

# **Advantage and Disadvantage across Australia's Extended Metropolitan Regions: A Typology of Socio-Economic Outcomes<sup>1</sup>**

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**Abstract**

New national and international economic and social forces have reshaped national geographies in general and the characteristics of cities in particular, resulting in a range of diverse social and spatial outcomes. These outcomes, which include greater differentiation across, within and between cities has become a feature of the economic and social forces associated with post-Fordist social structures. Taking localities across Australia's metropolitan regions this paper develops a typology of advantage and disadvantage using a model-based approach with clustering of data represented by a parameterised Gaussian mixture model and confidence intervals of the means providing a measure of differences between the clusters. The analysis finds seven clusters of localities that represent different aspects of the socio-spatial structure of the metropolitan regions studied.

## **Advantage and Disadvantage across Australia's Extended Metropolitan Regions: A Typology of Socio-Economic Outcomes**

### **Introduction**

The socio-spatial structure of contemporary cities and discussions relating to urban differentiation, segregation, social polarisation and social exclusion and inclusion are among central concerns in urban debates today. New national and international socio-economic forces have reshaped national geographies in general and the characteristics of cities in particular, resulting in a range of diverse social and spatial outcomes (O'Connor, Stimson and Daly 2001). Where once socio-spatial outcomes may have been clearly defined in research focusing on cities of the industrial era—here we might refer to the early and subsequent work by social area analysts (Timms 1970; Theodorson 1982)—a new or different set of divisions have been seen to emerge in post-industrial or post-Fordist cities. These new divisions do not necessarily exist in complete isolation from divisions that have appeared in earlier periods, but rather have developed from these existing patterns. Contemporary patterns therefore reflect the socio-spatial histories of cities. What are different about the contemporary socio-economic patterns are the factors and conditions leading to particular outcomes.

What we are now seeing, and have been seeing over the past two or three decades, is a complex set of interlinked factors impacting on the social and economic processes underway in cities. These interlinked factors have been referred to across a number of studies (Benassi et al 1997; Kesteloot 1998; Mingione 1996). With respect to these processes Kesteloot (1998, p.126) points out that

At the theoretical level, there is a growing consensus about three distinct spheres in which the sources of polarisation originate, namely transformations in the division of labour,...; the restructuring of nation-states and particularly the slow dismantling of the welfare state; and finally the second demographic transition, which results in the appearance of new household forms and the parallel increase of single people and social isolation.

The concern is that the changing economic structure, including a new division of labour, the crisis in the welfare state and the changes in demographic and household structures combine to make individuals more disadvantaged, while at the same time making others more advantaged. These changes are played out at the level of individuals and households as they result in unequal access to resources and life chances. However, these transitions also relate to the changing socio-spatial structure of cities as 'rich and poor concentrate respectively in rich and poor environments in terms of the resources of collective consumption, housing, mobility and access to jobs' (Kesteloot 1998, p.127).

Within the international literature reference to these types of concerns can be seen in research by Marcuse (1997; 1989), Marcuse and van Kempen (2000a, 2000b), Soja (2000), Dear (2000), Mikelbank (2004) and Walks (2001) in North America and by Hamnett (2003), Wessel (2001), Rhein (1998) and Musterd and Ostendorf (1998) in the United Kingdom and Europe. Marcuse (1997, p.228-229) talks about changes in space and race which have contributed to new processes of exclusion that are part of 'a broad pattern that makes up the post-Fordist city', while Soja (1997, p. 193) talks about forces altering the urban social structure in a way that has seen the form of the city explode 'to an unprecedented scale, scope and complexity'. More recently Walks (2001, p. 440), considering the changing socio-spatial structure of Toronto, supported this earlier work suggesting that 'the social ecology of the post-Fordist/global city may be characterized by

increasing social complexity and differentiation among, between and within neighbourhoods’.

Outside of North America similar issues have also been taken up. Hamnett (2003) considers the ways in which the socio-spatial structure of London has changed pointing to, among other things, the differentiation that has come to characterise the inner-city suggesting that it is ‘now one of the most prosperous areas in western Europe’ but it also has ‘one of the highest concentrations of deprivation’ (Hamnett 2003 p. 189). He suggests that outcomes such as these are the result of London’s global role and its specific industrial, occupational and social structure. Similar arguments are presented for other cities and regions in Europe with research such as the collection by Musterd and Ostendorf (1998) and the research by Rhein (1998) and Wessel (2001) pointing to the ways in which processes of socio-economic change have come to impact on the socio-spatial structures.

Within Australia, the primate urban region in each state (Sydney, Melbourne, Brisbane, Perth, Adelaide, Hobart), together with the capitals of the two territories (Canberra, Darwin) have been transformed in socio-economic terms and have seen the emergence of a set of new social realities reflected in differentiated socio-spatial and socioeconomic processes. Where once large working class communities may have been a dominant feature of most Australian cities (Baum et al. 2002), the economic and social processes that are characteristic of post-Fordism have resulted in a more complex and differentiated socio-spatial pattern. We see reference to the increasing suburbanization of poverty into

Australia's middle ring and old outer suburban areas, the movement of an aspirational class of households to opportunities in new outer suburbs, the dividing up of the old working class communities into several groups of new disadvantaged communities with each being affected by the new economic processes in different ways and the development of new advantaged communities closely tied to developments in the world economy (Stimson et al. 2001; Baum et al. 1999, 2002, Randolph 2004, O'Connor, Daly and Stimson 2001).

This has been the focus of recent work by Randolph (2004, p. 492) who has considered these shifts and has argued that Australia's cities have experienced a range of intensifying pressures that are resulting in a series of different outcomes within and between cities.

Although he provides little empirical support for his arguments, his conclusions are that

[t]he turnaround in the inner-city, the suburbanization of disadvantage, the new aspirational suburbs and the increasingly multi-regional city structure with increasingly multi-scaling of processes and outcomes, all point to new forms of city structure that make a change from the prevailing patterns of the period between 1945 and 1980.

Similar arguments have also been made by O'Connor, Stimson and Daly (2001) and Gleeson (2004).

The empirical work that has been conducted on Australian cities has been wide ranging and in a collective sense illustrates the changes that Randolph (2004) and others refer to. Early work by researchers including Stilwell and Hardwick (1973), Stilwell (1989) and Stretton (1970) point to the significant divisions that existed in cities during early periods of post-industrial development. The more recent research has continued these themes with research by Baum and Hassan (1993), Gregory and Hunter (1995), Hunter and

Gregory (1996) Raskall (1995, 2002), Beer and Forster (2002), Stimson et al. (2001) and Baum et al (1999; 2002) all providing insights into the socio-spatial structure of the contemporary Australian city. Reflecting the flavour of this empirical work Beer and Forster (2002, p. 13) discuss the uneven spatial impacts of economic restructuring on Australia's cities and argue that

In particular, job losses tended to be most severe in residential areas of manufacturing employment in lower income inner and middle suburbs. In contrast, job gains in service employment were strongest in the city centre and higher income inner and middle suburbs. Regions such as western Sydney, western and northern Melbourne and northern and western Adelaide, where manufacturing employment grew most rapidly during the 1950s and 1960s, were major losers in the process.

These changes have gone on to exacerbate 'established patterns of residential differentiation and contrasts in well-being between high- and low-income suburbs' (Beer and Forster 2002, p. 13). Likewise, others have shown that there appears to be significant changes occurring in the economic and social landscape of Australia's cities and metropolitan regions, with certain areas accumulating a disproportionate share of disadvantage over the past three decades. The more recent work by Stimson et al. (2001a) and Baum et al. (1999, 2002), both precursors to the current study, show that across Australian metropolitan regions changes underway in social and economic terms have impacted on the socio-spatial structure resulting in some communities being identified as being communities of social and economic opportunity, while others are identified as communities of vulnerability.

Concerns such as these are the focus of this paper. Specifically, we consider the socio-spatial patterns of advantage and disadvantage across Australia's metropolitan regions using the most recent census data, supplemented with other data sources. The approach

has similarities with earlier work on the socio-spatial structure of cities and essentially develops a classification system or typology of localities that focus on similarities and differences between places. Such an approach has its beginnings in 1920s human ecology, and was carried forward into the second half of the twentieth century by approaches including social area analysis and factorial ecology (e.g. Timms 1970). Although falling into disrepute during the 1970s because of the failure to generate theory (Castells 1972), its value for understanding the social structure of cities has recently been recognized by Smith (1995). The classification or typology building exercise undertaken in this paper allows the socio-spatial structure of cities to be understood with reference to a broad number of factors or indicators. These indicators are taken to represent aspects of advantage and disadvantage that are tied to broader considerations associated with the post-Fordist Australian city. This approach is not new. Classification schemes or typologies have been used to consider patterns and relationships across several areas including industrial areas (Markusen 1996), rural and regional places (Airola and Parker 1983, Beer et al. 1994 Stimson et al. 2001b) and metropolitan city regions (Massey and Eggers 1993, Coulton et al. 1996, Hill et al. 1998, Stimson et al. 2001a, Baum et al. 1999, 2002, Taylor and Hoyler 2000). Such typologies are not explanations of processes per se, but are ‘an attempt to systemize classification in aid of explanation’ (Marcuse 1997, p. 248) and provide a ‘richer understanding of complex phenomena’ (Mikelbank 2004, p. 961). They allow researchers to develop frameworks of understanding about the ways in which places function (DeMers 2000) and allow consideration of the likely processes underway across space and place.



In the context of the current paper, the approach developed allows an empirical consideration of conceptual ideas regarding socio-spatial outcomes and patterns in and across contemporary Australian cities and begins to allow us to consider the ways in which patterns in Australia reflect and contrast with wider international outcomes. In what follows, we begin by outlining the methodology adopted to build our typology of Australian metropolitan regions, including a consideration of the indicators used and the spatial scale adopted. Following this we then outline the main findings of the typology building exercise, before turning to consider some conclusions.

## **Typology building**

### **Methodology**

The objective of developing a typology of localities across metropolitan regions is to provide simplified sub-groups with which to consider broader processes. Several methods are available to cluster data into meaningful sub-groups. The current paper uses a strategy for implementing cluster analysis based on parameterised Gaussian (normal) mixture models (Fraley and Raftery 2002). These models are quite flexible in accommodating data with widely varying characteristics and are preferable because they allow statistical inference to be made about the components of the mixture model and hence probability statements about the classification of observations to a cluster. That is, the clustering methodology provides a measure of uncertainty about how well each observation is classified and these can be used to understand how well the cluster solution represents the actual data.

A distinctive advantage of a model-based clustering approach is that it allows the researcher to use model selection techniques such as the Bayesian Information Criterion (BIC) to compare outcomes (Schwarz 1978). This provides a systematic way of selecting both the parameterisation of the model and also the number of clusters. By computing the BIC for the single cluster model for each parameterisation and for the mixture likelihood with the optimal parameters from EM for 2 through to  $M$  clusters, a matrix of BIC values is produced. This provides a value for each possible combination of parameterisation and number of clusters. The ‘ideal’ cluster is that in which the BIC is highest and shows significant gain.

Apart from clustering the localities that make up the group of extended metropolitan regions, the aim of the paper is also to consider how the clusters of localities differ from one another. In this paper we adopt a visual data interpretation method using confidence intervals (Masson and Loftus 2003)<sup>ii</sup>. The method incorporates the use of confidence intervals (CI) in conjunction with visual presentation to allow the researcher to form inferences about the cluster outcomes that take account of both the cluster mean and also the wider spread of the data. The confidence intervals are used in two ways (see figure 1). Firstly, clusters whereby the CI is clearly different from others without overlap and are above or below the mean are considered to be strongly differentiated on that particular variable. Secondly, in some cases groups of clusters may have CIs that overlap but which are above or below the mean for the entire population and variables for which this occurs can also be considered to differentiate the clusters from others. The interpretation of the cluster outcomes then becomes an exercise in comparing outcomes on the interpretation

of CIs. The individual plots for each group of confidence intervals are not reproduced for this paper, but can be obtained from the authors.

## **Data**

A range of data is presented as part of the analysis. Initial data selection was undertaken by data mining with principal components analysis, using a smaller sample of observations to identify variables that explained large amounts of variation across localities. These data are associated with individual and household socio-economic characteristics of the resident population and are among those found in research on the economic and social patterns of cities and their communities (see for example Stilwell 1980, 1989; Baum and Hassan 1993; Coombes and Wong 1994; Baum et al. 1999; O'Connor and Healy 2001; Strait 2001) The final selection of variables was driven by this initial analysis together with a consideration of the conceptual issues we address in this paper. Table one presents the variables used in the final analysis, together with some explanatory notes, and a full explanation of each variable is set out below. The data was obtained from the Australian Bureau of Statistics (ABS) 2001 Census, together with other sources including the ABS integrated regional database which contains spatially aggregated administrative data such as taxation information and welfare receipts.

A group of 19 indicators represented occupation, industry and labour market characteristics, together with income and human capital. Two variables, educated professionals and vulnerable occupations account for occupation. Educated professionals include the percentage of workers with a degree qualification or above and who are

employed as managers, professionals or para-professionals. Vulnerable occupations are the percentage of workers classified as labourers, tradespeople or basic clerical workers with no post-school qualifications. While these variables do contain an indicator of human capital, a further measure, the percentage of people with low formal education is also included<sup>iii</sup>. The variables accounting for industry sector of employment were developed following earlier work by O'Connor and Healy (2001). Seventeen broad industry categories were reduced to seven categories; new economy, old economy, mass goods and services, mass recreation, construction, distribution and transport and agriculture. Four other variables that account for aspects of labour markets are also included. These are labour force participation rate, total unemployment and youth unemployment and the percentage of the workforce who are employed part-time.

We include six variables reflecting income and wealth. Two measures of earned income are included; average earned wage and salary and the ratio of high to low income. We also include two measures of wealth. One is the average interest earned on deposits held in financial institutions (interest earned per tax payer) and the other is the average imputation credits earned (imputation credits per taxpayer)<sup>iv</sup>. Finally two measures of income support are included— the proportion of people earning an aged pension and the proportion of people receiving cash transfers to offset rental (rent assistance).

Five indicators of the demographic or household characteristics of the resident population are also included. One measure accounts for the earning capacity of families with children (the percentage of single parent and couple families who have no employed

parent present), while another accounts for the proportion of single parent families. A measure accounting for age dependency is also included (the proportion of people aged 65 and over relative to the working age population), while two measures accounting for the presence of people born overseas are included (the level of self reported English proficiency and the proportion of people who arrived in Australia between 1996 and 2001).

Closely associated with these demographic characteristics, but also associated with income and living standards are measures accounting for housing. Four housing variables are included in the analysis. We include a measure of home ownership levels and also a measure accounting for the presence of public housing tenants. There are also two measures accounting for the extent of housing financial hardship. These are mortgage financial stress and rental financial stress and are measured by considering the proportion of low-income households who are paying more than 30% of income on rents or mortgage repayments (National Housing Strategy 1991).

Finally, we include two measures accounting for socio-economic change. These are changes in population or population in-movement and changes in labour force outcomes (percentage point change in labour force participation rate).

All of these variables are included in the final clustering approach and subsequent analysis. As many of the variables are reported in percentage terms, a log transformation

$$\text{Log}(p/1-p), \text{ where } p = P/100$$

is undertaken in order to account for floor and ceiling effects imposed by using percentage (P) based data.

### **Choice of spatial unit**

An issue in spatial analysis relates to the selection of the most appropriate level of spatial aggregation. Spatial data is often available ranging from small aggregations of individuals or households up to more coarse levels of aggregation such as cities, broad regions or states. Problems arise due to differences in data availability across various aggregation levels, problems relating to the ability to join data from different agencies who may use different spatial aggregations (a concordance problem) and issues discussed under the modifiable areal unit problem, including scale effects and problems of appropriate unit definition (see Fotheringham and Wong 1991; Bailey and Gatrell 1995).

Because the data used in this paper came from several sources it was necessary to select a level of aggregation that could be used across different data collection agencies. The available spatial level of ABS census data varies. Possibilities range from collector's district level (CD) that comprises approximately 200 to 400 households, up to broad statistical regions, sections of state and state level data. In many ways the use of data at the collector's district level would be ideal for the development of the typology as they are small enough to allow for a considerable level of detail to be considered and do not impose significant issues relating to scale. However, the use of such a small spatial unit was hampered by several factors. Firstly, as the typologies are developed using data from both ABS sources together with data from other government agencies a spatial unit had to

be chosen that allowed data to be matched. Data at CD level was not available from sources outside of the ABS and hence these spatial units were not suitable due to problems with concordance. In addition, CD level data is not available in a time series format thereby precluding any data accounting for change and as each CD is identified only by an identification number the outcomes of the typology would be less meaningful. That is, those interested in utilising the typology would not be able to readily identify places based on a simple numerical identifier.

Given these issues the only useful spatial level to consider was the Statistical Local Area (SLA). These vary in size and in most cases are equivalent to local government areas or parts of local government areas and can be readily identifiable by policy makers and the general public. We acknowledge that the use of SLAs does raise concerns relating to the modifiable areal unit problem and in particular the issue of scale. As a result it may be that coarse aggregations such as SLAs hide important fine grain patterns and therefore as these spatial units are not natural spatial areas, 'one must be cognisant of modifiable areal unit problems and their potential effects' (Horner and Murray 2002, p. 134). However, the use of SLAs represents the best compromise between spatial unit size, data detail and data availability. The SLAs we use are contained within the extended metropolitan regions, which comprise the major capital city statistical divisions, together with adjoining SLAs that have more than 10 per cent of their working population commuting into the larger statistical division. In a sense, the extended metropolitan regions represent capital city local labour market regions. The SLAs are used for the majority of the extended metropolitan regions with the exceptions being Canberra, Brisbane and Darwin.

In Canberra statistical sub-divisions (SSDs) are used, while in Brisbane and Darwin small SLAs are combined to equate to local government wards. This was done so as to reduce the large number of SLAs with only small populations, which in some cases caused problems with outliers in the data and zero cells. The final analysis was conducted with 301 localities.

### **A Typology of Advantage and Disadvantage**

As shown in table 2, the model-based clustering procedure resulted in the selection of 7 clusters which are divided into 3 advantaged groups of localities, 3 disadvantaged groups of localities and a single group of localities that is considered to be the average or marginal (neither relatively advantaged or disadvantaged). Table 2 provides an overview of the main differentiating variables that were used to describe the various clusters. Table 3 provides the means for each of the variables included in the analysis across each of the 7 clusters, while figures 2 to 9 provides maps of the clusters for each of the extended metropolitan regions. A list of individual localities included in each cluster can be obtained from the authors.

#### **Advantaged clusters**

The clusters identified as advantaged contain 107 individual localities or 38 percent of the total. A general overview of the profiles for each of the clusters (table 2) shows that indicators associated with positive employment outcomes, including engagement with new economy industries and occupations and high wages and salaries, together with generally low levels of socio-economic disadvantage are distinguishing features of the



advantaged clusters. Moreover, many of the indicators show marked differences when compared to the clusters labelled as disadvantage (table 3) indicating the polarising trends which have characterised Australia cities and which have been widely discussed in the literature. However, moving away from this general picture, an analysis of each advantaged cluster illustrates some important differences.

***Extremely advantaged new economy localities***

This first advantaged cluster comprises 31 localities found mainly in Sydney and Melbourne, but also in Perth, Canberra, Brisbane and Adelaide. Spatially, the clusters are found predominantly in near inner-city localities (see figures 2 to 9). The variables that differentiate this cluster from others suggest that it can be labelled as an ***extremely advantaged new economy localities*** cluster. Many of the residents in localities in this cluster might be thought to play a key role in sectors tied to new economy activities and have benefited from this association (O'Connor, Stimson and Daly 2001). Significantly, this cluster is differentiated from other groups and has the highest proportion of workers in new economy industry sectors (31.6 per cent), the highest proportion of educated professionals (48.1 per cent), the highest average wages and salaries (\$47207.49) and the highest income ratio (2.0). In addition, the cluster also has the highest level of interest received (\$1897.69) and imputation credits received (\$2255.83). Not surprisingly, given the advantaged label associated with this cluster, it has below average levels of people employed in vulnerable occupations (8.26 per cent), and people with low levels of education (19.8 per cent) and below average levels of households suffering mortgage financial stress (5.6 per cent).

Apart from these variables which strongly differentiate this cluster from the six others, the *extremely advantaged new economy localities* are also differentiated, along with other clusters, in terms of having below average levels of youth unemployment (9.6 per cent) and total unemployment (4.4 per cent) and below average non-earner households (9.5 per cent) and single parent families (12.5 per cent). Moreover, the cluster also has below average levels of public housing tenants (2.4 per cent) and below average age pension recipients (7.2 per cent), which is despite having an above average age dependency rate (21.8 per cent). Finally, this group of localities has a below average proportion of people employed in the construction sector (3.8 per cent) and perhaps not surprisingly a below average proportion of old economy workers (4.7 per cent).

#### *Middle class advantaged localities*

The second advantaged cluster consists of 49 localities found in Sydney, Melbourne, Brisbane, Adelaide, Hobart and Perth. Considering the factors differentiating this cluster from others it is labelled as the *middle class advantaged localities* cluster. The places found in this cluster include several middle suburban areas that have been doing well in terms of measures of affluence, although relative to the other advantaged clusters (especially the extremely advantaged cluster) the performance has been less impressive (figures 2 to 9). The localities are also found in some outer metropolitan regions that have recently become the location of new middle class housing developments and which some including Randolph (2004) and Gleeson (2004) refer to as the 'new urban rings of affluence' (Randolph 2004, p. 489).

The cluster is significantly different from others in terms of an above average income ratio (1.1), a below average proportion of people with low formal human capital (30.5 per cent), a below average proportion of old economy workers (7.7 per cent) and people employed in vulnerable occupations (13.0 per cent). The cluster is also differentiated, along with others, by above average wages and salaries (\$36124.31), above average new economy workers (22.5 per cent) and above average educated professionals (34.9 per cent). Other important indicators include below average proportions of youth unemployment (10.8 per cent) and total unemployment (5.3 per cent), below average levels of non-earner households (10.2 per cent), below average levels of single parent families (13.6 per cent) and a below average proportion of people receiving rental assistance (4.1 per cent). Finally, in terms of housing variables, this cluster has below average levels of households in mortgage financial stress (7.5 per cent) and below average percentage of public housing tenants (2.5 per cent).

### ***Population change advantaged localities***

The final advantaged cluster consisted of 37 localities found across Sydney, Melbourne, Canberra, Perth, Darwin, Brisbane and Adelaide (see figures 2 to 9). The cluster represented the changing socio-economic characteristics of localities in cities and is labelled as a ***population change advantaged localities*** cluster. The majority of the localities were found in inner-city areas, reflecting the gentrifying activities that have characterised cities for some time (Ley 1986, Forster 1995, Gleeson 2004). The cluster also represents the population change evident in Canberra and Darwin both of which have witnessed growth as a result of administrative functions of these places (Salt 2001).

Illustrating the cluster's advantaged position, it is differentiated from others in terms of an above average high-low income ratio (1.6) a below average percentage of people with low education (23.9 per cent) and people employed in vulnerable occupations (11.4 per cent). It also has an above average level of people employed in mass recreation industries (10.5 per cent). Moreover, reflecting the population change associated with the cluster, it is differentiated from others in terms of having the highest proportion of population in-movement (55.4 per cent) and a below average percentage of home owners (27.6 per cent), reflecting the fact that localities with high population in-movement are more likely to have low levels of ownership.

Apart from these indicators, which are the most important differentiating variables, the cluster is differentiated from other clusters in terms of above average wages and salaries (\$37394.26), and above average proportions of educated professionals (39.58 per cent) and new economy employees (24.2 per cent), and a below average proportion of households suffering mortgage financial stress (7.6 per cent). The cluster is also differentiated in terms of having below average percentages of people receiving age pensions (6.7 per cent), and age dependency (14.1 per cent) and a below average percentage of people employed in the construction industry (4.0 per cent) and old economy industries (4.3 per cent). The cluster does however have above average proportions of households in public housing (6.2 per cent), which reflects the historical nature of some of the places that were once locations of significant inner-city public housing developments.

### **Disadvantaged clusters**

Contrasting with the clusters characterised as advantaged are those clusters characterised as being disadvantaged. In general the disadvantage clusters are characterised by problems in terms of unemployment and disadvantaged occupational and industry characteristics and low incomes. However, as with the advantaged clusters this general picture does not reflect the significant differences between these clusters. An analysis of the significant variables and the individual means for each cluster provides insights into the differences.

#### ***Battling family-mortgage belt localities***

The first disadvantaged cluster represents the largest number of localities (66) that are found in Sydney, Melbourne, Brisbane, Perth, Adelaide and Hobart and spatially tended to be located mainly in middle and some outer-suburban localities (see figures 2 to 9). Considering the variables that differentiate this cluster from others suggests that the cluster can be labelled as a ***battling family-mortgage belt localities*** cluster. To a large extent the localities in this cluster represent the battling mortgage belt, but with disadvantage also reflected by concentrations of disadvantaged families (Swan 2005).

The cluster is differentiated from all other clusters in terms of above average proportions of households with mortgage stress (10.6 per cent), non-earner households (13.4 per cent), and single parent households (17.4 per cent). All of these variables clearly point to the disadvantaged nature of this cluster. Apart from these variables, the cluster is also

differentiated, along with other clusters, in terms of an above average proportion of people employed in vulnerable occupations (18.8 per cent) and commensurately a below average proportion of educated professionals (22.0 per cent) and new economy workers (17.8 per cent). The cluster was characterised by low incomes with below average wages and salaries (\$31507.98) and a below average income ratio (0.62). In addition, the cluster has below average levels of labour force participation (57.9 per cent) together with above average proportions of people with low formal human capital (40.7 per cent). Age dependency is above the average (21.4 per cent) and there is an above average proportion of public housing tenants (6.1 per cent). Finally, reflecting the blue-collar characteristics of many of the localities within the cluster there is an above average proportion of people employed in the distributive and transport industry sector (9.6 per cent).

### *Extremely disadvantaged old economy localities*

The second cluster of disadvantaged localities represents a group of places (37) adversely affected by economic restructuring and which are among the most disadvantaged localities in metropolitan Australia. For these localities, the post-Fordist economy has caused the old established economic and social geography to become obsolete as they are faced with new forces of production (Searle 1993). This is well illustrated by Peel's (1995) case study of Elizabeth in Adelaide where he notes

The combination of economic growth and adventurous public planning that underpinned the workers' city did not last. Crisis first arrived in the form of economic downturn of the mid 1970s. That was followed by restructurings which severed subsequent recovery from job creation...In this new environment places like Elizabeth faced an uncertain future...Their role in a reorganised and restructured economy would depend upon their ability to adjust, to attract and hold on to new investment and new kinds of jobs (p. 156).

These communities were found in Sydney, Melbourne, Brisbane, Perth, Adelaide and Hobart. Spatially, they were located in some middle and outer suburban localities (see figures 2 to 9). Considering the factors that differentiate this cluster from others, it is labelled as an *extremely disadvantaged old economy localities* cluster.

The cluster is differentiated from all others in terms of the highest proportion of people employed in vulnerable occupations (18.8 per cent), and old economy industry sectors (17.1 per cent), and also has above average levels of youth unemployment (19.5 per cent), total unemployment (11.4 per cent), non-earner households (15.9 per cent) and single parent households (19.9 per cent). The cluster also has a below average income ratio (0.3), proportion of educated professionals (13.2 per cent), imputation credit (\$133.04), interest received (\$302.61) and percentage point change in labour force participation (-5.4 points). The cluster is similar to the other disadvantaged clusters in terms of having an above average proportion of people with low education (44.6 per cent), and below average wages and salaries (\$28870.37). The cluster also has a below average proportion of new economy workers (13.6 per cent) and an above average proportion of households suffering from mortgage financial stress (12.5 per cent). Moreover, it has a below average proportion of people employed in the mass recreation industry sector (5.3 per cent) and has below average labour force participation rates (57.0 per cent), and below average levels of age dependency (15.3 per cent). It has an above average proportion of people employed in distributive and transport sectors (10.1 per cent) and an above average proportion of public housing tenants (9.6 per cent).

### ***Peri-urban agriculture based disadvantaged localities***

The final disadvantaged cluster comprises 35 localities found mainly in the outer peri-urban regions of Sydney, Melbourne, Adelaide, Brisbane and Perth (see figures 2 to 9). The distinguishing variables associated with this cluster point to a relative level of disadvantage and the cluster is labelled as the ***peri-urban agriculture based disadvantaged localities***. The cluster represents places which have become part of the extended metropolitan region due in-part to increasing urbanisation and a shift to what some authors refer to as ‘sea change’ localities (Burnley and Murphy 2004) or ‘tree-change’ localities. They are also suburbs in waiting and are the ‘shadow that moves outwards as the city spreads and extends its influence into its immediate hinterland’ (Bunker and Holloway 2002, p. 66). They are likely to be a mixture of places based on agriculture production and also consumption driven localities such as retirement communities.

The cluster is differentiated from all others in terms of an above average proportion of people employed in agriculture (12.4 per cent) and an above average proportion of people employed in vulnerable occupations (20.5 per cent). It also has a below average proportion of people with poor English skills (2.0 per cent) and recent arrivals (0.7 per cent), reflecting the settlement patterns of recently arrived migrants in cities. The cluster is similar to the other disadvantaged clusters in terms of having an above average proportion of people with low educational attainment (45.6 per cent) and low levels of educated professionals (20.0 per cent) and new economy industry workers (10.1 per cent). It also has below average labour force participation (56.9 per cent), and both wages



and salaries (\$28784.46) and the ratio of high incomes to low incomes (0.5) are below the average. The cluster also has below average proportions of non-earner households (9.4 per cent), single parent families (13.0 per cent) and proportions of public housing tenants (2.0 per cent), features shared with some of the advantaged clusters. The cluster has an above average level of age dependency (23.4 per cent) and an above average proportion of households suffering mortgage financial stress (13.0 per cent).

### *Average cluster*

The final cluster contains 46 localities found in Sydney, Melbourne, Brisbane, Adelaide, Perth and Darwin. Spatially, the localities found in this cluster are found in middle and outer areas of the metropolitan regions (see figures 2 to 9). The cluster has been labelled as a group of *working class battlers localities* and can be considered to represent the middle or average group of localities, which while not necessarily showing high levels of disadvantage are not, relative to other groups, highly advantaged. The cluster has characteristics of disadvantage such as low incomes, but has relatively good labour force outcomes (i.e. low unemployment) and low concentrations of disadvantaged families.

The cluster is not significantly differentiated from other groups on any of the variables. It is however differentiated along with other clusters in terms of a below average income ratio (0.7) and below average levels of imputation credits (\$314.08) and interest earned (\$422.62) and a below average percentage of people with poor English skills (3.8 per cent). The cluster also shares with the other disadvantaged groups an above average

proportion of people with low education (37.9 per cent) and also has below average wages and salaries (\$32173.84), below average proportion of new economy workers (16.1 per cent) and educated professionals (21.1 per cent) and an above average proportion of people employed in vulnerable occupations (17.9 per cent). Unlike other disadvantaged clusters this group of localities has below average levels of youth unemployment (10.7 per cent) and total unemployment (5.3 per cent). Common with the advantaged clusters, this cluster also has below average proportions of single parent families (13.1 per cent), non-earner families (9.4 per cent) and households in public housing (1.7 per cent). Finally the cluster has a below average proportion of age dependency (11.3per cent) and a below average proportion of people receiving aged pensions (6.4 per cent).

## **Discussion**

In this paper we began by suggesting that the socio-spatial structure of the contemporary Australian metropolitan regions was likely to reflect the outcomes of recent processes of social and economic change, and that the outcome of these in terms of patterns of advantage and disadvantage might reflect a new or different social reality. To consider this we developed a typology of advantage and disadvantage across localities within Australia's extended metropolitan regions using a combination of model based clustering and confidence intervals. The outcome of the analysis, which presented a typology of seven clusters (3 advantaged clusters, 3 disadvantaged clusters and 1 average cluster) points to several broad concluding outcomes. The first point relates to the emerging socio-spatial structure of Australia's metropolitan regions and follows on from

conceptual concerns raised by Randolph (2004) and others. The second point relates to the ways in which case studies such as the one presented here can offer some comparative insight into the broader international literature. We deal with these two points below.

First, as has been argued both within the international literature as well as that which looks specifically at Australian cities, the contemporary socio-spatial structure of metropolitan regions appears to reflect the broad processes underway in the post-Fordist city and that in some ways these patterns can be expected to be different from the patterns seen to exist during earlier periods. Not that there is a new spatial structure; the resulting patterns are not so different from preceding periods. Rather, there have been changes in the components of that structure. That is, divisions between advantage and disadvantage exist, just as they have in earlier times, what is new are the ways these are expressed and possibly the strength of the divides between them. This has certainly been the view expressed by others working on Australian material (Randolph 2004; O'Conner, Stimson and Daly 2001).

The divisions identified in the research are perhaps most noticeable at the extremes, that is between the highly advantaged new economy localities and the highly disadvantaged old economy localities. The group of localities identified as new economy advantaged have been an emerging feature of Australian cities as witnessed in previous research in various forms (See Baum et al 1999, 2002; Stimson et al. 2001), but are now perhaps becoming more differentiated from other localities as they become more and more

characterised as the privileged community of the global age (Baum et al. 2002). They are not a feature of all the metropolitan regions and are certainly more dominant in those with identified ties to the wider global economy such as Sydney, Melbourne and Perth. In Sydney, increasing global city functions associated with the presence of regional headquarters, the development of national gateway functions and the development of significant knowledge based industry sectors have generated wealth and high incomes for certain individuals who are able to live in these 'privileged communities' often close to the CBD in what has been referred to as 'global Sydney'. While there is little evidence of citadels (Marcuse and van Kempen 2000a) those with membership to global Sydney communities are seen as being increasingly differentiated from other communities and localities often with symbolic walled suburbs as a defence against crime and deprivation (McGregor 1997; Connell and Thom 2000; Gleeson 2004).

At the other extreme, the old economy disadvantaged localities show the negative impacts of economic restructuring and other processes and are among the most disadvantaged places within the metropolitan regions. Some of the localities are found in urban areas that experienced marked industrial development during earlier periods and which have, in the wake of deindustrialisation, been unable to prosper. Some such as those found in Adelaide are among the nations poorest suburbs having emerged as new industrial areas with prosperous workforces in the 1950s only to suffer profound demise through the 1970s and 1980s (Peel 1995; 2003). If the new economy advantaged localities are in some sense moving away from the rest of the country, then the old economy disadvantaged localities are being excluded from the economic life of the

surrounding society. While it is true that disadvantage in terms of unemployment and low incomes have been a feature of Australian cities for some time, these contemporary disadvantaged localities might be thought of as being different with disadvantage being more entrenched and less easy to escape. If these places are reflective in some senses of the ghettos of exclusion discussed by Marcuse and van Kempan (2000a p.19) then the following observation is pertinent

...the residents of the abandoned city, particularly in the new ghetto of the excluded, play a different role from those of the old ghetto in many respects....Older forms of the ghetto...remained an integral part of the mainstream economy, with residents of different classes and with a variety of prospects on the labour market. Their residents, when unemployed, were part of a reserve army of the unemployed, who had expectations of re-entering the mainstream labour force when conjunctural conditions changed. That holds less and less in the new ghettos.

The disadvantaged old economy localities are among Australia's equivalent to the new urban ghettos identified in the United States. The social and economic conditions might be at variance, but these are excluded places all the same and are likely to face the same issues of dependence, limited political participation, restricted socio-cultural integration and bad neighbourhood pathologies (Gregory and Hunter 1995; Musterd and Ostendorf 1998; Glesson 2002).

While these two examples represent the extremes in terms of advantage and disadvantage, the other clusters are also of interest. Gentrified and redeveloped inner-city localities have now firmly been established as part of the advantaged socio-spatial landscape. These were identified as part of the population change advantage localities and although these places have in the past had much more mixed socioeconomic outcomes (Forster 1995; Badcock 2001; Baum et al 1999, 2002), the pendulum appears

to have swung much more in the favour of advantage. These places do of course, when combined with the new economy advantaged localities, represent the spatial shift in advantage and disadvantage whereby inner-city locations are no longer the sites of disadvantage, but rather disadvantage has tended to be increasingly suburbanised. Spatially, the disadvantage old economy cluster was predominantly a suburban cluster and the cluster of localities characterised by household disadvantage and financial stress due to housing costs (*Battling family-mortgage belt localities*) are also for the most part firmly suburban, located in the middle and outer rings of the metropolitan regions. But disadvantage has not entirely taken over suburbia. The growth in the new middle class has seen localities in middle suburbia prosper (middle class advantaged cluster), while for some, these have contributed to a new rim of affluence on the edge of the metropolitan regions. According to Randolph (2004, p. 489)

The 'McMansion' suburbs – middle to higher income, large car dependent homes on small plots – are now a dominant feature of the new suburban landscape. These are not the lower income, more affordable fringe suburbs that characterized the 1960 and 1970s. Most notably, there is not a public housing development among them. This is new – the emergence of the middle classes on the urban fringe.

Finally, the peri-urban localities of the metropolitan regions represent the intensification of previous rural localities that have in many cases been engulfed by the commuter zones of the metropolitan regions. These peri-urban regions might be thought of as suburbs in waiting and are the 'shadow that moves outwards as the city spreads and extends its influence into its immediate hinterland' (Bunker and Holloway 2001, p. 66). They represent a new location of disadvantage in the metropolitan structure, although they are localities that have been developing for some time and may also show signs of improving socio-economic fortunes.

Naturally, these socio-spatial patterns hold for some metropolitan regions more than for others and it is certainly the case that the uneven social and economic histories as well as present trajectories of individual cities have impacted on the outcomes observed. At one extreme sits the Sydney metropolitan region. The internal structure of the city reflects its privileged position as the nation's major global city (Baum et al. 2002; O'Connor, Stimson and Daly 2001). It has far-and-away more advantaged localities than any other metropolitan region (excluding Canberra and Darwin which might be considered special cases) and has less disadvantaged localities. New economy advantaged localities are a dominant feature while old economy disadvantaged localities only feature in a comparatively small way. Relative to the distribution for all metropolitan regions Sydney has almost 1.5 times more advantaged localities than would be expected and only half the disadvantaged localities. There may therefore be some trickle-down of advantage through all localities so that even the worse-off places are not, relative to other cities, suffering as much. That is, it appears that in some sense the consequences of broader social and economic transitions have been cushioned by Sydney's relatively robust economic performance and that in a sense Sydney is pulling away from the rest of the country. This has been suggested elsewhere for Sydney (Connell 2000) and is also an outcome observed in cities internationally (Drenan, Tobier and Lewis 1996).

The metropolitan regions of Canberra (Australia's national capital) and Darwin (the capital of the Northern Territory) reflect special cases. Both have economic structures tied largely to public service and government activities and associated functions, a fact

that is reflected in the general level of advantage identified across these places (Salt 2001). This does not deny the presence of disadvantaged households or individuals. Rather, it indicates no cluster of households or individuals is large enough to form a disadvantaged group that our methodology and spatial scale would have identified.

The other cities—Melbourne, Brisbane, Perth, Adelaide and Hobart—all have more disadvantaged localities relative to the distribution for all metropolitan regions. Melbourne has a more balanced structure of advantaged and disadvantaged localities, a fact that previous analysis has suggested is an outcome of that city's mixed fortunes over the past two or three decades (Baum et al 2002), while what have been referred to as Australia's two sun-belt metropolitan regions, Brisbane and Perth (Stimson, Shuaib and O'Connor 1998), also have seemingly more balanced structures.

The contrast to these is the two remaining metropolitan regions of Adelaide and Hobart. The structure of these two metropolitan regions reflects the parlous economic conditions that exist today, a position that reflects the sustained negative economic outcomes that have characterised these cities over the past two to three decades (O'Connor, Stimson and Daly 2001). The two 'rust-belt' cities and Adelaide in particular have many more disadvantaged localities relative to other metropolitan regions with the old economy disadvantaged localities being especially overrepresented. While these two cities are attempting to reinvent their economic structures, they are none-the-less at the bottom of the socio-economic hierarchy of metropolitan regions.



The socio-spatial structure of the eight extended metropolitan regions, vary because of the changing socioeconomic conditions that include economic, demographic, social and political changes experienced over the past few decades. While the methodology employed here does not provide a means to clearly pinpoint the drivers of the differentiation between clusters, it would appear that the decline of the old economy and the rise of the new global economy have given rise to new groups of advantage and disadvantage across the metropolitan regions. Thus those urban areas most affected by the demise of the old economy have more disadvantaged localities, but those benefiting most from the global economy have more affluent localities. It is important however, to realise that drivers related to economic change are not the only important indicators. The reorganisation of Australian metropolitan regions in socio-spatial terms is also linked to changes in demographic patterns and shifts in policy. Here we refer to the fact that disadvantaged localities have also suffered from the inability of transformed families and the changing welfare state to supply adequate support in times of difficulty, thereby further resulting in increased disadvantage (Beer and Forster 2002). Some of these areas are the places that sociologists and others lament suffer the impacts of concentrated disadvantage. Places where entire families are at risk of falling into increasing rounds of social disadvantage through the impacts of weakened social networks and intergenerational transfers of disadvantage.

Apart from providing an empirical description of Australia's extended metropolitan regions, the paper also contributes to an understanding of the ways that the processes underway in Australian cities compare to those reflected in the wider international

literature. At a broad level, the general outcomes of increasing diversity and the so-called splintering of cities into new spatial reflections of advantage and disadvantage are common themes across most international literature. For instance, the recent work by Mikelbank (2004) into U.S. suburban places identified healthy suburbs associated with high incomes and high levels of human capital that might be considered similar to our extremely advantaged new-economy localities. He also identified struggling suburbs that are akin to our most disadvantage cluster of localities (old economy disadvantaged localities). However, the patterns observed here also point to some important differences. Some of these have been touched on earlier, but we consider them further here.

An important driver identified in much of the literature, especially research focusing on North American and European cities is the role that race and ethnicity play in new spaces of advantage and disadvantage. This is identified in work by Marcuse (1997) and others (Musterd and Ostendorf 1998; Hamnett 2003) where it is argued that space and race are contributing to the new processes of exclusion. However, the Australian metropolitan regions were found to have no discernable ethnically based communities, despite Australia being an immigrant country and Melbourne and Sydney being major destinations for immigrants from non-English-speaking countries. Certainly, there are parts of Sydney and Melbourne with significant numbers of foreign born, but our analysis did not identify discernable ethnic enclaves. Second, there were no marked public housing localities because public housing accounts for a tiny percentage (around 5 per cent) of the total Australian housing stock. There are certainly concentrations of public housing in some localities within some of the clusters, but they were not necessarily

associated with disadvantage (as in the population change advantaged localities) and in addition, any concentrations were too small to identify a separate group of places that would parallel, for example, some of the large public housing communities in Europe such as the French Grand Ensembles or North American cities such as New York or Chicago. Third, within Australian cities disadvantaged metropolitan communities are located largely towards the edge of metropolitan regions and on the fringe. This contrasts with many U.S. cities where poverty is an inner-city phenomenon reflected by research pointing to the problems of inner-city ghettos (Murdie 1998; Mikelbank 2004). The most disadvantaged Australian localities, those contained within the old economy extremely disadvantaged cluster, are located on the fringe of cities including Adelaide and Melbourne. In metropolitan Adelaide, this type of locality is clearly associated with the experiences of Elizabeth, but is also associated with localities such as Broadmeadows and Dandenong in Melbourne.

These points do of course raise the issues identified by Hamnett (1995, 1996) and others (Silver 1993; Kloosterman 1996; Baum 1997) that although broad globalising trends and influences impact on cities through similar processes, local impacts are important for understanding the socio-spatial patterns that emerge. With direct reference to Australian cities and the extent to which recent transformations have impacted on their socio-spatial characteristics, Beer and Forster (2002, p. 8) argue

Australia, like other advanced economies, has been profoundly affected during the past two decades by the complex set of economic, technological and social transformations commonly referred to as global restructuring. However, the

situation in Australia has been shaped by the particular nature of Australian urbanisation and urban form, the particular character of urban government and management and the particular impact of global restructuring on the Australian economy.

In short then, the outcomes noted here differ from other cities and regions elsewhere, due in part to Australia's historical urban development and particular level of urban and regional management and on the unique character of the globalising experience as witnessed in Australian cities. With reference to this it is worthwhile restating that this Australian study has identified equal numbers of advantaged and disadvantaged groups. This reflects the massive social restructuring of the past few decades, particularly changes resulting from the decline of the industrial age and the rise of post-Fordism or post-industrialism and the impact of transitions in demography and in public policy. The collapse of the earlier era has changed social and economic outcomes for traditional working class communities, but the emergence of post-Fordism brought about advantage to a new set of individuals and the localities in which they live. There is now a growing number of highly skilled service workers, notably professionals and managers, and a large number of low-skill service workers. There are also many people who had entered the labour market under the old (industrial) regime but are now unable to obtain well-paid secure employment under the new economic age. Where professionals and managers have effected new affluent communities and localities, the difficulties experienced by the later have brought disadvantaged communities and localities.

In conclusion, the analysis presented in this paper provides a description of the socio-spatial structure of Australian metropolitan regions. The typology developed provides a necessary basis for any detailed study of a particular locality or group of localities because it provides the context within which more in-depth study can be comprehended. A clear pattern of advantaged localities and disadvantaged localities was observed, with a cluster of 'average' localities sitting between the various degrees of advantage and disadvantage. It is important, nevertheless, to be cautious about the way these findings are used. The analysis has by necessity been broadly focused, identifying the main types of localities that are thought to exist in extended metropolitan regions. Clearly, there will be sub-groups within these broad classifications. For example, the advantaged new economy cluster is likely to contain communities of the global elite, but also contain some sub-communities of disadvantage. A finer empirical analysis of each cluster type would therefore pinpoint the presence of these sub-communities, and this could be done using census data at the collector's district level or by utilising other aggregate data sources or possibly ethnographic research.

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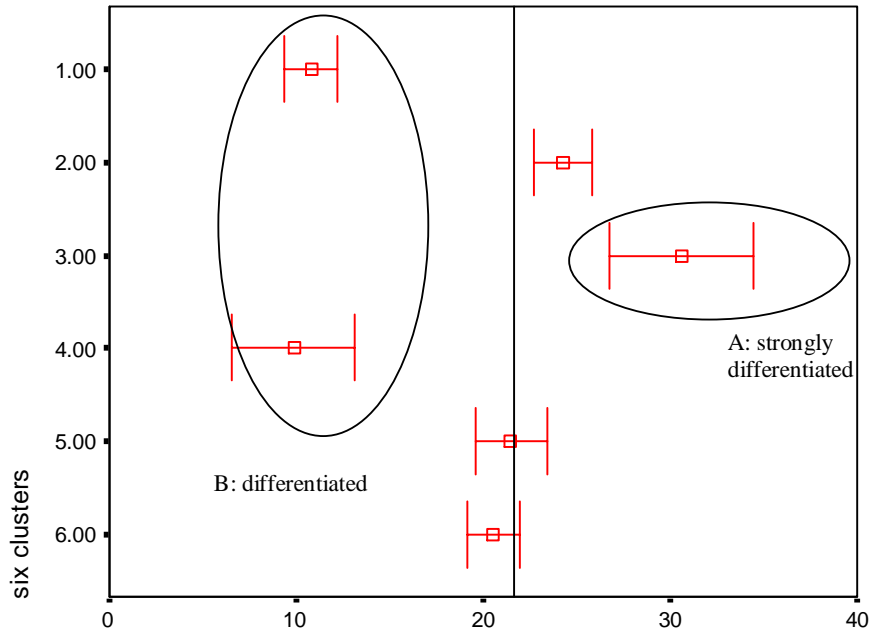
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**Table 1: variables used in the analysis**

Occupational characteristics	Educated professionals (1) Vulnerable occupations (2)	1: % of people with degree qualifications or above classified as managers, professionals or para-professionals  2: % of people classified as labourers, tradespeople and basic clerical with out post school qualifications
Industry characteristics	New economy (1) Old economy (1) Mass goods and services (1) Mass recreation (1) Construction Agriculture (1)	1: % of people employed in a given industry sector. Characterisation following O'Conner and Healy (2001)
Human capital	Low formal human capital	% of people who left school at year 10 (generally a minimum level of education)
Unemployment and labour force participation	Labour force participation (1) Total Unemployment rate (2) Youth unemployment rate (3) Part-time workers (4)	1: % of people in the labour force 2: % of people aged 25 to 64 unemployed in the labour force 3: % of people aged 15 to 24 unemployed in the labour force 4: % of part-time employees
Income /wealth	Wage and/or salary (1) Ratio of high income to low income (2) Tax imputation (3) Interest earned(3) Rental assistance (4) Pension receipts (5)	1: Average wage and salary earned (Australian Tax Office) 2: ratio of % high individual income to % low individual income 3: imputation credits and interest earned. (Australian Tax Office) 4. percentage of people receiving rental assistance from government 5. percentage of people receiving aged pensions
Household demographic measures	Non-earner families (1) Single parent families (2) Age dependency (3) Recent arrivals (4) Poor English skills (5)	1. % of families with children (couples and single parents) where no parent is employed 2. % of all families 3. people aged over 64 years as a % of working age population 4. % of people arriving in Australia between 1996 and 2001 5. % of people self reporting poor English skills
Housing	owner occupiers (1) public housing tenants (2) rental financial stress (3) mortgage financial stress (4)	1: % of households who are owner occupiers 2. % of public housing tenants 3: % of low income renters paying more than 30% of income on rent 4: % of low income home purchasers paying more than 30% on mortgage repayments
Socio-economic change	Residential in-movement (1) Point change in labour force participation rate (2)	1. percentage of people moving into SLA since 1996 2. change between 1996 and 2001

**Figure 1: Confidence intervals on means of clusters**



**Table 2: Matrix of outcomes, 7 clusters**

	<b>Differentiating variables</b>	<b>Important variables</b>
<b>Advantaged clusters</b>		
<i>Extremely advantaged new economy localities</i>	Average wage and salary (+) Income ratio (+) Imputation credit (+) Interest received (+) Educated professionals (+) Vulnerable occupations (-) New economy (+) Low human capital(-) Mortgage financial stress (-)	Pension recipients (-) Construction workers (-) Old economy workers (-) Youth unemployment (-) Total unemployment (-) Non earner families (-) Single parent families (-) Age dependency (+) Public housing tenants (-)
<i>Middle class advantaged localities</i>	Income ratio (+) Vulnerable occupations (-) Old economy (-)	Average wage and salary (+) Educated professionals (+) New Economy workers (+) Youth Unemployment rate (-) Total unemployment rate (-) Non earner families (-) Single parent families (-) Mortgage financial stress (-) Public housing tenants (-)
<i>Population change advantaged localities</i>	Population in-movement (+) Income ratio (+) Vulnerable occupations (-) Mass recreation (+) Low human capital (-) Home owners (-)	Average wage and salary (+) Pension recipients (-) Educated professionals (+) New economy workers (+) Construction workers (-) Old economy (-) Age dependency (-) Mortgage financial stress (-) Public housing tenants (+)
<b>Disadvantaged clusters</b>		
<i>Battling family-mortgage belt localities</i>	Non earner families (+) Single parent families (+) Mortgage financial stress (+)	Average wage and salary (-) Income ratio (-) Educated professionals (-) Vulnerable occupations (+) New Economy workers (-) Distribution and transport workers (+) Low human capital (+) Labour force participation (-) Age Dependency (+) Public housing tenants (+)
<i>Extremely disadvantaged old economy localities</i>	Change in labour force participation (+) Income ratio (-) Imputation credit (-) Interest earned (-) Old economy workers (+) Youth unemployment rate (+) Total unemployment rate (+) Non earner families (+) Single parent families (+)	Average wage and salary (-) New economy workers (-) Mass recreation (-) Distribution and transport workers (+) Low human capital (+) Labour force participation (-) Age dependency (-) Mortgage financial stress (+) Public housing tenants (+)
<i>Peri-urban agriculture based</i>	Vulnerable occupations (+)	Average wage and salary (-)



<i>disadvantaged localities</i>	Agricultural workers (+) Recent arrivals (-) Poor English skills (-)	Income ratio (-) Educated professionals (-) New economy workers (-) Construction workers (-) Low human capital (+) Labour force participation (-) Non earner families (-) Single parent families (-) Age dependency (+) Mortgage financial stress (+) Public housing tenants (-)
<b>Marginal cluster</b>		
<i>Working class battler localities</i>		Average wage and salary (-) Income ratio (-) Pension recipients (-) Vulnerable occupations (+) New economy workers (-) Low human capital (+) Youth unemployment rate (-) Total unemployment rate (-) Labour force participation (+) Non-earner families (-) Single parent families (-) Poor English skills (-) Age dependency (-) Public housing tenants (-)

Note: the columns presented in this table reflect the outcomes presented in table three where variables that differentiate one cluster from others are presented, as well as variables that while not strongly differentiating a particular cluster are important in understanding the overall differences.

**Table 3: Cluster means and confidence intervals, individual variables, 7 clusters**

	Advantaged clusters			Disadvantaged clusters			Average cluster	total
	<i>Extremely advantaged new economy localities</i>	<i>Middle class advantaged localities</i>	<i>Population change advantaged localities</i>	<i>Battling family-mortgage belt localities</i>	<i>Extremely disadvantaged old economy localities</i>	<i>Peri-urban agriculture based disadvantaged localities</i>	<i>Working class battler localities</i>	
Educated professionals	<b>48.2</b>	<b>34.9</b>	<b>39.6</b>	<b>22.0</b>	<b>13.2</b>	<b>20.0</b>	<b>21.6</b>	27.6
Vulnerable occupations	<b>8.3</b>	<b>13.0</b>	<b>11.4</b>	<b>18.8</b>	<b>25.1</b>	<b>20.5</b>	<b>17.9</b>	16.7
New economy	<b>31.6</b>	<b>22.5</b>	<b>24.2</b>	<b>17.8</b>	<b>13.6</b>	<b>10.1</b>	<b>16.1</b>	19.1
Mass goods and services	35.7	38.6	40.8	36.5	33.7	33.7	35.4	36.4
Construction	<b>3.7</b>	6.0	<b>3.9</b>	6.8	6.6	<b>7.8</b>	<b>8.5</b>	6.4
Mass recreation	8.8	7.3	<b>10.5</b>	6.8	<b>5.3</b>	7.7	<b>5.5</b>	7.3
Distribution and transportation	7.1	8.3	7.1	<b>9.6</b>	<b>10.1</b>	7.6	<b>9.8</b>	8.7
Old economy	<b>4.7</b>	<b>7.7</b>	<b>4.3</b>	10.9	<b>17.1</b>	10.4	11.6	9.7
Agriculture	0.6	0.6	0.7	0.9	2.1	<b>12.3</b>	2.8	2.6
Low human capital	<b>19.8</b>	<b>30.5</b>	<b>23.9</b>	<b>40.7</b>	<b>44.6</b>	<b>45.6</b>	<b>37.9</b>	35.4
Youth unemployment rate	<b>9.6</b>	<b>10.8</b>	12.9	14.7	<b>19.5</b>	13.7	<b>10.74</b>	13.2
Total unemployment rate	<b>4.4</b>	<b>5.3</b>	6.8	8.2	<b>11.4</b>	7.1	<b>2.3</b>	6.9
Labour force participation	62.7	62.7	64.1	<b>57.9</b>	<b>57.0</b>	<b>56.9</b>	<b>67.9</b>	61.3
Part time work	30.8	30.9	29.4	29.8	30.3	32.4	30.2	30.4
Average wage and salary	<b>47207.49</b>	<b>36124.31</b>	<b>37394.26</b>	<b>31507.98</b>	<b>28870.37</b>	<b>28784.46</b>	<b>32173.83</b>	34060.78
Income ratio	<b>2.05</b>	<b>1.1</b>	<b>1.6</b>	<b>0.6</b>	<b>0.3</b>	<b>0.5</b>	<b>0.7</b>	0.9
Imputation credit	<b>2255.83</b>	658.03	887.46	294.18	<b>133.04</b>	452.51	314.08	630.01
Interest received	<b>1897.69</b>	941.33	846.37	583.25	<b>302.61</b>	752.43	422.62	769.89
Pension receipt	<b>7.2</b>	9.9	<b>6.7</b>	11.3	9.0	11.7	<b>6.4</b>	9.1
Rental assistance	3.3	4.0	5.9	5.8	5.8	5.0	3.57	4.9

Non-earner families	<b>9.5</b>	<b>10.2</b>	11.9	<b>13.4</b>	<b>15.9</b>	<b>9.4</b>	<b>9.5</b>	11.5
Single parent families	<b>12.5</b>	<b>13.6</b>	15.8	<b>17.4</b>	<b>19.6</b>	<b>13.0</b>	<b>13.1</b>	15.2
Recent arrivals	5.6	3.9	5.8	3.9	2.9	<b>0.7</b>	1.9	3.5
Poor English skills	6.1	9.1	9.9	10.8	10.8	<b>2.0</b>	<b>3.8</b>	7.8
Age dependency	<b>21.9</b>	<b>21.3</b>	<b>14.1</b>	<b>21.4</b>	<b>15.3</b>	<b>24.4</b>	<b>11.3</b>	18.5
Rental financial stress	17.3	19.9	19.5	21.5	22.5	24.5	19.7	20.8
Mortgage financial stress	<b>5.6</b>	<b>7.5</b>	<b>7.6</b>	<b>10.6</b>	<b>12.5</b>	<b>13.0</b>	9.2	9.5
Public housing tenants	<b>2.4</b>	<b>2.5</b>	<b>6.2</b>	<b>6.1</b>	<b>9.6</b>	<b>2.0</b>	<b>1.7</b>	4.4
Home owners	44.2	45.2	<b>27.8</b>	39.8	33.4	44.8	37.1	39.0
Population in-movement	48.3	41.6	<b>55.4</b>	43.4	40.7	43.9	43.1	44.7
Point change in labour force participation	1.8	0.0	0.7	-1.3	<b>-5.4</b>	-2.6	-1.3	-1.2

Note: shaded cells with bold figure indicate variables which strongly differentiate one cluster from others; cells with bold figure only indicates variables that while important, do not strongly differentiate one cluster from others. In this case several clusters may be grouped together.

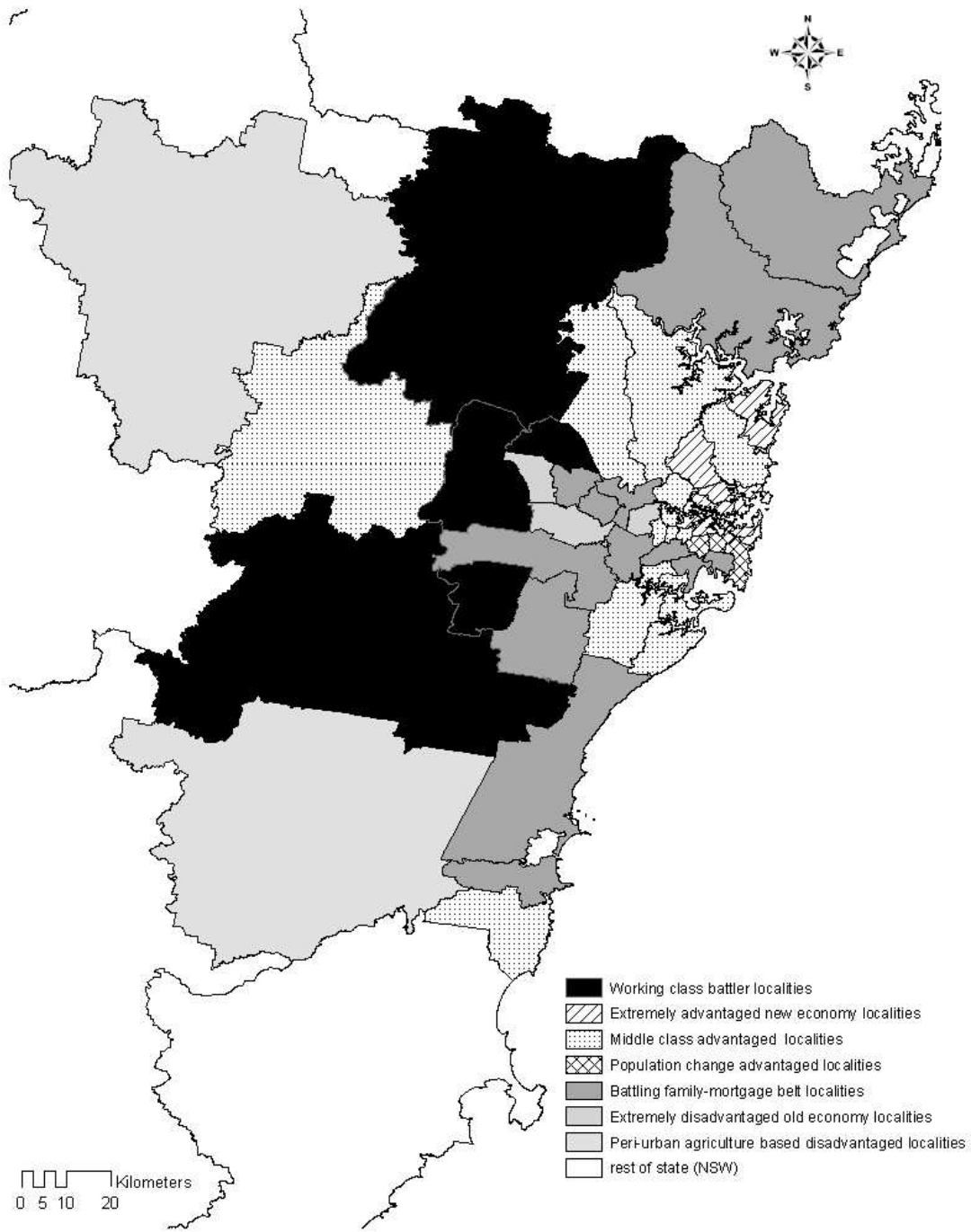


Figure two: Clusters of advantage and disadvantage, Sydney

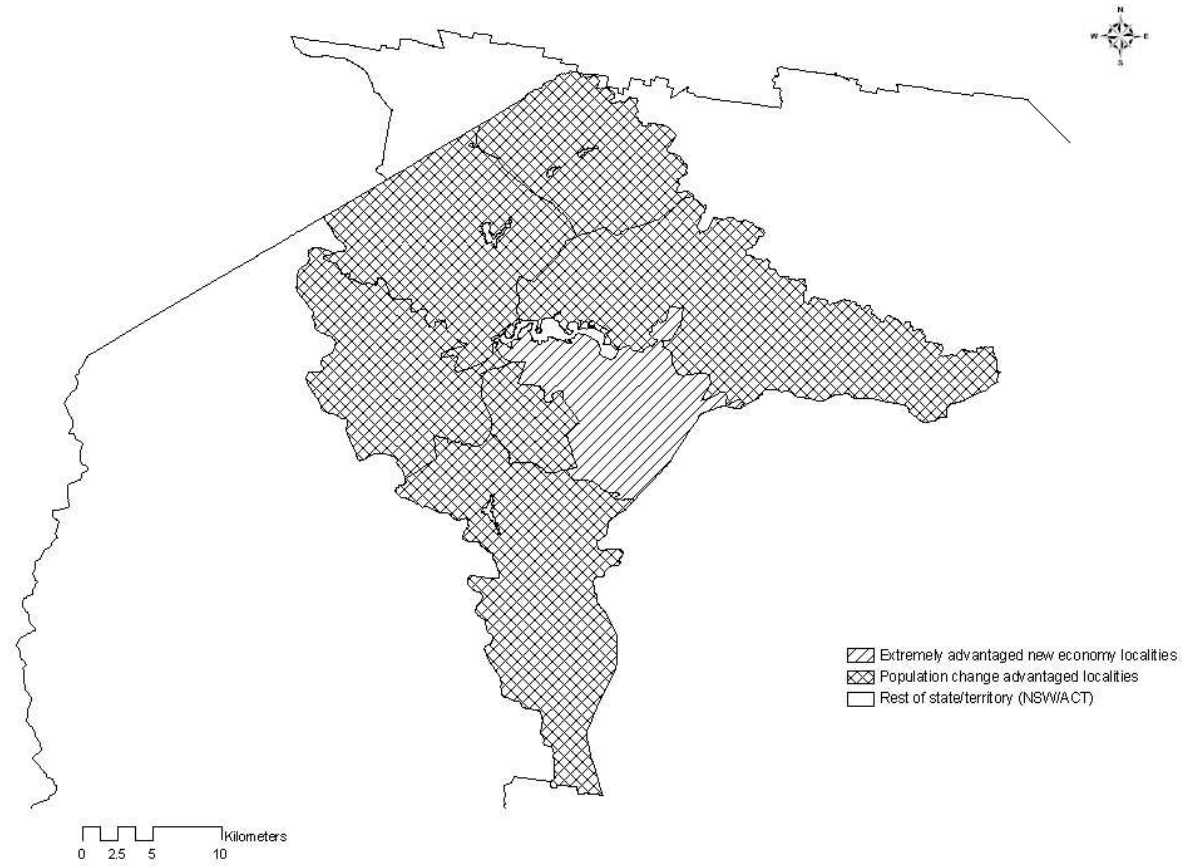


Figure three: Clusters of advantage and disadvantage, Canberra

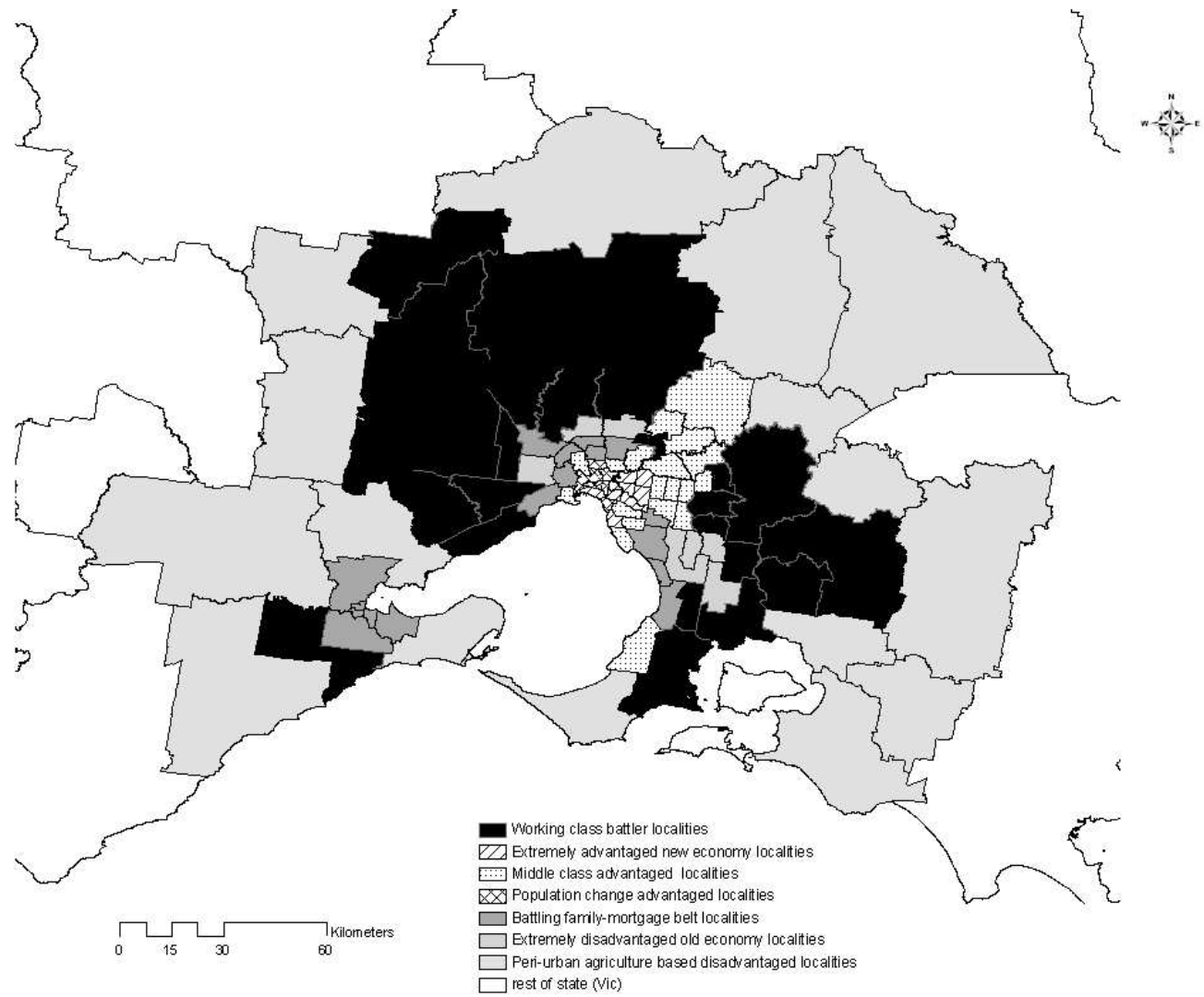


Figure four: Clusters of advantage and disadvantage, Melbourne

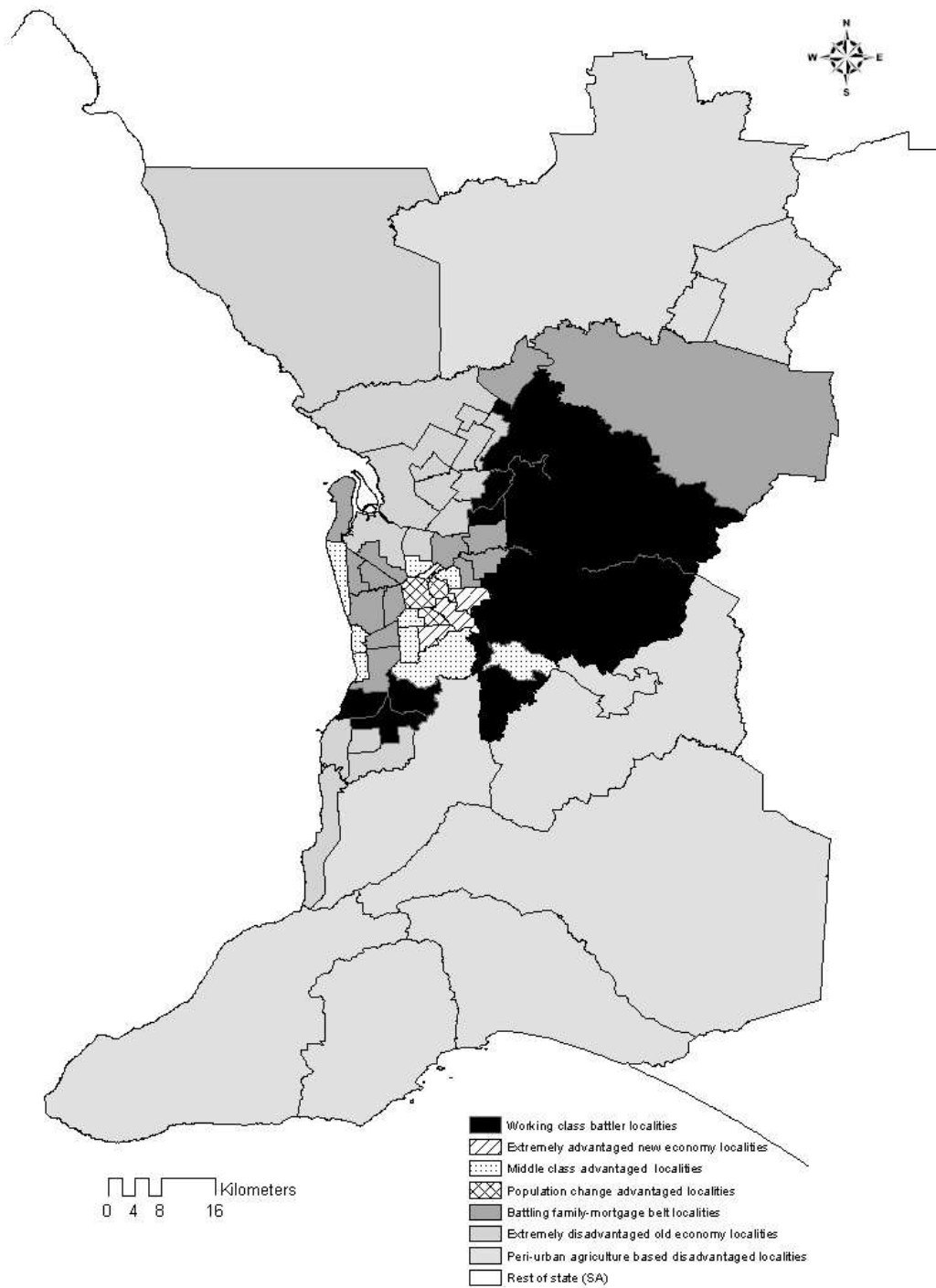


Figure five: Clusters of advantage and disadvantage, Adelaide

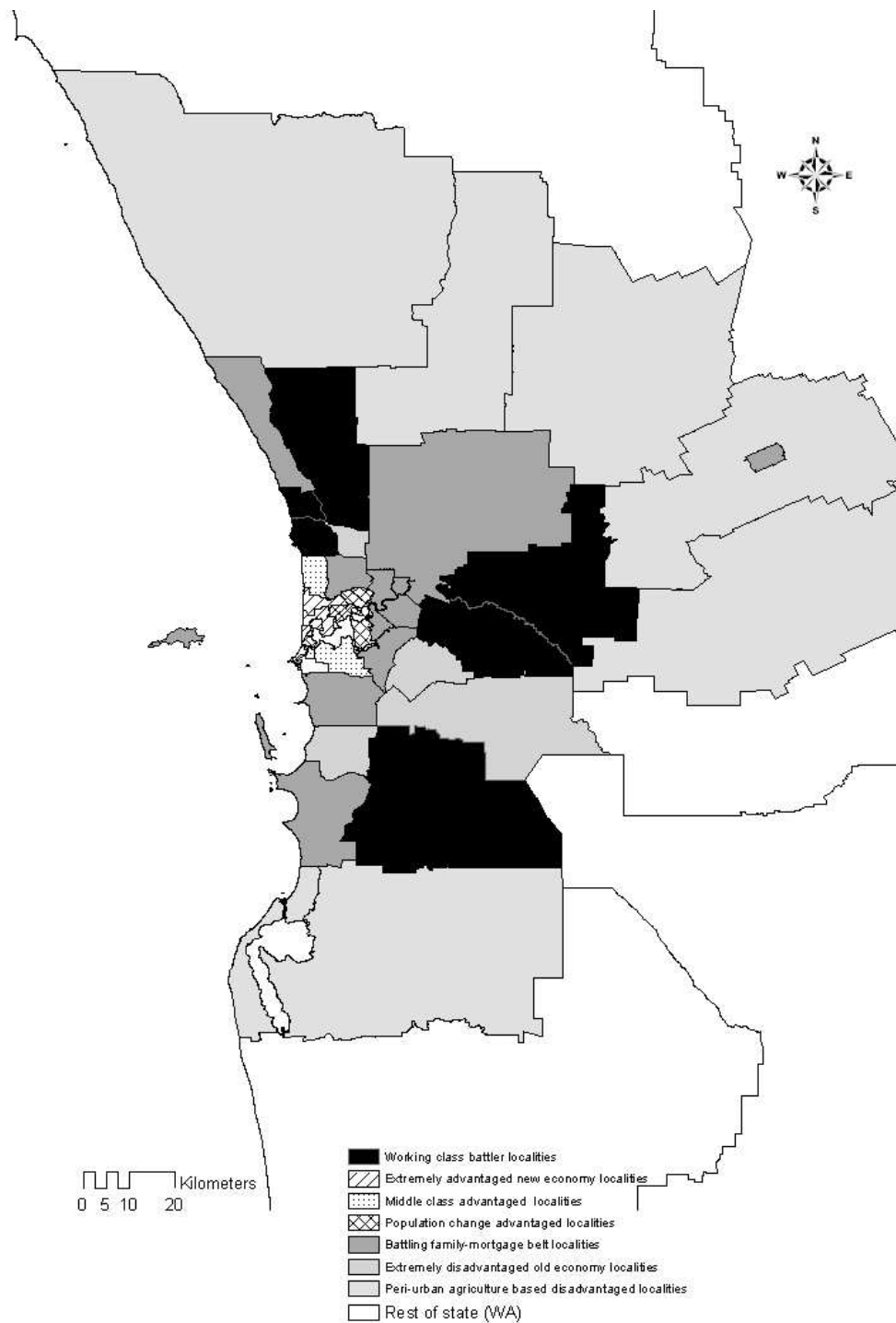


Figure six: Clusters of advantage and disadvantage, Perth



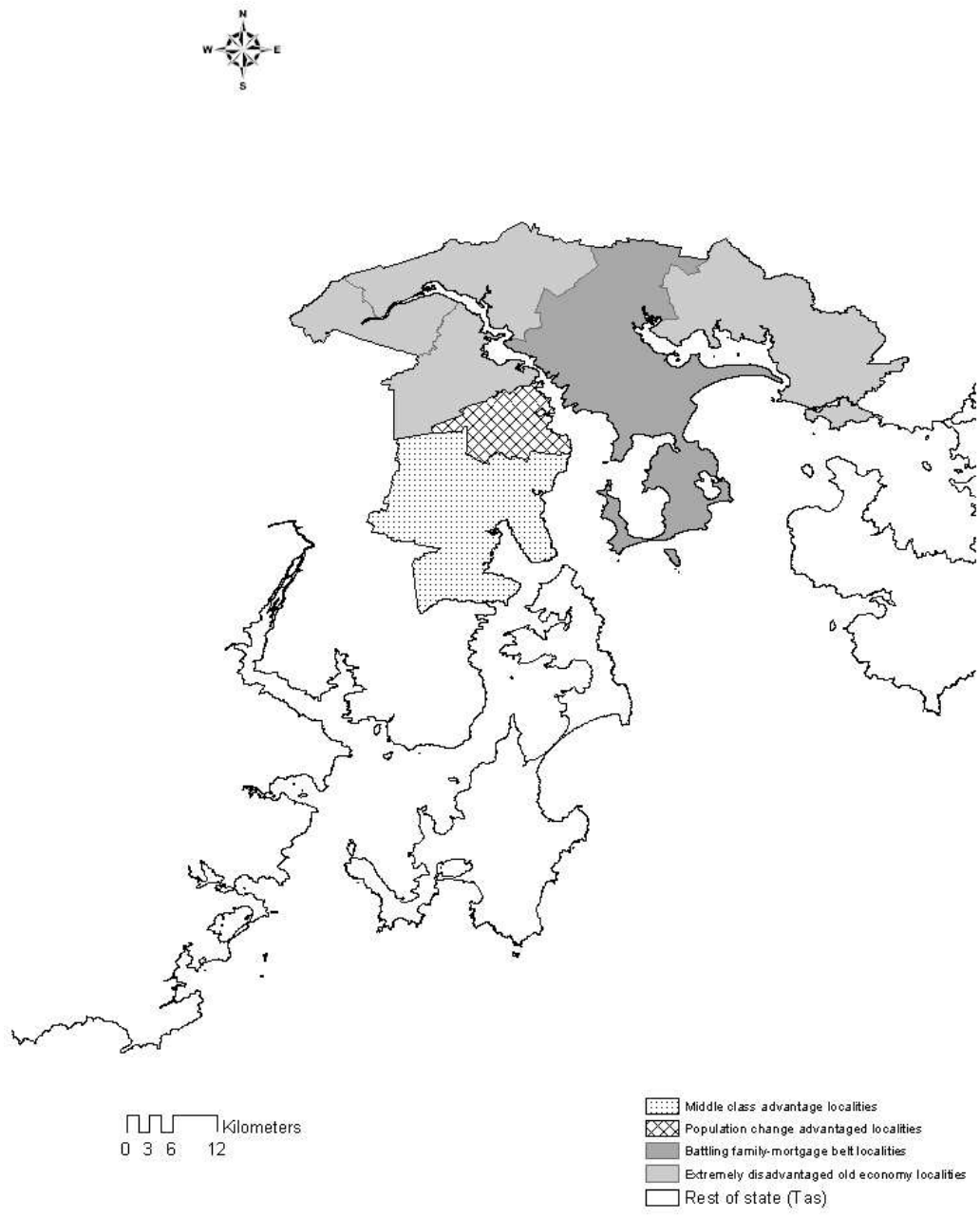


Figure seven: Clusters of advantage and disadvantage, Hobart

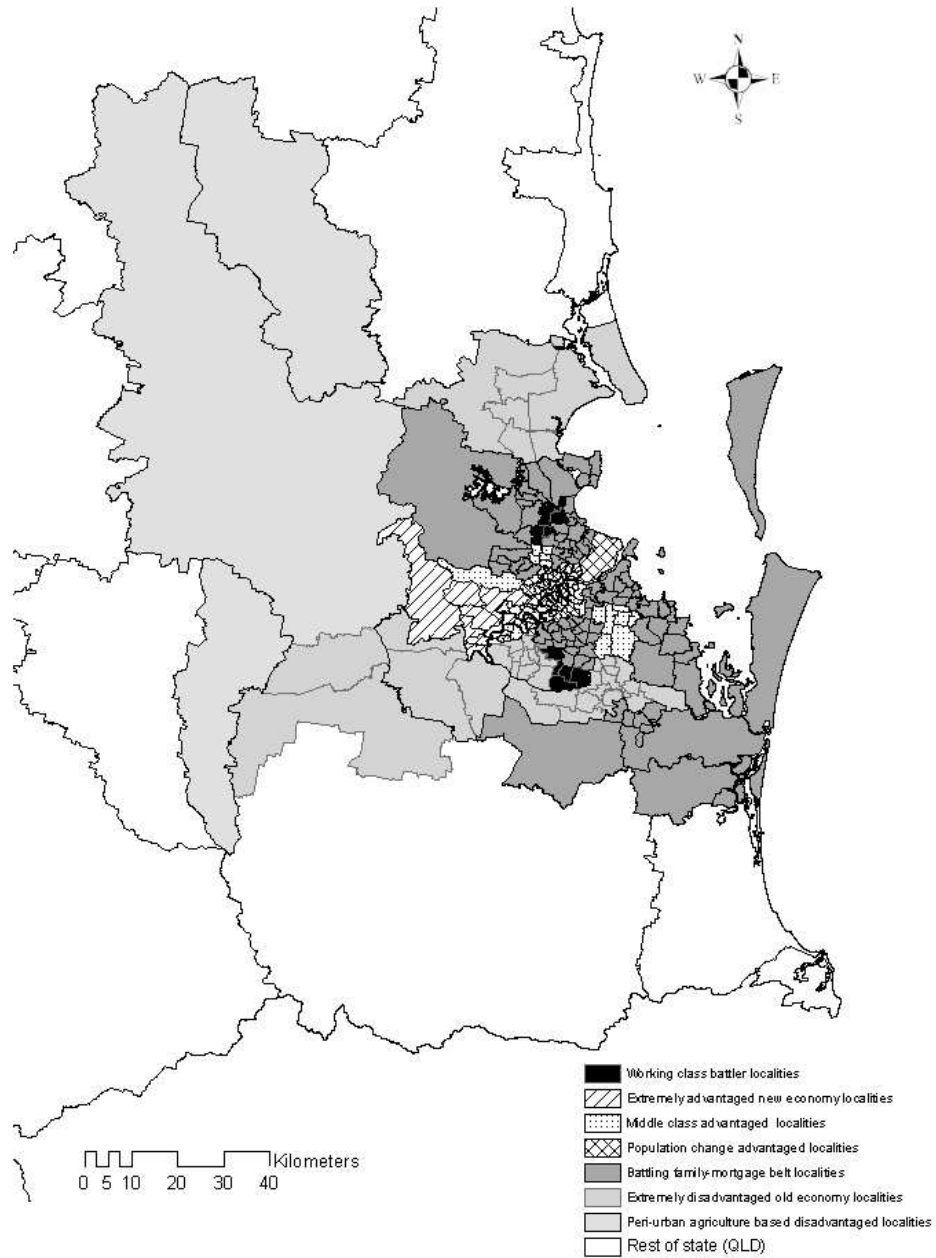


Figure eight: Clusters of advantage and disadvantage, Brisbane

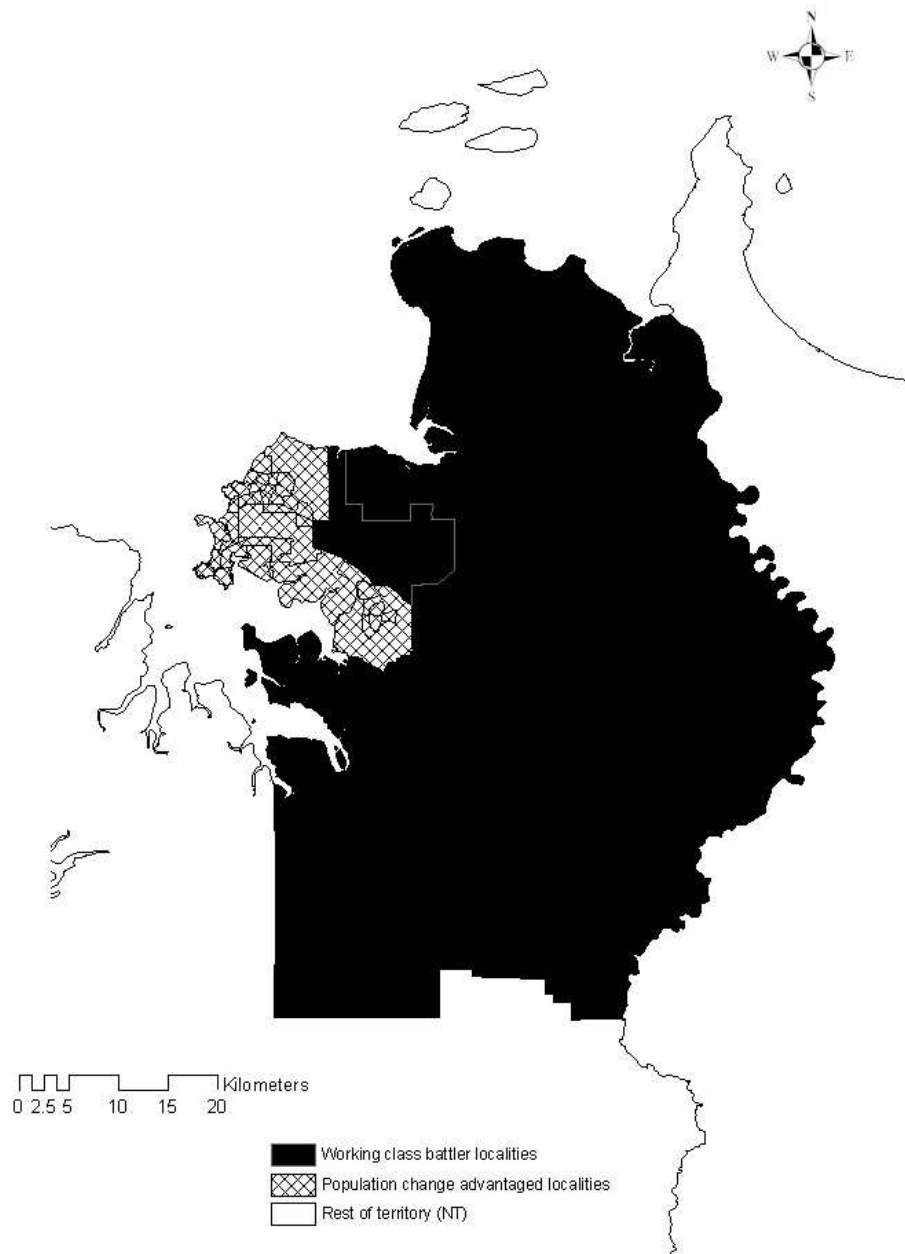


Figure nine: Clusters of advantage and disadvantage, Darwin

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<sup>i</sup> This research was funded by an Australian Research Council Discovery Project 'Spatially Integrated Socio-Economic Analysis: Australia at the New Millennium' DP0208102

<sup>ii</sup> The appeal of this methodology is that it allows the researcher to easily identify the differences between the clusters and hence aid in the development of the typology. A downfall of such an approach is that it does not allow the researcher to identify the most important indicators or variables. One option that has been used elsewhere (Hill et al. 1998; Baum et al. 1999; 2002) is discriminant analysis which allows the researcher to discriminate or differentiate between a range of variables and identify, through several linear combinations, those variables that have the most weight in explaining the differences between clusters. However, the combination of cluster analysis and discriminant analysis is not considered statistically sound. Discriminant analysis is useful for identifying the linear combination of a set of variables that maximizes the separation between known groupings of observations. It is assumed that the group to which each observation belongs is known a priori, before the analysis to identify important separation variables is commenced. If the number and characteristics of the groups is unknown, cluster analysis is often used to classify observations into clusters or groups that are associated with similar measurement outcomes on the variables of interest. In this case there is some error associated with identification of the true groups. The final groupings will depend on a number of issues including the distance measure used in the clustering procedure and the set of variables used to generate the clusters. Consequently, errors may be introduced by undertaking discriminant analysis using the same variables that are used to derive the clusters.

<sup>iii</sup> There was a concern that the measure of low formal education and the measure of vulnerable occupations may have been highly correlated. However, they account for two different populations. The former accounts for all people over the age of 15 years, while the later only includes people who are in employed education. It was therefore decided to keep both indicators in the analysis.

<sup>iv</sup> Imputation credits (or tax credits) are essentially a credit back on tax. Taxpayers are required to pay tax on the dividend income received through owning shares. But, if an Australian company has already paid tax on its income, and then distributed the dividends, making the taxpayer pay tax on these dividends would be taxing the same profits a second time.