

POPULATION AND EMPLOYMENT CHANGE IN AUSTRALIA'S FUNCTIONAL ECONOMIC REGIONS

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ABSTRACT: This paper considers the issue of population growth and its impacts on employment change at a regional level. Specifically it addresses the question: 'What are the associations between shifts in population share and shifts in employment share across regional Australia and are we witnessing shifts in employment associated with the widely observed shifts in population to the so-called sun-belt states? It attempts to answer this question by up-dating an earlier analysis using newly formed spatial units—functional economic regions (FERS)—and recent census data. It finds that while there is some broad aggregate associations between population growth and employment growth, once a sectoral analysis is undertaken, the linear association between population and employment changes is less clear-cut.

1. INTRODUCTION

A keystone of the regional studies literature has been the analysis of the social and economic dimensions of regional performance. Ranging from simple descriptive analyses to more complex typology development and multivariate modelling, the aim of this literature has been to understand the potential drivers and dynamics behind the unequal or unbalanced aspects of regional development and to feed these understandings into policy. Within this subject area, there has been a long heritage of research on the patterns of national settlement. In a general way the discussion has used a dichotomy of regions, with a 'newer', usually sun-belt region, gaining population and economic activity through migration and local expansion and an 'older' rust-belt or snow-belt region losing jobs due to out migration and population and industry decline.

The broad sun-belt / rust-belt dichotomy has pervaded a great deal of understanding into the development of the settlement pattern in the United States and was for a long time a prominent part of research into the patterns of population change in Europe. Within the United States An et al. (2003) have shown that newer or sun-belt metropolitan regions have grown almost three times faster than older frost-belt areas, a situation which recently Storper and Manville (2006, 1248) have argued reflects the view that 'the old cold, dense city region of the Western world has become, in the eyes of observers, something like a frail and aging relative'. Importantly Storper and Manville (2006) recognise that even though there is some evidence of a turnaround and resurgence, the

United States' sunbelt regions have continued to gain at the expense of the older and colder places. In Europe, the research by scholars including Schätzl (1993), Lambooy (1994), and Erzner (1999) all pointed to the potential of a European 'sunbelt', running along the Mediterranean coast from Milan to Valencia, labelled the 'Nord du Sud', i.e. the North of the South. This arch-shaped belt with cities such as Nice, Marseille and Barcelona is said to emerge on the basis of high-tech and service activities combined with a qualified work force and a pleasant working and living climate (RECLUS 1989; Schätzl 1993).

This view that sun-belt places would lead in population and jobs growth has been a prominent theme in the Australian academic and popular literature over the past two decades including the recent period of economic prosperity. The popular view in Australia over recent years has focused on the development of the two sun-belt states and in particular the regions around the metropolitan areas of Brisbane and Perth. The growth in these regions is seen to be associated with the internal migration of population from southern states and the rise in the tourism sector and resource development within Queensland and Western Australia. Summaries of these aggregate changes suggest that the processes embedded in these trends will mean a currently third-ranked Brisbane may replace currently second-ranked Melbourne in the not-too-distant future. More generally, these trends have underpinned a prediction that a coastal (largely Sunbelt) Australia has emerged as the predominant region in population and cultural terms (Salt 2001).

The idea of sun-belt and rust-belt dichotomies, while interesting, has been widely criticized as being too simplistic, especially when high capital- and skill-intensive industries remain active in rustbelt regions, and as national supply chains are used to meet the new demands in sunbelt areas. That is, rather than witnessing a decline in employment, some so-called rust-belt regions have in fact seen stability in their employment profiles when particular industry sectors are considered (O'Connor 1995). This argument about employment stability hinges on rigidity or inertia in the established job patterns and labour market outcomes emanating from the locational decisions of firms in some economic sectors which means jobs growth and in some cases population growth may well continue all-be-it sometimes in a largely unobserved fashion.

Several arguments have been presented to help understand this inertia in the face of general decline (Storper and Manville 2006). Often the inertia or rigidities in regional employment in some sectors is associated with the continued importance attached to the roles of many of the big old centres, especially in activities such as the high wage-paying advanced services, telecommunications and research and development activity. This type of thinking can be seen in the research by Harrison (1992) and Markusen, (1996) as to what renders a location attractive or 'sticky' to particular industries and more recently in Storper and Venables (2002), who expose the continued importance of face-to-face contact in providing the "buzz" that attracts and retains activity in the established centres.

What these new perspectives suggest is that the so-called rust-belt or cold-belt cities are still prominent even though there may be a strong shift in

population and economic activity to new areas. The significance of the rust belt state of Ohio in the last two United States presidential elections provides strong evidence to support that observation. One explanation which plays a prominent part in the An, Gordon and Richardson (2002) analysis as well in that of Cheshire and Magrini (2003) is that big cities might be spreading out further and further, creating the global city regions discussed by Scott (2000) and Simons and Hack (2000). As most of their growth is occurring in middle and outer suburban regions, using older definitions of metropolitan areas might miss some of this growth. One illustration of that is the comparison of a small and large definition of the New York region in research carried out by O'Neill and Moss (1991), which found many more national and international activities in the larger region, when compared to the smaller region. The work by Hoddos (2002) on Philadelphia provides another example of that outcome. He found significant numbers of global businesses and major clusters of employees in the wider region surrounding Philadelphia, even though the city at the heart of that region was not gaining jobs or population. This outcome is consistent with Lang's (2001) observation about "edgeless cities", although the process he describes does also have expression in the newer and warmer regions. Urban research in Europe has long recognized this potential outcome, by utilizing "functional urban regions" as a spatial unit for analysis. In effect then the local outcomes of what appear to be large-scale national shifts associated with the images of sunbelt and frostbelt may be tempered not only by the inertia of significant economic activity in cold region cities, but also reinforced by expansion in jobs and population within some parts (or on the fringe of) their metropolitan areas.

In Australia, the detailed work on the shifts in the nation's economic geography by O'Connor, Stimson and Daly (2000) found that the changes in the patterns of population were not matched by shifts in the pattern of production and investment, which still favour the southern part of the nation, in particular the metropolitan areas of Sydney and Melbourne. In particular the research found the location of sophisticated advanced service or symbolic analyst jobs favoured Melbourne and Sydney. In this same vein O'Connor (2001) has shown that some leading coastal population growth locations have attracted very little investment in commercial construction, the facilities needed for production in much of the economy and are in fact areas of high unemployment and social welfare dependence (confirmed by Stimson and Taylor's (1996) analysis of welfare recipients in South east Queensland). Looking at the pattern of national population change another way, Hugo (2004) has used geographic information systems to identify a demographic centre of Australia over a 100 year period. He finds it located in central western NSW; he showed that over a one hundred year period (when the national population increased by some 14 million people) the demographic centre has shifted north by no more than 90 kilometres.

2. ANALYTICAL QUESTIONS, METHODS AND DATA

This foregoing provides the context for the current paper. The exact analytical question the paper poses is: "What are the associations between shifts in population share and shifts in employment share when measured in functional

regions? Expressed another way, what evidence is there of the sun-belt growth phenomena in terms of employment or has there been some stickiness or inertia associated with the distribution of population and employment across the Australian settlement system?

Expanding on earlier work by Baum and O'Connor (2005) the paper uses 1996 and 2006 census data to investigate population and employment shifts. Its' main contribution is to up-date this earlier work and add a new regional dimension to the analysis. To achieve the later objective we undertake the analysis in this paper by using newly developed Functional Economic Regions (FERs) rather than use Australian Bureau of Statistics Statistical Divisions as the earlier work has done. FERs for Australia were developed by Mitchell (2008) using 2006 journey to work data and considering interaction via commuting flows using the Intramax procedure. A total of 140 FERs are identified for Australia and a full list of the Regions can be obtained from http://e1.newcastle.edu.au/coffee/functional_regions/.

Using these new spatial units we analyse the shifts in population and employment across each of the 140 regions by identifying the change in shares of national population and employment. This approach provides a rich insight into regional change as it can identify a strong underlying pattern of economic and population change as some places rise above (or fall below) the national trend and so record increases (or falls) in shares of national activity. Where these changes are large there is potential to examine whether the local outcome is associated with the sunbelt-rustbelt dichotomy or reflects other forces at work.

The analysis uses the following measures:

- The proportion of the national population in each FER for 1996 and 2006 and the direction and magnitude of the change in each FER's share of national population. The top 12 FERs and the bottom 12 FERs are reported in tabular format in Table 1.
- The proportion of the national employment in each FER for 1996 and 2006 and the direction and magnitude of the change in each FER's share of national employment. The top 12 FERs and the bottom 12 FERs are reported in tabular format in Table 2.
- The direction and magnitude of change over the decade 1996 and 2006 in each FER's share of employment in selected industry sectors. This information is compared to changes in shares of population and analysed with a scatter graph. The scatter graphs are interpreted in the following way. If population change is the key influence on employment, all the data points should fall in quadrants 2 and 4 of the graphed output: any evidence of the influence of factors other than population will produce regions with outcomes shown in quadrants 1 and 3 (See Figure 1).

The data is used to assess the scale of the shifts that have been occurring in population and employment so as to expose the way inertia in some of the old and the cold regions modifies the pattern of dispersal associated with the sunbelt phenomenon.

Table 1. Top 12 and bottom 12 functional economic regions ranked by gains/losses of national population share 1996-2006

	Population 1996	National share 1996	Population 2006	National share 2006	Change in national share
Top 12 Functional Economic Regions					
Gold Coast-Tweed	397,998	2.23	533,948	2.66	0.437
Brisbane North - Caboolture	636,971	3.56	778,565	3.88	0.320
Brisbane South - Beaudesert	687,012	3.84	832,089	4.15	0.307
West Melbourne-Ballan- Macedon	758,114	4.24	909,685	4.54	0.296
Sunshine Coast	219,305	1.23	293,899	1.47	0.239
Monash-Casey-Cardinia	462,861	2.59	557,501	2.78	0.191
Inner Melbourne	200,036	1.12	261,605	1.30	0.186
Fremantle-Mandurah	301,562	1.69	369,499	1.84	0.156
North Perth-Joondalup	485,857	2.72	567,674	2.83	0.114
Ipswich and surrounds	218,568	1.22	261,585	1.30	0.082
Inner and South Sydney -Eastern Suburbs	431,597	2.41	499,913	2.49	0.079
Townsville-Thuringowa	134,740	0.75	162,101	0.81	0.055
Bottom 12 Functional Economic Regions					
Adelaide-Elizabeth- McLaren Vale	1,006,495	5.63	1,062,160	5.30	-0.333
Kew-Camberwell-Yarra Ranges	736,744	4.12	787,032	3.93	-0.196
Sydney North	792,274	4.43	850,104	4.24	-0.192
Inner West Sydney – Canterbury-Bankstown	565,679	3.16	608,461	3.03	-0.130
Caulfield - South-Eastern Suburbs	470,947	2.63	508,217	2.53	-0.100
St George-Sutherland	391,962	2.19	422,693	2.11	-0.084
Newcastle-Singleton	477,563	2.67	519,635	2.59	-0.080
Wollongong-Kiama	246,795	1.38	261,869	1.31	-0.074
Dubbo - North-Western NSW	85,103	0.48	82,041	0.41	-0.067
Albury-Wangaratta	173,449	0.97	181,498	0.91	-0.065
Latrobe Valley-South Gippsland	184,654	1.03	194,355	0.97	-0.064
Tamworth-Walgett	93,991	0.53	92,891	0.46	-0.062

Table 2. Top 12 and bottom 12 functional economic regions ranked by gains/losses of national employment share 1996-2006

	Employment 1996	National share 1996	Employment 2006	National share 2006	Change in national share
Top 12 Functional Economic Regions					
Gold Coast-Tweed	95,358	1.99	138,306	2.50	0.508
Brisbane South - Beaudesert	209,598	4.01	262,984	4.41	0.401
Brisbane North - Caboolture	195,393	3.78	245,812	4.17	0.383
West Melbourne-Ballan-Macedon	216,631	4.05	261,864	4.38	0.332
Sunshine Coast	47,105	1.03	69,336	1.34	0.310
Inner Melbourne	63,852	1.20	89,117	1.44	0.249
Fremantle-Mandurah	79,713	1.62	101,916	1.82	0.197
North Perth-Joondalup	145,180	2.91	173,736	3.05	0.139
Ipswich and surrounds	63,863	1.20	78,673	1.30	0.102
Townsville-Thuringowa	40,104	0.77	51,257	0.85	0.073
North-Eastern Perth	49,268	0.97	59,973	1.03	0.064
Monash-Casey-Cardinia	142,066	2.67	161,883	2.74	0.062
Bottom 12 Functional Economic Regions					
Sydney North	275,085	5.22	276,389	4.64	-0.579
Kew-Camberwell-Yarra Ranges	233,848	4.56	242,592	4.27	-0.296
Inner West Sydney – Canterbury-Bankstown	166,357	3.04	171,731	2.82	-0.222
St George-Sutherland	130,191	2.44	134,116	2.26	-0.184
Adelaide-Elizabeth-McLaren Vale	273,067	5.50	300,968	5.33	-0.167
Caulfield - South-Eastern Suburbs	154,018	2.92	166,244	2.79	-0.128
Inner and South Sydney- Eastern Suburbs	149,159	2.75	168,653	2.65	-0.103
Western Sydney – Blue Mountains	253,270	4.69	282,348	4.61	-0.083
Kalgoorlie-Wiluna	17,638	0.30	15,320	0.23	-0.069
Northern Darwin suburbs	17,505	0.33	16,427	0.26	-0.066
Wollongong-Kiama	64,863	1.27	66,908	1.20	-0.064
Cairns-Cook	62,865	1.21	66,916	1.15	-0.063

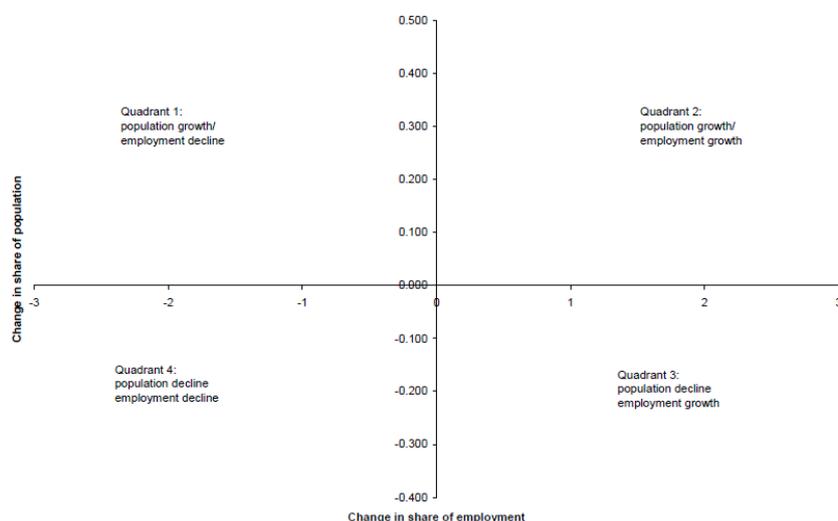


Figure 1. Scatter Graph Analysis

3. POPULATION AND EMPLOYMENT CHANGE IN AUSTRALIA'S FUNCTIONAL ECONOMIC REGIONS

To begin considering the associations between regional population growth and employment growth we first present an analysis of the top and bottom 12 Functional Economic Regions in terms of shares of national population growth (Table 1). The most apparent point to note in that regions in Australia's sun-belt states (especially the south east of Queensland, but also Western Australia) dominate the top 12 regions and are absent from the bottom 12 regions. Of the 12 regions with the largest increases in share of national population the majority are located in large metropolitan areas and 8 are located in the two sun-belt regions. Of the non sun-belt regions three are located in Victoria (West Melbourne-Ballan-Macedon, Monash-Casey-Cardinia and inner-Melbourne) and one is located in New South Wales (Inner and South Sydney-Eastern Suburbs). For the bottom 12 regions, the familiar pattern of decline associated with the southern states, (especially the Adelaide region) is apparent and importantly there is a significant share of decline outside the major metropolitan regions. Apart from the Adelaide-Elizabeth-McLaren vale region in South Australia, regions in New South Wales accounted for 7 of the bottom 12, with regions in Victoria accounting for a further 4 regions.

The parallel analysis of change in shares of national employment change among the functional economic regions (Table 2) found similar patterns, especially in terms of those FERs located in the top 12 growth regions. The list of top 12 regions is almost identical to the list of regions ranked by growth in share of national population suggesting the possibility of a strong population growth-employment growth pattern nationally. Again the sun-belt states of

Queensland and Western Australia dominate (especially the large urban regions in the south of each state) with the Brisbane, Gold Coast, and Sunshine Coast accounting for a large increased share in national employment. The only difference, apart from the order of the regions in the ranking, is the removal from the top 12 of the Sydney region of Inner and South Sydney-Eastern Suburbs and its replacement with the sun-belt region of North-Eastern Perth.

Considering the bottom 12 ranked regions, several were also included in the bottom ranked regions by population share including Sydney North, Kew-Camberwell-Yarra Ranges and Adelaide-Elizabeth-McLaren Vale. However several others including Inner and south Sydney Eastern suburbs (a population growth hot spot-table 1) were also in the bottom 12 employment growth regions.

The link between population growth regions and employment growth regions is further illustrated by the scatter-plot in Figure 2. Here we can clearly see a strong positive association between regions with high increases in population share (y-axis) and regions with large increases in aggregate employment share (x-axis) and finding further reinforced by the correlation coefficient of 0.89.

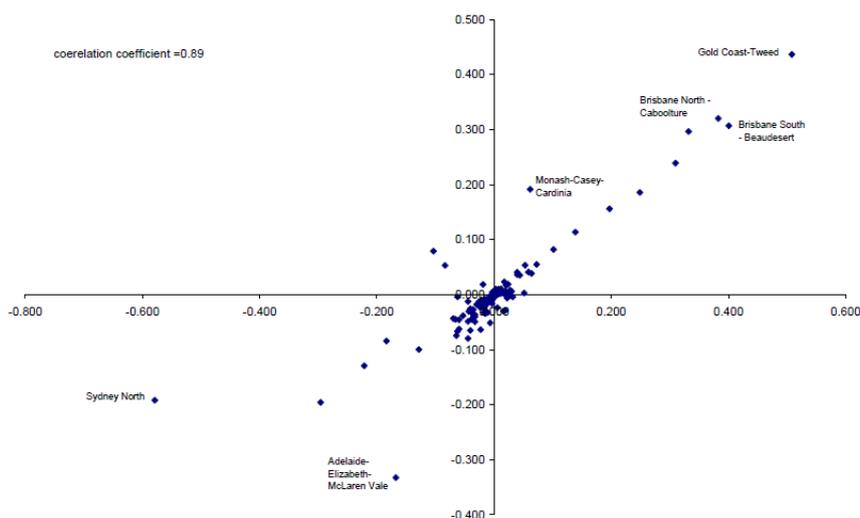


Figure 2. Change in National Share of Population and Employment, 1996-2006

One additional dimension that the use of functional regions exposes is the role of the middle and outer suburbs as location of jobs over the period under study here. As can be seen in the top 12 list, outer Brisbane, Melbourne and Perth locations figure prominently. In contrast some inner locations are actually found among the bottom 12. Although this data does not show the location of employment (the data relates to the residential location of employed persons), given what is known about the self-containment of suburban labour markets and given the way the FERS are constructed, these data infer that the locus of employment change has begun to shift in favour of these areas (O'Connor and

Healy 2004). Hence not only is there a national scale shift in employment taking place, but it is one that maybe focussed especially on the middle and outer suburbs of the growing cities.

3. A SECTORAL PERSPECTIVE ON CHANGES IN REGIONAL EMPLOYMENT

The analysis presented above suggests that at broad aggregate levels regions with increases in population share also record increases in aggregate employment share. However, a different picture emerges once we account for employment change by industry sector. The central interest here was the extent to which changes in shares of jobs in selected sectors reflected the patterns of change in shares of population highlighted above. It is possible that factors other than population change shape the location of activity in some sectors; if so regional patterns of employment change will differ from regional patterns of population change. Those differences could contribute to the inertia in the national population distribution outlined earlier.

Several different industry sectors are subject to analysis. These include sectors where change could be expected to follow population (i.e retail trade, health and construction), compared to ones where regional population change might be a less significant influence upon employment change (property and business services, manufacturing and communication).

3.1 Retail trade, health, construction and property

Within the broader development of the settlement system we would expect that industry sectors that are aligned to population size as an indicator of demand, will show a strong employment/population correlation. There is certainly some evidence that employment opportunities in the construction sector, for example, have been significant in the sun-belt states and there can be expected to be a significant link between population growth and demand for services such as retail sales and health. Nationally retail trade, health and construction showed large gains in employment between 1996 and 2006 (Table 3). For retail trade and health (Figures 3 and 4) there is an almost linear association displayed in the visual presentation and also in the correlation coefficients. In both cases a simple correlation between growth in population share and sector employment is positive and strong underscoring the fact that growth in these industries are likely to be heavily influenced by population. The positive association between population and retail trade is, as expected, very strong (a correlation coefficient of 0.74) with a number of the sun-belt regions witnessing relatively high gains in employment in this sector. A similar picture is presented in Figure 4 where relatively strong growth in the health sector is commensurate with relative gains in population (correlation coefficient of 0.77).

For the construction and property sectors (Figure 5 and 6) the patterns are less strong, although there still remains a positive correlation with population growth. For the property sector the correlation coefficient of 0.69 is reflected in the position of regions on the scatter graph (i.e. most regions in quadrant 2 and 4). For construction the correlation coefficient is smaller (0.59) reflecting the

more widespread nature of this sector.

Table 3. Employment by Industry in Australia. 1996 and 2006.

	1996		2006		Change in national share 1996 to 2006
	Total number employed	% share of national employed	Total number employed	% share of national employed	
Agriculture, forestry & fishing	324,330	4.25	280,923	3.09	-1.16
Mining	86,261	1.13	106,896	1.17	0.04
Manufacturing	922,899	12.09	952,014	10.46	-1.63
Electricity, gas, water & waste services	69,441	0.91	89,449	0.98	0.07
Construction	471,135	6.17	709,843	7.80	1.63
Wholesale trade	422,683	5.54	396,361	4.35	-1.18
Retail trade	778,005	10.19	1,033,193	11.35	1.16
Accommodation & food services	476,672	6.24	575,113	6.32	0.07
Transport, postal & warehousing	359,157	4.70	427,793	4.70	0.00
Information media & telecommunications	192,914	2.53	176,821	1.94	-0.58
Financial & insurance services	296,456	3.88	348,587	3.83	-0.05
Rental, hiring & real estate services	118,554	1.55	153,906	1.69	0.14
Professional, scientific & technical services	467,170	6.12	602,018	6.61	0.49
Administrative & support services	211,736	2.77	286,622	3.15	0.38
Public administration & safety	466,527	6.11	608,600	6.68	0.58
Education & training	559,212	7.32	697,807	7.66	0.34
Health care & social assistance	716,163	9.38	956,150	10.50	1.12
Arts & recreation services	107,691	1.41	127,394	1.40	-0.01

As with the data for employment at an aggregate level we note that the shifts in employment share recorded in the significant sub-belt regions is small, although the combined growth of two outer suburban components (Brisbane-North Caboolture, Brisbane South-Beaudesert) plus Gold Coast-Tweed, and Sunshine Coast means a larger urban region such as the Queensland SEQ region is likely to be significant.. The close association between employment opportunities in these sectors and gains in regional population shares has an added significance, as employment in these sectors has been a significant area of employment expansion in the Australian economy. Through that connection population growth regions are attracting rising shares of expanding national sectors. It is surprising then that the combined effects of these two changes have

not been seen in even larger shares of employment in these sectors. That perhaps shows again that the underlying employment distribution in the national settlement system still maintains some bias or inertia towards the larger, older established settlements and regions.

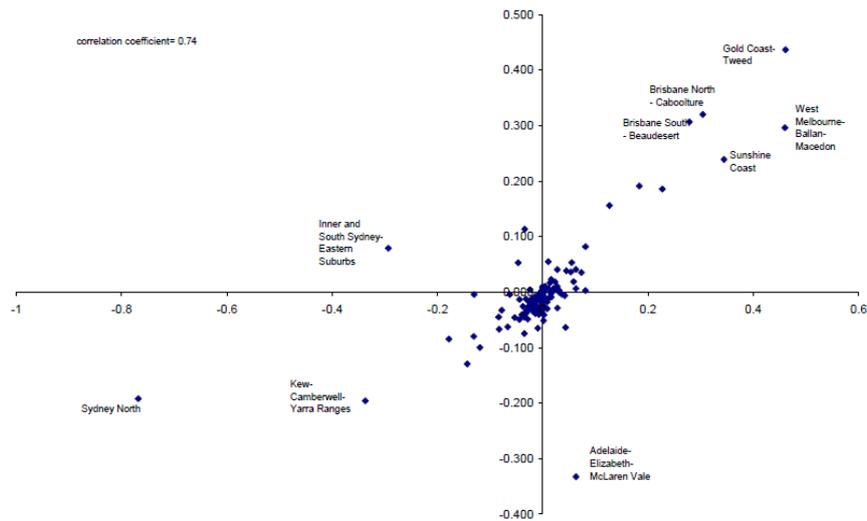


Figure 3. Changes in National Share of Total Population and Employment in Retail, 1996 and 2006

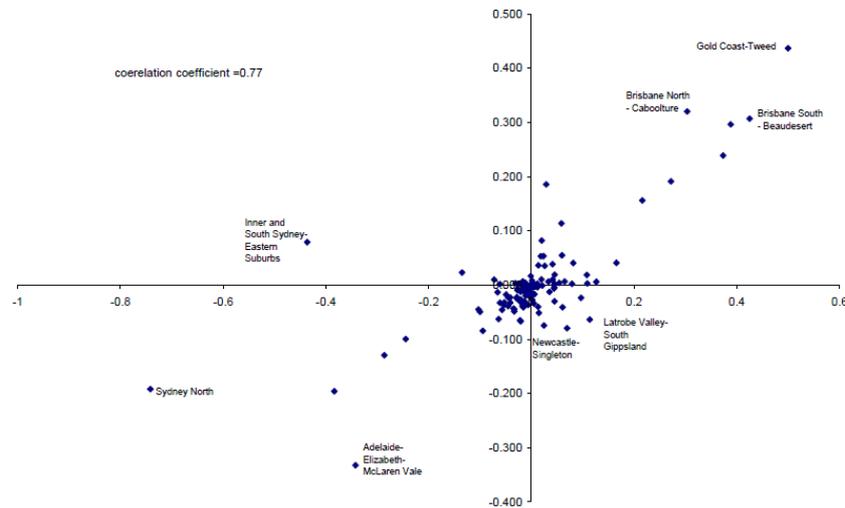


Figure 4. Changes in National Share of Total Population and Employment in Health, 1996 and 2006

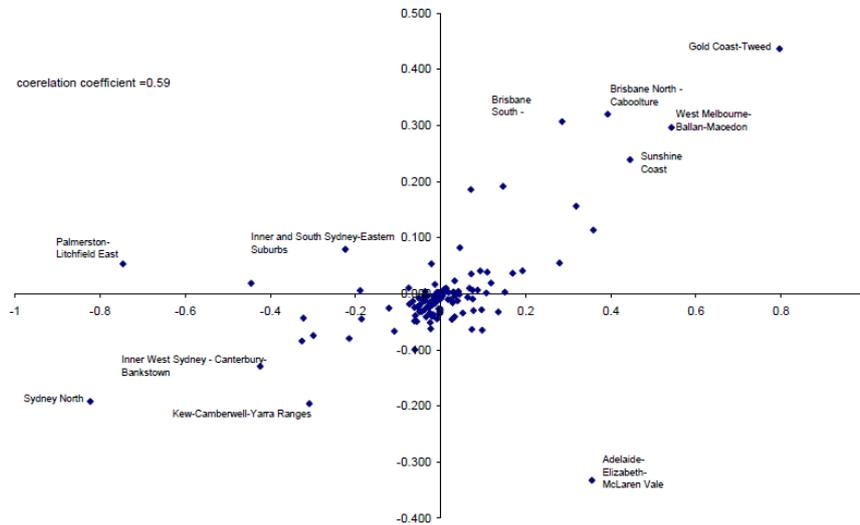


Figure 5. Changes in National Share of Total Population and Employment in Construction, 1996 and 2006

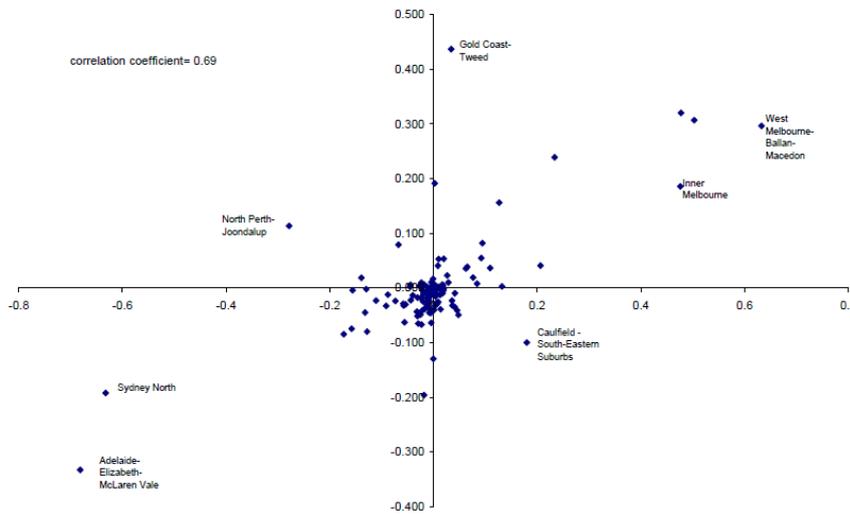


Figure 6. Changes in National Share of Total Population and Employment in Property, 1996 and 2006

3.2 Finance and media/communications

We might expect that unlike employment in retail trade and health, employment in finance and media/communications will show less association with population growth. Certainly for finance (Figure 7) and media and communications (Figure 8) there are fewer regions registering both population growth and employment growth (quadrant 2) suggesting that issues other than population change might shape employment development. This fact is underscored by the relatively low correlation coefficients (0.47 and 0.42 respectively) between population change and employment change across each sector. Moreover, the complexity of the population/employment relationship is reflected by the fact that for some population growth regions, employment change in these activities is negative while for some population decline regions (cold spots) employment share actually increased. In finance and media communications for example, the region of North Perth –Joondalup recorded declining shares of employment. For Caulfield-South Eastern suburbs in Melbourne (a population cold spot) growth in national share in finance and media was equivalent to the change in share recorded by the Gold Coast-Tweed region. It is apparent that employment in these activities is shaped by forces outside of the usual local demand shaped by population.

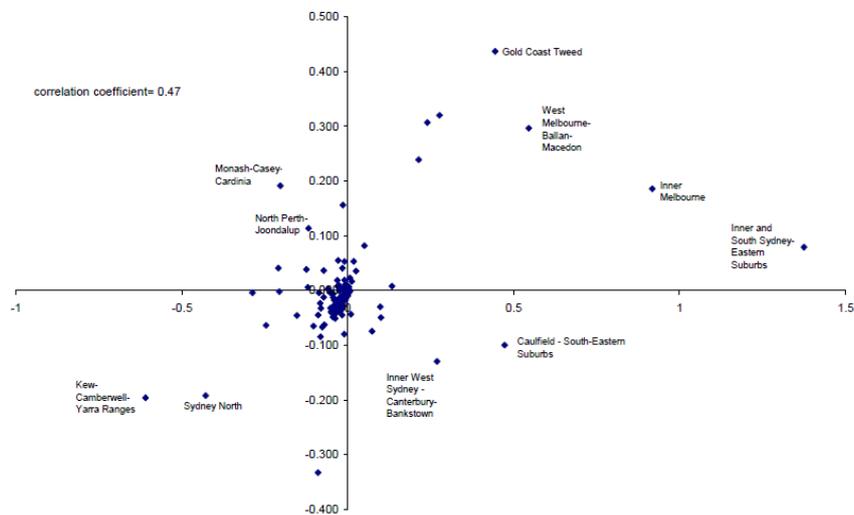


Figure 7. Changes in National Share of Total Population and Employment in Finance, 1996 and 2006

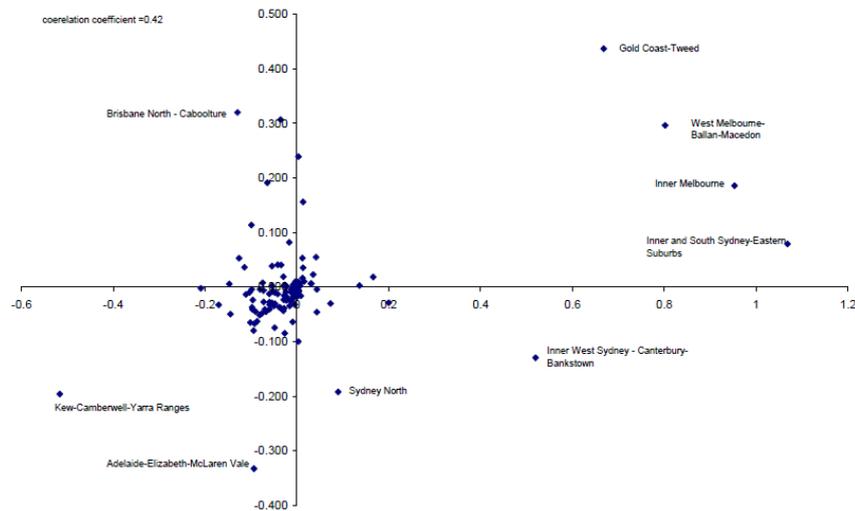


Figure 8. Changes in National Share of Total Population and Employment in Media and Communications, 1996 and 2006

3.3 Manufacturing and public administration and defence

The association between population growth and employment in the manufacturing sector and employment in public administration and defence is less clear than the other categories considered here. It is possible that these sectors might have different associations with the pattern of population change as they both have special features in location, favouring centres with infrastructure (manufacturing) and a few selected centres of federal, state and local administration (public administration). Defence has been a special case as the focus of its activities has been shifted from the south to the north of the nation for strategic and management reasons. Figure 9 and 10 display patterns of change in the shares of national employment in each of these sectors.

The distribution of change in shares of employment in manufacturing shows that many regions register small gains in share of national employment even though they have falls in share of population, implying that firms in this sector are locating activity (and expanding existing facilities) in a wide range of regions, a point backed up by the correlation coefficient of 0.56. There has been a prominent change in employment share in favour of Brisbane-South Beaudesert, but once again that is just a little more than one per cent of the total employment in the manufacturing sector. Manufacturing, it seems, contributes to the stability in the location of population and jobs, even though this sector is not expanding its overall numbers.

For public administration and defence, population growth is significant, but at the same time gains in share are recorded for many regions that have small declines in share of population. In fact the distribution of population growth and employment growth is highly dispersed (correlation coefficient of 0.45). The

position of the ACT and surrounds is illustrative. It has one of the larger gains in share of employment but has recorded a decline in population share. These outcomes illustrate that employment in this sector contributes to the stability in the national pattern of employment in the face of population trends.

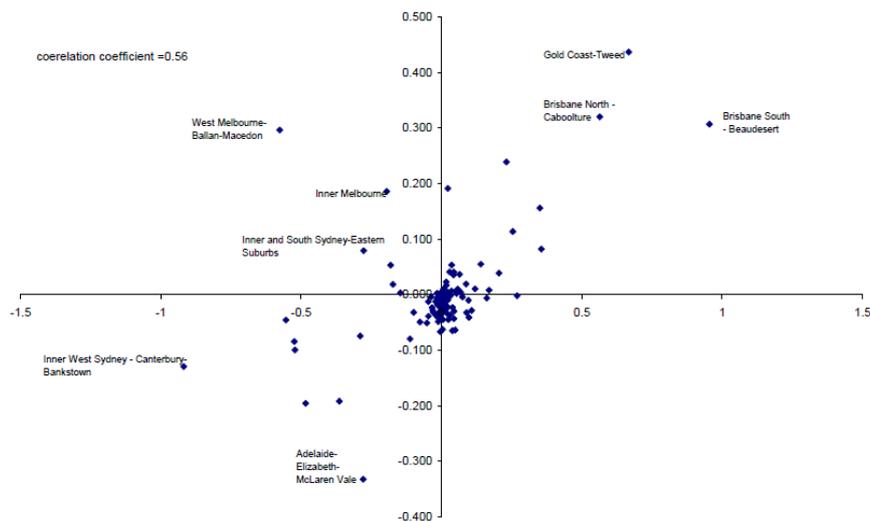


Figure 9. Changes in National Share of Total Population and Employment in Manufacturing, 1996 and 2006

3.3 Mining

The recent mining boom has brought into sharp focus the role of the two Sunbelt states in Australia's resource sector performance. The correlation coefficient (0.06) suggests that there is very little association between population growth and growth in employment in mining, a fact clearly illustrated in the scatter graph (Figure 11). However when interpreting the change in this sector we need to recognise that the residential locations of mine workers (as counted by the census) can now be very different to their place of work, as many are employed on long term fly- or drive-in and out shifts. Hence regions such as North Perth-Joondalup and Fremantle-Mandurah in Perth and the Northern Queensland regions of Mackay and surrounds, Townsville-Thuringowa and Rockhampton-Emerald are prominent here. The Perth examples reflect fly-in-fly-out activities to the mines in far-North Western Australia, while the Queensland cases are linked to drive in as well as key service town functions. The Adelaide-Elizabeth-McLaren Vale region is also important here, even though it is as a rust-belt industrial area, with population loss. It too houses miners, some of whom are employed in activities in north South Australia. Paradoxically, the one region exhibiting significant falls in mining employment is the Newcastle-Singleton region. – a testament to the new capital intensity of

the Australian mining industry.

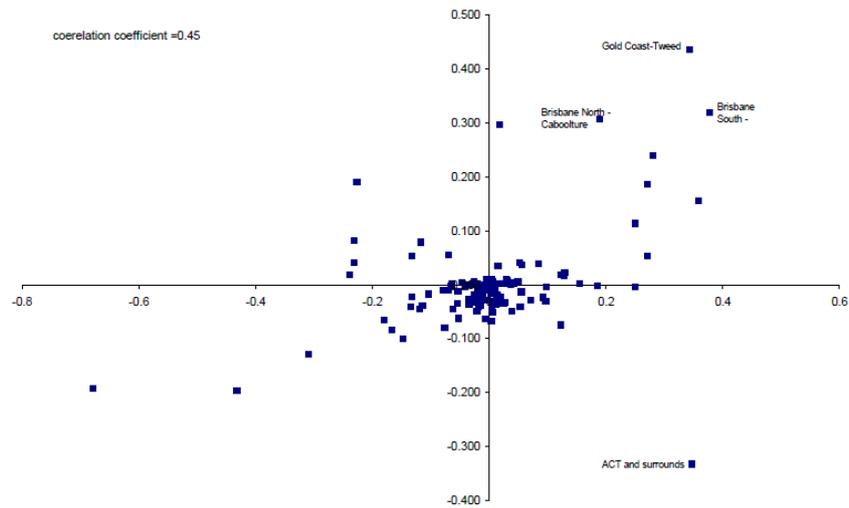


Figure 10. Changes in National Share of Total Population and Employment in Public Administration and Defense, 1996 and 2006

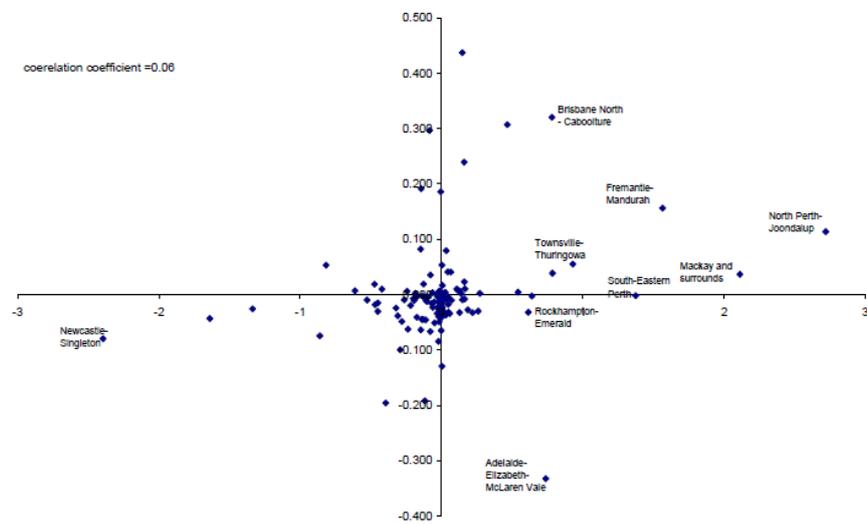


Figure 11. Changes in National Share of Total Population and Employment in Mining, 1996 and 2006

4. CONCLUSIONS AND IMPLICATIONS

This paper has utilized a finer grain regional structure to re-consider how the most recent changes in regional shares of national population might be associated with shifts in their national share of employment. The exact analytical questions centred on the continuation of associations between shifts in population share and shifts in employment share and in particular whether the stickiness or inertia associated with the distribution of employment detected in earlier analyses has remained a feature of the Australian settlement system? What we found is that the associations between population change and employment change are less clear than they had been in the earlier work..

The strongest impression in this information is one of overall stability in the distribution of jobs and population within and between the regions of Australia. This comes about as the overall pattern of population and employment change is shared surprisingly evenly between the regions, with gains or losses above the national average rarely more than one percentage point. This is evidence of the inertia in the development of settlement systems, and the importance attached to the sunk costs in the operation of business sectors in particular regions. Expressed in another way it shows how agglomeration remains a powerful force in the modern economy, especially in producer services and manufacturing. It is possible that this inertia emerges from the adaptability and internal change of the old and cold regions. That inertia might be supplied by the capacity to accommodate development in middle and outer suburbs, which was a feature of the results, so that the big old regions spread around their edges, intensify in some places and re-develop in others.

This outcome is in distinct contrast to the pattern of change in the United States where new regional growth has steadily drifted away from the sphere of influence of the old and cold cities of the east and dragged the centre of gravity of the national settlement steadily west. The population shifts have been reinforced by employment change seen in the emergence of new industrial regions on the west coast and in the south. That outcome reflects some special physical conditions, policy choices, and contact with an emerging Pacific Asian market. Those circumstances have much less relevance in Australia.

It is possible that this outcome reflects some unique Australian features, and may not be transferable to other nations and other continents. As O'Connor (1984, 1987) argued in an initial exploration of the ideas developed in the current paper, there are two interrelated features in the Australian settlement system that maintain and enhance the stability discussed above. These are the two very large metropolitan areas located within 1,000 kilometres of one another, and no more than one hour's flight time (and overnight road delivery) to the majority of the nation's population, and most of the nation's fast growth population regions. Taken together these circumstances seriously reinforce the agglomerative advantages of the established pattern of activity, especially in the more complex business service and manufacturing activities. As a result, when the national population expands into some of the newer and warmer locations, it can be served by businesses within these large centres. This effect is likely to be felt

especially in employment, which in turn retains population share. Hence the spatial distribution of employment and population is steadily reinforced even as it is generating new frontiers.

In national policy terms it is important to understand the force of this underlying trend, and also to develop an ability to predict if and when the new regional growth pattern will change the old underlying structures. That understanding could be linked to national infrastructure planning policy for example. Although it is common to think of the new emerging population regions as the natural focus of attention in infrastructure expenditure, this research shows that the old established cores (and in particular their middle and outer suburban regions) could justify a strong call on future economic infrastructure funds. Given the material presented in this paper it would seem that the forces needed to re-shape Australia's economic and population geography are currently relatively weak; not until we find regions attracting 5 and 10 percent more than the national average share of population and jobs should we begin to think of a major realignment in the nation's geography and hence its infrastructure funding.

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