and 1996, and that this decline was spatially distributed. Inner Melbourne areas exhibited particularly strong declines of between 20 and 50 per cent, in the proportion of rental stock in the 'low-cost' bracket. By comparison, outer areas, such as Greater Dandenong in the southeast and Brimbank in the west experienced increases in the proportion of low cost rental stock of greater than 20 per cent. Similar findings were reported by Yates (2002) who noted that inner Melbourne, for example, lost more than 4,000 low rent dwellings between 1986 and 1996.

Wulff and Evans' (1999) investigation of Commonwealth Rent Assistance also demonstrated similar strong spatial affordability patterns. Households receiving Commonwealth Rent Assistance (CRA) payments were concentrated spatially in Melbourne. But this concentration varied across the different types of household receiving CRA. Thus single unemployed CRA recipients were concentrated in the core and inner areas, while sole parent and family households were concentrated in middle or outer areas. Of particular relevance to the present research project, locations with a relatively high proportion of CRA recipients tended to be those outer areas that also had high levels of unemployment.

Burke and Hayward (2000) also found that the ratio of median house price to both average yearly male earnings, and average dual income household earnings, had increased across much of Melbourne during the period 1989 to 1999. This effect was particularly marked for inner and inner-eastern areas of the metropolitan area. Interestingly, in a number of outer-suburban areas, particularly those in the southeast, housing affordability had improved during the 1989-1999 period. Such findings appear to reflect the differentials in house price inflation that Burke and Hayward reported earlier.

The combination of decreasing affordability of housing in inner areas of Melbourne and the improving or static affordability levels in outer areas confirm concerns expressed by many authors since the early-1990s that Australian cities are becoming increasingly spatially polarised due to shifts in the labour market and housing market. Concerns voiced by authors such as, for example, O'Connor and Healy (2002) and Baum et al (1999) remain relevant. This issue of how labour market and housing market dynamics shape socio-economic opportunity is of particular relevance to policy makers who are concerned with, for example, reducing the number of households receiving income assistance, or ensuring equity of spatial access to employment and services. Such concerns are closely linked to issues of 'spatial mismatch' and it is to this notion that discussion turns.

SPATIAL MISMATCH AND TRANSPORT EXCLUSION

Spatial mismatch and urban structure

Concerns in the US in the late-1960s over differences at the metropolitan scale between locations where employment opportunity is greatest, and where those who are in greatest need of availing themselves of such opportunities actually reside, gave rise to the notion of a 'spatial mismatch'. Spatial mismatch refers to the disproportionate number of jobs that are located in certain city locations (in the US this is the suburbs), relative to the spatial concentrations of working poor and under-employed, which are located elsewhere (in the US this is the inner city areas). In the US context, spatial mismatch is typically referred to as a hypothesis for explaining relative employment disadvantage between ethno-racial groups, particularly inner city African-Americans and Hispanics. While spatial mismatch is supported by empirical evidence in the US, there remains some disagreement about its validity.

The spatial mismatch hypothesis was first explored empirically by Kain (1968) in a major investigation of the places where low-income non-white households were located, in comparison to the locations where employment growth was greatest. Kain found that because the housing markets of large US cities were spatially segregated along ethno-racial lines, the areas where African-American households were able to locate were typically areas that had limited employment opportunity. The urban socio-spatial structure therefore placed African-American households at a disadvantage relative to other, in particular white, households. Much of the employment growth experienced in the US since the late-1960s has been in the suburbs, areas from which African-Americans have faced discriminatory access to housing. By being located in areas with limited employment opportunity, African-American households suffered both job-search problems, as well as longer commutes to access employment.

Kain's 'spatial mismatch' argument resulted in numerous subsequent studies of the residential and employment geography of large US urban areas (Holzer 1991; Ihlanfeldt and Sjoquist 1998). While some studies have been sceptical of the argument (Taylor and Ong 1995), the majority appear to support the hypothesis (Ihlanfeldt and Sjoquist 1998; Pugh 1998), that the geography of employment location and racial residential segregation adversely affects the socio-economic opportunities for low-income non-whites.

The spatial mismatch hypothesis is not without its critics however, who have criticised spatial mismatch theory on both empirical and theoretical grounds. Moore and Laramore (1990), for example, suggest that inner urban households do not possess the requisite skills to avail themselves of the central city employment opportunities. In this characterisation, spatial mismatch is understood as a mismatch of labour skill resulting from the transition from the old economy to a 'higher order' labour market, which is then combined with the historic patterns of racial residential segregation to disadvantage inner urban African American households.

Ong and Taylor have suggested that spatial mismatch is not in itself a problem but that an 'automobile' mismatch exists, such that low-income inner urban households have lower rates of automobile ownership than suburban households, and as a result are unable to access suburban employment opportunities to the same degree. By comparison, Sanchez (1999), modelling for Portland and Atlanta in the US, for example, suggests that proximity to public transport is a positive factor in determining labour participation.

Understandings of the patterns of racial residential segregation, which have been highly visible factor in US urban areas, are of limited applicability to the Australian context. Australian cities generally lack strong socio-ethnic segregation, and rather than being areas of low socio-economic status, Australian cities' inner-urban areas typically contain high levels of employment and socio-economic opportunity. However the socio-economic dimensions of the spatial mismatch hypothesis remain applicable in Australia given the context of the ongoing restructuring of urban housing and labour markets. If Australian housing markets segregate households on the basis of socio-economic status, and spatial patterns of employment growth do not favour areas where such households are concentrated, then comparable socio-economic opportunity problems to those experienced by US cities are likely to arise, albeit without such a strong ethno-racial dimension.

The purpose of the present research is to investigate the spatial concentration of labour market opportunity relative to the spatial concentration of socio-economic housing opportunity, in the Australian context, focussing on Melbourne to evaluate the extent of any geographic mismatch. A second component of the study will examine the role that transport systems play in overcoming any spatial mismatch.

Transport and social exclusion

A further issue that is related to spatial mismatch and the concentration of socio-economic disadvantage is that of access to transport services in urban areas. There is a strong overseas understanding of the importance of transport, particularly public transport in reducing the effects of social exclusionary housing markets on socio-economically disadvantaged households (Murray *et al.* 1998; Sanchez 1999; DLTR 2000; Gleeson and Randolph 2001; National Shelter 2001; Litman 2003; Social Exclusion Unit 2003). A UK government study (DLTR 2000) of the links between social exclusion and transport, for example, concluded that:

Households without a car, in a society in which household car ownership is the norm, are "socially excluded" within our definition of the term since they cannot fully participate i.e. behave as the vast majority behaves. Even non-possession of a driving licence can be a disadvantage in that, to take a specific example, it reduces job opportunities. (p. 76)

This issue has only been given sporadic attention in Australian urban research and policy discussions. Though now dated, Morris (1981) noted that at that time, one-sixth of Melbourne's households did not own a car, such that:

The consequences of inadequate or inappropriate public transport are far from trivial. Car ownership is an expensive necessity for most low-income families and imposes an undue strain on their budgets. (p. 21)

Morris (1981) also noted that while Melbourne had very good public transport infrastructure, the geographic spread of these services, was focussed on the central and middle suburbs, rather than those areas on the fringe where services were considered poor.

Similar concerns were echoed in the Australian Social Justice Research Program into Locational Disadvantage (Travers Morgan 1992) and by the National Housing Strategy (1992) in the early 1990s. The National Housing Strategy (1992) concluded that:

People without private transport, especially where public transport is not readily available are likely to be disadvantaged. In particular older people, young people and members of a car-owning household who cannot use the car, are more likely to have problems and/or longer travel times to services and jobs. (p. 57)

More recently, the Victorian State Government has noted the poor spatial coverage of public transport services in Melbourne's outer suburbs in the Melbourne 2030 planning document (Department of Infrastructure 2002). There is a strong rhetorical focus within this strategy on redressing inequities in the spatial coverage of public transport services. However the underlying basis for the strategy, which is supported by the most recent expenditure decisions, is that transport in Melbourne's outer areas will remain focussed on roads, including freeways, and the private automobile, for the foreseeable future (Dodson 2003). For those households who are unable to drive, or who lack access to adequate public transport, their access to community services and employment opportunities are likely to remain constrained.

Transit rich/transit poor

One of the best recent examples of empirical research on the spatial dimensions of transport exclusion in Australia is Cheal's (2003) consideration of 'transit-rich' and 'transit-poor' areas of Melbourne. Cheal mapped the areas of Melbourne where high quality public transport services are available, based on 'best-practice' international standards of public transport service. The criteria for an area to be 'transit rich' included minimum service frequencies of 30 minutes, the capacity to travel in more than one direction (i.e. north-south and east-west), 5 am to midnight services and weekend services. These standards are based on Mees' (2000) benchmarking of Melbourne's public transport system against the more efficient and more patronised Toronto system. Based on this standard, Cheal found that 82.5 per cent of Melbourne's population lived outside of 'transit rich' areas (2003. p.32). Cheal then compared the socio-economic characteristics of the populations in the transit-rich and transit-poor areas, and found that transit-poor households tended to be socio-economically worse off on average, when compared to those in the transit-rich areas.

Among Cheal's conclusions were the following observations:

Obviously, those living in transit poor Melbourne without cars are severely restricted in the times and destinations to which they can travel. This means that many people face a curtailment of their ability to participate in a range of activities that other people take for granted. Often they are reliant on the generosity of friends and family for simple and regular trips such as shopping. Where such generosity is not available they must either go without that trip or make the journey by taxi, both potentially costly options in their own ways. (p.54)

The implication of Cheal's research, that those residing outside 'transport rich' Melbourne are socio-economically worse off than those within this area, suggests that transport contributes a significant component to the existing levels of social disadvantage. Given housing is most affordable in the poorer, outer-suburban areas of Melbourne, (Wulff and Reynolds 2000; Dodson 2003), these less advantaged locations are likely to be far outside the 'transit rich' areas.

The direction of causality, if any, remains unclear from Cheal's analysis. Thus it is uncertain whether poorer households prefer automobile dependent suburbs, whether their employment opportunities are dispersed throughout suburban locations rather than centred on the CBD, or whether housing markets operate to exclude lower socio-economic status households from areas where public services are relatively good. Most likely it is a combination of all three processes (see below).

Conclusions

These concerns clearly point to the importance of urban spatial patterns, in terms of both housing and labour markets, in determining and facilitating the success or otherwise of households within the urban economy. In the context of an increased rate of urban socio-economic restructuring, and the recognition that policy makers must be more closely attuned to the effects that these changes generate on households and individuals, the need for research which illuminates the dynamics between housing affordability and employment opportunity is pressing. It is this need that the present project only seeks to partially satisfy, given the breadth of the problem and the methodological complexity required for a comprehensive research intervention.

PART II: ASSESSING SPATIAL MISMATCH IN MELBOURNE

Part I of this report has considered the literature and conceptual issues relating to the links between housing affordability, socio-economic and employment opportunity and transport. The remainder of this paper presents preliminary empirical evidence to assess the extent to which spatial mismatch is occurring between the location of affordable housing and labour market opportunity in Melbourne. The data is drawn primarily from 2001 census data, however other data is used where relevant or necessary. This part is divided into three sections: housing affordability, labour market disadvantage and opportunity, and the links between housing and employment opportunity.

Housing expenditure and affordability

Housing expenditure: rental costs

This first section seeks to identify locations where housing is most affordable for low-income households within the metropolitan area. Both rental and home-ownership affordability are considered. Census data as published by the Australian Bureau of Statistics is not ideal for this purpose, as the data is categorised and published in ways that limit the cross-tabulation of different household characteristics. Further, the data is now over three years out of date. However for the purposes of this exploratory study, these concerns are relatively minor. Further, there are few alternative data sets available which could provide the comprehensive spatial and population coverage of the Census, particularly across a range of spatial and demographic scales.

The project has mapped three housing cost variables across the Melbourne metropolitan area, to the statistical local area level. The first of these maps examines household rental expenditure (Figure 1).

There is a clear spatial differentiation in the proportion of private rental households in Melbourne metropolitan Statistical Local Areas (SLAs) for whom rents are less than \$150 per week. The most obvious pattern is the difference between the inner city and the middle and outer areas. Less than a quarter of households in most of the inner city and inner and mid-eastern suburbs are paying rents under \$150 per week. By comparison areas further out, such as in the outer western older industrial area of Sunshine and the northern older industrial area of Northcote had high proportions of up to 50 per cent of households paying low rents, while over 50 per cent of households in the older industrial area of Dandenong were paying rents at or below the \$150 level.

The only other areas where the proportion of households with low rental payments was the same or higher than Dandenong included those effectively beyond the urban fringe, such as on the Mornington Peninsula or the Yarra Ranges. Many of the areas in the middle-outer east and south of Melbourne, and the middle-outer east had between 25 and 37.5 per cent of households paying less than \$150 per week in rent. Two noteworthy exceptions to this pattern are the proportion of low-rent paying

households in the recently settled areas of Melton East and Narre Warren – Berwick on the outer west and outer east respectively, where a low proportion of households are paying low rents, when compared to adjacent areas.

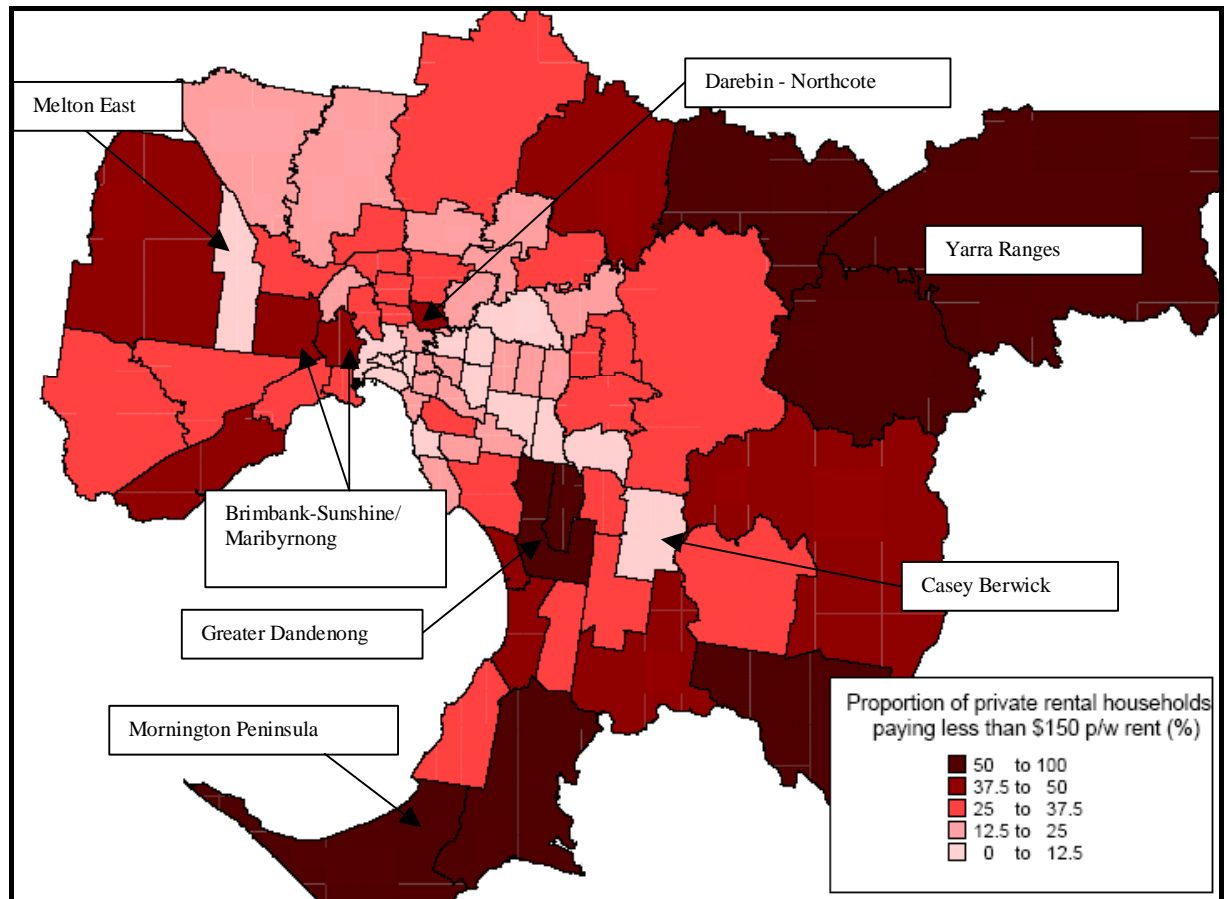


Figure 1: Proportion of private rental households paying rents less than \$150 per week, for Melbourne statistical local areas, 2001 (Source: ABS CDATA 2001).

The patterns above are consistent with previous research findings, particularly those of Burke and Hayward (2000) and Yates (Yates 2002), suggesting that recent shifts in the rental housing market appear to be continuations of trends from the mid-1990s. The only major new phenomena are the outer areas such as Melton East where there are relatively few low-rent households. Melton East is the site of the medium- to high-price new estates identified by Dodson and Berry (2003) that are attracting mid- to high socio-economic status residents, and it is not surprising therefore that this area might have a low proportion of households paying low rents.

Housing expenditure: mortgage costs

Mortgage repayment levels also display strong spatial patterns that largely mirror those in the rental market. Figure 2 maps the proportion of households whose monthly mortgage repayments were less than \$600 in 2001. The \$600 figure was

chosen because this approximates a \$150 weekly rental cost converted to a monthly figure. As Figure 2 demonstrates, much of central Melbourne, the inner north, eastern as well as the north east are areas where at most 15 per cent of households are paying less than \$600 per month on their mortgage. Middle suburban areas, in the west, north and east also have relatively low proportions of households with low mortgage repayments.

Households with mortgages requiring less than \$600 per month are more concentrated in areas in the middle and outer west, such as Sunshine and Altona, as well as the outer north, including Fawkner and Preston, and the outer southeast, such as Pakenham and Beaconsfield. The highest concentrations of households with low mortgages appear in the Broadmeadows and Dandenong areas in the outer northwest and outer southeast respectively. These areas were also areas of relatively concentrated low-rental households.

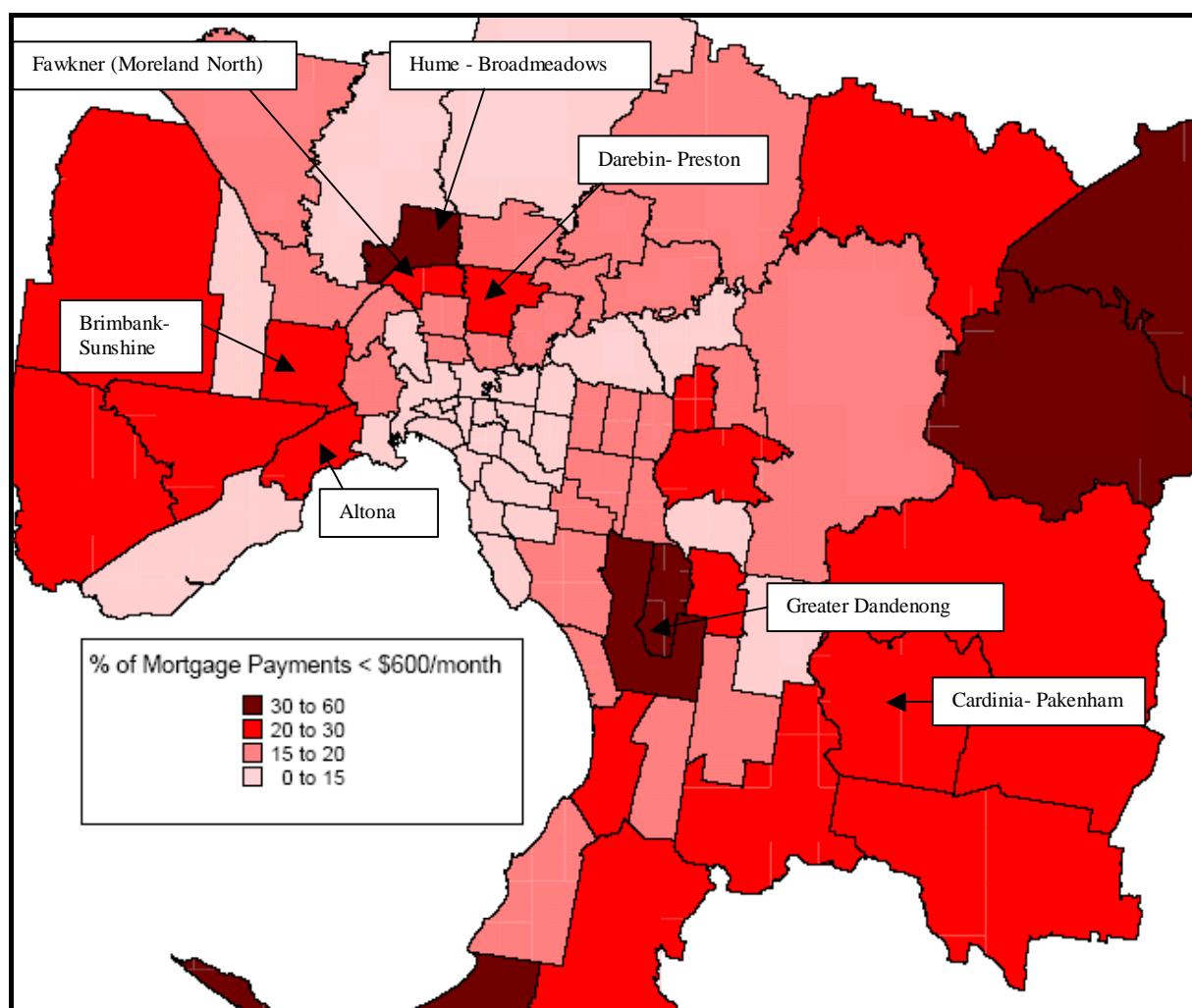


Figure 2: Proportion of households paying less than \$600 in mortgage repayments per month, for Statistical Local Areas in Melbourne, 2001 (Source: ABS CDATA 2001).

A further phenomenon to note are the outer areas where, like low rents, low mortgages are less concentrated. These areas again include Melton East and Narre Warren Berwick, reflecting the relatively higher house prices of these areas relative to other adjacent locations. Dodson and Berry (2003) noted a band of high labour market status households across the mid-north west of Melbourne between Melton East and Moonee Valley. This tract of low-unemployment areas is reflected in the low proportion of households in this area having mortgages of less than \$600 per month.

Affordability in rental housing

Housing affordability patterns also reflect the way in which the housing market is interacting with labour market and broader socio-economic opportunities, to enable or exclude socio-economic status households from particular areas. This section examines the low-income rented housing sector and the modest-income home-ownership sector. The first analysis concerns the spatial affordability patterns for rental housing for households receiving Commonwealth rental support, using a 30 per cent affordability threshold, as calculated by the Victorian Office of Housing (VOH) (Figure 3). The study uses the Local Government Area (LGA) as the basic geographic unit, which diminishes the detail, but nonetheless enables the broad affordability patterns to be observed. The underlying data presented here is the same as was used in Dodson and Berry (2003).

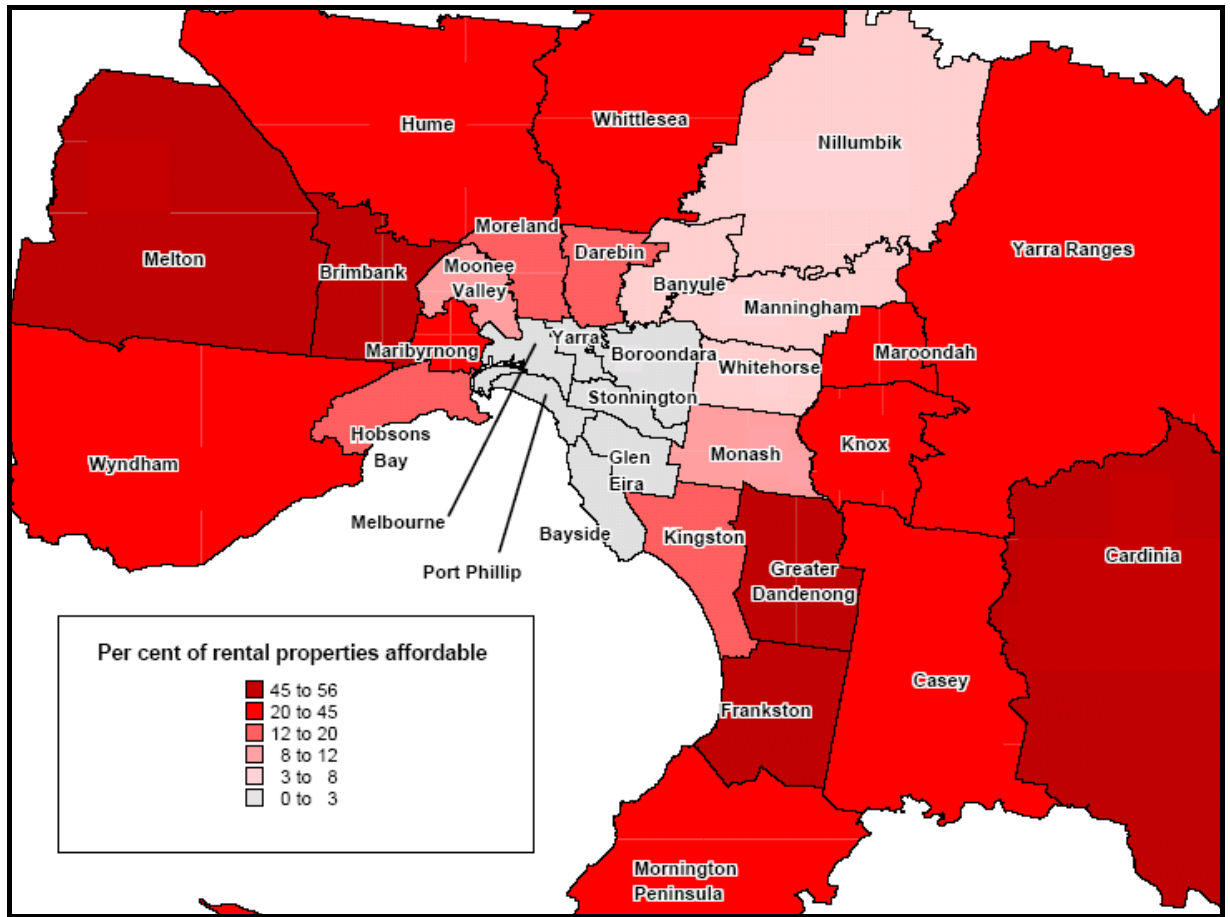


Figure 3: Proportion of rental housing affordable for households in receipt of Centrelink pensions at the 30% of income level of affordability, for Melbourne Local Government Areas, July 2002 (Source: Office of Housing (2002)).

As Figure 3 demonstrates, the affordability of rental housing for low-income households is highly geographically constrained. Less than 12 per cent of rental properties in most central, inner-east and northeast municipalities are affordable to Centrelink income households. Affordability levels are particularly low in the central area, with, for example, less than three per cent of rental properties in Melbourne, Yarra, Port Philip, Boroondara and Stonnington affordable to Centrelink income households at the 30 per cent threshold.

The most affordable LGAs for rental housing are in outer or fringe areas. Of particular note are the older industrial municipalities of Brimbank and Dandenong, which have a relatively high proportion of rental properties affordable to low-income households. These affordability patterns are not unexpected, given the way households paying low rents were found to be distributed (Figure 1).

Affordability of home-ownership

To assess the costs of home-ownership relative to income, a measure of affordability was constructed and mapped at the suburb level (Figure 4). The measure used is based on a dual-income average-wage family purchasing the median priced house

for each suburb, in 2002. The measure assumes a 20 per cent deposit, an interest rate of 6.75 per cent and a 25-year repayment schedule.

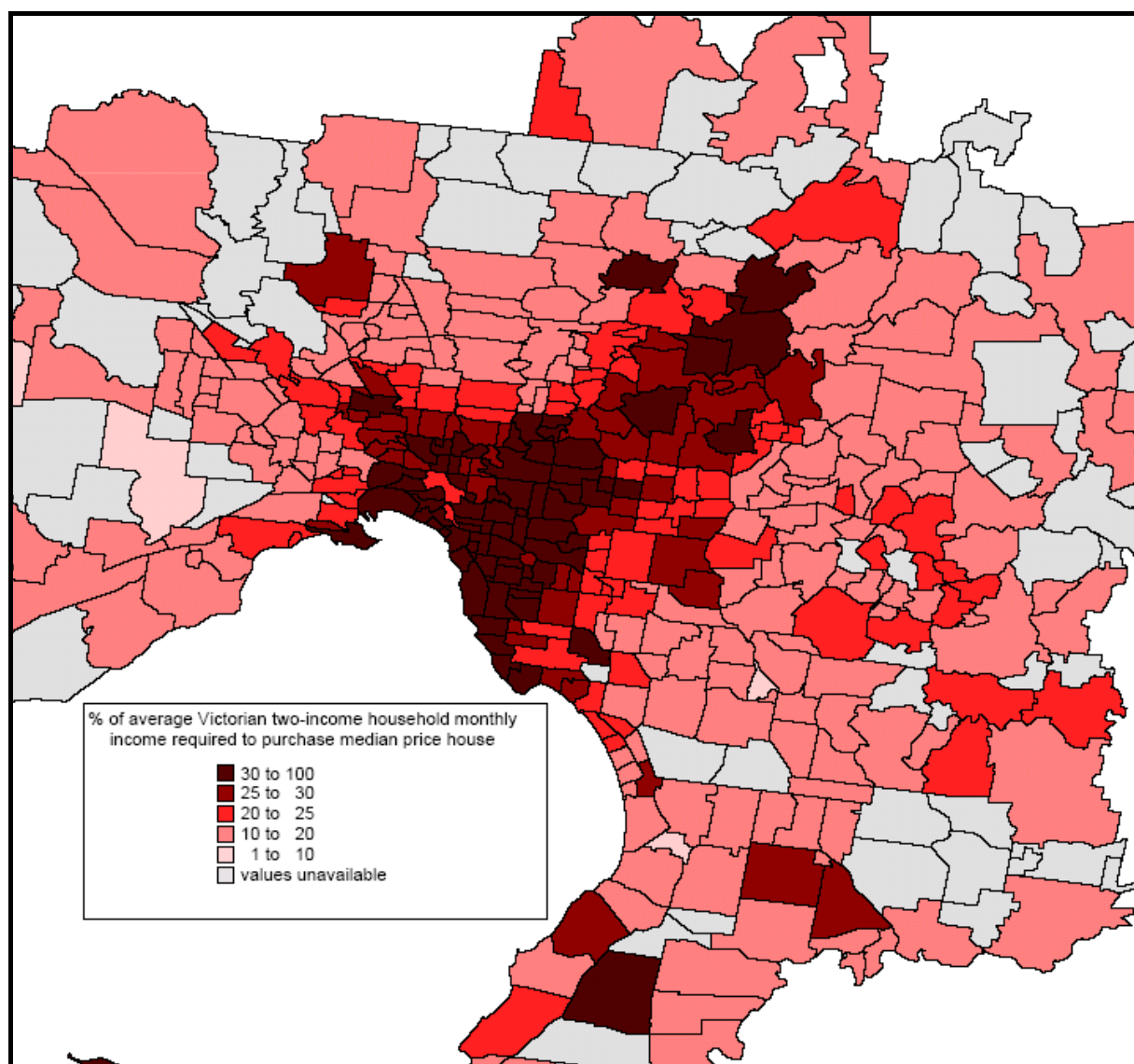


Figure 4: Proportion of average Victorian dual-household income required to purchase median price house for Melbourne suburbs, 2002 (Source: Valuer General Property Data; ABS Cat. 6302.0).

The data presented in Figure 4 exhibit similar patterns to those observed in Figures 1 to 3: low affordability in the central city, particularly within the north-east axis between St Kilda and Hurstbridge. This area of low affordability is bounded to the north and east by areas of constrained affordability, and includes the inner north, as well as some parts of the inner southeast. Outside the central and inner areas, housing affordability is relatively good with a dual-income average income household needing to pay 20 per cent of its monthly income or less on mortgage repayments in order to purchase the median priced house. The measure used is relatively conservative as it assumes a dual-income household receiving approximately \$7500

per month or just over \$90,000 per year. For the many households below this income level, such as those with a single below-average income earner, affordability would be even more constrained to outer-urban locations.

The housing price and affordability data presented above demonstrate that households with modest incomes face significant spatial access constraints on their residential location within the Melbourne metropolitan region. The patterns observed provide a recent confirmation of the continuity of earlier trends identified by previous investigations of spatial housing cost burden and affordability in Melbourne, such as Burke and Hayward (2000), O'Connor and Healy (2002) and Yates (2002). Melbourne's housing market continues to spatially segregate households on the basis of income and affordability, a phenomenon that is not new.

The fact that low- and modest-income households are being concentrated in specific locations, particularly in outer areas is not of direct concern to the present project. What is of concern is whether these housing market patterns place low- and modest-income households at a subsequent disadvantage in the spatial labour market. Do the residential locations that are affordable to low- and modest-income households diminish the geographic employment opportunities for these households, and what are the results of this effect? The following section examines recent spatial patterns in Melbourne's labour markets and assesses the extent to which labour market opportunity is co-located with housing affordability. The analysis is primarily concerned with the magnitude of employment opportunity rather than the quality of that opportunity, such as the sectoral composition of geographically proximate jobs.

Spatial Labour Market Disadvantage and Opportunity

Labour market disadvantage

The urban literature within which this research project is situated has demonstrated an important link between the socio-economic differentiating effects of labour market change and the socio-spatial differentiation of households via spatial housing markets. Previous research (see above discussion) has described the spatial patterns of labour market advantage and disadvantage in Melbourne, based on 1996 Census data. While central and inner areas of Melbourne exhibited relatively low unemployment rates during the past decade, particular outer areas, such as Sunshine, Broadmeadows and Dandenong had much higher rates. This project seeks to identify the spatial patterns of unemployment that can be observed using 2001 Census data.

The spatial patterns of labour market disadvantage are presented in Figure 5, which maps 2001 Census unemployment data for all persons for metropolitan Melbourne, at the SLA level. The shading is organised around the 2001 metropolitan rate of unemployment of 6.6 per cent.

The 2001 spatial unemployment patterns are in large part a continuation of previous (i.e. 1996) concentration patterns (for example Dodson and Berry 2003), albeit with some improvement in the magnitude of the rates of unemployment. For example the

areas with the lowest levels of unemployment are concentrated in the inner, north and outer east of Melbourne, where the unemployment rate was at least 1 per cent less than the metropolitan rate. Similar levels of unemployment occurred in the outer north, outer southeast, the outer north- and southwest. A number of fringe areas demonstrated particularly low unemployment rates. These areas of low unemployment appear to coincide with the locations of the new estates with medium- to high-socioeconomic status households that were reported by Dodson and Berry (2003). Such patterns reflect the growing recognition that the fringe can no longer necessarily be considered a place of socio-economic disadvantage.

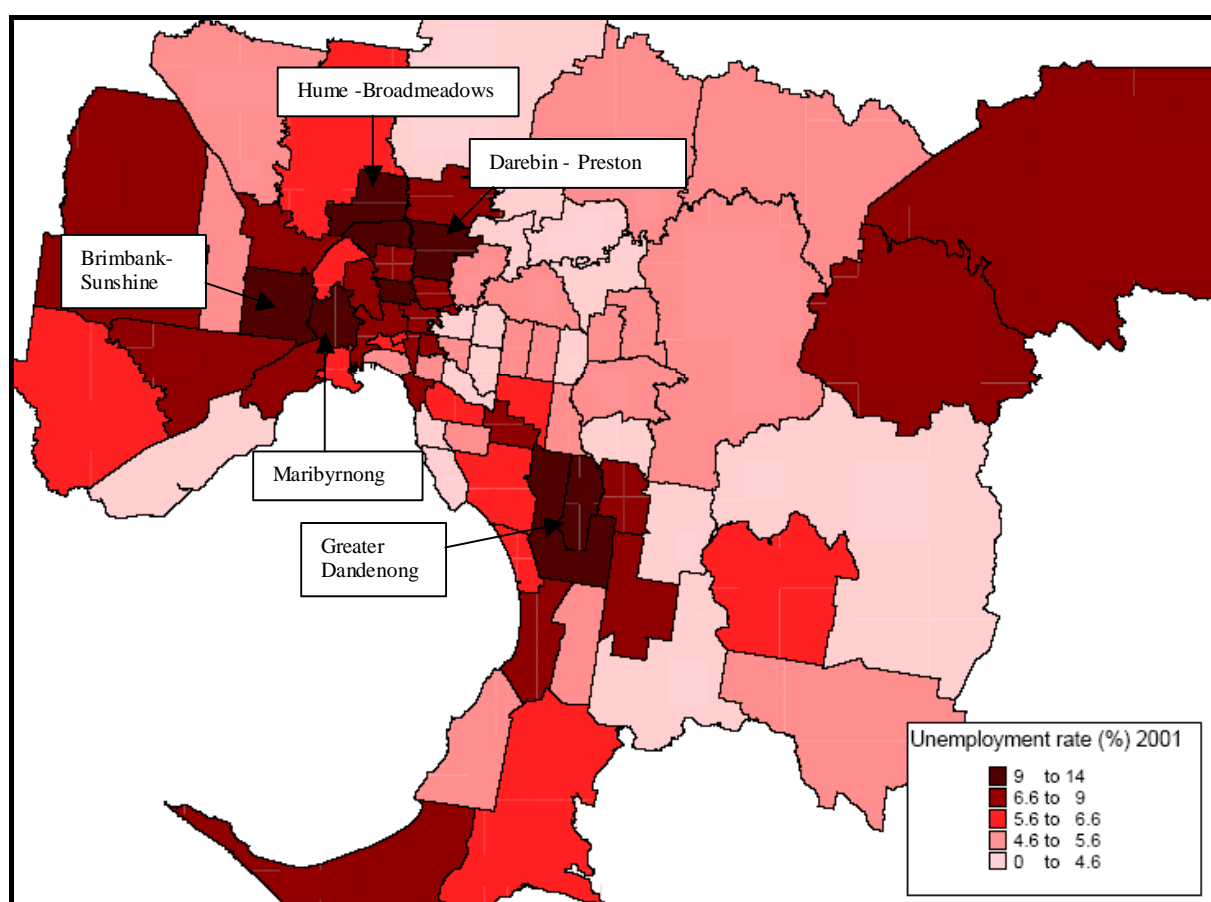


Figure 5: Unemployment as a proportion of the labour force, Melbourne Statistical Local Areas, 2001 (Source: ABS CDATA 2001).

High unemployment remains spatially concentrated in some areas, such as Dandenong in the south east of the metropolitan area, where unemployment was higher than 9 per cent. However, a broad region across Melbourne's north and west experienced high unemployment rates in 2001. Of particular note in this region are the areas where unemployment was higher than 9 per cent, such as Sunshine and Maribyrnong in the west, and Broadmeadows, Glenroy and Preston in the north. Again, these areas of high unemployment are consistent with the regions of

community vulnerability identified by previous researchers, such as Baum et al (1999).

Unemployment decline 1996-2001

While a static view of unemployment rates enable an understanding of the labour market situation at a point in time, the present project is also interested in the spatial patterns of labour market opportunity. Spatial patterns of labour market opportunity can be depicted in two basic ways. The first is by describing the spatial patterns of decline in unemployment over time, while the second assesses where new jobs are located over time. The changes in unemployment rates have been calculated for Melbourne at the SLA level between 1996 and 2001 (Figure 6). The change in the unemployment rate refers to the number of percentage points by which unemployment either declined or increased during the period in question such that a negative figure indicates a declining unemployment rate.

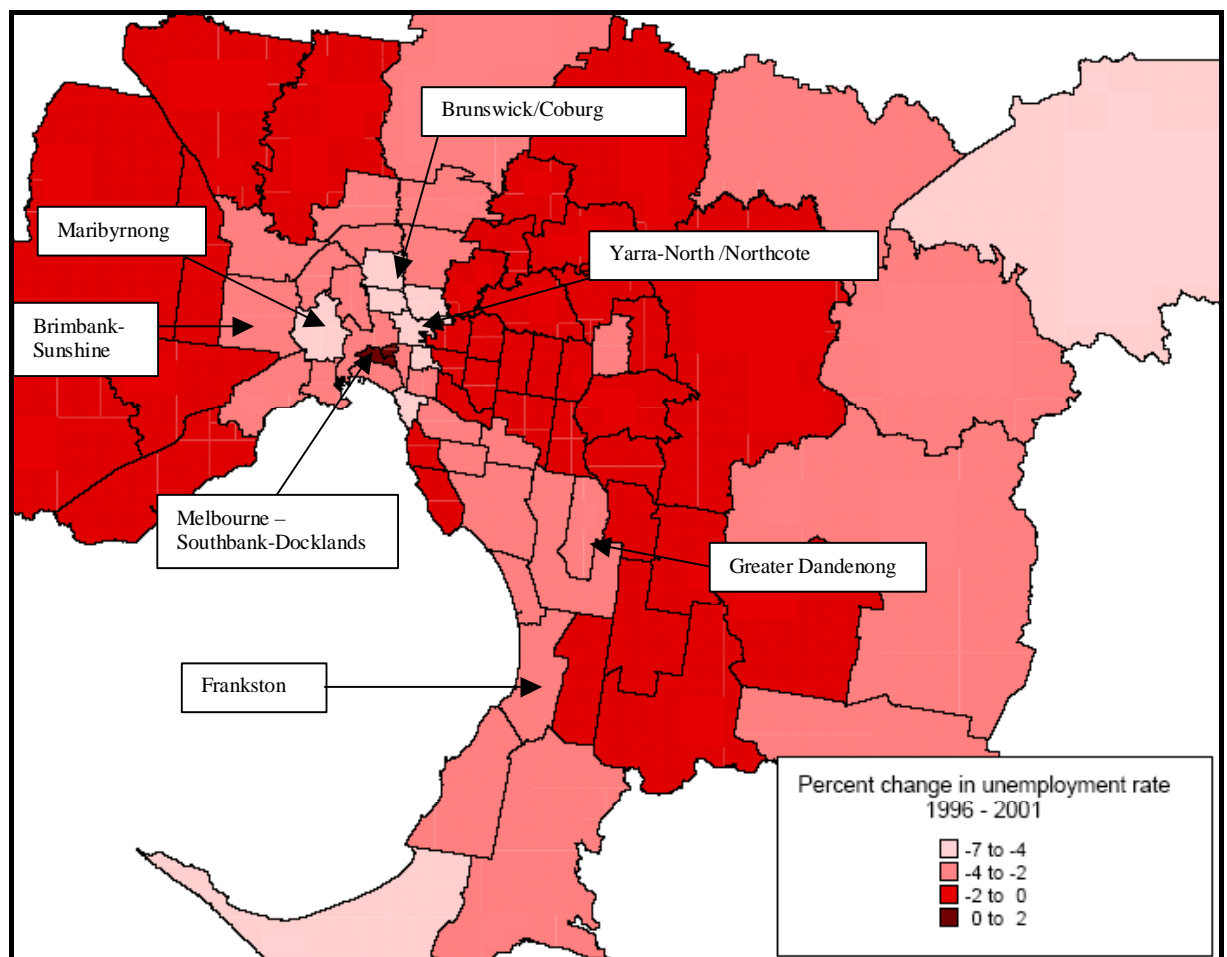


Figure 6: Percentage point change in unemployment rate for Melbourne Statistical Local Areas, 1996-2001 (Source: ABS CDATA 2001).

Three broad patterns are apparent from Figure 6. The first is the unexpected increase in unemployment in the inner Melbourne and Docklands areas. Given that these areas are strongly associated with the high-status 'informational' economy it is surprising that increased unemployment was recorded for residents of these areas. This outcome is most probably the result of shifts in the statistical boundaries – the Melbourne-Southbank/Docklands SLA was added after the 1996 Census and as a result, the values in the adjacent existing SLAs in Melbourne were reduced through redistribution. However the effect may also in part be due to an actual downturn in the 'informational' employment sector that occurred after 1999.

Other noteworthy areas are those where unemployment has declined by between four and seven percentage points, such as Yarra and Brunswick in the inner north and Maribyrnong in the inner west. Maribyrnong has in recent decades been an area of relatively high unemployment in Melbourne and a strong unemployment decline there would suggest some recovery from previous labour market disadvantage. But Maribyrnong and the inner north area has also been the site of gentrification by professionals associated with the inner-city labour market, such that the positive shifts in unemployment in these locations could be the result of displacement of individuals experiencing labour market disadvantage, rather than an in-situ improvement in their employment circumstances. There is potential that weaker labour-market status households could have been displaced by gentrification, shifting to the adjacent middle tract of suburbia, Sunshine, which already has a high unemployment rate.

Areas with reasonably strong decline in unemployment rates include the middle and outer west and northern areas, such as Sunshine, Broadmeadows and Thomastown, and areas in the outer southeast such as Dandenong and Frankston. This is a positive indication, given that these areas are most frequently cited as concentrations of labour market disadvantage.

A final set of areas with limited unemployment decline includes those in the outer west, inner east and northeast, as well as the outer east and southeast. In these areas, unemployment declined by, at most, two percentage points between 1996 and 2001. This however is not entirely unexpected, as these areas already had low unemployment rates, and thus had proportionally fewer workers to be absorbed into the ranks of the employed.

The patterns described above demonstrate that during periods of economic growth, areas with high unemployment rates can experience a rapid change of fortune. While unemployment rates in 2001 remained higher than the metropolitan rate in areas of historic labour market vulnerability, such as Sunshine or Dandenong, these areas also experienced strong improvements in their overall labour market position during 1996-2001. By comparison areas with already strong labour market positions also underwent an improvement but to a much lesser extent.

Employment growth, 1996-2001

The growth in employment across Melbourne Statistical Local Areas (SLAs) between 1996 and 2001 is presented in Figure 7, calculated from ABS Working Population Profile figures. The patterns of employment growth are dominated by suburban SLAs. Almost all the areas with greater than 20 per cent employment growth during the 1996-2001 period in western areas of Melbourne were almost exclusively further than 10 kilometres from the Melbourne CBD. In the east, most of the dominant areas of employment growth were located further than 15 km from the CBD. Clearly the suburbs dominate employment growth, with outer and fringe areas being particularly important in this regard.

It is possible that new employment in fringe areas could be more apparent rather than actual, as firms re-locate to outer areas which were previously not settled, and thus the statistical gains appear greater than their real numbers indicate. However there is also a middle-outer ring of suburbs, from Altona in the west, through Sunshine, Broadmeadows, Thomastown-Lalor, Greensborough, and through Ringwood, Rowville and Dandenong, which have experienced strong employment growth. This would confirm that the general pattern of middle and outer suburbs receiving higher employment gains is the dominant pattern.

By comparison, inner areas performed relatively weakly in terms of employment growth. In particular locations close to the Melbourne CBD, such as Maribyrnong, Melbourne City, Carlton-Fitzroy and inner northern areas such as Brunswick and Northcote experienced employment declines of up to 20 per cent. Employment growth in inner and middle-eastern locations was stronger, but somewhat mixed, with some areas such as Mount Waverly–Oakleigh declining, while others such as Hawthorn and Kew experiencing modest improvements.

The employment growth patterns in Figure 7 are presented in percentage terms, which reveals the relative size of the set of new jobs, relative to existing jobs, for each locality. To enable inter-locality comparisons, Figure 8 provides the absolute values for employment growth for the Melbourne SLAs during the 1996-2001 period. Absolute employment growth shows similar patterns to those for the percentage growth. The highest absolute employment growth occurred in the Melbourne CBD and immediate surrounding inner city areas, such as Melbourne-Southbank and Yarra-North. Many outer suburban areas also experienced strong total growth in job numbers. In particular there was a large tract of outer-suburban SLAs in Melbourne's west and north which experienced strong absolute growth in employment during 1996-2001. These SLAs include those in the Werribee, Brimbank, Hume, and Whittlesea SLAs.

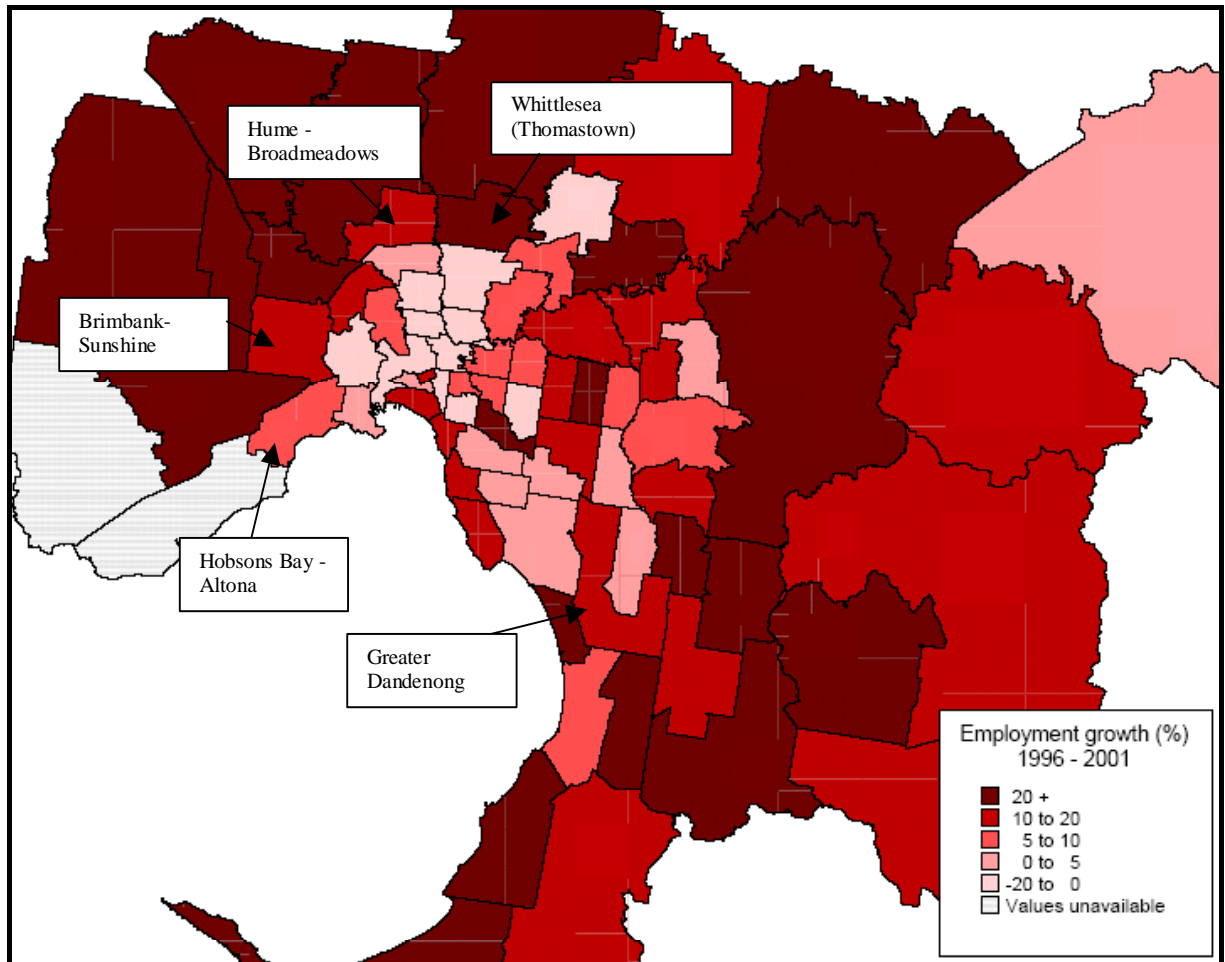


Figure 7: Employment growth in Melbourne Statistical Local Areas, 1996 – 2001
(Source: ABS CDATA 2001).

Outer southeastern SLAs also received relatively high numbers of new jobs during 1996-2001. The Knox and Casey SLAs, as well as Dandenong received strong absolute job growth, while some mid-eastern SLAs demonstrated similar employment strength, such as those in the municipalities of Manningham, Whitehorse and Monash.

Conversely, and reflecting the poor growth demonstrated in the percentage growth map, a number of SLAs in the inner-west and inner-north experienced employment losses during 1996-2001. In particular, Maribyrnong, and the Coburg-Preston areas all lost jobs during the investigation period. Throughout many of the remaining suburban areas, there were mixed growth levels, with northeastern and inner- and middle-eastern SLAs receiving low to moderate employment growth.

The absolute employment growth patterns are not surprisingly similar to the percentage patterns. Across both Figures 7 and 8, the trend towards strong employment growth in outer suburban areas is apparent. In particular there was strong employment growth in localities that were identified in Part I of this report, and by many researchers prior to this investigation, as being substantially relatively disadvantaged in terms of labour market opportunity. While the resident populations

of these localities continue to demonstrate high levels of labour market disadvantage, the 1996-2001 period can thus be understood as a time when there was strong growth in the employment opportunities available to these households. This issue of employment availability in areas of disadvantage is investigated in further detail in the following section.

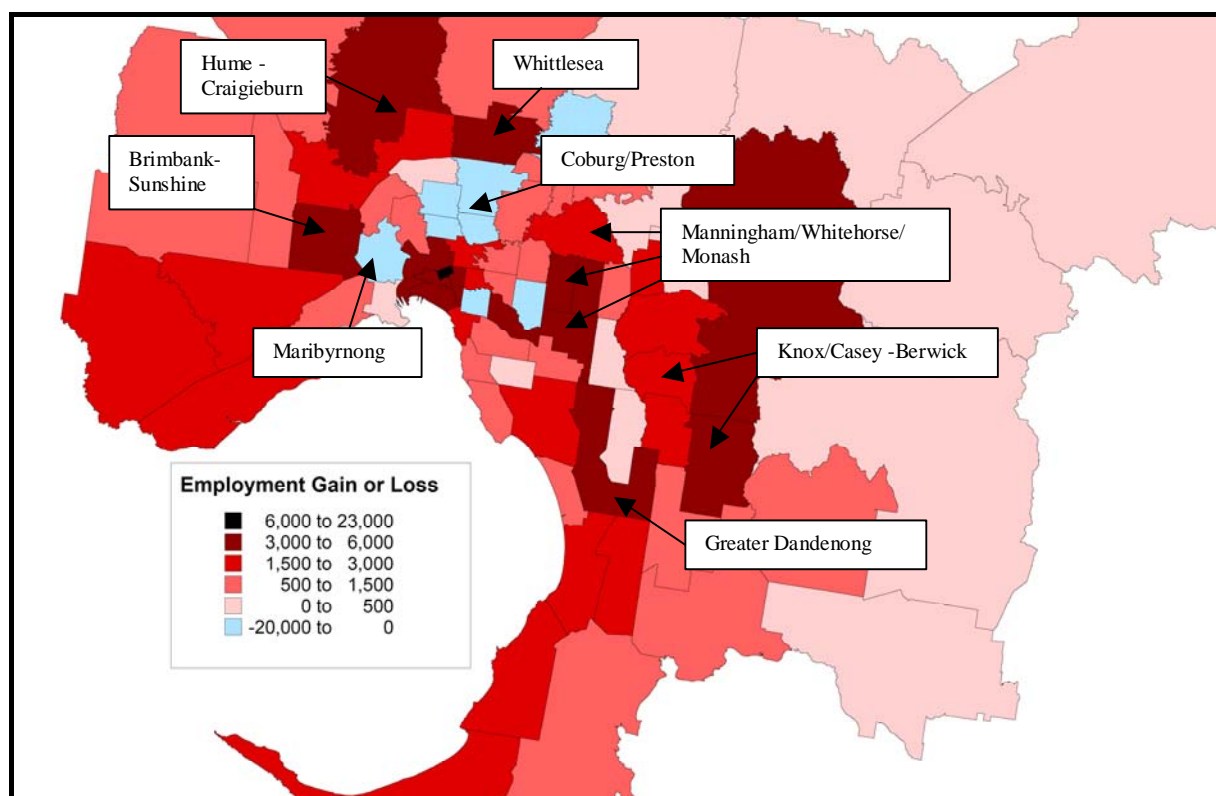


Figure 8: Absolute gains or losses in employment during 1996-2001 for Melbourne Statistical Local Areas (Source: ABS Working Population Profile Data).

Employment growth proximate to low cost housing areas

To make an assessment of the extent of spatial mismatch between areas that are affordable to low-income households, the number of jobs that were added to low-cost housing areas that also had high unemployment levels, during the period 1996-2001 has been charted (Figure 9). The low-cost housing areas selected were Sunshine, Broadmeadows and Dandenong. Dandenong here is taken to include two SLAs: Dandenong 'Dandenong' and Dandenong 'Balance'. The reason for this combination is that the 'Dandenong' SLA is relatively small and the adjacent 'Balance' SLA is closely linked spatially to the Dandenong SLA, bordering it to the west, south and east. Both SLAs are also physically and socially closely connected. It therefore seems sensible in this case to combine both SLAs as one unit for the purposes of this study. Such combination is not as appropriate in the case of the Sunshine and Broadmeadows SLAs as these are relatively more distinct from their adjacent areas.

As can be seen from the 10 km commuting distances around Sunshine, Broadmeadows and Dandenong, these areas of lower cost housing and high labour market disadvantage are reasonably well situated relative to new employment opportunities. All are situated in locations surrounded by areas where employment is increasing, in some instances markedly. Perhaps the most strongly placed out of these locations is Dandenong, where the labour market is expanding in the southeast urban 'growth corridor'. This 'growth corridor' has been more intensively developed and consists of more urbanised area than the comparator fringe areas to the west of Sunshine and Broadmeadows. The western localities however have much closer access to new employment opportunities in the CBD, yet are separated from the CBD by substantial tracts of weak employment growth.

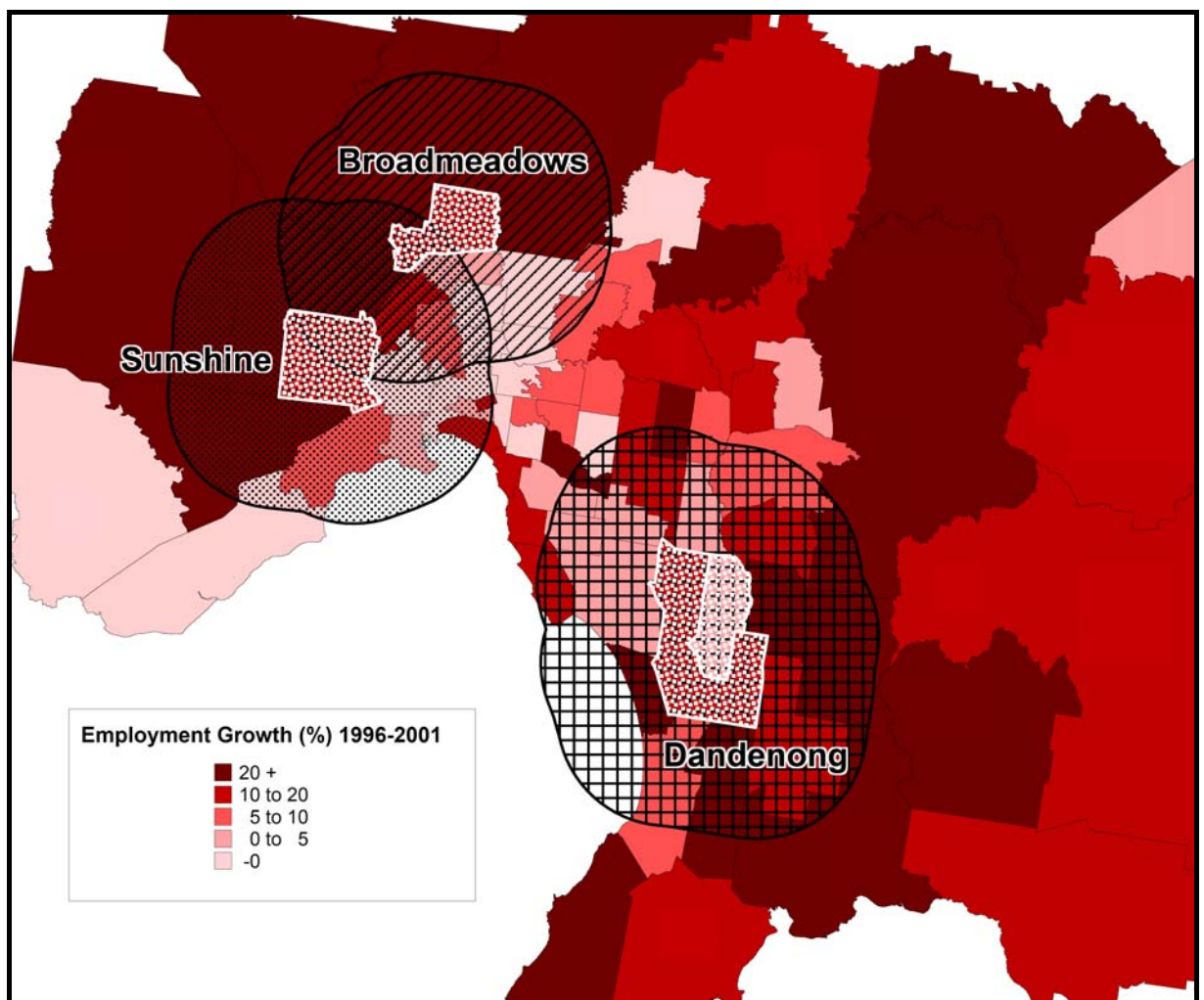


Figure 9: Selected low cost housing areas relative to employment growth (1996-2002) for SLAs, within 10 kilometre commuting distance (Source: ABS Working Population Profile 2001).

It is possible using Geographic Information Systems (GIS) to calculate the total number of additional jobs that were generated in the 10 km commuting 'buffer'

(depicted in Figure 9) surrounding the selected affordable housing SLAs during 1996-2001. The totals for each buffer are provided in Table 1.

Table 1: Additional jobs within 10 km radius of low-cost housing areas with high unemployment rates, 1996-2001.

SLA	Sunshine	Broadmeadows	Dandenong
Additional jobs within 10 km, 1996-2001:	65495	47999	45036
Total Unemployed 1996:	5576	4238	8302
Total Unemployed 2001:	4486	3100	6085
Change in Unemployed population 1996-2001:	-1090	-1138	-2217

The Sunshine SLA had the greatest number of new jobs within ten kilometres, largely because the Melbourne CBD is within 10 km of Sunshine. Surprisingly, Dandenong had the fewest new jobs within ten kilometres. This is an unexpected figure, given that the SLA is situated within the southeast growth corridor which might be expected to be providing new employment.

The table also provides the total number of unemployed persons in 1996 and 2001 and the difference between these two figures. As the table also demonstrates, the total number of jobs added to the areas within 10 km of the selected SLAs is many times larger than the total number of unemployed within the SLAs in 1996. New jobs within 10 km of Broadmeadows and Sunshine outnumbered the unemployed by a factor of at least 10, while the equivalent factor for Dandenong was approximately 5 times. It however would be wrong to suggest that each unemployed person had multiple employment opportunities open to them as population growth and competition for new jobs from the residents of other areas make a simple comparison of this kind difficult. Nonetheless, there was not shortage of employment surrounding the study areas during the period investigated.

The figures in Table 1 also indicate the relative 'stickiness' of unemployment between the selected study SLAs. Within ten kilometres of Sunshine, 17,496 additional jobs were generated than were created within the same distance from Broadmeadows (although there was some spatial overlap, see Figure 9) during 1996-2001. However, a much greater proportion of the Broadmeadows unemployed population obtained employment during the 1996-2001 period than was the case for Sunshine. Similar differences occurred between Sunshine and Dandenong. Clearly some factor was inhibiting the gaining of employment by unemployed residents of Sunshine than was the case with other study SLAs.

Spatial mismatch at the SLA level

Based on the figures and tables presented above it is clear that the hypothesis that there is a spatial mismatch between housing affordability and employment opportunity in Melbourne is not strongly supported, at least at the level of the statistical local area (SLA). While some variation in the buffer distance would no doubt produce different counts for new employment in the proximity of the study

SLAs, the 10 km distance chosen is considered a reasonable commuting distance and thus a strong indication of the relative availability of new job opportunities during the period of study. The conclusion is that unemployed residents in the case study SLAs were located within a spatial employment context in which they had relatively strong proximity to new employment opportunities. This finding clearly diverges from what might have been expected given what is known from the literature concerning spatial mismatch either in Australia or overseas.

An explanation for the observation that there is limited empirical support for spatial mismatch in Australia likely lies in the historical and highly specific nature of Australian urbanisation. The concept of spatial mismatch was originally developed by researchers in the US urban context. US cities tend to display a high degree of spatial concentration of social and ethnic disadvantage in their economically declining, inner areas, where housing is cheaper. Most employment, at least since WWII, has occurred in suburban areas, such as 'perimeter' (Fishman 1987) or 'edge' (Garreau 1990) cities, with higher housing costs and with high levels of ethnic discrimination. As US cities have expanded, inner city residents have thus been progressively distanced from employment opportunities.

In the Australian context, from the late-1960s, the inner suburbs gave way to outer suburban areas as locations of cheaper housing, while employment in some sectors, such as manufacturing, has also gradually been shifting outwards. More recently, many parts of the Australian urban fringe have become high cost housing locations, but are also generating new employment. The result is that suburbs of socio-economic disadvantage that were previously 'exiled' on the fringe are now being surrounded not just by new areas of relative socio-economic advantage, but also by newly generated employment that is accompanying these higher status housing areas. This is exemplified in the case of Sunshine, where recent housing estates in the Melton-East corridor to the northwest of the SLA are being populated by relatively high socio-economic status households (Dodson and Berry 2003). Their locational disadvantage relative to spatial labour markets is thus gradually diminishing. Spatial mismatch for disadvantaged fringe areas in Melbourne is therefore diminishing.

What remains problematic however, despite the improvement to the regional employment context for localities such as Sunshine, Broadmeadows and Dandenong, is the persistence of high relative levels of socio-economic disadvantage in these areas. While there have been large numbers of job opportunities in the areas surrounding these SLAs in the 1996-2001 period, the employment gains have been modest. This observation suggests that while gross spatial factors may be diminishing in importance, some other factors may be operating that perpetuates the 'stickiness' of employment in the study SLAs.

One factor that could be operating to inhibit the gaining of employment by unemployed residents of the study SLAs is the skill levels of the population relative to the types of jobs that are being generated proximate to their location. While this issue may be a strong factor affecting the opportunities available to the study SLAs,

this research project was not intended to consider this type of question and accordingly detailed assessment of the likely contours of the problem cannot be substantially entertained.

A further factor relates to the difference between proximity to employment opportunities and access to those opportunities. Proximity is a gross quantitative spatial measure that allows for little consideration of experiential or qualitative dimensions of the interactions between urban space, residential location and labour market opportunity. By comparison, notions of access are more flexible and potentially more powerful in providing insights into the capacities and methods available to households in negotiating urban space, both in terms of housing and employment location, and travel between these sites. Part III of this project turns to this question of access and considers the potential for alternative transport modes to cater to the employment needs of the populations within the study areas.

PART III – TRANSPORT ACCESS

Transport and labour market disadvantage

Part II of this project has demonstrated that the spatial mismatch hypothesis cannot be deployed to explain the spatial concentration of low-cost housing and household labour market disadvantage. The areas of lowest housing cost are often also areas with enduring high proportions of low labour market status households, but they are increasingly surrounded by new employment, which potentially provides spatial opportunities for lower labour market status households to gain employment.

However the above analysis was based on a simple calculation using distance from the Statistical Local Area (SLA) of residence as the assessment criteria for proximity of any spatial mismatch. But urban space is not uniformly traversable, given the distances involved, the availability of differing modes of transport and the capacities of households to access those modes. Overseas literature has suggested that access to means of travel can substantially impact upon households and individuals abilities to access both employment opportunities, as well as basic social and community services. Accordingly, while this project was primarily concerned with assessing the extent of spatial mismatch, the question as to the capacity of households to travel across the urban areas to access employment opportunities remains unexplored.

This part of the report explores the connections between household labour market status and their access to transport in the case study SLAs, and relative to the broader metropolitan population. The section responds to Research Questions 4 and 5 that concern the use and availability of transport modes at the local scale in areas of higher housing affordability where the resident population has relatively weak labour market status. To some extent, this investigation replicates the work of Cheal (2002), however the focus on the local scale followed in this project, and the concern with labour market status rather than general socio-economic status provides additional insights into the capacity of local transport services to provide for residents potential travel needs.

Local public transport availability

Research Question 4 asked what transport modes are available in locations of higher unemployment. In responding to this question, this section focuses on the case study SLAs as the areas of higher unemployment to be considered. The analysis begins by identifying the modes of transport that are present in these SLAs and then undertakes Geographic Information System (GIS) manipulations and calculations to assess the capacity of these modes to provide for local residents' access to employment and goods and services. The analysis is largely focused on public transport as road networks are presumed to already provide adequate access to employment and services. While this is a potentially contestable assumption, the restriction of the discussion to public transport modes is justified on the basis that

these are more easily investigated considering the resources available to this project.

The first concern is with identifying the modes of public transport that are available in the case study SLAs. Figures 10, 11 and 12 present the modes available in each of Sunshine, Broadmeadows and Dandenong, mapped over the Census Collectors Districts (CDs) with the population per CD depicted by the area shading. The maps provide both bus routes and train stations. Bus routes are depicted as continuous, as the stops are typically spaced quite closely along suburban streets, with the potential to stop at almost any point along the route. Trains however are only accessible at railway stations and thus only the stations are depicted in these maps. The bus routes and station names are provided for the reader's information rather than having any analytical purpose per se.

Some points of relevance to the project can be noted from the route maps. The first point is that there is a mix of public transport modes within the case study SLAs. All three contain a number of bus routes as well as at least one if not two train lines, often with a junction between two lines (as is the case with Sunshine Station in Figure 10). Sunshine is serviced by 9 bus routes, Broadmeadows by 15 and Dandenong by 18 routes. There is some degree of spatial integration of modal routes, often with a train station providing the hub of a set of radial bus routes. This is the case with Sunshine Station, Broadmeadows Station and Dandenong Station in their respective SLAs.

The second point to note is the spread of public transport routes across the SLAs. Thus while Sunshine Station is connected to a number of bus routes, many of which traverse the southern sectors of the SLA, the northern part of the locality is less well served. In particular the northwestern section has only one bus route, which follows a fairly windy route through the area. Similar situations are present in Broadmeadows and Dandenong, although the gross spread of bus routes in these SLAs appears denser than in Sunshine.

A third issue to note is the extent to which the public transport routes are spatially coherent. All three SLAs contain a number of bus routes that follow what Mees (2000, see also Frazetto 1999) has referred to as the 'wandering minstrel' pattern, in that they appear designed to maximise spatial coverage rather than provide a direct service between destinations. This problem is present in the case of, for example, the 451 route in Sunshine, the 477 and 542 routes in Broadmeadows and the 842 in Dandenong. This means that the routes sacrifice accessibility for potential patronage, thus reducing the quality of the service provided.

The fourth point to note is that the combination of spatial coverage and the numbers of routes suggests that the study areas have good levels of public transport service available to residents. It might be tempting for a policy maker or planner to assume that residents travel needs are currently adequately served by the mix of available routes. However the following analysis of the service quality provided by these routes sheds some doubt on this adequacy.

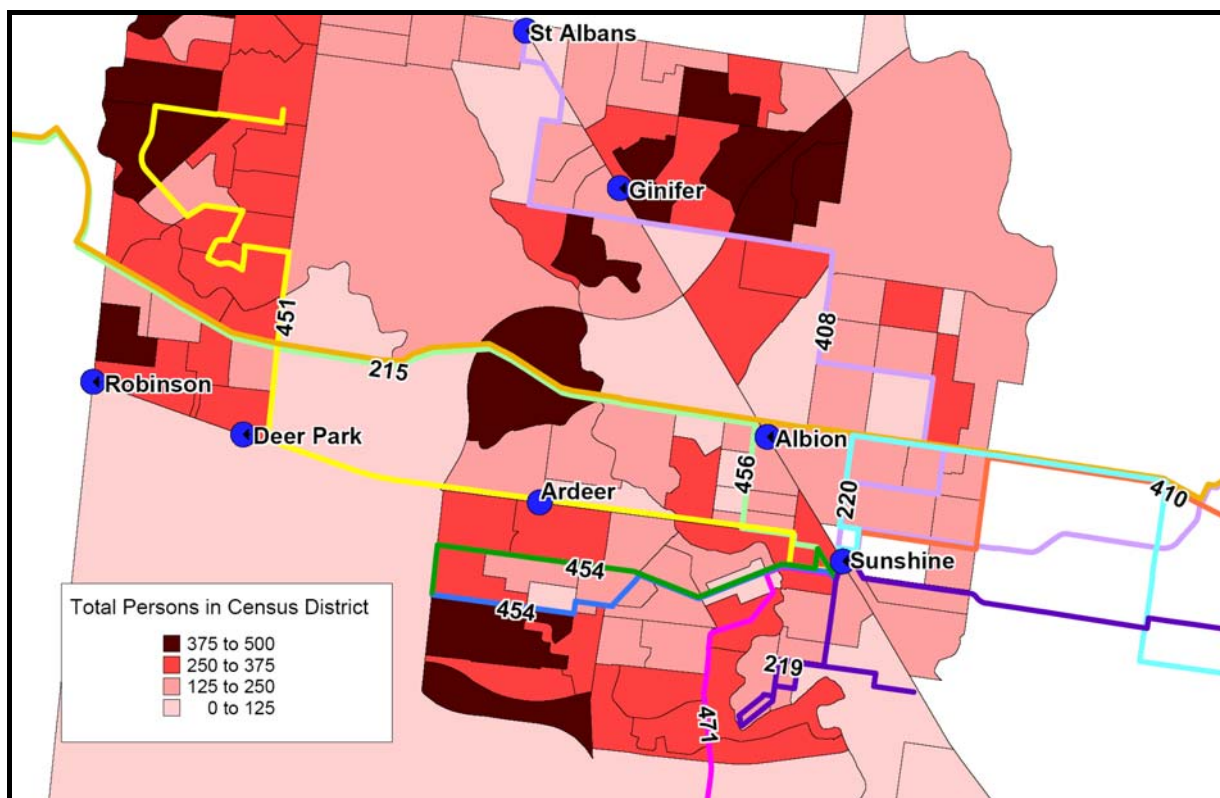


Figure 10: Public transport routes for the Sunshine Statistical Local Area, with population per Census Collector District depicted (Source: ABS CDATA 2001 and DOI Public Transport Data).

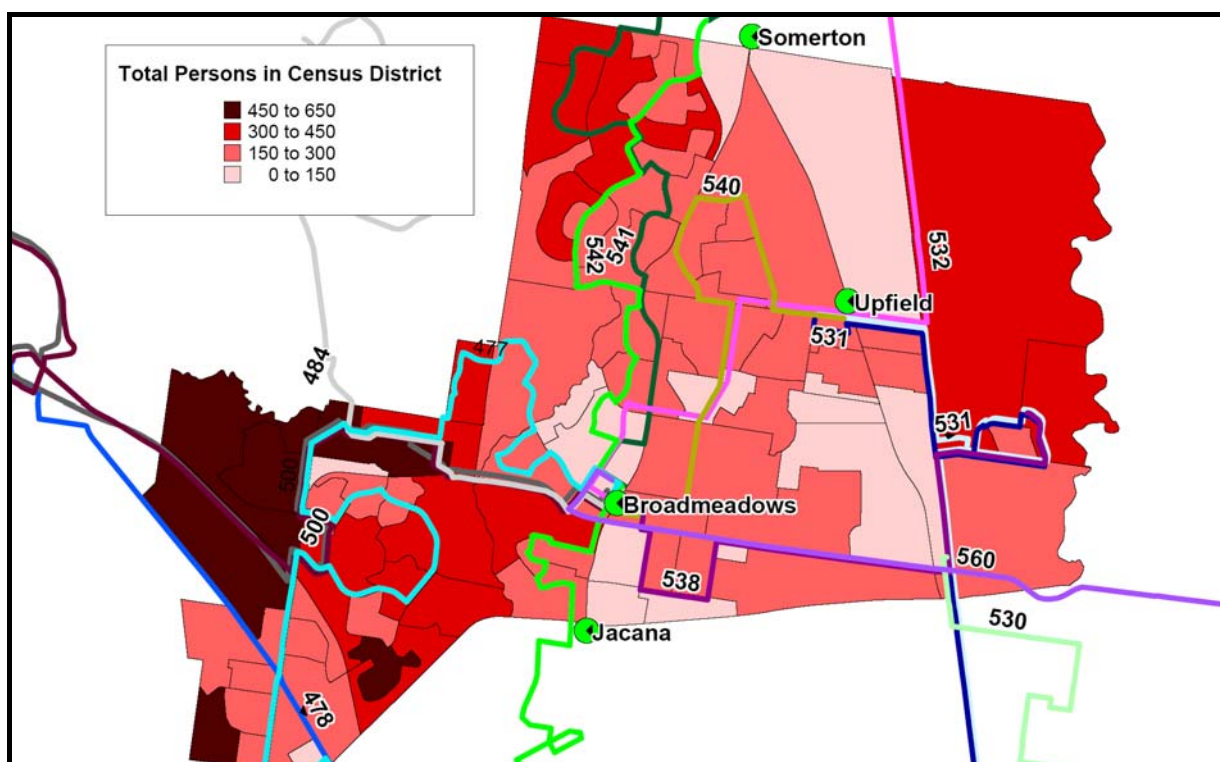
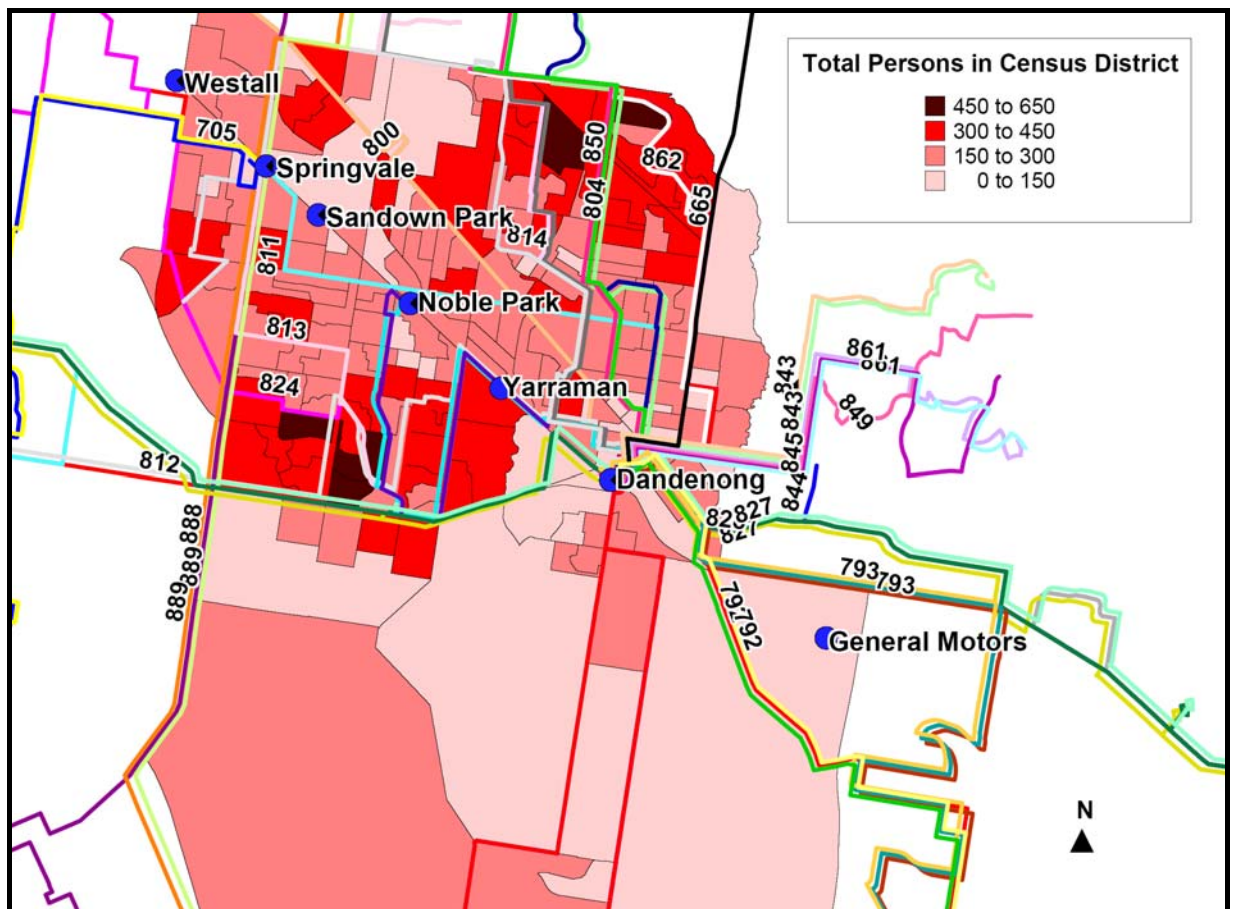


Figure 11: Public transport routes for the Broadmeadows Statistical Local Area, with population per Census Collector District depicted (Source: ABS CDATA 2001 and DOI Public Transport Data).



Service adequacy in the case study areas

Assessing service adequacy

The assessment of public transport service adequacy is a highly complex undertaking. The definition of what constitutes ‘adequate’ is open to substantial debate. Is proximity to a route more important than route frequency? How is it possible to balance the daily availability of a public transport service against high frequency services or services that operate across many periods of the day? What is the importance of network connectivity in providing public transport users with a range of potential destinations? These questions are important and depending on how they are answered can produce varying outcomes.

Various authors in the literature on transport and urban accessibility have offered suggestions as to standards or benchmarks for assessing transport adequacy. Mees (2000) argues that an integrated network of high frequency services which operate from early morning to late at night every day is necessary to provide a viable alternative mode choice to the car. Cheal (2003) agrees with Mees, citing Toronto

and Zurich as cities where this level of service is provided, and using these assessment criteria as the basis for his study of 'transit rich' and 'transit poor' Melbourne.

A further consideration is the role of public transport relative to individuals with low labour market status. While this study doesn't directly address issues of labour market change, other studies, such as Dodson and Berry (2003) and Fagan et al (2004) have noted the changing balance of sectoral employment away from traditionally dominant sectors such as manufacturing, towards service sectors. Further trends have been towards part-time and casual employment, with greater flexibility in working hours beyond the conventional forty-hour working week. It is likely to be those workers with lower labour market status that are most affected by these shifts and most likely to be employed in part-time or casual employment with flexible working times, often involving either early or late shifts, or weekend work. If they were dependent on public transport for their journey to work, such individuals would require a public transport service that is able to provide high quality access to employment at a range of times and days. Given this assumption it is necessary to assess the extent to which local public transport services are capable of providing a level of service adequate to the potential needs of unemployed workers who may be seeking employment in jobs where substantial temporal flexibility is required.

How then to assess public transport service adequacy? There are few studies that provide a model for the present investigation. Most prior research involves complex public transport service modelling, with high data demands, but which also typically operates at the metropolitan scale. Local area studies have primarily involved qualitative approaches such as surveys of local resident assessments of their transport access. An example of this approach is the qualitative research undertaken by the UK Department of Local Government Transport and the Regions (DLTR) (2000). In its study, the DLTR didn't set a quantitative standard of transport 'adequacy' but rather assessed transport services as adequate on the basis of their affordability, availability, accessibility and acceptability to the populations they served. The DLTR noted that even geographic proximity to a bus route did not automatically convey 'access' upon nearby residents, who may be physically incapable of accessing the route due to personal incapacity or environmental factors, such as a busy road.

This study takes a modest middle ground between high intensity modelling, and high intensity qualitative research, using a mix of GIS and qualitative assessments to calculate the degree of spatial access to, and via local public transport services. The focus of this study is on access in terms of spatial proximity to a public transport route. The study does not attempt to gauge the qualitative characteristics of the local physical environment in the vicinity of each route, nor does it attempt to evaluate the personal capacities of nearby residents that might affect their ability to access the public transport routes, beyond an attempt (see below) to identify financial limitations to transport access.

This uses three assessment criteria against which to judge the quality of the public transport service provided in the three case study SLAs, at the level of the spatial coverage provided by individual routes. These criteria are:

1. Vices every day (i.e. including Saturday and Sunday).
2. Services operating between 6 am and 12 am
3. High frequency (20 minutes or less) services during the weekday peaks (7-9 am; 5-7 pm).

The assumption is that employment opportunities for unemployed individuals are likely to require highly flexible working hours, with similarly flexible temporal and spatial mobility needs. The criteria used in this project are relatively conservative and contrast markedly with the levels of service actually provided in the case study SLAs. The criteria however don't take into account network factors associated with urban accessibility. That is, they don't provide a means of determining whether the available public transport service provides interconnections with the broader transport network thus providing access to a range of potential destinations. This issue has been poorly addressed in urban transport research and poses substantial methodological difficulties. So far, attempts to incorporate a network dimension have relied upon complex modelling which requires resources beyond the capacities of the present project. Accordingly, the project will not seek to address the question of network interconnection as part of the assessment of public transport service adequacy.

Train services however do provide substantial opportunities for interconnection as they operate on a spatially extensive and highly integrated scale. In recognition of this fact, the following evaluation of local public transport services classifies train stations as meeting the criteria provided above. This is justified on the basis that train services also operate at high frequency during peak hour, from early morning to late at night and on all days of the week. Rail services also follow coherent routes and have high levels of interconnectivity with the rest of the metropolitan public transport network. This categorisation diverges from that of Cheal (2003) who considers the capacity to travel in four directions (for example north-south and east-west) as a key criterion for considering a locality to be 'transit rich'. As the empirical study below demonstrates, if the Cheal criteria were used in the present case research effectively no localities would meet this service standard.

The service assessment criteria were applied to each public transport route within the case study SLAs in the following way. Routes were scored as to whether they met the criteria with 1 point assigned for each criterion they satisfied. Thus each route could potentially achieve scores of 1, 2 or 3 points, thus allowing comparison between routes. It is then possible to map the areas serviced by routes satisfying 1, 2 or 3 of the assessment criteria. A score of 3 ('level 3' service) indicates the route satisfies all of the three assessment criteria. Detailed information about route operation and frequencies was not available as part of the network GIS layers. Accordingly, the assessment of the extent to which each route satisfied the assessment criteria was undertaken by inspection of the route timetables.

Rather than simply identifying the routes by level of quality the scoring of routes was then adapted to assess the spatial service coverage provided by each route within each SLA. This was carried out using GIS analysis that created 'buffers' of the public transport routes, similar to the buffering of the employment catchments of the case study SLAs provided in Part II of this report. The public transport routes were buffered in the following way. Bus routes were buffered with 400 metre radii and train stations at 1000 metre radii. The 400m distance is justified as this is the standard criterion used by public transport planners as the maximum distance patrons would be expected to walk to access bus services (Murray *et al.* 1998; Murray 2003). For rail services public transport planners typically consider areas within 1000 metres of a rail station as being served by that rail service. The buffers created were combined to provide an aggregate buffer, for services at level 1, 2 and 3.

Local service adequacy

The assessment of the bus services against the three criteria described above is set out in Table 2. The assessment is illuminating. Only one bus route out of the 99 assessed met all three of the assessment criteria, and only two satisfied two criteria. Seventy-four of the bus routes satisfied none of the service quality criteria against which they were assessed. Sunshine, despite having fewer bus services than the other case study SLAs was the only area to have one adequate quality service.

Table 2: Assessment of bus services in case study SLAs by service quality criteria.

SLA	No. Bus Routes	1 Operating 6 am-12 pm	2 Everyday service	3 High Frequency Peak	Number of Routes Satisfying Criteria:			
					0	1	2	3
Sunshine	10	1	4	5	3	4	2	1
Broadmeadows	14	0	1	2	11	3	0	0
Dandenong	75	0	1	1	60	15	0	0

What are the implications of this spatio-temporal coverage of public transport in the case study SLAs? This question can be answered through GIS analysis of the spatial coverage of the localities. Figures 13, 14 and 15 depict the rate of unemployment per CD for each SLA, overlain with a 'buffer' that identifies the area covered by public transport services that satisfy at least one of the three assessment criteria above. Bus services are buffered at 400 metres while train stations are buffered at 1000 metres.

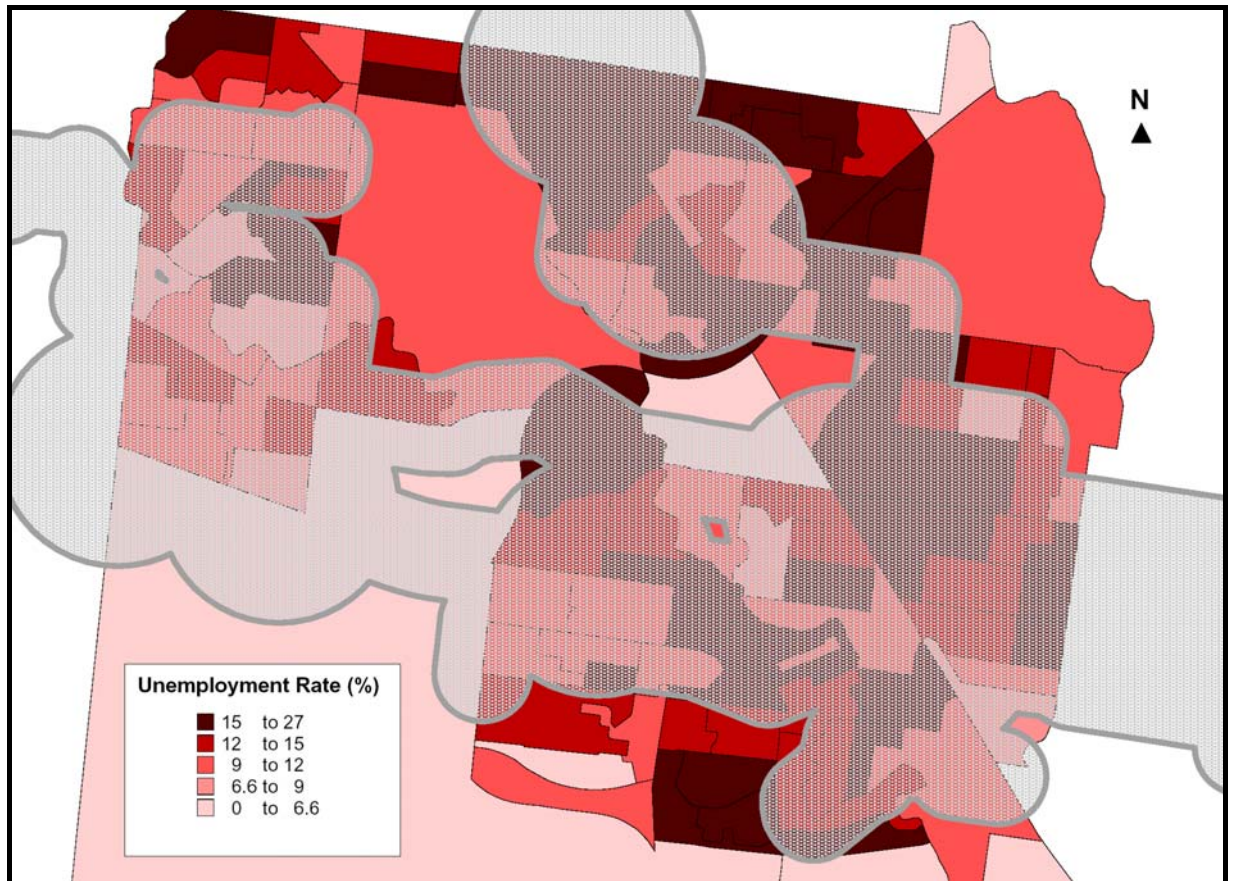


Figure 13: Public transport coverage satisfying 1 assessment criterion for the Sunshine Statistical Local Area, with unemployment rate per Census Collector District depicted (Source: ABS CDATA 2001 and DOI Public Transport Data).

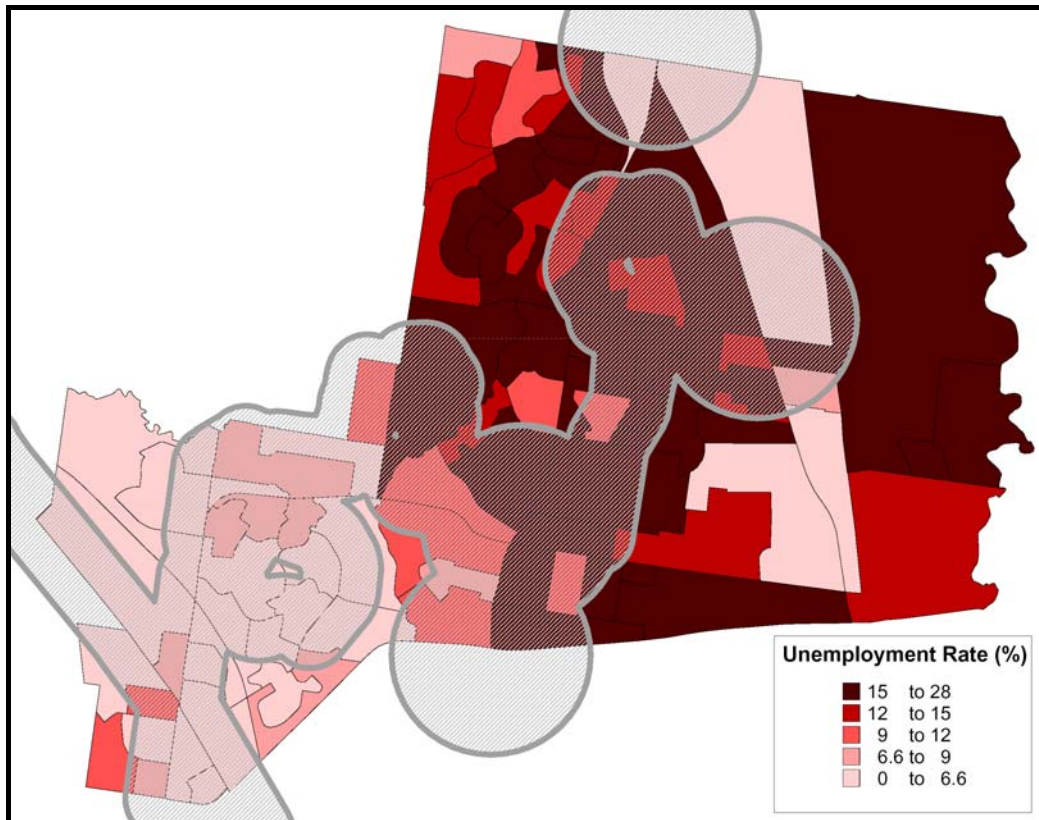


Figure 14: Public transport coverage satisfying 1 assessment criterion for the Broadmeadows Statistical Local Area, with unemployment rate per Census Collector District depicted (Source: ABS CDATA 2001 and DOI Public Transport Data).

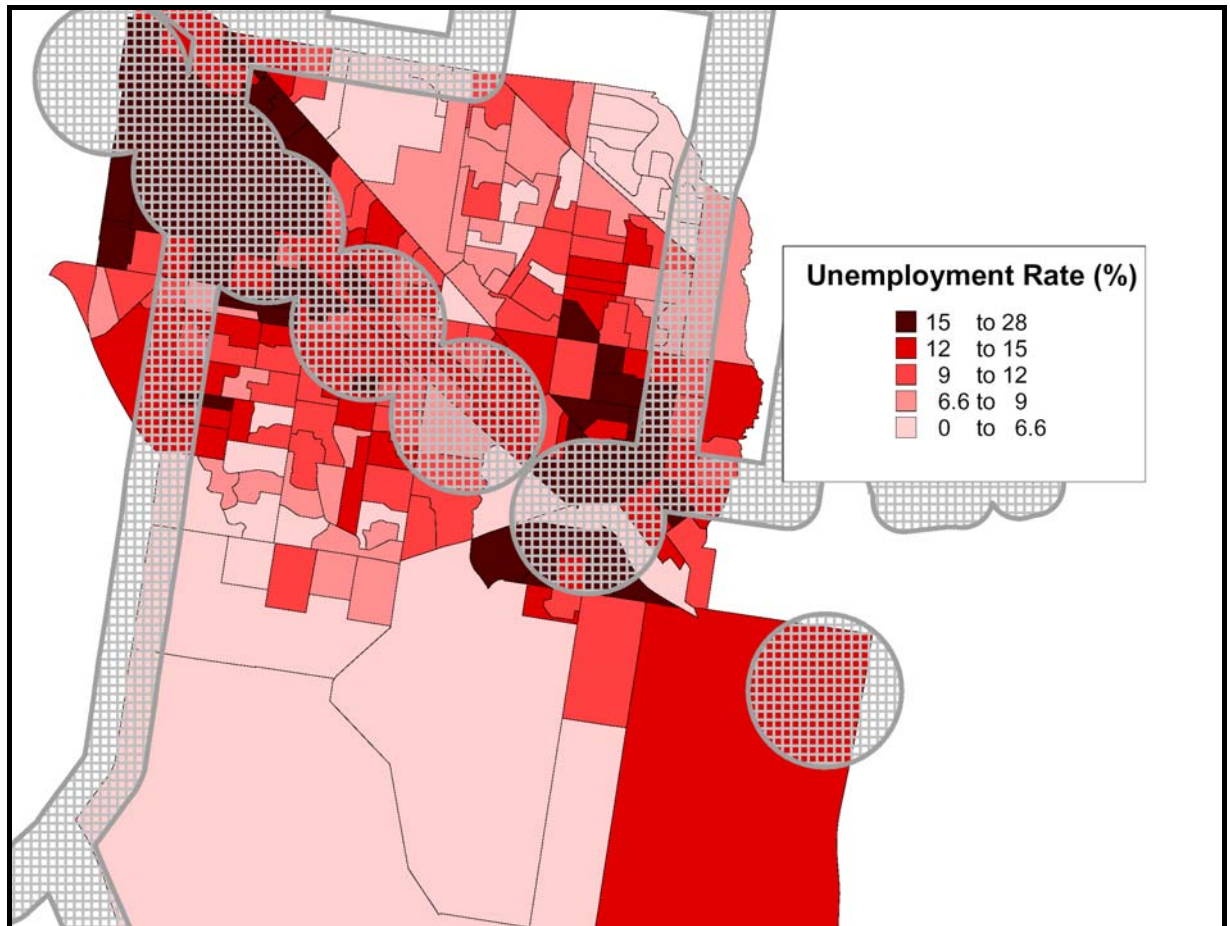


Figure 15: Public transport coverage satisfying 1 service quality criterion for the Dandenong Statistical Local Areas, with unemployment rate per Census Collector District depicted (Source: ABS CDATA 2001 and DOI Public Transport Data).

Figures 13, 14 and 15 are largely reflective of the data presented in Table 2, but the actual spatial extent of the coverage of public transport is more clearly apparent in these figures. It is obvious that the coverage of public transport is spatially uneven for all three SLAs. Large tracts of both Broadmeadows and Dandenong are outside of the coverage area for public transport, and while the excluded areas are not as extensive in Sunshine there still remain substantial portions of the SLA where public transport is not available.

In fact the figures greatly overstate the actual quality of the public transport service. As Table 2 demonstrates only one bus route in across all three case study SLAs met all three quality-of-service assessment criteria, and only two routes satisfied two criteria. All three of these higher quality routes were in Sunshine. Hence figures 13, 14 and 15 only depict coverage by routes which meet 1 or more criteria, with the majority of routes only satisfying one criterion. The buffer does not discriminate between which of the criteria a given route satisfies. Even these areas cannot realistically be considered to be adequately serviced if the full range of service-adequacy criteria are not satisfied. It is clear from both the Figures and Table 2 that the vast majority of CDs within the case study areas are not serviced by public

transport that is of sufficient quality to enable high quality access to both employment and social and community services.

It would be possible to buffer and map the routes that meet all three criteria, for all three SLAs. However, such an exercise would be largely irrelevant, given that only the rail stations in Broadmeadows and Dandenong would be depicted, and in Sunshine only one bus route would be depicted in addition to the rail stations. This pattern is already quite apparent from the figures as presented. As an example however, the situation for Sunshine is provided in Figure 16.

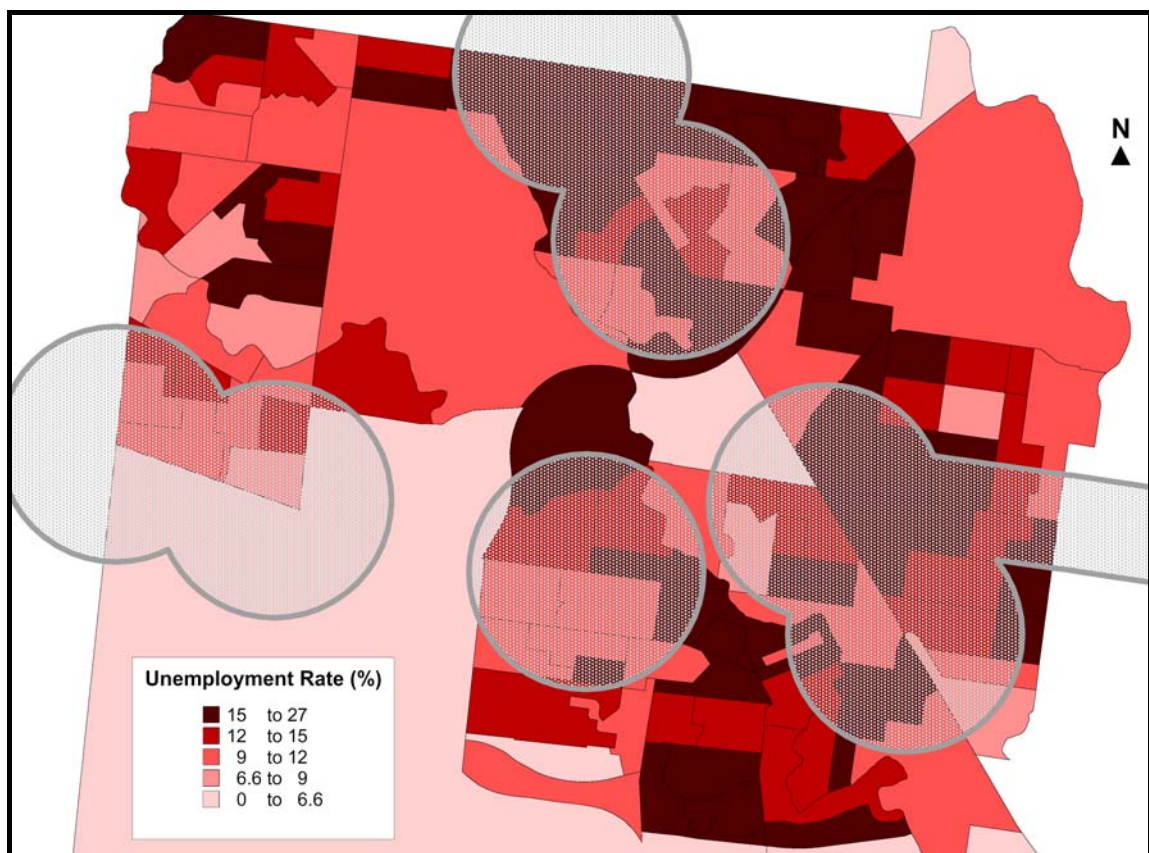


Figure 16: Public transport coverage satisfying 3 service quality criteria for the Sunshine Statistical Local Areas, with unemployment rate per Census Collector District depicted (Source: ABS CDATA 2001 and DOI Public Transport Data).

Inclusion and exclusion through public transport access

Measuring service coverage

The coverage maps provided above demonstrate that there are substantial deficits in the quality of public transport service available to households in the case study SLAs, and that the coverage even at this poor level of service is highly uneven. Using GIS and Census data it is possible to identify households that are located within an area that is serviced by adequate public transport as defined in this study.

Further calculations can be undertaken to identify any differences in relevant socio-economic characteristics between households inside and outside areas covered by adequate public transport. These calculations have been undertaken for the case study SLAs and the results are set out in Table 3.

These measurements provide the basis for understanding inclusion and exclusion, as the areas covered by 'adequate' public transport can be seen to be 'included' while those outside this zone can be understood as excluded. This dualistic categorisation matches Cheal's (2003) notion of 'transit rich' and 'transit poor' in Melbourne and is thus supported by prior research.

Among the case study SLAs, only Sunshine had a bus route which provided a 'level 3' service as used in this research project as a measure of adequacy. Thus Table 3 uses as the category of 'adequate coverage' households located within 1000 metres of a rail station. This of course is a contestable measurement of service adequacy, but can be justified for three reasons. Rail provides a more regular service in terms of frequency and periods of operation than do almost all of the bus services within the case study SLAs. Second, rail provides high interconnectivity. Third, rail stations are present in all of the case studies meaning that no case study SLA need be left out of the analysis due to lack of rail stations.

Table 3: Selected socio-economic characteristics of households within 1000m radius of a rail station, for selected SLAs, 2001 (Source: ABS CDATA 2001 and DOI public transport data).

SLA	Inside/ Outside Buffer	Households (%)	UE Total number	UE Rate (%)	Households without PMV (%)	% JTW by PT	% JTW by PMV
Sunshine	<i>Inside</i>	59.3	2537	13.9	13.9	11.6	64.1
	<i>Outside</i>	40.7	1949	13.7	7.5	8.4	67.4
Broadmeadows	<i>Inside</i>	39.1	1332	15.3	12.4	8.6	72.4
	<i>Outside</i>	60.9	1768	10.3	6.4	7.3	75.7
Dandenong	<i>Inside</i>	43.6	3075	14.5	15.1	10.7	71.8
	<i>Outside</i>	56.4	3010	9.2	8.1	6.7	76.8

One note of caution is required. The Census aggregates individual and household data to the Collectors District level, and the areas and boundaries of these CDs are highly spatially idiosyncratic. There are numerous instances across the case studies where the 1000 metre buffer overlaps only a fraction of a CD rather than the entire CD. Clearly households in the portion of the CD not covered by the buffer should technically be considered as 'excluded' from that buffer. However such sensitivity is not possible with the data as it is presently available. Accordingly, CDs are considered to be 'included' within the 1000 metre buffer if the buffer intersects their area. In the case of large CDs, such as in the southern part of the Dandenong SLA,

this necessarily means that some households will be counted as 'included' when they are in fact located well beyond the 1000 metre distance to a rail station. In general the overall small size of CDs means that these inconsistencies are relatively minor. But what is also important to note is that this approach to measuring which households are 'included' and which are 'excluded' automatically overstates the proportion of households that are 'included'. The assessment of inclusion and exclusion is therefore a conservative estimate that *overstates* the level of inclusion at the level of service quality against which services are assessed.

What then is to be discerned from Table 3? The first issue of note is the proportion of all households within the case study SLAs that are covered by 'inclusive' transit and those that are not covered by such services. The majority of households within Sunshine are covered by such services, but for Broadmeadows and Dandenong the reverse is true. While residents of Dandenong fare better than those in Broadmeadows, some 56 per cent remain excluded from the level of public transport service considered by this project to be adequate in providing suitable access to employment opportunities. These high rates are of concern and should be noted by policy makers. It is regrettable that in the 21st century that substantial numbers of households in areas that are highly socio-economically disadvantaged remain excluded from access to public transport services of a level of quality equivalent to the service provided by the rail system. This incongruence is further emphasised when the levels of public transport access in higher-socio-economic status areas is considered.

Labour market exclusion

The second issue of note is the differing rates of unemployment among the labour force within the transport 'included' and the transport 'excluded' Census Districts. While there is substantial variability in the unemployment rates across the three case study SLAs, one common characteristic is that the unemployment rate is lower for members of the labour force in CDs that are transport 'excluded', than for those households who are transport 'included'. This difference was least great for Sunshine which recorded a rate of unemployment inside the rail buffer of only 0.2 percentage points higher than for the area outside the buffer. Differences in the unemployment rates for Broadmeadows and Dandenong were more marked. The unemployment rate in the 'included' zone of Broadmeadows was five percentage points higher (equivalent to fifty per cent greater magnitude) than the rate for the area outside the buffer zone, while in Dandenong the equivalent difference was 5.3 percentage points. These are substantial differences and deserve some explanation.

The best explanation is that a substantial proportion of unemployed households who are on limited budgets are including access to public transport as a factor in their locational decision-making. Hence locations with good levels of public transport, such as rail stations, are attracting a relatively higher proportion of unemployed households in preference to locations where rail access is lesser. This explanation

is supported by literature on household location decision-making that indicates that proximity to rail is a positive factor in locational decisions. However, for the population generally, public transport cost, as opposed to reliability and frequency, is less of a factor than it is for households on very low incomes, such as the unemployed. Accordingly the difference in unemployment rates between locations with good public transport access compared to those locations with poorer public transport access potentially indicates decisions on the part of the unemployed to ensure adequate transport access in their decision making. While this research study does not seek to consider the local effects of differential rental pricing between transport 'inclusive' and transport 'exclusive' locations within the case study SLAs, further future investigation would seem to be of some importance, to tease out in greater detail the links between public transport service adequacy, differential rental costs, and the locational decisions made by unemployed households.

An alternative explanation to that offered above exists, but is more complex and thus more tenuous, yet deserves consideration. Households outside the high quality public transport zone may be forced by their lack of alternative transport options to purchase motor vehicles. While this may put them at a financial disadvantage, it may result in their members having greater range and better access to employment opportunities as these arise, particularly when they experience unemployment. As a result members of these households may be more successful in obtaining employment than those within households who do not own motor vehicles. This explanation is less open to empirical testing and cannot therefore be verified. It remains an unlikely explanation relative to that given above.

Access to motor vehicles

Motor vehicle ownership

The third issue of interest is the relative ownership of motor vehicles among households in the case study SLAs. Lower motor vehicle ownership can be an indicator of higher levels of access to high quality public transport, as the Morris et al (1981) study suggests. Census data provides information on the number of households within the case study SLAs that own and do not own motor vehicles. Accordingly, some sense of the extent of dependence of case study SLA households on either motor vehicles, or conversely, on alternative modes of transport such as public transport, can be developed. One methodological note is required: the Census differentiates between households who do not own a car, but do own a motorbike. This project counts those households who do not own a car, but do own a motorbike, as not owning a motor vehicle. The analysis is simplified in this case, and the proportion of households who own motorbikes, but not cars is so small as to be insignificant to the analysis.

The most notable phenomenon demonstrated by Table 3 is the difference in motor vehicle ownership between households who live within the transit 'inclusion' when compared to those living outside that area. The effect was consistent among all three case study SLAs, with the divergence being greatest in Dandenong, where the

proportion of households that do not own motor vehicles was almost twice as great for areas within the adequate public transport zone than for those areas outside of that zone. Within the adequate transit zone, 15.1 per cent of Dandenong households did not own motor vehicles compared to 8.1 per cent for those outside the adequate transit zone. Broadmeadows demonstrated a very similar pattern to Dandenong, with 12.4 per cent of inside-zone households without motor vehicles compared to 6.4 per cent of households outside the zone.

What is the import of these results? Well, the simplest explanation is that the level of service provided to households within close proximity to high quality public transport services is sufficient to enable a substantial proportion of such households to avoid owning motor vehicles. A cursory observation of the 2001 Melbourne Social Atlas suggests this suggestion has some empirical support, with rail lines in Melbourne exhibiting lower rates of motor vehicle ownership than adjacent suburban areas. Such an explanation would assume a positive decision by households to eschew motor vehicle ownership in favour of the accessibility, provided by public transport. However, this explanation faces a number of difficulties in terms of the direction of causality. Given what is known about the regional outer suburban context in which the case study SLAs are positioned, lack of a motor vehicle is likely to confer substantial disadvantage on a household. Decisions not to own a motor vehicle in this context are less likely to be due to the adequacy of local transit services than to some other, probably socio-economic factor.

Given the way in which unemployment rates seem to be correlated with a greater likelihood of a household being located within a high quality public transport area, as demonstrated above, the phenomenon of lower vehicle ownership in high quality transit areas suggests that lower household income due to one or all members of that household being unemployed prevents that household from being able to afford motor vehicle ownership. Entangled in this interaction between household labour market status, vehicle ownership and access to public transport is the locational decision making process of households in relation to the combination of expenditures, and tradeoffs in expenditure between rental costs and transport costs. It is known from the analysis conducted at the SLA scale that within the case study SLAs there is both a high proportion of unemployed households and a high proportion of households with low housing costs (relative to broader metropolitan housing prices).

More detailed exploration of the links between housing cost, transport access and vehicle ownership would require much finer detail and specific data concerning household characteristics. The analysis provided above includes some assumptions that cannot be verified with the data that is available. For example, it is not possible to ascertain whether the households who do not own motor vehicles contain the unemployed persons identified in the analysis. It is entirely possible that all of the unemployed residents of the case study SLAs reside within households that own motor vehicles. While this possibility cannot be tested, it seems highly counter-intuitive that households who are among the lowest socio-economic strata in Australia would have sufficient resources to own motor vehicles while other

households, not in this socio-economic position would not have such resources. In fact there is probably some overlap between the two groups, but on the basis of past and present research it can reasonably be presumed that a substantial proportion of the households that do not own motor vehicles are also households that contain unemployed persons.

It would be feasible to investigate the contours of the problem in closer detail. However, the form of empirical data necessary to further investigate this relationship is not available via the CDATE package that forms the informational base for this project. The resources available to the present project did not extend to cross-tabulations that could identify the proportion of, for example, unemployed households by rent paid or motor vehicle ownership, at the CD level, for the SLAs in question. It is likely that further research would need to be undertaken to further tease out the relationship at the local scale between labour market status, household housing costs, location in relation to public transport and motor vehicle ownership.

On the basis of the data generated by the present project, a conclusion that can be at least tentatively entertained is that the spatial and temporal availability of high quality public transport enables members of households who have low labour market status to avoid the costs of motor vehicle ownership. If correct, this conclusion suggests that public transport, if it is of sufficient quality to provide adequate levels of accessibility for households with unemployed people can enable such households to avoid the costs associated with motor vehicle ownership (described below). Whether this also enables such households to access employment opportunities remains unknown. Some insights however can be generated from the Census Means of Journey to Work data.

Work travel by public transport

The above discussions have indicated substantive differences between the level of motor vehicle ownership between households within the adequate transport areas, and those outside of these zones. Given this divergence it is appropriate to consider the relative levels of public transport use compared to private motor vehicle use, within and without the two service adequacy zones for each of the three case study SLAs. Census travel data relates only to the journey to work and thus is formally unable to capture the use of public transport by the unemployed. Hence any assessment of the travel burden carried by different modes, (in this instance public transport versus private motor vehicles) for individuals not currently employed is not possible. Accordingly, the mode share for employed households is used as a proxy for all households, notwithstanding the obvious inadequacies of this approach.

A further note is that the Census journey to work data is organised so as to count travel by multiple modes, including private motor vehicles. Because it is difficult to disaggregate these different categories, this project counts all travel to work that involved at least one mode of public transport, as use of public transport. Private motor vehicles are counted as including car drivers, passengers in cars (excluding taxis) and truck drivers and passengers. This categorisation potentially undercounts car travel and overstates public transport travel, as journeys involving cars and

public transport will be counted as public transport trips. Such methodological quirks are inevitable given the data being used.

What then do the journey to work figures for the case study areas reveal about the transport behaviour of the case study households? The figures for Table 3 demonstrate that there is a pattern of higher use of public transport among those areas considered 'adequate' when compared to those areas deemed inadequate. Thus in the case of Sunshine, public transport use for work journeys was a relatively high 11.6 per cent of all work trips inside the adequate transport zone compared to 8.4 per cent outside the area. The figures for Dandenong were comparable, with 10.7 per cent of workers using public transport within the zone contrasting with 6.7 per cent outside the zone. The differential for Broadmeadows was not as great, with 8.6 per cent within the zone compared to 7.3 per cent outside. As a result, public transport use within the Broadmeadows adequate transport zone was only slightly less than for the areas outside the equivalent Sunshine area.

The clearest pattern across the results for all three case studies is the fact that public transport use within areas serviced by good quality public transport is at a minimum of 1.3 per cent and up to 4 per cent greater than in areas where public transport service is poor. It must be remembered of course that the areas outside of the adequate transport zones do have some public transport services, it is just that these services are of poor quality, and insufficient for the kind of flexible work access considered necessary to enable access to employment opportunities for the lower labour market status households and individuals who are the focus of this project.

While the differences in public transport work trips between the adequate and inadequate transport zones are not large, they do indicate that where public transport is of higher quality it is more likely to be used for work trips. While it is difficult to speculate what role public transport might play in enabling greater work access for unemployed residents of the case study SLAs, it is likely that better quality public transport will facilitate improved access to work opportunities, once income factors are taken into account (see below).

A further caveat is necessary however. The areas counted as adequate transit zones above are primarily areas around rail stations. Rail transit in Melbourne is oriented radially, relative to the metropolitan CBD. Thus despite the higher quality service offered by rail public transport, the locations to which this provides good access lie along the rail corridor. Given that this research project has demonstrated the paucity of public transport services adequate to provide good quality service, in particular bus services, these results suggest that access to employment by public transport where that employment is not situated along a local rail line, will be constrained. This relationship deserves greater investigation, however the questions posed by the present project do not anticipate further empirical inquiry than that which has been already undertaken. Again there is a clear need for further research to tease out these housing-transport-employment relationships at the local scale.

Sub-regional public transport work access

One simple indication of the adequacy of the public transport services in providing access from the case study SLAs to areas of regional employment growth can be undertaken using GIS. This indication is provided in Figure 17, which depicts areas of employment growth (and therefore potential opportunity for the unemployed, relative to the major public transport routes.

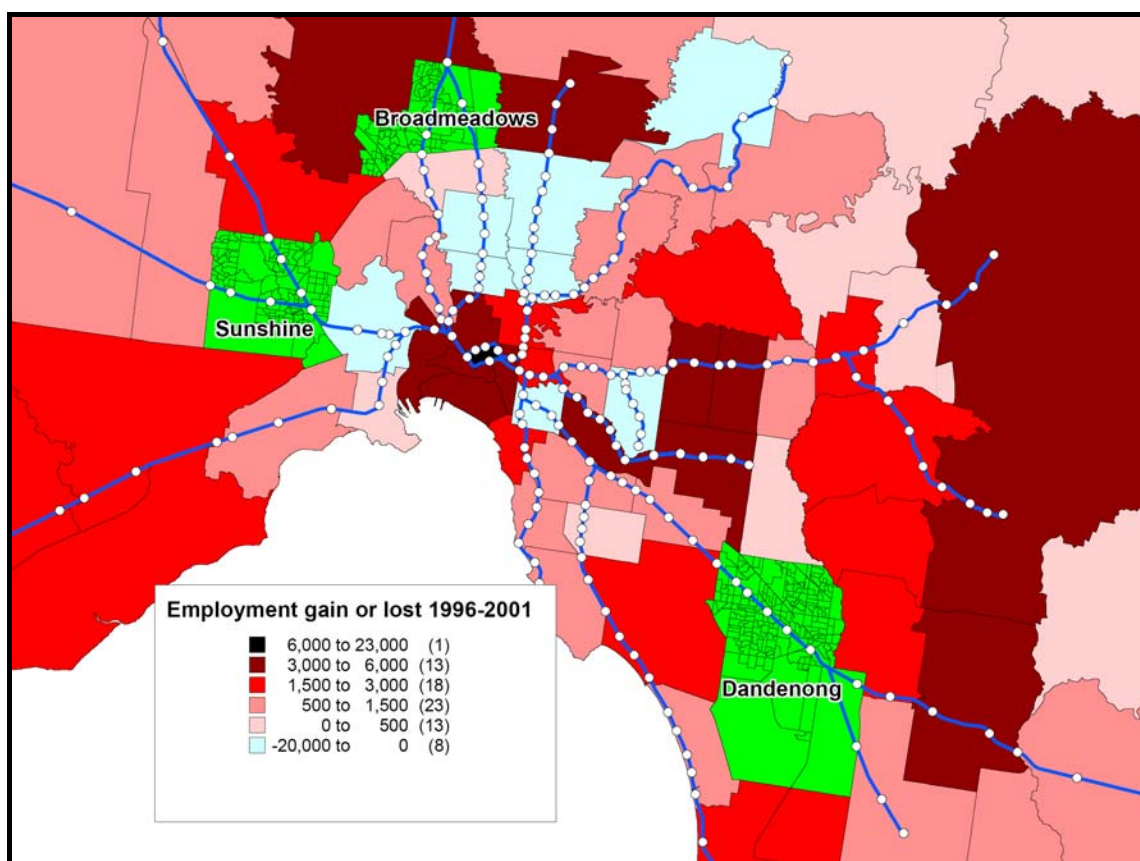


Figure 17: Melbourne employment growth 1996-2001, showing case study SLAs and major outer-suburban public transport routes (Source: ABS Working Population Profile 2001 and DOI public transport data).

While Figure 17 is only intended as an indicator of the degree of access by case study SLA residents to areas where employment is growing, some patterns are worth noting. The first is that spatial employment growth outside of Melbourne's inner city region is occurring in large circumferential bands. Hence employment is expanding in the areas to the south, north and northeast of Dandenong, and in a broad band in the west from Werribee, through Sunshine, Keilor, Broadmeadows and into Thomastown and Lalor. By contrast, the major public transport corridors are radial, and thus while they intersect these large tracts of employment, they are not able to provide high quality public transport access. While Figure 17 does not depict the bus routes servicing these circumferential employment growth zones, the background understanding of the quality of outer-suburban bus services derived

from reports by various sources (Mees 2000, PTUA 2003), and the results from the present study, suggests that the quality of public transport in these zones is quite poor. These public transport routes are unlikely to provide the level of service necessary to enable the kind of flexible work access likely to be required by public transport dependent job seekers within the case study SLAs who are potentially seeking work in the nearby employment growth zones.

Work travel by motor vehicle

The corollary of the use of public transport for work travel is the use of private motor vehicles to access employment. Census data provides information on travel to work via private motor vehicles, as presented in Table 3. Again some notable patterns are present in this data. The most notable of these is that for each case study SLA, the proportion of work trips undertaken by residents using private motor vehicles was greater for the CDs outside of the 'adequate' transport zone than within that zone. Thus 64.1 per cent of Sunshine residents within the adequate transport zone who made work journeys used private motor vehicles, compared with 67.4 per cent outside of that zone. For Broadmeadows the figures were 72.4 of in-zone working residents and 75.7 per cent of out-of-zone working residents respectively. In Dandenong, the figures were 71.8 per cent and 76.8 per cent respectively.

The difference between the proportion of workers using motor vehicles within the adequate transit zone compared to those outside the zone was thus 3.3 percentage points for Sunshine and Broadmeadows, but a greater 5.0 percentage points for Dandenong. While the differences are not large, the pattern definitely indicates that there is an effect on motor vehicle use arising from the availability of good quality public transport. This is emphasised when the extremes are noted. The adequate transit zone in Sunshine saw the highest mode share for work trips by public transport of 11.6 per cent and the lowest mode share for work trips by private motor vehicles of 64.1 per cent. Conversely the inadequate transit zone in Dandenong had the lowest proportion of public transport work trips of all areas within the case studies, while the motor vehicle mode share for this zone was the highest across the case studies.

The extent of difference in the proportion of work trips by private motor vehicle undertaken by workers residing within 1000 metres of rail stations is perhaps not as substantial as might have been expected given the quality of the rail service. However as Figure 17 indicates, the rail service provides good quality spatial access in a radial direction, rather than in a circumferential direction, which is where the employment growth is occurring. Workers travelling requiring circumferential work journeys would therefore be poorly served by rail. Existing rail services therefore appear to be unable to provide access to suburbanising employment growth in the circumferential regions described above (Figure 17). But the bus services are also of insufficient quality to provide the degree of service considered to be adequate for employment access in the contemporary employment environment. These service inadequacies would appear to be in part the cause of the high levels of automobile dependence for work trips among residents of these regions.

The Dandenong SLA provides a good example of the problem that this project has revealed. While there is strong employment growth within the circumferential suburban corridor to the north and south of Dandenong, the public transport access to these areas, is particularly poor. Figure 12 shows a number of bus routes travelling north from Dandenong towards the employment growth areas, but when assessed against the criteria of service quality for employment access as used in this project, none of the routes were considered to provide a service adequate for employment access. Similar effects are present in the case of Sunshine and Broadmeadows. These failures of service seem to be effectively requiring workers in these outer regions to undertake work trips by private motor vehicle.

Methodologically, these outcomes also suggest that the criteria for assessing the adequacy or otherwise of public transport services within the case study SLAs was appropriate to the research questions, given the empirical observations that have been made. The patterns show a clear relationship between public transport quality and the extent to which this mode is used for work trips. Given that the public transport system in the outer-suburban areas in question is largely inadequate to the task of providing flexible employment access, the question of the financial burden imposed upon households due to the necessity of owning a motor vehicle becomes a question of some importance. What financial burden would an unemployed resident of Dandenong incur, for example, when seeking access to employment north of this SLA. The final component of this research project considers the issue of financial imposition resulting from the effective necessity of case study households owning motor vehicles as a consequence of the poor provision of public transport in these locations.

Transport cost and household expenditure

In a methodologically perfect research world, there would be a dataset available that would provide information on the expenditure patterns of households by income level at a local scale, which could be used to identify patterns and differences among and between households for different geographic areas. The ABS undertakes periodic surveys of households' expenditure including a very detailed breakdown of household expenditure, including on transport costs. However the data from these surveys are aggregated to a large spatial scale, typically at the level of the metropolitan area. Hence it is not possible to identify household expenditure for specific localities within the broader metropolitan context, such as the disadvantaged case study SLAs that this project investigates.¹

Nor does census data provide information about household expenditure. The census does provide information at a very fine local scale, but the data is aggregated

¹ However a recent AHURI report by RMIT-NATSEM 'The regional impact of Rent Assistance' (report 30147) has developed a model which synthesises information from Survey of Income and housing costs and the Census to estimate local incomes and expenditure on housing.

and categorised into income bands. This categorisation means it is difficult to use an imputed average transport cost to assess the proportion of household income likely to be expended on public transport by those households. A calculation of this sort was undertaken for the mortgage affordability mapping provided in Figure 4, except the availability of house costs per suburb were able to be included in the analysis. Suburban house prices have a strong spatial component as they are tied to the metropolitan land market. Transport costs however are less dependent on the spatial location of a given household, and more dependent on the behavioural socio-economic characteristics of the households. However the metropolitan scale is too general as it is unable to distinguish between different spatial structural and form characteristics, such as households close to public transport, or those located in higher rather than lower density areas.

A nominal cost of private motor vehicle ownership and operation is available from the Royal Automobile Club of Victoria, which calculates and publishes annual assessments of the running costs per representative models of private motor vehicle in categories ranging from 'small car' to 'large car' and 'SUV'. These costings include loan repayments, depreciation, maintenance, insurance, registration and operating costs. They therefore provide a potential, if nonetheless problematic, set of standardised costs of motor vehicle ownership. Such costing could then be subtracted from household incomes to provide an imputed level of household transport expenditure on transport.

Australian housing affordability researchers have, at least since the National Housing Strategy deployed the notion of 'housing stress' to evaluate the affordability of housing relative to household incomes. A typical measure is that households within the lowest two income quintiles who have housing expenditure greater than 30 per cent of their income are considered to have unaffordable housing. Given concerns with the location/transport tradeoffs made by households in terms of their housing choices, it is potentially feasible to deploy the notion of 'transport stress' to assess the extent to which the transport costs experienced by households relative to their urban location, causes affordability problems, either in connection or independent of housing costs. Such an approach is currently being explored by Griffith University's Urban Policy Program in similar research on transport disadvantage in South East Queensland. Assessing 'transport stress' is however complicated by the data collection, availability, aggregation and categorisation problems outlined above.

What are the implications of these methodological issues for this project? It is clear that the lack of suitable data diminishes the ability of the research to address issues of transport cost, relative to household income. The data does permit some observations based on inferences from the foregoing spatial analyses, and some tentative discussion can be provided on the basis of this information

Table 4: Average Weekly Household expenditure on housing and transport for Melbourne, 1998/1999 (Source: ABS 2000).

Household Expenditure		Expenditure
Housing	Rental (\$)	33.95
	Home Ownership (\$)	65.53
Housing Total (\$)		99.48
Housing as proportion of Total (%)		12.9
Transport	Motor Vehicle Ownership (\$)	127.66
	Public Transport (\$)	4.60
Transport Total (\$)		136.84
Transport as proportion of Total (%)		17.8
Total (\$)		768.60

Table 4 presents average weekly household expenditure information for Melbourne from the ABS 1998-1999 Household Expenditure Survey. The table demonstrates two important features. The first is that average weekly household expenditure on transport is greater than for housing. The second important feature is that private motor vehicle ownership constitutes the greatest proportion of household expenditure on transport. These figures however cannot be interpreted at the sub-metropolitan spatial scale, or relative to household income levels.

Motor vehicle operating costs

The Royal Automotive Club of Victoria (RACV) provides calculations of the running costs for private motor vehicles, by vehicle model, on an annual basis. While these calculations were not intended for use in research such as the present study, they can provide some indication of the annualised cost of motor vehicle ownership expressed as a weekly cost. Table 5 sets out the average weekly ownership costs for light, small, medium and large cars assessed by the RACV in 2002. The figures are ownership costs from new, over five years, and include finance, insurance, registration, maintenance and depreciation costs, as well as an assumed 15,000 annual kilometres travelled.

Table 6: Average weekly cost of car ownership for selected vehicle sizes, Victoria, 2002 (Source: RACV Private Vehicle Operating Costs 2002).

Vehicle size	Light	Small	Medium	Large
Weekly costs (\$)	103.24	127.53	152.76	161.89

Source: <http://motoring.racv.com.au/racvm/whichcar/opcostdescription.cfm>

Two patterns in the table are worth noting. The first is that operating costs rise depending on the size of vehicle owned. Hence large vehicles are more costly than

smaller vehicles. This is not directly relevant to the study, but suggests that operating costs for larger households, who are more likely to own larger vehicles, may be higher. Second, the magnitude of the weekly costs is also worth noting. A small or medium sized car, when total ownership costs are taken into account on an annual basis clearly imposes a high weekly cost on the household owning the vehicle. As these figures are calculated on the basis of a vehicle purchased from new, they can only be used as indicative costs. Obviously, low-income households are less likely to purchase new vehicles than those on higher incomes, instead purchasing second-hand vehicles. Used cars are likely to have lower up-front costs in terms of financing and depreciation, but are more likely to have higher maintenance and running costs, than new vehicles. On the basis of the available data it is difficult to impute the weekly costs of owning and running a used motor vehicle. Given that finance and depreciation will be the major cost differences between new and used vehicles, it would be reasonable in the absence of other information to assume that costs for a used vehicle would be approximately half to fifty per cent of the cost of a new vehicle. This would suggest the cost of running a small to medium vehicle might be between \$60 and \$80 per week, when annualised. Such a value would indicate a reasonable financial burden on households with low incomes.

Income and household transport costs

Morris et al's (1979) study demonstrated that lower income households tend to spend less on transport than higher income households. Given this study is concerned with the financial burden that transport costs may pose for households with low labour market status, some current indication of this relationship is appropriate. Some contemporary evidence for this relationship is provided by the ABS Household Expenditure Survey data for income quintiles, as shown in Table 6.

Such figures are averaged and aggregated at such a spatial scale that they are unable to provide substantial insight into local scale relationships between household income, spatial location and transport costs. However there is a clear pattern for lower income households to spend less on motor vehicles per week, than higher income households. These figures suggest therefore, that access to transport is financially reduced for lower income households when compared to higher income households.

Table 6: Average household expenditure on motor vehicle ownership per income quintile for all households, Australia, 1998/1999 (Source: ABS Household Expenditure Survey).

Income Band	Lowest 20% (Less than \$301)	Second quintile (\$301 to \$551)	Third quintile (\$552 to \$883)	Fourth quintile (\$884 to \$1373)	Highest 20% (More than \$1373)	All households
Motor Vehicle Ownership Costs	45.27	68.13	99.38	143.64	196.30	110.51

The absence of better data limits any substantial conclusions about the impact of motor vehicle ownership costs on the financial status of low labour market status households in the locations of higher housing affordability considered in this study. However, given the predominance of low-income households and those on statutory incomes in the case study locations, combined with a high proportion of households owning motor vehicles, it is likely that motor vehicle ownership is imposing a large financial burden on such households. Further research, including the collection of more detailed data that is appropriate to both the spatial scale and purpose of the investigation, is necessary to further tease out the relationships between household social status and access to transport in the case study localities.

DISCUSSION OF RESEARCH QUESTIONS

This project has investigated the notion of a spatial mismatch between locations of housing affordability and the location of employment opportunity in Melbourne. The project posed a set of research questions and has responded to each of these in turn. This section reviews the research questions and discusses the response to each of these as provided by the empirical analysis undertaken in the project.

Research Question 1: What are the spatial patterns of housing affordability, unemployment concentration and employment location in Melbourne?

Part II of this project responded to research question 1 by using census and other data to map the locations of higher proportions of lower cost housing, unemployment and employment growth. These patterns are discussed in turn.

Housing costs

Housing costs across Melbourne demonstrate a clear spatial differentiation. The most obvious difference is the distinction between housing costs in the inner city and those in the outer suburbs. The proportion of inner city households with low housing costs is much lower than for middle and outer suburban areas. The inner city and inner-east areas of Melbourne are of relatively high cost, while those in middle and outer areas are relatively less expensive. Some localities, in particular Sunshine and Dandenong had particularly high proportions of households with low housing costs. Of further note, very low proportions of households in some of the recently developed outer-suburban areas, such as Melton East or Berwick had low housing costs, indicating the phenomenon of higher socio-economic status fringe estates reported by Dodson and Berry (2003).

These spatial patterns can be understood as continuations of the previous patterns reported by Wulff and Reynolds (2000) and Burke and Hayward (2000). These previous authors demonstrated strong divisions in Melbourne's housing market between inner and middle areas and outer suburbs. Such authors also noted the phenomenon of lower cost housing in particular areas, such as Sunshine and Dandenong, that the present analysis of 2001 data has shown to be continuing.

Unemployment concentration

Like housing costs, spatial unemployment patterns were highly spatially differentiated across the Melbourne metropolitan area. Localities in the inner east demonstrated lower unemployment rates than those in the west and north of the city, some of which had very high unemployment rates, such as Sunshine and Broadmeadows. Areas in the outer south east also experienced high rates of unemployment in 2001, in particular Dandenong.

There was an overall decline in the proportion of the labour force who are unemployed, for all statistical local areas, during 1996-2001, with strongest declines in the proportion of the labour force unemployed occurring in Maribyrnong in the

west and Preston and Coburg in the north. The southeast, including Dandenong also recorded strong declines in unemployment rates during 1996-2001.

Employment growth

Employment grew across most of Melbourne's statistical local areas during 1996-2001. While there were some strong gains in a few inner city locations, most of the areas where employment grew strongly were in outer-suburban locations. In particular the outer west and north and the outer southeast demonstrated strong employment growth. Areas with weakest employment growth tended to be in the inner west and north of Melbourne.

Absolute employment gains showed substantial spatial variation across Melbourne SLAs. Again the outer west and north were favoured locations for absolute employment growth, while the outer east and south east also had strong employment gains. Some areas in the inner west and north experienced absolute employment losses during 1996-2001, such as Maribyrnong, Coburg and Preston.

Conclusions for Research Question 1

Housing markets are highly spatially differentiated across Melbourne. Low cost housing areas also seem to be broadly correlated with concentrations of unemployment. Employment growth is also spatially uneven across Melbourne. And while there is some overlap, areas of low cost housing and high unemployment are not necessarily where employment is growing.

Research Question 2: What tenure effects are present in the spatial patterns of housing affordability and employment location?

Part II of this project responded to research question 2 via Office of Housing and ABS data, which was used to map affordability calculations for statutory income households in rented housing for standardised average income households in mortgaged housing. These patterns are discussed in turn.

Rental housing affordability

Rental housing affordability demonstrated strong spatial patterns, organised around a general northeast axis. Inner city and inner northeastern locations demonstrated the worst affordability for lower and modest income households. In these areas, less than 8 per cent of rental housing would have been unaffordable for households on Centrelink statutory incomes.

Areas of greatest rental affordability were typically those in the outer suburbs, such as Brimbank in the west and Dandenong in the southeast. In these areas at least 45 per cent of housing was affordable to households on statutory incomes.

Mortgage housing affordability

Like the patterns for rental housing affordability, mortgage affordability patterns favoured the middle and outer suburbs. The proportion of a standardised monthly income required to service a median-priced housing mortgage in areas such as

Sunshine, and Dandenong was typically less than 25 per cent. For central and inner north and eastern localities, housing affordability was much worse. In these areas, between 25 per cent and 100 per cent of the standardised monthly income was required to service a median priced mortgage in 2002. Clearly, there is a strong spatial divide in terms of housing affordability in Melbourne. This divide favours outer-suburban areas, but brings with it the tendency to concentration of unemployment identified above.

Research Question 3: Is there evidence for a spatial mismatch in Melbourne between the locations of affordable housing and the location of employment opportunity, and if so, how is this associated with housing tenure?

Spatial mismatch is weak in Melbourne

On the basis of the empirical investigation undertaken in this project, there is no evidence for a strong spatial mismatch between housing affordability and the location of employment opportunity in Melbourne. Areas where unemployment is highly concentrated are typically located within close proximity to areas where employment growth is strong. The case study areas of Sunshine, Broadmeadows and Dandenong all had substantial areas of new employment growth. The absolute growth in employment exceeded the number of unemployed persons in the case study SLAs by many times. The socio-spatial reasons for this lack of spatial mismatch are discussed in further detail below.

There therefore does not appear to be a substantial link between any spatial mismatch and housing tenure. That gross spatial mismatch is weak, if at all present, suggests that housing tenure is not an important factor in the links between housing affordability and employment opportunity. As is discussed below, other factors, such as the skill levels of the unemployed, and the capacity to access employment opportunities is likely to play a more substantial role in limiting the uptake of employment by households in disadvantaged locations.

Research Question 4: What transport modes are available in locations of higher unemployment, and conversely, in locations of employment concentration?

The project responded to research question 4 by identifying and mapping the transport modes available in the case study areas where unemployment is concentrated. The quality of service provided was assessed using a standardised set of service quality criteria based on the necessity of work access in a temporally flexible labour market.

Public transport availability

Public transport modes available in the case study SLAs included rail and bus services. Each case study area had apparently good coverage by public transport. However, when the standardised criteria of service quality were applied to these services, it was apparent that most locations within the case study SLAs were served by very poor public transport. None of the SLAs had any bus services (with the

possible exception of Sunshine) met the criteria of providing temporally flexible access to regional employment. Rail services were viewed as providing a better service but this provided limited coverage. Clearly, the residents of the case study SLAs are served by poor public transport, and that which is available is unlikely to provide the flexible work access (suitable for shift, part time or casual workers). Further, the quality of access to areas of employment growth was shown to be poor, raising questions about the extent to which the unemployed might be able to obtain employment in these locations. Poor transport may be a frictional factor in the gaining of employment by unemployed residents of the case study SLAs.

Research question 5: What transport modes are used by households in locations of higher unemployment or higher housing affordability, and conversely, in locations of employment concentration, and what financial burden do alternative transport modes imply for low-income households.

Public transport access and labour market status

Research question 5 was addressed by using GIS analysis to identify differences in individuals' and households' labour market status between areas with good public transport coverage compared to those areas with poor coverage, in the case study SLAs. The results demonstrate that unemployment tends to be higher in locations with better public transport coverage compared to areas with poor public transport. This is explained as indicating that public transport access is a factor in lower labour market status households' locational decision-making, particularly when the analysis of access to motor vehicles is considered.

Access to private motor vehicles

The results from the analysis demonstrate that households within the public transport 'inclusion' zones of the case study SLAs were consistently much less likely to own motor vehicles than those outside the zone. This suggests that households are able to trade off better public transport access against motor vehicle ownership. This may be a short-term coping strategy: it is cheaper to not own a motor vehicle. However over the medium and longer term, motor vehicle ownership is more likely to provide access to employment opportunities, than the relatively inadequate regional public transport system. More work is required to fully tease out the intricacies of these relationships.

Journey to work modes

The analysis of census journey to work data demonstrates that there is a slightly higher rate of public transport use for work trips by residents within the 'adequate' transport zones in the case study SLAs than for residents in the 'inadequate' transport zones. This is not surprising – higher quality service would likely attract higher patronage (Mees 2004), but importantly also suggests the assessment criteria used in the study are appropriate. Given the higher rate of unemployment within

'adequate' transit areas, it is difficult to determine exactly what the relationship in these areas is, between public transport service quality and access to employment.

Sub-regional employment access

The majority of new employment growth within 10 km of the case study SLAs has been in circumferential bands, particularly in the outer suburbs. Circumferential public transport is however very poor. None of the circumferential services in the case study areas provided the level of service considered sufficient to provide temporally flexible employment access. While rail services are of good quality, these are radially aligned and unable to provide circumferential employment access. Clearly there is a need for improvements to outer-suburban public transport services along circumferential routes to provide the level of transport access to employment that rail services currently provide to radial employment locations such as the CBD.

Research Question 6: How might Federal and State governments better respond to issues of locational disadvantage and affordability relative to employment opportunity, housing affordability and transport provision?

Given the somewhat ambivalent findings arising from this research project, the ways in which state and federal governments could respond to issues of locational disadvantage, concentrated housing and unemployment and problems of employment access are not completely clear cut. However some important shifts in policy thinking are necessary.

Taking transport and disadvantage issues seriously

The main way that Federal and State governments could respond to problems of ensuring access to employment by unemployed households is to pay greater attention to transport issues relative to urban housing and labour markets. Governments need to dedicate further research resources to more comprehensively and closely investigating the kind of issues considered in this project. Much more research activity needs to be directed to teasing out the relationships between the various household and urban spatial characteristics that have been partially investigated in this project. But such detailed analysis will require more substantial resources, particularly in terms of obtaining and analysing the data that is used in the investigation. This project has relied primarily on Census data. However, Census data is not well suited to investigations of transport behaviour particularly beyond the journey to work. Had the data from the Victorian Activity and Travel Survey (VATS) been available to the present project, more detailed analysis might have been possible. However given that VATS only surveys approximately 150 persons per Melbourne LGA per year, the potential sample available for a study that focuses on the SLA level would have been very small.

Service auditing

A further way in which Federal and State governments need to take transport issues seriously is by being required to account for the quality of services provided. The ongoing suburbanisation of employment growth that has been demonstrated in this

project is not being accompanied by concomitant improvements to public transport services in the metropolitan sub-regions where this growth is occurring. The high quality public transport services that do exist operate on routes designed for the spatial employment structure of a 19th Century city, not for the dynamic and decentralised employment structure of a city in the 20th Century. Bus routes in these areas are woefully inadequate to provide temporally flexible work access in circumferential directions.

It is worth noting that the New South Wales Government has undertaken a series of strategic reviews of Sydney's outer-suburban public transport services. This has resulted in a much greater focus on the role of buses in a dispersed employment environment, and has led to policy changes and new approaches to service provision that have the potential to improve employment access if pursued fully. It is imperative that the Victorian State government begins to follow an equally serious approach to suburban public transport in Melbourne.

UK researchers and policy makers have advocated for a 'gender audit' of public transport services to assess their adequacy and appropriateness in meeting the travel needs of women. However in the case of the poorly serviced outer-suburban areas of Melbourne, a general public transport audit seems appropriate. Such an audit would identify the extent to which the existing public transport system provides adequate and affordable access to employment for low-labour market status households beyond just the locations of high housing affordability that were the focus of this research project. Such an audit would require the State government to explain how it is improving services to meet the needs of low labour market status, and other households, in terms of the variables considered in this research project: spatial coverage; days and hours of operation; service frequency; and network integration.

Inclusive tollways?

Freeway building remains the preferred approach to addressing outer-suburban transportation issues. The Western Ring Road (WRR) in Melbourne's west and north, and the recently approved Mitcham-Frankston Tollway (MFT) in the outer east are all designed for circumferential travel of the sort not currently provided for by public transport. However, as Dodson and Berry (Dodson and Berry 2004) have demonstrated in AHURI-sponsored research on the Western Ring Road, the economic benefits of such major transport infrastructure projects risk bypassing the disadvantaged populations they purport to serve, suggesting highly limited economic gains for such disadvantaged areas. In the case of Melbourne's outer-east, the planned Mitcham-Frankston Freeway will potentially provide circumferential access to the growing employment locations along its route. However on the basis of the WRR outcomes, the extent to which the MFT will assist low labour market status individuals and households in the concentrated disadvantage area of Dandenong to access this growing employment remains highly questionable, as the tollway relies on private motor vehicle ownership and user-pays access to the transport corridor.

Concentrated service concentration

A further Victorian State Government program 'Transit Cities' intends to increase residential densities, generate a more diverse mix of land-use activities and enhance the quality of public transport services around selected rail nodes. Locations selected for this program include Broadmeadows and Dandenong; Sunshine is included in a second-tier group of Transit Cities referred to as 'principal activity centres'. The Transit Cities program intends the integration of train and bus modes within the mixed-use transit centre. While this is a positive step forward, questions remain about the quality of the bus services that will feed to the Transit Cities those local residents who are beyond walking distance of the centre. Integration of services at a rail-bus node will not result in a sufficient improvement in service quality if it is not accompanied by an improvement to services in the areas surrounding the Transit City. Mees's argument that service quality as at least as important a factor as urban form remains pertinent when low labour market status concentrations outside of, but adjacent to, Transit Cities are considered.

Given the patterns of employment growth identified in this report, more attention needs to be given to the sub- and cross-regional links between the Transit Cities and the employment growth areas surrounding them. While some employment will become further concentrated in the Transit Cities, much of the employment in industries that are incompatible with mixed-use centres will remain outside of the Transit Cities, but this employment is likely to provide potential employment opportunities for the low labour market status residents concentrated around transit cities such as Broadmeadows and Dandenong. If the focus remains on the Transit City locations, potential improvements in access to employment in locations outside of the Transit Cities may be overlooked.

Federal policy priorities

The Federal government has a strong interest in the links between households labour market status, the spatial distribution of urban employment and the capacity for individuals and households seeking employment to access employment opportunities. This project has demonstrated that there is a link between labour market status, housing affordability and access to employment. It would seem sensible for the Federal government to take closer account of the impacts of urban structure and urban mobility and accessibility on the opportunities available to low labour market status households, particularly in light of the concentrating spatial effects of housing markets. Current Federal government interest in transportation policies remains largely focused on road infrastructure, via the Auslink program. While there has been a slight recent shift in priorities toward a greater concern with public transport, the focus remains on large infrastructure, rather than services quality and coverage. There would seem to be scope for some rethinking of Federal urban transport policies in accordance with the themes and concerns identified in this project.

Conclusions: Urban structure and comparative urban development.

This project has investigated a rarely researched and poorly understood relationship between spatial housing and labour markets. The project has demonstrated that the evidence of the kind of gross spatial mismatch typically found in US cities is not present in Melbourne. The reasons for this are multiple, but can be explained in terms of the divergent historical processes of urbanisation and suburban development in Australian cities, compared to those in the US. Australia's outer suburbs, for many decades post-WWII, remained the locations where the poorest urban populations were located, particularly after gentrification from the early-1970s returned the middle-class to inner city areas, and displaced poorer households to outer areas. While new tracts of affluence have emerged in outer-suburban locations, a substantial band of relatively disadvantaged areas remains in outer-suburbia. These shifts have been accompanied by important changes to the spatial distribution of employment. While industrial activity began in the inner areas of Australian cities, after WWII this began to re-locate to outer-suburban locations, providing employment for the relatively less affluent populations in these areas. Restructuring since the 1970s has led to the entrenchment of labour market disadvantage in many of these often spatially isolated outer suburban locations, particularly for those previously engaged in industrial employment. As Australian cities continue to expand outwards however, they are also, slowly, bringing employment with them. Employment growth in Melbourne is now strongest in the central city and in large tracts of the fringe. This outward 'ripple' of employment is now bringing jobs to the outer suburbs, and beginning to surround and infiltrate the disadvantaged areas. Such employment growth is now providing opportunities for the populations of these disadvantaged outer suburban locations. Frictions however remain, and the transport system, particularly the rail and bus links which provided such high quality connections in the past, deserves substantial scrutiny and investment.

In the US city, the flight of the middle class to the suburbs, was much more marked, and occurred earlier than in Australian cities. The abandonment of inner city areas was therefore more substantial resulting in high levels of disadvantage in inner city locations and a resulting greater degree of resistance to potential for gentrification. US suburbs became the areas of relative socio-economic advantage, and combined with discriminatory social attitudes perpetuated the concentration of inner-city disadvantage. Many US suburban regions developed 'perimeter' or 'edge' cities which concentrated employment (albeit at low levels) in middle- and outer-urban locations. This suburbanisation of employment was more marked than for Australian cities, and combined with the relative unattractiveness of the inner city to the middle class has perpetuated the entrenched spatial mismatch between employment opportunity and residential location identified by US urban scholars. Such employment and residential change has been supported by transport policies which have emphasised automobiles and freeways as the dominant transport modes for urban travel.

The spatial development patterns of Australian cities suggests they are unlikely to replicate the US city in terms of the gross spatial entrenchment of socio-economic disadvantage. However pockets of disadvantage remain in Australian cities, particularly in those areas where decline in industrial employment has been greatest. Policy makers must pay close attention now and in the future to the way in which suburban employment growth occurs to ensure that the spatial patterns of such growth, and the transport linkages between residential and employment areas are not only environmentally sustainable, but also contribute to the amelioration of the levels of socio-economic disadvantage that exist and persist.

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Australian Housing and Urban Research Institute
Level 1 114 Flinders Street, Melbourne Victoria 3000
Phone +61 3 9660 2300 Fax +61 3 9663 5488
Email information@ahuri.edu.au Web www.ahuri.edu.au