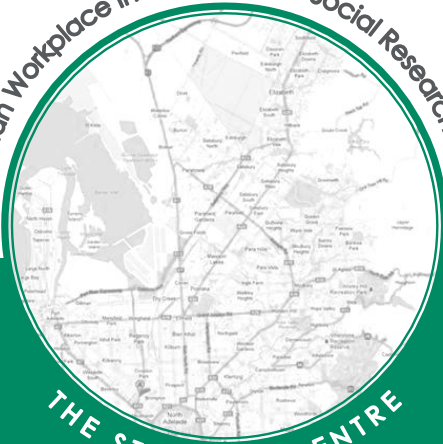


Australian Workplace Innovation and Social Research Centre



THE STRETTON CENTRE

ECONOMIC PROFILE: SHIFT-SHARE ANALYSIS

Parvin Mahmoudi, Rasika Ranasinghe and John Spoehr
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***Economic
Profile***

Shift-share analysis

Australian Workplace Innovation and Social Research Centre
The University of Adelaide
230 North Terrace
Adelaide
South Australia 5005

www.adelaide.edu.au/wiser

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KEY FINDINGS AT A GLANCE

- This study provides an analysis of the regional economy of Adelaide – North and the City of Playford during the period 2006 to 2011 using shift-share analysis.
- The dominant employment¹ sector in Playford in 2006 was manufacturing (30%) which was more than double that of South Australia as a whole (13%). By 2011, the share of manufacturing employment had fallen both in Playford (20%) and South Australia (11%).
- The health care and social assistance sector has been steadily growing between 2006 and 2011, with its share in Playford growing from 15% to 20% during this period. The same in South Australia was 13% in 2006 which increased to 14% by 2011.
- Manufacturing was followed by health care and social assistance (15%), retail trade (14%), education and training (9%), and public administration and safety (5%). These five industry sectors provided around 73% of Playford's employment in 2006.
- The dominant employment sector in Adelaide – North in 2006 was manufacturing (20%), followed by retail trade (15%), health care and social assistance (11%), education and training (9%), and public administration and safety (8%). These five industries provided around 63% of Adelaide – North's employment in 2006. However, by 2011, manufacturing employment fell to 17% in the region, while at the same time increasing the share of employment in health care and social assistance (from 11% in 2006 to 13% in 2011).
- Based on shift-share analysis for the period 2006 – 2011:

Top five leading industries in Playford are:

1. health care and social assistance;
2. agriculture, forestry and fishing;
3. retail trade;
4. accommodation and food services; and
5. construction.

Top five lagging industries in Playford are:

1. manufacturing;
2. education and training;
3. professional, scientific and technical services;
4. wholesale trade; and
5. mining.

Top five leading industries in Adelaide – North are:

1. manufacturing;
2. health care and social assistance;
3. transport, postal and warehousing;
4. retail trade; and
5. public administration and safety.

Top five leading industries in Adelaide – North are:

1. Professional, scientific and technical services;
2. Education and training;
3. Rental, hiring and real estate services;
4. Electricity, gas, water and waste services; and
5. Other services.

¹ Employment data throughout the report are from the ABS Census of Population and Housing based on place of work.

1 INTRODUCTION

This report provides an analysis of the regional economy of Adelaide – North and the City of Playford during the period 2006 to 2011 using shift-share analysis. Regional development occurs within a national framework and is partially a function of a range of economic factors that occur at the macro level. Yet regional economies do not behave as smaller, monolithic subdivisions of a larger, national whole (Doeringer et al., 1987), and a country's overall economic growth trends are not often replicated at the regional level.

Shift-share analysis is an effective tool in analysing these differences among regional growth patterns and describing sub-national economies. The analysis that follows utilises this approach to examine the structure of the regional economy of Playford and Adelaide – North in terms of industry employment over time. Shift-share analysis is a method that describes growth of regional economies by decomposing regional growth into three components: the state share, industrial mix and regional share. This approach provides policy makers with a descriptive tool that enables them draw inductive conclusions about past changes, and develop a framework for examining the component of growth or decline². It also provides insights in evaluating performance of the local economy, and illustrates how well the region's mix of industries is performing.

1.1 ADELAIDE – NORTH

Encompassing a land area of over 937.8 km², Adelaide – North is comprised of the following five sub-regions defined in terms of the Australian Bureau of Statistics (ABS) Statistical Areas Level 3 (SA3), illustrated in Figure 1:³

- Gawler – Two Wells;
- Playford;
- Port Adelaide – East;
- Salisbury; and
- Tea Tree Gully.

Adelaide – North's population in 2011 amounted to nearly one quarter (24%) of the state total (ABS, 2012). It is estimated that the population in the region will increase by nearly 170,000 over the next 30 years, with a majority of this growth expected to be in Playford⁴ where the resident population increased 13% between 2006 and 2011 bringing the total to nearly 80,000 (ABS, 2012). Playford is also home to a relatively youthful population with nearly one quarter (23%) aged between 15 and 24 years in 2012 making the prevailing high level of unemployment in this age-group (19% at April 2014) an important policy priority⁵.

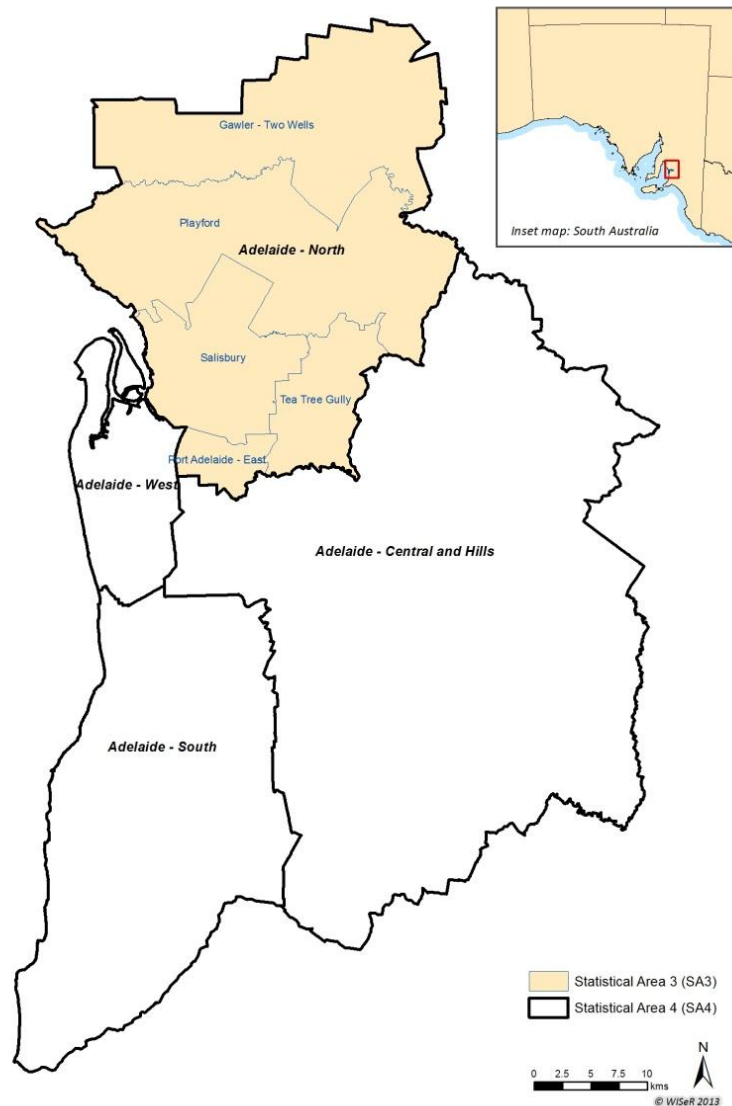
² Note that this is not a behavioural model and offers no theoretical insight as to why or how the change occurred, and hence cannot be used to make inferences about future changes. It merely develops a framework for examining the components of growth or decline.

³ Adelaide – North is defined in the 2011 Census based on Australian Statistical Geography Standard (ASGS) at SA3 2011. The 2006 Census data for this region were collected using the ASGS classification at Statistical Local Area (SLA) 2011. This study uses the ABS concordance table, 1270.0.55.006 *Statistical Local Area 2011 to Statistical Area Level 3 2011*, to collate 2006 Census data for Adelaide – North 2011 SA3.

⁴ Government of South Australia, Department of planning and local government (2010), "The 30- year plan for greater Adelaide".

⁵ DFEEST (2012), Workforce Wizard.

FIGURE 1: STATISTICAL AREA LEVEL 3 (SA3): ADELAIDE – NORTH, 2011



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Data source: ABS Census of Population and Housing, 2011

The manufacturing sector continues to be vital in the regional economy, employing 20% in Playford in 2011 and 17% in Adelaide – North, based on place of work (ABS, 2012). The Department of Employment (2013) five-year regional projections (2012–2017) indicate that manufacturing employment will contract by nearly 7% by 2017 in Adelaide – North and by 8% in South Australia (SA)⁶. The reduction in manufacturing employment is heavily influenced over coming years by the impact of the closure of GM Holden in 2017. The cessation of Ford and Toyota manufacturing in Australia will likely exacerbate these effects. Over the same period, the burgeoning healthcare and social assistance sector is projected to increase employment by 8.7% in Adelaide – North and by 8% in SA.

The role of education in determining labour market outcomes, earnings and occupational attainment has been extensively documented⁷. Education is also a key factor in Broom,

⁶ Formerly Department of Education, Employment and Workplace Relations. Employment projections can be found at <http://lmip.gov.au/default.aspx?LMIP/Publications/IndustryEmploymentProjections>.

⁷ See for example, Becker and Tomes (1986), Bowles (1972), Bowles and Gintis (2002), Solon (1999) and Psacharopoulos and Patrinos (2002).

Jones, McDonnell and William's (1980) multi-generational model of the inheritance of inequality in Australia. Within this context, the distribution of education outcomes provides a lens into the stock of human capital at a given time in a region, which is crucial in understanding its broader socio-economic outlook. Compared to the state average, Adelaide – North has lower levels of educational attainment and qualifications, particularly at the higher education levels. A major inhibitor of workforce participation in this region is intergenerational disadvantage in the labour market, which needs to be addressed using appropriate education, training and social support policies.

This report analyses the structure of the regional economy of Playford and Adelaide – North in terms of industry employment between 2006 and 2011 based on the ABS Census of Population and Housing. First, observed changes in employment by place of work by region and industry over time were examined in order to ascertain their trends. Then shift-share analysis was used to provide additional insights into the observed structural changes of the two regional economies in terms of industry employment between 2006 and 2011. The structural changes were disaggregated into three components of the state share, industry mix and regional components, which can be used for outlining the magnitude and direction of broad economic trends.

2 EMPLOYMENT AND INDUSTRY COMPOSITION

2.1 REGIONAL EMPLOYMENT

Total employment numbers by place of work in Playford, Adelaide – North, and South Australia for the Census years 2006 and 2011 are presented in Table 1.⁸ Total employment in Playford was 22,150 in 2006, which increased to 23,734 in 2011. This indicates an average annual growth of 1.43% over the five-year period. This average annual growth rate was below the state's rate which was 1.84%. The number of persons employed in Adelaide – North was 109,820 in 2006 and increased to 119,693 by 2011. The number of persons employed in Adelaide – North increased at an average rate of 1.80% per annum between 2006 and 2011. This rate was marginally less than the average annual growth rate of 1.84% for SA.

TABLE 1: REGIONAL EMPLOYMENT: 2006 AND 2011

Region	Playford	Adelaide – North	South Australia
Employment by place of work (no.)			
2006	22,150	109,820	658,660
2011	23,734	119,693	719,224
Average annual growth rate (%)			
2006 – 2011	1.43%	1.80%	1.84%

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Data source: ABS Census of Population and Housing, 2006 and 2011. Count method: Place of work

2.2 REGIONAL SHARE OF INDUSTRY EMPLOYMENT

Regional employment shares by industry⁹ for Playford and Adelaide – North are presented in Table 2. Playford accounted for 3.4% of the state's total employment in 2006, which reduced marginally to 3.3% in 2011. Adelaide – North accounted for 16.7% of the state's employment in 2006 which also decreased marginally to 16.6% in 2011. During

⁸ The employment data reported in Table 1 distributes the figures for undefined categories (SA undefined, off-shore areas and migratory and no fixed address) over all the regions within South Australia, weighted by employment proportions.

⁹ Industry classifications are based on the Australian and New Zealand Standard Industrial Classification (ANZSIC) at the 1- digit level.

the same period, the share of manufacturing employment contracted by 1.3 percentage points in Playford, while increasing by 0.9 points in Adelaide – North. Of note is the growing health care and social assistance industry which experienced a 0.7 percentage point increase in employment in Playford, while 0.5 points increase in Adelaide – North.

TABLE 2: REGIONAL SHARE OF INDUSTRY EMPLOYMENT (%): 2006 AND 2011

	Playford		Adelaide – North	
	2006	2011	2006	2011
Agriculture, Forestry and Fishing	3.4%	4.2%	6.6%	6.8%
Mining	1.7%	1.4%	3.8%	3.7%
Manufacturing	7.4%	6.1%	25.0%	25.9%
Electricity, Gas, Water and Waste Services	2.1%	2.0%	13.1%	10.9%
Construction	2.4%	2.8%	18.3%	18.1%
Wholesale Trade	2.4%	2.3%	19.8%	20.5%
Retail Trade	3.9%	4.1%	20.3%	20.8%
Accommodation and Food Services	2.4%	2.7%	14.1%	14.2%
Transport, Postal and Warehousing	2.0%	2.1%	17.2%	18.9%
Information Media and Telecommunications	0.6%	0.8%	10.2%	9.5%
Financial and Insurance Services	0.6%	0.8%	6.2%	6.0%
Rental, Hiring and Real Estate Services	2.0%	2.0%	15.7%	12.9%
Professional, Scientific and Technical Services	0.9%	0.8%	9.5%	8.3%
Administrative and Support Services	2.6%	3.2%	12.9%	14.4%
Public Administration and Safety	2.3%	2.3%	19.0%	19.5%
Education and Training	3.7%	3.6%	18.7%	18.3%
Health Care and Social Assistance	3.9%	4.6%	14.5%	15.0%
Arts and Recreation Services	1.5%	1.6%	10.8%	10.0%
Other Services	1.9%	1.9%	16.2%	15.9%
Total	3.4%	3.3%	16.7%	16.6%

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Data source: ABS Census of Population and Housing, 2006 and 2011. Count method: Place of work

2.3 INDUSTRY SHARE OF REGIONAL EMPLOYMENT

Industry distribution (proportions) of regional employment in 2006 and 2011 is presented in Table 3.¹⁰ The dominant employment sector in Playford in 2006 was manufacturing (30%) which was more than double the share of manufacturing in South Australia (13%). Manufacturing was followed by health care and social assistance (15%), retail trade (14%), education and training (9%), and public administration and safety (5%). These five industry sectors provided around 73% of Playford’s employment. These industry sectors remained relatively unchanged in 2011, except for manufacturing, and health care and social assistance industry sectors. Employment in manufacturing declined by 10% while there was a growth of 5% in health care and social assistance.

¹⁰ Employment by industry (numbers) are given in Table A 1 in the Appendix.

TABLE 3: INDUSTRY SHARE OF REGIONAL EMPLOYMENT (%): 2006 AND 2011

2006 ANZSIC – 1 Digit Level	Playford		Adelaide – North		South Australia	
	2006	2011	2006	2011	2006	2011
Agriculture, forestry and fishing	5%	5%	2%	2%	5%	4%
Mining	0%	1%	0%	0%	1%	1%
Manufacturing	30%	20%	20%	17%	13%	11%
Electricity, gas, water and waste services	1%	1%	1%	1%	1%	1%
Construction	4%	5%	6%	6%	7%	8%
Wholesale trade	3%	3%	5%	5%	4%	4%
Retail trade	14%	15%	15%	15%	12%	11%
Accommodation and food services	4%	5%	5%	6%	6%	6%
Transport, postal and warehousing	2%	3%	4%	5%	4%	4%
Information media and telecommunications	0%	0%	1%	1%	2%	1%
Financial and insurance services	1%	1%	1%	1%	3%	3%
Rental, hiring and real estate services	1%	1%	1%	1%	1%	1%
Professional, scientific and technical services	1%	1%	3%	3%	5%	6%
Administrative and support services	2%	3%	2%	3%	3%	3%
Public administration and safety	5%	5%	8%	9%	7%	7%
Education and training	9%	9%	9%	9%	8%	8%
Health care and social assistance	15%	20%	11%	13%	13%	14%
Arts and recreation services	1%	1%	1%	1%	1%	1%
Other services	2%	2%	4%	4%	4%	4%
Total	100%	100%	100%	100%	100%	100%

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Data source: ABS Census of Population and Housing, 2006 and 2011. Count method: Place of work

Table 3 also indicates that, the dominant employment sector in Adelaide – North in 2006 was manufacturing (20%) but not as dominant as the share of manufacturing in Playford (30%). In 2011, employment in manufacturing declined by 3% less than the fall in Playford. Manufacturing was followed by retail trade (15%), health care and social assistance (11%), education and training (9%), and public administration and safety (8%). These five industry sectors provided around 63% of Adelaide – North’s employment. This indicates that employment was more diversified in Adelaide – North in 2006. By 2011, employment in manufacturing declined by 3% while employment in health care and social assistance grew by 2%.

3 ECONOMIC GROWTH – SHIFT-SHARE ANALYSIS

Shift-share analysis is a technique that enables the comparison of regional growth patterns with state or national levels. It is based on a set of identity equations, each of which depicts some aspect of economic growth (such as income or employment), and allows the decomposition of structural regional change into three components:

- state share;
- industry mix; and
- regional shift.

State share component shows the amount by which total employment in the region would have grown during the time studied, if it grew at precisely the same rate as total employment in the state as a whole

Industry mix component identifies the influence of state sectoral growth rates on the regional economy. This effect arises from the fact that at the state level some sectors grow more quickly than others. Thus a region that specialises in ‘slow growth’ sectors is likely to show a net negative proportionality shift. On the contrary, a region favoured by a high proportion of ‘rapid growth’ sectors will, most likely, show a positive proportionality shift.

Regional shift component identifies the region specific element of structural change in the regional economy between the base year and the end year. Regions that have positive differential effects will have locational advantages for particular activities that have improved relative to other regions. Sectors at the regional level do not necessarily grow or decline at the same rate at the state level due to situations which provide regional comparative advantages or disadvantages.

In this study, shift-share analysis is applied to industrial employment in Playford and Adelaide – North. The numbers of persons employed in Playford and Adelaide – North were, respectively, 22,150 and 109,820 at 2006 (Table 1). These figures increased to 23,734 and 119,693 at 2011 (Table 1). Shift-share analysis breaks the net growth into three components of the state share, industry mix, and regional shift. Details of the analytical method are discussed in the appendix.

3.1 PLAYFORD

The aggregation of the three components of the State of SA share, industry mix, and regional shift indicates total structural changes in the economy of Playford in terms of industry employment over 2006 and 2011 Census. These three components are presented in Table 4.

State share component

As indicated in Table 1, the number of persons employed in Playford increased from 22,150 in 2006 to 23,734 in 2011, indicating a net growth of 1,584. Had Playford’s employment grown at the same rate as the state average, there would have been 2,037 more workers instead of 1,584 in 2011 (Table 4). This loss of 453 workers can be explained by the industry mix and regional shift components.

Industry mix component

There is usually a difference between a particular industry’s growth rate and the state average. Had Playford’s employment grown at the same rate as the state sectoral growth rates, Playford would have lost 867 jobs (Table 4).

Regional shift component

The difference between the state share and industry mix is the regional shift. The regional shift indicates that regional conditions were responsible for Playford maintaining 414 jobs (Table 4).

TABLE 4: SHIFT-SHARE ANALYSIS (NO.): CITY OF PLAYFORD, 2006 TO 2011

2006 ANZSIC – 1 Digit Level	State Share	Industry Mix	Regional Shift	Net Growth
Agriculture, forestry and fishing	93	-182	236	146
Mining	9	46	-28	27
Manufacturing	607	-1,323	-1,081	-1,797
Electricity, gas, water and waste services	14	42	-7	49
Construction	73	118	142	333
Wholesale trade	57	-42	-44	-29
Retail trade	293	-171	170	292
Accommodation and food services	87	62	151	300
Transport, postal and warehousing	49	-11	25	63
Information media and telecommunications	6	-4	25	27
Financial and insurance services	12	-7	54	58
Rental, hiring and real estate services	18	-15	2	0
Professional, scientific and technical services	30	20	-50	0
Administrative and support services	47	-9	132	170
Public administration and safety	96	103	-13	187
Education and training	182	126	-71	237
Health care and social assistance	308	360	758	1,426
Arts and recreation services	10	12	12	34
Other services	45	10	2	56
Total	2,037	-867	414	1,584

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Data source: ABS Census of Population and Housing, 2006 and 2011. Count method: Place of work

Based on the above analysis, the top five leading and lagging industries in Playford can be ranked as follows.

Top five leading industries in Playford (2006 – 2011):

1. Health care and social assistance;
2. Agriculture, forestry and fishing;
3. Retail trade;
4. Accommodation and food services; and
5. Construction.

Top five lagging industries in Playford (2006 – 2011):

1. Manufacturing;
2. Education and training;
3. Professional, scientific and technical services;
4. Wholesale trade; and
5. Mining.

3.2 ADELAIDE – NORTH

The three components of the State of SA share, industry mix, and regional shift of the structural changes in the economy of Adelaide – North in terms of industry employment over 2006 and 2011 Census are presented in Table 5.

State share component

As indicated in Table 1, the number of persons employed in the northern region increased from 109,820 in 2006 to 119,693 in 2011, indicating a net growth of 9,874. If the employment in Adelaide – North increased at the same rate as the state average in 2011, there would have been an employment increase of 10,098 instead (Table 5). The industry mix and regional shift components were responsible for job loss of 224 (the difference between 9,873 and 10,098) in Adelaide – North.

Industry mix component

This component identifies the influence of state sectoral growth rates on the regional economy. If employment in Adelaide – North increased at the same rate as the state sectoral growth rates, Adelaide – North would have lost 1,602 jobs (Table 5).

Regional shift component

The regional shift is the difference between the state share and industry mix, and illustrates the difference between the change observed in a sector in the reference area (the state of SA, in this case), and in the study area (Adelaide – North). Table 5 indicates that better conditions in Adelaide – North had enabled the region maintain overall jobs of 1,377.

Based on this analysis, the top five leading and lagging industries in Adelaide – North are ranked as follows.

Top five leading industries in Adelaide – North (2006 – 2011):

1. Manufacturing;
2. Health care and social assistance;
3. Transport, postal and warehousing;
4. Retail trade; and
5. Public administration and safety.

Top five lagging industries in Adelaide – North (2006 – 2011):

1. Professional, scientific and technical services;
2. Education and training;
3. Rental, hiring and real estate services;
4. Electricity, gas, water and waste services; and
5. Other services.

TABLE 5: SHIFT-SHARE ANALYSIS (NO.): ADELAIDE – NORTH, 2006 TO 2011

2006 ANZSIC – 1 Digit Level	State Share	Industry Mix	Regional Shift	Net Growth
Agriculture, forestry and fishing	183	-359	45	-132
Mining	20	106	-8	118
Manufacturing	2,038	-4,443	705	-1,700
Electricity, gas, water and waste services	89	260	-213	137
Construction	558	898	-68	1,388
Wholesale trade	469	-343	193	318
Retail trade	1,533	-894	460	1,098
Accommodation and food services	521	368	70	959
Transport, postal and warehousing	426	-97	468	797
Information media and telecommunications	100	-76	-81	-57
Financial and insurance services	130	-80	-62	-12
Rental, hiring and real estate services	142	-122	-279	0
Professional, scientific and technical services	320	212	-491	41
Administrative and support services	236	-44	319	511
Public administration and safety	800	857	257	1,913
Education and training	917	635	-296	1,256
Health care and social assistance	1,154	1,346	524	3,025
Arts and recreation services	77	89	-77	89
Other services	385	84	-87	382
Total	10,098	-1,602	1,377	9,874

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Data source: ABS Census of Population and Housing, 2006 and 2011. Count method: Place of work

Shift-share analysis technique is a descriptive tool that can provide a simple and straightforward approach to separating out the state and industrial contributions from regional growth. The method, while useful to regional economists to draw inductive conclusions about past structural changes, does not offer any insights into the source/s of the changes. It should be used in combination with other analyses to determine a region's economic potential or to make recommendations about future changes.

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APPENDIX

TABLE A 1: EMPLOYMENT BY INDUSTRY (NO.): 2006 AND 2011

2006 ANZSIC –1 Digit Level	Playford		Adelaide – North		South Australia	
	2006	2011	2006	2011	2006	2011
Agriculture, forestry and fishing	1,007	1,153	1,986	1,855	29,991	27,327
Mining	95	122	221	339	5,782	9,095
Manufacturing	6,600	4,802	22,166	20,466	88,637	79,022
Electricity, gas, water and waste services	157	206	973	1,110	7,456	10,136
Construction	794	1,127	6,067	7,455	33,150	41,104
Wholesale trade	625	596	5,099	5,418	25,776	26,410
Retail trade	3,190	3,482	16,668	17,767	82,138	85,283
Accommodation and food services	949	1,249	5,668	6,627	40,207	46,515
Transport, postal and warehousing	534	597	4,633	5,430	26,859	28,768
Information media and telecommunications	63	89	1,091	1,035	10,678	10,920
Financial and insurance services	129	188	1,418	1,406	22,737	23,550
Rental, hiring and real estate services	193	197	1,541	1,282	9,839	9,967
Professional, scientific and technical services	326	325	3,481	3,521	36,701	42,306
Administrative and support services	509	680	2,563	3,074	19,838	21,323
Public administration and safety	1,049	1,236	8,698	10,611	45,806	54,529
Education and training	1,977	2,214	9,972	11,228	53,191	61,472
Health care and social assistance	3,355	4,781	12,552	15,577	86,319	103,514
Arts and recreation services	113	148	835	924	7,747	9,286
Other services	485	541	4,187	4,569	25,808	28,697
Total	22,150	23,734	109,820	119,693	658,660	719,224

WISeR 2014

Data source: ABS Census of Population and Housing, 2006 and 2011. Count method: Place of work

SHIFT-SHARE ANALYSIS

Shift-share analysis is based on a set of identity equations, each of which depicts some aspect of economic growth (such as employment and income). It allows the decomposition of structural regional change into three components:

- state share;
- industry mix; and
- regional shift.

State share component shows the amount by which total employment in the region would have grown during the time studied, if it grew at precisely the same rate as total employment in the state as a whole. The state share component is derived as follows:

$$(region_i^{2006} * \frac{SA^{2011}}{SA^{2006}}) - region_i^{2006}$$

where

$region_i^{2006}$ employment numbers (by place of work) in an industry i in the region at 2006 Census (the base year);

SA^{2011} total employment numbers (by place of work) in SA at 2011 Census (the end year); and

SA^{2006} total employment numbers (by place of work) in SA at 2006 Census.

Industry mix component identifies the influence of state sectoral growth rates on the regional economy. This effect arises from the fact that at the state level some sectors grow more quickly than others. Thus a region that specialises in 'slow growth' sectors is likely to show a net negative proportionality shift. On the contrary, a region favoured by a high proportion of 'rapid growth' sectors will, most likely, show a positive proportionality shift. The industry mix component is defined as:

$$region_i^{2006} * (\frac{SA_i^{2011}}{SA_i^{2006}} - \frac{SA^{2011}}{SA^{2006}})$$

where

$region_i^{2006}$ employment numbers (by place of work) in an industry i in the region at 2006 Census;

SA_i^{2011} employment numbers (by place of work) in an industry i in SA at 2011 Census;

SA_i^{2006} employment numbers (by place of work) in an industry i in SA at 2006 Census;

SA^{2011} total employment numbers (by place of work) in SA at 2011 Census (the end year); and

SA^{2006} total employment numbers (by place of work) in SA at 2006 Census.

Regional shift component identifies the region specific element of structural change in the regional economy between the base year and the end year. Regions that have positive differential effects will have locational advantages for particular activities that have improved relative to other regions. Sectors at the regional level do not necessarily grow or decline at the same rate at the state level due to situations which provide regional comparative advantages or disadvantages. The regional shift component is defined as:

$$region_i^{2006} * \left(\frac{region_i^{2011}}{region_i^{2006}} - \frac{SA^{2011}}{SA^{2006}} \right)$$

where

$region_i^{2006}$ employment numbers (by place of work) in an industry i in the region at 2006 Census;

$region_i^{2011}$ employment numbers (by place of work) in an industry i in the region at 2011 Census;

$region_i^{2006}$ employment numbers (by place of work) in an industry i in the region at 2006 Census;

SA^{2011} total employment numbers (by place of work) in SA at 2011 Census (the end year); and

SA^{2006} total employment numbers (by place of work) in SA at 2006 Census.

the 1990s, the number of people with a mental health problem has increased in the UK. The prevalence of mental health problems has increased from 10% in 1990 to 15% in 2000 (Meltzer and Pevalin 2002). The prevalence of mental health problems has increased in the UK from 10% in 1990 to 15% in 2000 (Meltzer and Pevalin 2002).

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