ANALYSIS OF SOCIO-ECONOMIC ADVANTAGE AND DISADVANTAGE IN AUSTRALIA'S LARGE NON-METROPOLITAN REGIONS

Scott Baum
Urban Research Program, Griffith University, Nathan QLD 4111

Robert Stimson
Centre for Sustainable Urban and Regional Futures, University of Queensland, St Lucia QLD 4072

ABSTRACT: Australia's large regional cities and towns display wide variation in how they are adjusting to the socio-economic transitions that have occurred over the past decade. In terms of socio-economic advantage and disadvantage these changes, which are often associated with globalization, wider economic and technological restructuring, changing demographics of the population and shifts in public policy are not evenly dispersed across non-metropolitan regions, result in a range of often contrasting outcomes. Such outcomes have been discussed across a variety of academic disciplines using a variety of data and methods, and the research undertaken provides a useful grounding for contemporary studies both theoretically and methodologically. Interest in such studies has also been high among policy makers and the general public and ongoing analysis of new data provides an opportunity to further extend and update our understanding. The current paper represents an analysis of Australian Bureau of Statistics 2001 Census data aimed at analysing non-metropolitan regions based on their performance across a range of selected socio-economic variables. Using model based clustering methods this paper places non-metropolitan regions into clusters depending on the degree to which they share similar socio-economic and demographic outcomes. These clusters form the basis of a typology representing the range of socio-economic and demographic outcomes at the regional level. This typology offers a useful framework with which to consider the performance of regions along a range of ideal types.

1. INTRODUCTION

The economic and social performance of rural and regional Australia has received increased attention in recent years. Like large metropolitan cities, non-metropolitan localities have faced transitions and change associated with wider national and international economic restructuring, demographic shifts and realignment of public policy at various levels. As the role of regions in national economies has changed, there have been commensurate shifts in the socio-economic characteristics of individual localities, together with shifts in understanding these outcomes. One theme explored within the Australian context relates to the crisis in rural and regional Australia as forces including falling commodity prices, metropolitan centred social and economic policies and population migration have combined to increase non-metropolitan disadvantage and social malaise (Banks 2000). Debate on these outcomes have centred on

accounts dealing with non-metropolitan changes with particular attention focusing on the loss of services and infrastructure in non-metropolitan regions as population loss and reduced cash flow all combine to accentuate a cycle of decline (Lawrence et al. 1996, 1999; Scott et al. 2001). However, while some see these outcomes in terms of an aggregate non-metropolitan response to changing social and economic trends, and reference to a city-country dichotomy, the more likely outcome is that while some places within non-metropolitan Australia have witnessed a decline in social and economic terms, others are doing well. In short, non-metropolitan Australia is characterised by localities and regions that are socio-economic winners and localities and regions that are socio-economic losers.

This later line of thought has been the theme of recent discussions and research into the impact of change in non-metropolitan Australia. Systematic research and debate regarding such differences emerged during the 1990s, and has been highlighted in numerous publications (Beer et al. 1994; Beer and Maude 1995; Australian Productivity Commission 1998; Beer 1999; Stimson et al. 2001; Baum et al. 1999; Gray and Lawrence 2001; Beer et al. 2003 and Pritchard and McManus 2000). Discussing the outcomes of globalisation on regional Australia, Gray and Lawrence (2001: 115) argue that

> *Alongside the promise of the generation of wealth comes a certainty that deprivation and poverty will accompany it. Along with the opportunity for global marketing comes vulnerability to forces of global investment...The inevitable result is a deepening of the chasms between the people and communities which have inherent advantages and those which do not.*

The question of differential outcomes as a result of social and economic changes is also raised by Beer et al. (2003: 67-68) when they argue that

> *The structure and performance of regions across Australia cannot be explained by analysis looking solely at the State/Territory scale or by employing crude dichotomies such as rust belts or sun belts. Analysis of this issue requires an appreciation of the complex characteristics of spatial difference and performance within the nation and the multi-faceted roots that give rise to those outcomes.*

Clearly the main point is that non-metropolitan Australia is characterised by difference in terms of socio-economic outcomes, a fact that many have attempted to pick up on in empirical work. Within the empirical work one approach, which has its foundations in the early sociological research on the social ecology of cities, and more recently in understanding the structure of post-industrial cities and urban regions (Coulton et al. 1996; Massey and Eggers 1993; Berry, 1996; Baum et al. 1999; Mikelbank 2004), has been the development of typologies of non-metropolitan Australian cities and towns. Emerging from a need to understand and simplify complex processes the use of typologies quantitatively identifies similarities and differences between observations (in this case non-metropolitan regions), classifies observations according to these outcomes and provides substantive analysis and understanding of the groups. They are not meant to be explanations of processes per se, but are "an attempt to systemize classification in aid of explanation" (Marcuse 1997: 248). They provide a

"richer understanding of complex phenomena" (Mikelbank 2004: 961). It is the ability to elucidate the overall structure of localities and regions that makes these typology-building exercises useful.

In terms of non-metropolitan Australia, the early work by Beer and others (Beer 1999; Beer et al. 1994; Beer and Maude 1995) is an example of a typology building approach which takes a range of indicators and uses a suitable multivariate analytical approach to assemble ideal types or typologies of localities and regions which represent the broad nature of socio-economic patterns emerging. In the case of the research by Beer and his colleagues, the focus was on considering the functional classification of regional cities by classifying urban centres with populations greater than 10,000 into several clusters. The basis of the classification scheme was industry employment, with the outcomes illustrating that economic development was occurring over a range of regional city types resulting in a diverse group of non-metropolitan regions 'with disparate economies and social structures' (Beer et al 1994:1). A more recent example of this typology building approach was the research by Stimson (Stimson et al. 2001) and Baum (Baum et al. 1999) who considered broad indicators of socio-economic performance across all levels of the settlement system. In the research focusing on non-metropolitan Australia, the analysis of communities with populations greater than 10,000 demonstrated that a complex set of patterns of socio-economic performance was evident.

The current paper follows the work of Stimson et al. (2001) and Baum et al. (1999) and develops a typology of socio-economic performance across Australia's non-metropolitan regions and localities. Specifically, the paper focuses large non-metropolitan urban regions (population greater than 10,000 with greater than 50 percent of population characterised as urban) using a range of data available at a spatial level (Statistical Local Areas) to develop a typology of socio-economic outcomes. The paper used a model-based approach with the clustering of data represented by a parameterised Gaussian mixture model. The iterative EM (expectation-maximisation) algorithm is used to compute the maximum likelihood parameter estimates for the mixture model using hierarchical techniques. The mixture model is estimated for ten different parameterisations of the covariance matrix and the Bayesian Information Criterion (BIC) is used to determine the best model parameterisation along with the number of mixture components or clusters. Plots of confidence intervals of the mean for each variable in a cluster were produced to determine the differences between the clusters. In the sections that follow, we further expand on the methodology adopted and then describe the typology of non-metropolitan Australia that has been developed. The paper finishes with some concluding comments.

2. TYPOLOGY BUILDING USING A MODEL BASED CLUSTERING AND CONFIDENCE INTERVALS

The context for developing typologies is to cluster observations into groups sharing similar features and then to provide some understanding of the ways in which the groups differ. Several methods are available to cluster or partition

data into meaningful sub-groups. Clustering methods range from approaches that are largely heuristic to more formal modelling procedures that adopt statistical models to group data. While heuristic approaches have been widely used to cluster spatially based data (see for example Hill et al. 1998; Baum et al 1999) the current paper used a strategy for implementing cluster analysis based on Parameterized Gaussian (normal) mixture models (Fraley and Raftery 2002). These models are quite flexible in accommodating data with widely varying characteristics (for more details see http://www.stat. washington.edu /fraley /mclust/soft.shtml). This model-based method of clustering is often preferable because it allows 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, it provides a measure of uncertainty about how well each observation is classified.

The three stages in the clustering process using mixture models are:
- initialization via model-based hierarchical agglomerative clustering;
- maximum likelihood estimation of the mixture model using the EM algorithm; and
- selection of the model and the number of clusters using the Bayesian Information Criterion (BIC).

The MCLUST procedure is a software package for implementing this model-based clustering strategy through the statistical software SPLUS and R. It includes functions that combine hierarchical clustering, EM algorithm for estimation of mixture models and the BIC for model selection. It also provides visual graphics for displaying the clustering and classification results.

The procedure estimates Gaussian mixture models for a range of component sizes as well as various parameterizations of the covariance matrix for each mixture component. The parameterizations of the covariance matrix consider the volume, shape and orientation of the clusters and are denoted:
1. EII: spherical, equal volume
2. VII: spherical, unequal volume
3. EEI: diagonal, equal volume, equal shape
4. VVI: diagonal, varying volume, varying shape
5. EEE: ellipsoidal, equal volume, shape and orientation
6. VVV: ellipsoidal, varying volume, shape and orientation

Given the maximum likelihood estimates for the chosen mixture model, MCLUST produces the conditional probabilities that each observation belongs to the different groups associated with the components (clusters) of the mixture model. The final classification of an observation is made to the group which corresponds to the greatest conditional probability for that observation.

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 (Schwarz 1978) to compare outcomes. This gives a systematic means 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. Additionally, to aid in interpretation the BICs are plotted for each model, allowing the researcher to determine the optimal clusters and model parameterisation. The 'ideal' cluster is that in which the BIC is highest and shows significant gain.

Apart from clustering the SLAs that make up the group of large non-metropolitan urban regions the aim of the paper is also to consider how the clusters of localities differ from one another. Methods such as discriminant analysis have been used in the past with the means of clusters, combined with discriminant functions to consider how clusters differ (see for example Hill et al. 1998; Baum et al. 1999). An alternative method and the one chosen in this paper, is to adopt a graphically based data interpretation method using confidence intervals (Masson and Loftus 2003). Basically the method incorporates the use of confidence intervals (CI) in conjunction with graphical presentation to allow the researchers 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 (Figure 1). Firstly, clusters whereby the CI is clearly different from others without overlap, are considered to be singularly differentiated on that particular variable. Secondly, in some cases groups of clusters may have CI 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.

3. A TYPOLOGY OF SOCIO-ECONOMIC OUTCOMES ACROSS NON-METROPOLITAN AUSTRALIA

The objective of the paper is to apply the typology building process discussed above to understand the socio-economic outcomes that have emerged in non-metropolitan Australia.

In developing the typology a range of data was used. These data were associated with the region's economic performance, as they were expressed in residents' and individuals' characteristics and with socio-economic and socio-cultural characteristics of households and residents more generally. In general, these variables correspond to those found in research on the economic and social transformations of communities and localities and have been widely used elsewhere (see for example Stimson et al. 2001; Baum et al. 1999, Hill et al. 1998). The variables are set out in Table 1 and were transformed where appropriate using a log transformation to account for floor and ceiling effects imposed by using percentage data[1].

Because the data used in the analysis came from several sources it was necessary to select a level of aggregation which could be used across different data collection agencies. For this purpose Australian Bureau of Statistics Statistical Local Areas (SLAs) were used. Across the Australian settlement

[1] The transformation method used was a log transformation: $\log(p/1-p)$, where $p = P/100$.

system over 1300 SLAs are available for analysis. In this paper, SLAs were chosen that: (1) were outside the extended metropolitan regions (see Baum et al. 2005); (2) had populations greater than 10 000 persons; and (3) had an urban population, as defined by the Australian Bureau of Statistics, of over 50 percent.

In addition in some cases several smaller SLAs were combined to make more meaningful regions. This occurred in situations were larger regional centres were represented by several SLAs with the result being 18 derived regions. The decision rule resulted in 118 localities being included in the final analysis.
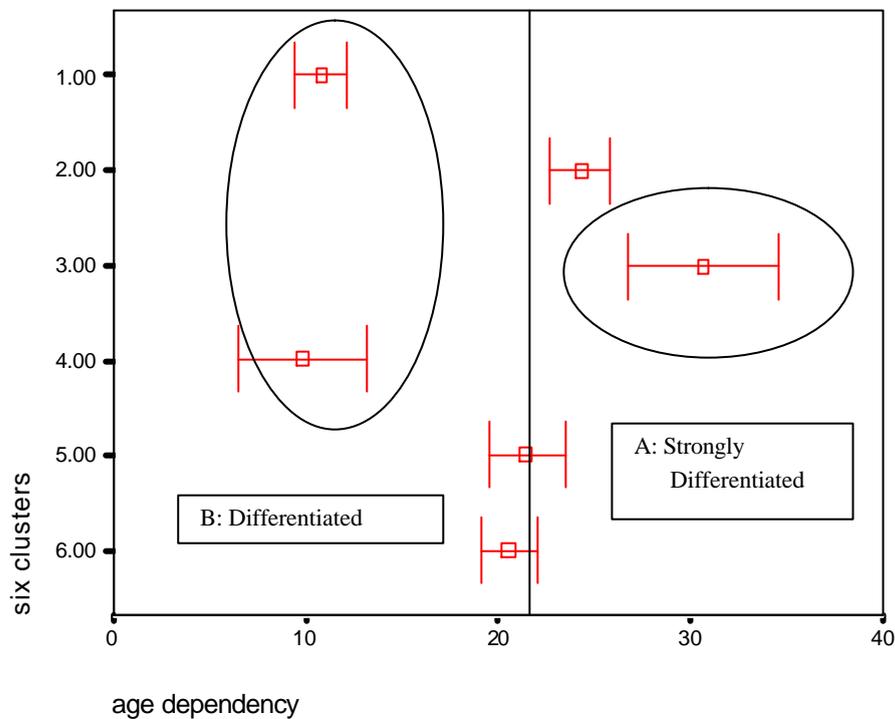
**Figure 1.** Confidence Intervals on Means of Clusters

The model-based clustering procedure and the BIC outcome and plots (Figure 2 and Table 2) lead to the selection of 6 clusters of localities (BIC=-**8565.8**) using the EEI parameterization (diagonal, equal volume, equal shape) for the component covariance matrix. Note that even though the BIC is highest for the EEE parameterization with a single component, the BIC decreases consistently does not achieve a maximum for greater numbers of components. In addition, the conditional probability for each locality's membership to a cluster are generally low, suggesting that the choice of cluster is reasonable, with only ten out of the 118 places having a probability greater than 0.05.
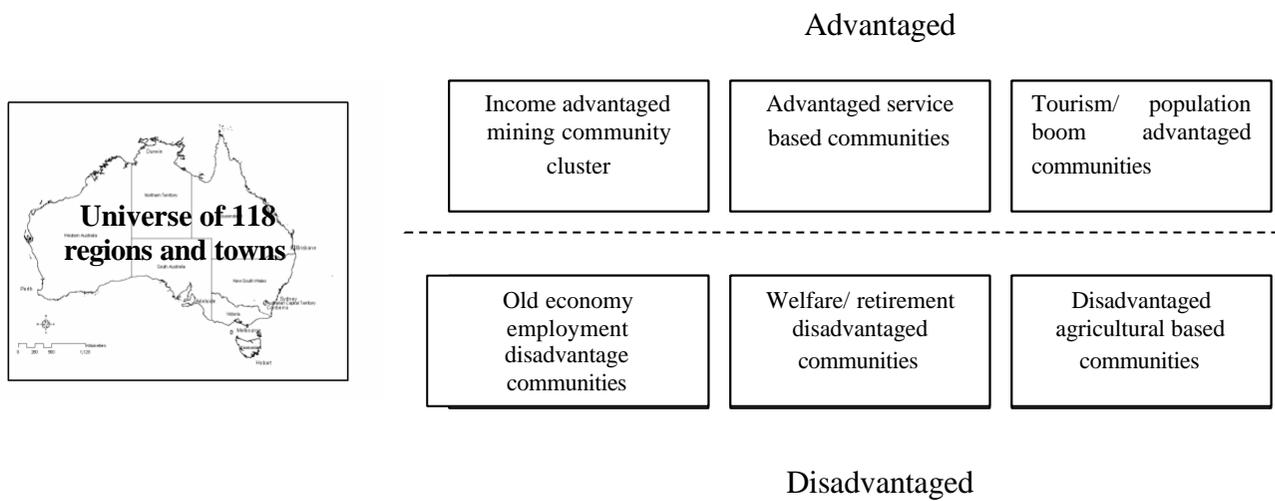
Table 1. Variables Used in the Analysis

Socio-economic change	change in population change in employment	% change between 1991 and 2001
Occupational characteristics	educated professionals (1) vulnerable occupations (2)	1: % of persons with degree qualifications or above classified as managers, professionals or para-professionals 2: % of persons classified as labourers, tradespersons and basic clerical with out post school qualifications
Industry characteristics	new economy (1) old economy (1) mass goods and services (1) mass recreation (1) agriculture (1) mining (1) s	1: % of persons employed in a given industry sector. Characterisation following O'Conner and Healy (2001)
Human capital	low formal human capital	% of persons who left school at year 10 (generally a minimum level of education)
Income /wealth	wage and/or salary (1) ratio of high income to low income (2) Tax imputation (3) Interest earned(3)	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) Note: 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.
Unemployment and labour force participation	Labour force participation (1) Adult Unemployment rate (2) youth unemployment rate (3) part time workers (4)	1: % of persons in the labour force 2: % of persons aged 25 to 64 unemployed 3: % of persons aged 15 to 24 unemployed 4: % of part time employees
Household / family measures	Non-earner families	% of families with children (couples and single parents) where no parent is employed
Housing	owner occupiers (1) rental financial stress (2) mortgage financial stress (3)	1: % of households who are owner occupiers 2: % of low income renters paying more than 30% of income on rent 3: % of low income home purchasers paying more than 30% on mortgage repayments

Table 2. Baysian Information Criterion

	EII	VII	EEI	VVI	EEE	VVV
1	-43884.88	-43884.88	-9725.443	-9725.443	-7697.805	-7697.805
2	-41369.33	-40492.83	-9266.832	-9230.143	-7723.384	-8149.765
3	-39376.25	-38399.78	-8972.525	-8851.038	-7784.452	-9031.343
4	-37994.36	-37172.31	-8824.934	-8692.287	-7844.912	NA
5	-37491.05	-36059.54	-8705.285	-8765.637	-7862.713	NA
6	-36706.62	-35386.75	**-8565.808**	-9005.365	-7909.608	NA
7	-36510.56	-34740.67	-8597.268	-9005.748	-7962.729	NA
8	-36413.15	-34292.93	-8606.874	-9097.053	-8028.119	NA
9	-36390.94	-33945.26	-8642.750	-9060.589	-8122.630	NA
10	-34526.19	-33726.47	-8646.806	-9215.656	-8219.351	NA
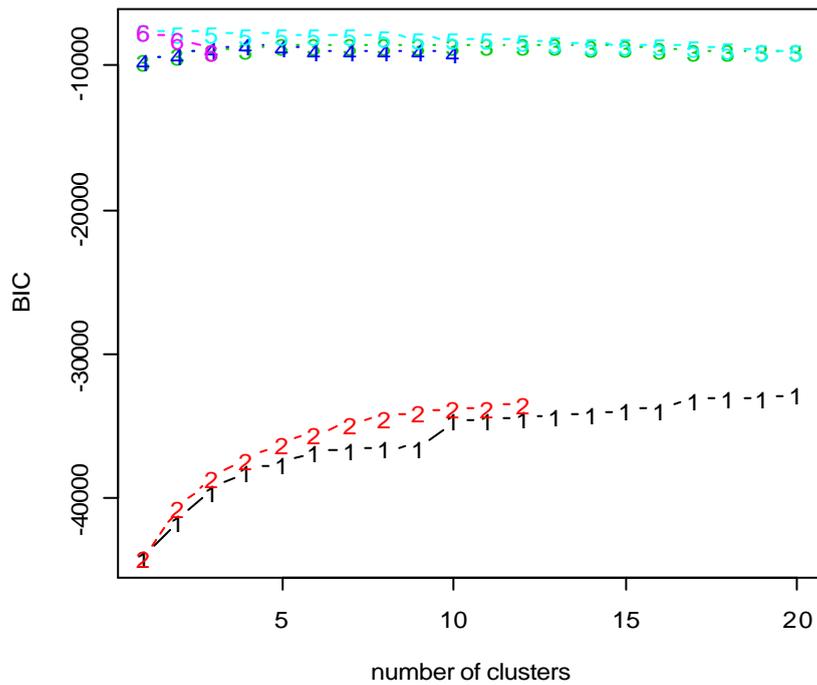
Figure 2. Bayesian Information Criterion (BIC) Plot

Advantaged

Income advantaged mining community cluster	Advantaged service based communities	Tourism/ population boom advantaged communities

Universe of 118 regions and towns

Old economy employment disadvantage communities	Welfare/ retirement disadvantaged communities	Disadvantaged agricultural based communities

Disadvantaged

Figure 3. Typology of Advantage and Disadvantage

The six clusters can be divided generally into three relatively advantaged clusters and three relatively disadvantaged clusters (figure three). Each of the clusters is examined in the following sections. Data in the Appendix table provides means to aid interpretation.

4. CLUSTERS OF SOCIO-ECONOMIC ADVANTAGE

4.1 Income Advantaged Mining Community Cluster

Advantage for some towns and regions is clearly demonstrated by high incomes. The *income advantaged mining community cluster* comprises 8 regions and towns found in New South Wales, Queensland and Western Australia (Figure 4). These places are built around mining and they are clearly advantaged. Mount Isa with its copper, lead, silver and zinc and Emerald (coal) are included in this group as is Singleton and Muswellbrook (Muswellbrook also has some pastoral industries), both of which have a mining industry based on coal. In Western Australia, Kalgoorlie/Boulder (which is also famous for its gold) and Port Hedland (which has its iron ore processing and is the gateway to the mining company towns in the Pilbara) are included.

New South Wales	*Queensland*	*Western Australia*
Singleton	Banana	Kalgoorlie/Boulder
Muswellbrook	Emerald	Port Hedland
	Mount Isa	Roebourne (Karratha, Wickham)

Figure 4. Income Advantaged Mining Based Communities

Considering those variables which strongly differentiate the cluster from others, the *income advantaged mining community cluster* records the highest average wage and salary ($338781.13) and the highest proportion of persons working in the mining sector (15.3 percent). Also reflecting the generally strong income characteristics of places within the cluster, there is a below average level of households suffering mortgage financial stress (5.4 percent). The cluster also has below average levels of persons employed part time (24.8 percent), a finding that reflects the particular labour force characteristics of the localities included in this cluster.

While these variables are the main ones differentiating this cluster from the remaining five groups, the mining based communities also have below average adult unemployment (5.9 percent) and households suffering from rental financial stress (10.4 percent) and have below average proportions of people aged 65 and older relative to people of workforce age (10.4 percent) and persons receiving aged pensions (4.2 percent).

4.2 Tourism/ Population Boom Advantaged Communities

The second advantaged cluster comprises a mixture of regions which have a strong tourism driven economy or regions which have shown high population

growth over the decade 1991 to 2001, both of which have been identified by some researchers as potential drivers of advantage in regional Australia (Beer et al. 2003; Salt 2001). The *tourism / population boom advantaged communities* comprise 13 places that make up another advantaged group of localities (Figure 5). Most of them have strong tourism bases, but others—only a small proportion— stand out because of their strong population growth. The tourism localities reflect the overwhelming growth in international and domestic tourism that has occurred over the past few couple of decades. They are advantaged because people want to go there and spend money on new consumerist activities (Mullins 1995). Population boom places are booming due to amenity, a desire for some sea change (or tree change) or due to the locality vis-à-vis major metropolitan regions. The locations in this cluster include Snowy River and Queanbeyan (New South Wales), Douglas and Whitsunday (Queensland), Alice Springs and Katherine (Northern Territory) and Broome and Wyndham-East Kimberley (Western Australia).

New South Wales	*Queensland*	*Western Australia*
Queanbeyan	Calliope	Greenough
Snowy River	Gladstone	Wyndham-East Kimberley
	Whitsunday	Broome
	Douglas	*Northern Territory*
	Thuringowa	Katherine
	Cairns	Alice Springs

Figure 5. Tourism/ Population Boom Advantaged Communities

This cluster is not strongly differentiated by any one variable (possibly reflecting the mixed nature of the cluster). It did however have above average level of population growth (27.4 percent) and was advantaged in terms of having an income ratio above 1 (indicating more high income individuals than low income ones), above average labour force participation (64.9 percent) and low adult unemployment (6.3 percent). In addition the cluster also had below average age dependency (10.8 percent) and households suffering from rental financial stress (14.2 percent).

4.3 Advantaged Service Based Communities

From the 119 regions and towns making up the universe of large non-metropolitan places, 31 were classified as forming a cluster of *advantaged service based communities* (Figure 6).

Many of these places play important support roles for both their local populations as well as populations from surrounding areas that comprise their trading hinterlands. These advantaged service towns have diverse socio-economic characteristics and are generally doing well. Some of these places have regional universities and other educational facilities. They are often the localities of decentralised government offices and some have defence bases. They are also the localities of base hospitals and other higher order health facilities. Some of

these places are likely to be "sponge cities" that draw in population from surrounding towns or regions and are able to absorb excess labour from these places. Some are also places that have been able to overcome decline as many of them have taken on higher order functions similar to metropolitan regions.

New South Wales	Victoria	Queensland
Lake Macquarie	Warrnambool	Rockhampton
Maitland	Horsham - Central	Mackay
Tamworth	Greater Shepparton	Atherton
Armidale Dumaresq - City	Campaspe - Echuca	Toowoomba
Dubbo	Wodonga	Townsville
Bathurst	Wangaratta - Central	South Australia
Orange	Wellington-Sale	Mount Gambier
Goulburn	Latrobe – Traralgon	Port Lincoln
Wagga Wagga	Baw Baw	Western Australia
Albury	Ballarat	Bunbury
Newcastle	Greater Bendigo	Tasmania
		West Tamar

Figure 6. Advantaged Service Based Communities

The regions included in this cluster are located in New South Wales (Wagga-Wagga; Dubbo), Victoria (Greater Bendigo, Ballarat), Queensland (Townsville, Toowoomba), South Australia (Port Lincoln), Tasmania (West Tamar) and Western Australia (Bunbury).

The cluster is not strongly differentiated on any one variable and in this sense might be considered to be an average -between advantaged and disadvantaged-cluster (many of the means are close to the mean for the total non-metropolitan SLAs), a finding that reflects the fact that many of the SLAs in this cluster are large in population size with broad distributions of socio-economic variables accounting for both advantage and disadvantage. It does however have a below average adult unemployment rate (8.2 pecent) and an above average labour force participation rate (59.7 percent). Although the cluster has a below average income ratio (0.5) suggesting more low income individuals than high income individuals, the figure is close to the mean.

5. CLUSTERS OF SOCIO-ECONOMIC DISADVANTAGE

5.1 Disadvantaged Agricultural Based Communities

A widely held view of regional Australia is that it is in crisis. Often this relates to the outcomes of restructuring in the agricultural sector and the impacts that this has had on regions based on farming and pastoral activities. Twenty-one regions and towns found across New South Wales, Queensland, Victoria and Western Australia are included in this cluster (Figure 7). They are the types of places that Ian Gray and Geoff Lawrence (2001) talk about when they argue that the process of change in rural Australia has forced people and their communities

'to make fundamental changes which are likely to affect them detrimentally and severely, potentially affecting their livelihoods, state of health and general quality of life' (p. 53).

New South Wales	*Victoria*	*Queensland*
Gunnedah	Ararat	Kingaroy
Moree Plains	Mildura	Bowen
Narrabri	Campaspe - Kyabram	Burdekin
Mudgee	Moira - West	Jondaryan
Cowra	Swan Hill	*Western Australia*
Parkes		Esperance
Young		
Tumut		
Griffith		
Leeton		
Inverell		

Figure 7. Disadvantaged Agricultural Based Communities

In Queensland, Bowen, with its beef cattle and Kingaroy (peanuts), are included in this cluster. So are fruit growing/processing places like Campaspe-Kyabram in Victoria and Leeton in New South Wales (Leeton also does cereal and livestock). Ararat, the pastoral based locality in Victoria, and Mudgee in New South Wales with its sheep, but also wine and agricultural produce, are in the cluster. So too is Esperance in Western Australia, known for its wheat, sheep and cattle.

Considering those variables which strongly differentiated this cluster, the *disadvantaged agricultural based communities* had above average proportion of persons employed in agriculture (20.4 percent) and above average level of interest earned ($761.84). The cluster also had above low incomes (income ratio of 0.4), but has a below average percentage of households suffering from rental financial stress (17.7 percent) and in terms of employment has a below average adult unemployment rate and an above average level of labour force participation (59.8 percent).

5.2 Old Economy Employment Disadvantage Communities

A look around the large non-metropolitan regions suggests that some places, have suffered more than others at the hands of economic restructuring and have become places of disadvantage and declining opportunity. It is these places that the shift away from protectionism and the reorganisation and decline of "old economy" manufacturing industries has hit hardest. They are sometimes places of population decline as residents leave these "population cold spots" for possibly a better economic future elsewhere.

Twenty-three regions and towns are included in this cluster of *old economy employment disadvantage communities* (Figure 8). The towns of the iron triangle in South Australia (Whyalla, Port Pirie and Port Augusta) are included

on this list. These are places that have been hit hard by the de-industrialisation process that has adversely impacted on South Australia more generally. In New South Wales the old mining towns of Cessnock and Broken Hill are included, both of which have seen better days in economic terms. Bundaberg in Queensland has not been able to shake disadvantage, and Maryborough, just near the retirement town of Hervey Bay, is also included on the list. Victoria has Portland as well as towns in the La Trobe Valley, while Western Australia is represented on the list by Geraldton. Tasmania, the other "rust-belt" state (along side South Australia) has Burnie and Devonport.

New South Wales	Queensland	Western Australia
Cessnock	Bundaberg	Geraldton
Lismore	Gympie	Glenelg – Portland
Richmond Valley – Casino	Maryborough	*Tasmania*
Grafton	Warwick – Central	Burnie
Greater Taree	*South Australia*	Central Coast
Kempsey	Murray Bridge	Devonport
Broken Hill	Whyalla	Waratah/Wynyard
Victoria	Port Pirie-city	
Latrobe – Moe	Port Augusta	
Latrobe – Morwell		

Figure 8. Old Economy Employment Disadvantage Communities

The cluster is significantly differentiated from other clusters by households suffering rental financial stress (23.5 percent) and by families with no employed parents (18.3 percent). It also has above average employment in old economy industries (9.6 percent). The cluster also has above average youth and adult unemployment rates (21.9 percent; 12.3 percent) and a below average labour force participation rate (53 percent). It has more low incomes than high incomes (a ratio of 0.4:1) and has an above average proportion of person receiving pensions (11.8 percent).

5.3 Welfare/ Retirement Migration Disadvantaged Communities

Sun-belt migration has been a phenomenon shaping the socio-economic structure of many (mostly) coastal localities over the past decade or so. It is clearly associated with populations in search of a "sea change" and with those who have been labelled as "down shifters". It has also more often than not been associated with welfare or retirement based migration patterns with many a retired couple or person on welfare benefits moving to the coast in search of life style and amenity. It is this retirement migration that has sustained and driven the population turnaround occurring in many places. It has been suggested by geographers Burnley and Murphy (2004, 35) that:

> *retirees have for decades been a driving force of population growth in population turnaround localities. In the early stages of the turnaround, many places sustained up to a third of their population growth from retirees. Such*

folk have always been driven by the benefits of trading down from high priced city houses to cheaper or higher quality housing as well as the attractions of a low key lifestyle in a high amenity environment.

So where are the people moving? Twenty-one regions and towns are in the cluster classified as *welfare/ retirement migration disadvantaged communities* (Figure 9). The coast and particularly places in northern New South Wales and Southern Queensland, are popular. There is Port Stephens and Byron Bay in New South Wales and Burnett and Hervey Bay in Queensland. But there are other places as well. East Gippsland – Bairnsdale represents Victoria while in South Australia there is the Copper Coast region, which includes places such as Kadina, Moonta and Wallaroo. Western Australia has Busselton and Albany. Interestingly, Queensland's Gold Coast and Sunshine Coast also make the list representing the pull of these high-amenity urban tourism areas to some sea-changers.

New South Wales	Victoria	South Australia
Port Stephens	East Gippsland – Bairnsdale	Copper Coast
Great Lakes	*Queensland*	*Western Australia*
Tweed	Burnett	Busselton
Ballina	Hervey Bay	Albany
Byron	Livingstone	
Maclean	Gold Coast	
Bega Valley	Maroochy	
Eurobodalla	Noosa	
Shoalhaven		
Coffs Harbour		
Hastings		

Figure 9. Welfare/ Retirement Migration Disadvantaged Communities

Considering the variables which strongly differentiate this cluster from all others, the *welfare/ retirement migration disadvantaged communities* have above average rates of part-time employment (35.7 percent), above average proportions of households suffering rent financial stress (26.7 percent) and mortgage financial stress (15.1 percent) and above average levels of interest earned per taxpayer ($935.15) and imputation credits earned ($467.27). Reflecting the retirement nature of the cluster it is also differentiated by having a high level of age dependency (30.6 percent). The cluster also has a low income ratio (0.3) illustrating the presence of more low income earners than high income earners and a below average labour force participation rate (50.6 percent). The cluster also has high unemployment, both youth unemployment (19.1 percent) and adult unemployment (10.9 percent).

6. DISCUSSION AND CONCLUSIONS

This paper has offered an analysis of Australia's large non-metropolitan urban regions by providing a typology of regions and towns using a multi-variate

clustering technique. What it illustrates is that socio-economic restructuring has resulted in mixed outcomes and differentiated impacts at the local level. Some places have indeed benefited from these changes and have been able to develop in a positive way. Others have developed negative outcomes which have included, relative to other places, low levels of labour force participation, high unemployment rates and low incomes and high levels of household socio-economic disadvantage.

But the pattern of differentiated advantage and disadvantage across space is complex as well as uneven. It is interesting to note that population growth is a characteristic of both places which are classified as advantaged and disadvantaged, so being a 'boom town' in terms of population growth is not always associated with positive outcomes. The so-called sea change localities, places such as Ballina and Hervey Bay (located in the welfare and retirement migration disadvantaged community cluster), have high rates of population growth and some jobs growth, but they display relatively poor outcomes in terms of income, and in spite of a positive position in terms of job growth they still have above average rates of unemployment. Then there are the "boom regions" such as Queanbeyan (located in the income/ labour market advantaged tourism based/ population boom regions cluster) which suggest the opposite outcomes – population and employment growth but also positive socio-economic performance. In this case a population boom might be seen in a more positive light, especially by local community leaders and politicians.

The impact of sectors such as mining and tourism and the important part that large service towns play also is reflected in advantage at different levels. The importance of tourism reflects the impact of "sunrise industries" on positive regional outcomes as discussed by authors such as Beer, Maude and Pritchard (2003) and it reflects the ability of some places to rise on the changing economic tide through the development of these industry sectors and their support economies. The other extreme of regional economic restructuring is evident in some places of disadvantage with regions based on agricultural and manufacturing industries doing less well. The impact of restructuring in the agricultural sector has been well documented by authors such as Gray and Lawrence (2001) who note how the socio-economic outcomes have been less than positive. Manufacturing based regions have also felt the negative impacts of restructuring, especially those where the economic base is built on "old economy" manufacturing sectors. Some of these places have been single industry towns or places that had once prospered under early industry protection and have not been able to respond well to the economic changes occurring.

The picture we have described in this chapter is set at an aggregate level. It would be useful in addition to consider some of the local implications of the patterns observed. For instance, are high incomes associated with mining employment necessarily felt at the local level? Put another way what are the local multiplier effects of these high incomes? If employment is based on "fly-in-fly-out" operations as in some mining towns, then the impact for the local economy may not be as great as might be implied. Likewise, although subjective measures may indicate disadvantage, local communities through strong social

capital and networks may be able to band together to turnaround disadvantage (see Cocklin and Alston 2002). Questions such as these are issues that need to be addressed if policy makers are to fully understand the ways in which advantage and disadvantage manifest at the local community level.

All of these things of course raise challenging policy questions. How do we deal with places that have such differentiated outcomes? And should we be investing in people or places? Government action can either be directed at the economic opportunity of people irrespective of where they live or be targeted at places, recognising that economic activity is anchored geographically. A focus on people recognises the impact that intervention in education, taxation and financial assistance can have on local outcomes. A strong people-based policy is premised on the belief that there is no friction in the adjustment process and that people can and will move jobs and residential locations to achieve particular objectives. By contrast place-based policy recognises the frictions in adjustment for individuals and firms. It delivers assistance to locations in the form of infrastructure, community facilities and regionally targeted financial assistance to firms. The policy challenge presented by change in rural and regional Australia is to better develop a mix of people-based and place based policies which maintains and enhances the success of regions that are booming while also accounting for the problems of disadvantaged places.

REFERENCES

Australian Productivity Commission, (1998) *Aspects of Structural Change*, Australian Government Publishing Service, Canberra.

Banks, G. (2000) *Meeting the Challenge of Change in Regional Australia*, Address to Renaissance of the Regions Symposium, Melbourne, Victoria 9th November, http://www.pc.gov.au/speechescs20001109/ cs20001109.pdf, date accessed 11th July 2005.

Baum, S., Stimson, R., O'Connor, K., Mullins, P. and Davis, R. (1999) *Community Opportunity and Vulnerability in Australia's Cities and Towns: Characteristics, Patters and Implications*, University of Queensland Press, for the Australian Housing and Urban Research Institute, Brisbane.

Baum, S. O'Connor, K. & Stimson, R. (2005) *Fault Lines Exposed: Advantage and Disadvantage across Australia's Settlement System*, Monash University e-Press, Melbourne.

Beer, A. (1999) Regional cities with Australia's evolving urban system, 1992-1996, Paper presented at the *16th Pacific Regional Science Conference*, Seoul, July.

Beer, A. Bolam, A. and Maude, A. (1994) *Beyond the Capitals: Urban Growth in Regional Australia*, Australian Government Publishing Service, Canberra.

Beer, A. and Maude, A. (1995) Regional cities in the Australian urban system, 1961 to 1991, *Urban Policy and Research*, 13, pp. 135-148.

Beer, A. Maude, A. and Pritchard, B. (2003) *Developing Australia's Regions: Theory and Practice*, University of New South Wales Press, Sydney.

Berry, B. 1996 Technology-sensitive urban typology, *Urban Geography*, 17, pp. 674-68.

Burnley, I. and Murphy, P. (2004) *Sea Change: Movement from Metropolitan to Arcadian Australia*, UNSW Press: Sydney.

Cocklin, C. and Alston, M. (eds.) (2003) *Community Sustainability in Rural Australia: A Question of Capital? Academy of the Social Sciences in Australia*, Centre for Rural Social Research, Charles Sturt University: Wagga Wagga, NSW.

Coulton, C. Chow, J. Wang, E. and Su, M (1996) Geographical concentration of affluence and poverty in 100 metropolitan areas, 1990, *Urban Affairs Review*, 32, pp. 186-216.

Fraley C. and Raftery, A. (2002) Model Based Clustering, Discriminant Analysis and Density Estimation. *Journal of the American Statistical Association*, 97(June), pp. 611-631.

Gray, I. and Lawrence, G. (2001) *A Future for Regional Australia: Escaping Global Misfortune*, Cambridge University Press: Cambridge, UK.

Hill, E. Brennan, J. and Wolman, H. (1998) What is a central city in the United States: Applying a statistical technique for developing taxonomies, *Urban Studies*, 35, pp. 1935-1969.

Lawrence, G. Lyons, K. and Momtaz, S. (eds) (1996) *Social Change in Rural Australia*, Central Queensland University, Rockhampton.

Marcuse, P. (1997) The enclave, the citadel and the ghetto: What has changed in the post-fordist U.S. city? *Urban Affairs Review*, 33, pp. 228-264.

Massey, D. and Eggers, M. (1993) The spatial concentration of affluence and poverty during the 1970s, *Urban Affairs Quarterly*, 29, pp. 299-315.

Masson, M. and Loftus, G. (2003) Using confidence intervals for graphically based data interpretation, *Canadian Journal of Experimental Psychology*, 57, pp. 203-220.

Mikelbank, B. (2004) A typology of U.S. suburban places, *Housing Policy Debate*, 15, pp. 935-964.

Mullins, P. (1995) Progress Associations and Urban Development: The Gold Coast, 1945-79. *Urban Policy and Research*, 13, pp. 6-19.

O'Connor, K. and Healy, E. (2001) *The Links between Housing Markets and Labour Markets in Melbourne.* Work in progress report prepared for the Australian Housing and Urban Research Institute, Melbourne: Australian Housing and Urban Research Institute.

Pritchard, B. and McManus, P. (eds.) (2000) *Land of Discontent: The Dynamics of Change in Rural and Regional Australia*, University of New South Wales Press: Sydney.

Salt, B. (2001) *The Big Shift: Welcome to the Third Australian Culture*. Hardie Grant Books: South Yarra, VICT.

Schwarz, G. (1978) Estimating the dimensions of a model, *The Annals of Statistics*, 6, pp. 461-464.

Scott, K. Park, J. and Cocklin, C. (2001) From sustainable rural community to social sustainability, *Journal of Rural Studies*, 16, pp. 433-446.

Stimson, R., Baum, S., Mullins, P. and O'Connor, K. (2001) Australia's Regional Cities and Towns: Modelling Community Opportunity and Vulnerability, *Australasian Journal of Regional Studies*, 7(1), pp. 23-62.

DATA APPENDIX:

CLUSTER MEANS, INDIVIDUAL VARIABLES, SIX CLUSTERS

Note: Cells that are bold and shaded indicate that this is an important differentiating variable and sets this group apart from others. Cells that are bolded only indicate that this is an important variable, but does not individually differentiate this group from others.

	Cluster 1: Tourism/ population boom communities	Cluster 2: Old economy, employment disadvantaged communities	Cluster 3: Welfare /retirement migration disadvantaged communities	Cluster 4: Income based mining based communities	Cluster 5: Agriculture based disadvantaged communities	Cluster 6: Advantaged service based communities	Total
Population change	**27.4**	-3.4	**32.0**	3.9	3.7	6.7	10.9
Employment change	34.7	-4.2	39.6	8.3	10.1	12.6	15.9
Average wage and salary	30977.83	28923.40	27123.4	**38781.13**	27753.62	30162.02	29594.00
Income ratio	**1.1**	**0.3**	**0.3**	**2.4**	**0.4**	**0.5**	0.6
Imputation credit	281.09	239.73	**467.27**	225.20	351.24	364.05	337.40
Interest received	400.24	656.76	**935.19**	382.82	**761.84**	649.10	659.99
Pension receipt	**4.2**	**11.8**	**12.8**	**4.2**	10.1	10.3	9.9
Rental assistance	4.1	6.2	**8.6**	3.1	5.4	6.0	6.0
Educated professionals/ managers	22.2	18.7	22.1	18.7	17.5	22.2	20.4
Vulnerable occupations	18.2	22.8	19.6	19.1	22.4	20.9	20.9
New economy	12.3	10.6	12.3	10.0	8.3	12.0	11.0
Mass goods and services	37.1	41.6	40.4	29.1	33.1	42.6	38.8
Construction	7.2	5.9	8.2	7.7	5.3	6.4	6.6
Mass recreation	11.9	6.6	10.7	5.9	5.2	7.1	7.7
Distribution and transportation	9.7	8.6	**7.1**	9.0	9.2	8.2	8.5
Old economy	6.7	9.6	5.2	5.9	8.7	8.7	7.8

	Cluster 1: Tourism/ population boom communities	Cluster 2: Old economy, employment disadvantaged communities	Cluster 3: Welfare /retirement migration disadvantaged communities	Cluster 4: Income based mining based communities	Cluster 5: Agriculture based disadvantaged communities	Cluster 6: Advantaged service based communities	Total
Agriculture	4.2	4.4	5.9	7.1	**20.4**	3.7	7.5
Mining	1.5	1.3	0.4	**15.3**	1.1	0.8	1.9
Low human capital	42.9	55.7	52.3	49.6	55.6	47.2	51.0
Rate of Youth unemployment	11.9	**21.9**	**19.1**	11.1	13.8	15.9	16.6
Rate of Adult unemployment	**6.3**	**12.3**	**10.9**	**5.9**	**6.9**	**8.2**	8.9
Labour force participation	**64.9**	**53.0**	**50.6**	**66.9**	**59.8**	**59.7**	57.7
Part time work	30.3	32.0	**35.7**	**24.8**	28.6	31.5	31.3
Non-earner families	10.9	**18.3**	14.4	9.6	12.9	13.9	14.1
Single parent families	15.6	19.1	15.8	13.3	14.1	17.7	16.5
Recent arrivals	1.8	0.6	1.2	1.7	1.0	1.0	1.1
Poor English skills	2.6	2.8	1.6	1.9	6.8	4.3	3.6
Indigenous population	8.7	4.5	2.2	7.2	4.5	2.9	4.3
Age dependency	**10.8**	24.3	**30.6**	**10.4**	21.8	20.6	21.6
Rental financial stress	**14.2**	**23.5**	**26.7**	**10.4**	**17.7**	20.5	20.4
Mortgage financial stress	9.5	10.4	**15.1**	**5.4**	11.0	9.0	10.6
Public housing tenants	5.4	8.1	3.0	6.8	4.3	6.3	5.6
Home owners	28.6	42.2	44.9	27.5	44.0	38.3	39.6