



Australian Government

Department of Infrastructure and Regional Development

Bureau of Infrastructure, Transport and Regional Economics



Changes in Australia's industry structure: cities and regions, 2006–2011

At a glance

- This Information Sheet analyses recent changes in Australia's industry structure, focusing on changes in employment by industry at a city and regional level from 2006 to 2011. It updates BITRE *Information Sheet* 32, which focused on changes between 2001 and 2006.
- Average annual growth in employment for each industry was generally lower than the respective industry's gross value added (GVA) growth, except for the *Mining, Electricity, gas, water and waste services, Accommodation and food services, Education and training, and Administrative and support services* industries.
- From 2006 to 2011, *Agriculture, forestry and fishing* was the major industry contributing to job loss in Coastal cities, Coastal country, Inland country and Remote areas, while *Manufacturing* had the largest job loss in Capital cities and Inland regional cities. *Mining* was the main job growth industry in Remote areas, while *Health care and social assistance* had the largest job gain in all of the other types of regions.
- The distribution of industry employment change across all 391 working zones (WZs) in Australia shows that 60.6 per cent experienced employment growth between 2006 and 2011, while 38.9 per cent experienced employment decline, and 0.5 per cent recorded no change. *Mining* is the most frequently growing industry across WZs (79 per cent of WZs experienced job growth), followed by *Health care and social assistance* and *Construction* (76 per cent each).
- Between 2006 and 2011, national employment increased at an average annual rate of 2.1 per cent. Among those 38 WZs which had estimated resident population of 50 000 or more in 2011, the average annual growth rate of employment was highest for Mackay and surrounds (3.6 per cent) and lowest in Mildura and surrounds (0.0 per cent, declining by 50 jobs).
- Among the eight capital city WZs, *Health care and social assistance* was the top industry contributor to job growth between 2006 and 2011 in Sydney, Melbourne, Brisbane and Adelaide, while *Construction* was the main contributor in Perth and Hobart, and *Public administration and safety* in Darwin and Canberra.
- Among the 30 non-capital WZs, the *Health care and social assistance* industry added the most jobs in 24 WZs. The *Construction* and *Mining* industries recorded the most job growth in three WZs each.
- *Agriculture, forestry and fishing* and *Manufacturing* recorded significant job losses in many Australian cities and regions—these two industries were the main declining industry in 16 and 15 WZs, respectively.
- Jobs in the *Information, media and telecommunications* and *Financial and insurance services* industries became increasingly concentrated in Sydney and Melbourne between 2006 and 2011.
- Between 2006 and 2011, capital city WZs generally experienced less industry-based structural change than the non-capital city WZs.
- From 2006 to 2011, the Statistical Local Areas with the largest job growth (based on 'place of work') were inner city locations, such as Southbank-Docklands in Melbourne (27 858), Sydney Inner (21 120), Melbourne Inner (19 527) and Perth Inner (13 208). This inner city job growth is coming particularly from the *Finance and insurance services* and *Professional, scientific and technical services* industries.

Introduction

The main objective of this research is to understand the changes that have occurred in industry structure since 2006 in the national economy and in state/territory, city and regional economies, in order to support evidence-based urban and regional policy development and infrastructure planning. Industry structure is assessed using both output and employment data for Australia and its states and territories, while for Australia's cities and regions it is assessed based solely on employment data.

In the recent past, the Bureau of Infrastructure, Transport and Regional Economics (BITRE) has released two publications on changes in industry structure in Australia's regions and main cities (see BITRE 2003, BITRE 2009). This current information sheet is essentially the update of BITRE *Information Sheet 32* (BITRE 2009) which used ABS Census data for 2001 and 2006. This present information sheet uses ABS Census data for 2006 and 2011.

There are other reports that analyse industry employment growth at a city/regional scale, including:

- BITRE (2013b) contains some information on the principal industry drivers of job growth in Australia's four largest cities from 2006 to 2011, while BITRE (2010, 2011b, 2012, 2013a) contain in-depth analysis of industry employment in the respective cities for the 2001 to 2006 period.
- *State of Australian Cities 2013* included some analysis of changes in *Manufacturing* industry employment within Sydney and Melbourne for 2001 and 2011 (DIT 2013).
- *Progress in Australian Regions 2014* presents data on the change in the number of employed persons between 2001 and 2011 at a range of geographic scales. It also presents contextual information on the main growth and decline industry, and a structural change index, for the 2001 to 2011 period (Department of Infrastructure and Regional Development 2014).
- The annual *Australian Jobs* publication profiles industries and occupations, and produces summary information on labour markets at the state/territory, capital city and rest of state scale (Department of Education 2014).
- *A Review of Selected Regional Industrial Diversity Indexes, 2011* analyses the distribution of employment across industries in regions across Australia for 2011 (ABS 2014b).

This study adds value by covering all of Australia (not just the largest cities) and all of its industries, and focuses specifically on the changes that have occurred in the period since 2006.

After introducing the study's methodology, this Information Sheet commences with an overview of recent national trends in industry output and employment, and explores how these trends differ across states and territories. It then investigates patterns of industry employment change at a city and regional scale, identifying the main industry contributors to employment growth and decline in each region, and highlighting the regions that have experienced the greatest structural change in recent years. There is a particular focus on the role that the *Health care and social assistance* and *Construction* industries have played in shaping Australia's recent employment growth. The final sections of the Information Sheet discuss national employment projections for industries and present some concluding remarks.

Data and Methodology

This Information Sheet is focused on changes in industry structure since 2006. For Australia and its states and territories, the analysis covers the 2006 to 2013 period. However, for cities and sub-state regions, the latest available data comes from the 2011 census, and so the analysis relates to the 2006 to 2011 period.

The analysis was undertaken at several different geographic scales:

- National level Gross Domestic Product (GDP) data and Labour Force Survey (LFS) employment data by industry were used to identify national trends for each industry.
- State/Territory level data from these two sources was used to see and whether the individual drivers of growth are specific to individual states/territories.

- A regional summary classification¹ was used to see whether industry drivers of employment growth varied across different types of regions.
- BITRE's working zone² classification (see Box 1) was used to analyse the industry drivers of employment growth for individual cities and regions.
- Statistical Local Areas (SLAs) and Local Government Areas (LGAs) were used to examine industry employment change at a small area scale.

Box 1: Rationale for using BITRE working zone classification

Since employment data in this study relates to where people live, not where they work, there are people enumerated in an SLA who commute to work in a different nearby SLA. In cases where a significant proportion of people who live in an SLA work in another SLA, the employment data will be less meaningful. BITRE working zones (WZs) overcome this problem.

BITRE WZs are based on ASGC 2006 SLA boundaries. WZs reflect the area within which people are willing to commute from their place of residence to their place of employment (BITRE 2003). BITRE has defined 391 WZs from approximately 1400 SLAs, based on commuting patterns revealed by the 2006 census. For each WZ, the majority of employed residents work in the same region in which they live, and so employment by industry data provides a reasonable guide to the industry structure of the region's economy. Details of the WZ boundaries are presented in BITRE's Industry Structure Database 2009.

Source: BITRE (2009).

The key data source for this study is the *ABS Census of Population and Housing*. Other data sources include the *Australian System of National Accounts* (ABS 2013a), *Australian National Accounts: State Accounts* (ABS 2013b), *Labour Force, Australia, Detailed* (ABS 2013c) and *Labour Force, Australia* (ABS 2014a).

The specific ABS census product used was the Basic Community Profile DataPack 2006 and 2011.³ These data are based on the respondent's 'place of usual residence' (PUR). Census employment data provides a count of the total number of employed persons in the relevant geographic area, irrespective of whether they are working on a full-time or part-time basis.

Total employment of people aged 15 years and over by industry was calculated using 19 industries, as defined by the Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (ABS 2006). The analysis focuses on the 1-digit industry classification. However, in some situations, the 2-digit classification was used (especially for detailed analysis of the *Health care and social assistance* and *Construction* industries).

Counts of employed persons from the ABS census are consistently lower than counts from the ABS *Labour Force Survey*, which provides Australia's official measure of employment (for details, see Appendix A). The LFS is the preferred source of employment data at the national and state/territory scales. However, census data is the preferred source for the sub-state analysis in this study, as it can be reliably disaggregated by industry and region. Consequently, the census data presented in this Information Sheet provides a conservative estimate of employment, but is comparable across Australia's cities and regions.

Census employment data is available on a 'place of work' (POW) basis and a PUR basis. Normally the POW data would provide the most suitable basis for assessing spatial changes in job location for cities, regions and small areas, and this was the approach adopted previously by BITRE for assessing job and industry change from 2001 to 2006 (BITRE 2009). However, changes to ABS coding methods have had a particularly significant impact on the comparability of the POW data for 2006 and 2011 (as outlined in Appendix A). Comparability of the PUR employment data between 2006 and 2011 is not affected by such issues. To maximise the coverage of employed persons, and avoid the data quality problems caused by changes in POW coding practices, BITRE has chosen to use PUR-based measures of employment growth for all of its analysis of aggregate spatial units (e.g. capital cities, state balances, working zones). All national census-based analysis in this Information Sheet is also based on PUR data. Use of PUR-based measures of employment growth is

¹ Capital cities, Coastal cities, Inland cities, Coastal country areas and Inland country areas (BITRE 2011a).

² Details of BITRE working zones (WZs) can be found in BITRE (2009).

³ The '2006 DataPacks' is a CD-ROM product containing 2006 *Census of Population and Housing* Basic Community Profile data for all of Australia down to the Collection District (CD) level. The '2011 DataPacks' contain 2011 Census data for numerous areas (including Statistical Local Areas and Statistical Area Level 2s) within the one package. Both DataPacks also include digital boundary map files and metadata/referencing information (ABS 2008, 2013d).

appropriate for relatively aggregated geographies which are largely self-contained (i.e. a high proportion of employed usual residents have a place of work within their home city/region).

For small area analysis of where job growth is physically located, it is necessary to rely on the POW data (taking note of its limitations).

Gross Value Added and employment growth by industry, 2006 to 2013

One measure of the importance of an industry is its contribution to the economy. The size of the Australian economy is typically described in terms of gross domestic product (GDP), and the structure of the economy is typically described in terms of industry gross value added (GVA) (ABS 2012a, p.510). GVA provides an estimate of the value of production by any industry, which is the total value of goods and services produced by an industry, after deducting the cost of goods and services used in the process of production. Another measure of the significance of an industry is its contribution to total employment. At the time this research was undertaken, the latest available GVA data for states and territories related to the financial year ended June 2013, and so this section provides information on changes in GVA and employment for industry sectors between 2006 and 2013.

Industry Gross Value Added

Table 1 provides volume measures of industry GVA for June 2006 and June 2013. Data are presented at a broad industry level, classified according to the ANZSIC 2006 (ABS 2006).

In June 2013, the GVA for all industries was \$1305 billion (in volume terms), an increase of nearly \$240 billion or an average annual increase of 2.9 per cent from June 2006. This average annual GVA growth rate is lower than the average annual GVA growth rate of 3.4 per cent between 2001 and 2006 (ABS 2013a).

In 2013, the industries which made the greatest contribution to GVA at the national level (more than \$100 billion) were: *Mining* (\$146.4 billion or 11.2 per cent of total), *Financial and insurance services* (\$121.6 billion or 9.3 per cent), *Construction* (\$115.4 billion or 8.8 per cent), *Manufacturing* (\$103.6 billion or 7.9 per cent) and *Professional, scientific and technical services* (\$100.0 billion or 7.7 per cent). This pattern is somewhat different than in 2006. In 2006, *Manufacturing* ranked top in terms of contribution to the GVA at the national level (9.9 per cent of total).

Between 2006 and 2013, there were five industries which increased in GVA by more than \$25 billion. These industries are: *Mining* (\$49.1 billion), *Construction* (\$30.1 billion), *Financial and insurance services* (\$28.6 billion), *Professional, scientific and technical services* (\$26.4 billion) and *Health care and social assistance* (\$26.4 billion). In contrast, the GVA for the *Manufacturing* industry declined (–\$1.6 billion) during the same period.

Over the period between 2006 and 2013, *Mining's* GVA share increased from 9.1 per cent to 11.2 per cent, *Construction* from 8.0 per cent to 8.8 per cent, *Professional, scientific and technical services* from 6.9 per cent to 7.7 per cent and *Health care and social assistance* from 6.6 per cent to 7.4 per cent. The largest fall in an industry's share of total GVA in the same period was for the *Manufacturing* industry (down from 9.9 per cent to 7.9 per cent).

Table 1 also shows that *Mining* had the highest average annual GVA growth (6.0 per cent) between 2006 and 2013. This is followed by *Health care and social assistance* (4.7 per cent), *Professional, scientific and technical services* (4.5 per cent) and *Construction* (4.4 per cent).

Table 2 shows industry GVA by states and territories for 2006 and 2013. Although industry GVA was higher in New South Wales, Victoria and Queensland in both years, Western Australia experienced the largest increase in industry GVA (up \$71.4 billion) between 2006 and 2013. The increases in industry GVA for New South Wales, Victoria and Queensland are \$55.1 billion, \$44.5 billion and \$42.9 billion, respectively. In other words, of the total GVA growth of nearly \$240 billion nationally, Western Australia produced around 30 per cent, followed by New South Wales (23 per cent), Victoria (19 per cent) and Queensland (18 per cent). The remaining states and territories constituted only around 11 per cent.

Between 2006 and 2013, the average annual growth rate of industry GVA was fastest in Western Australia (5.5 per cent per annum) and slowest in Tasmania (1.3 per cent per annum). Although the share of total GVA growth attributable to the Northern Territory was less than 2 per cent (\$4 372 million of \$239 567 million, Table 2), the average annual growth rate was second fastest (4.3 per cent per annum).

Table 1 Change in Industry Gross Value Added, Australia, 2006 to 2013

Industry ^a	Industry Gross Value Added (\$ million) ^{b,c}			Average annual growth (Per cent)
	2006	2013	Change (2006–2013)	
Agriculture, forestry and fishing	31 289	31 860	571	0.3
Mining	97 249	146 391	49 142	6.0
Manufacturing	105 174	103 623	–1551	–0.2
Electricity, gas, water and waste services	34 723	37 637	2 914	1.2
Construction	85 274	115 392	30 118	4.4
Wholesale trade	53 539	64 576	11 037	2.7
Retail trade	56 783	68 501	11 718	2.7
Accommodation and food services	33 423	34 871	1 448	0.6
Transport, postal and warehousing	58 964	72 918	13 954	3.1
Information media and telecommunications	35 097	41 047	5 950	2.3
Financial and insurance services	92 994	121 552	28 558	3.9
Rental, hiring and real estate services	35 641	38 872	3 231	1.2
Professional, scientific and technical services	73 599	100 016	26 417	4.5
Administrative and support services	42 039	44 731	2 692	0.9
Public administration and safety	65 485	78 808	13 323	2.7
Education and training	58 697	68 615	9 918	2.3
Health care and social assistance	70 349	96 714	26 365	4.7
Arts and recreation services	9 745	12 067	2 322	3.1
Other services	25 042	26 482	1 440	0.8
All industries	1 065 106	1 304 673	239 567	2.9

^a Classified according to the *Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006* (ABS 2006).

^b GVA figures are based on Year ending June and GVA estimates are all expressed in Chain Volume terms. Chain Volume estimates provide time series of expenditure and production aggregates that are free of the direct effects of price change.

^c The sum of GVA across industries differs from GDP to the extent of taxes less subsidies on products.

Source: ABS (2013a).

Table 2 Change in Industry Gross Value Added, States and Territories, 2006 to 2013

States and Territories	Industry Gross Value Added (\$ million) ^b			Average annual growth (Per cent)
	2006	2013	Change (2006–2013)	
New South Wales	340 336	395 429	55 093	2.2
Victoria	236 216	280 697	44 481	2.5
Queensland	209 154	252 032	42 878	2.7
South Australia	67 051	80 467	13 416	2.6
Western Australia	156 647	228 091	71 444	5.5
Tasmania	19 001	20 831	1 830	1.3
Northern Territory	12 698	17 070	4 372	4.3
Australian Capital Territory	24 003	30 056	6 053	3.3
Australia	1 065 106	1 304 673	239 567	2.9

^a GVA figures are based on Year ending June and GVA estimates are all expressed in Chain Volume terms.

Source: ABS (2013b).

Table 3 lists the top three industries which contributed to GVA growth and the top industry where GVA declined for each state/territory in Australia from 2006 to 2013.

Financial and insurance services was the industry which contributed the largest GVA growth in New South Wales and Victoria (combined around \$20 billion), while *Construction* was the top industry in Queensland and South Australia (combined around \$10 billion). *Mining* was the top growth industry in Western Australia and

the Northern Territory (combined around \$38 billion), *Health care and social assistance* in Tasmania (\$500 million) and *Public administration and safety* in the Australian Capital Territory (\$1.9 billion).

Manufacturing was the industry which contributed the largest GVA decline for Victoria, Queensland, Tasmania and the Australian Capital Territory. *Administrative services* was the main declining industry in New South Wales, South Australia, and Northern Territory, while in Western Australia, it was *Agriculture*.

Table 3 Contribution to change in Industry Gross Value Added, States and Territories, 2006 to 2013

States and Territories	Top 3 key industry value added						Key industry declined	
	Top industry	Value added (\$ m)	2nd top industry	Value added (\$ m)	3rd top industry	Value added (\$ m)	Key industry	Value declined (\$ m)
New South Wales	Financial services	10 446	Health care	7 659	Professional services	6 388	Administrative Services	-2 368
Victoria	Financial services	9 015	Professional services	8 523	Health Care	6 784	Manufacturing	-2 071
Queensland	Construction	7 753	Health care	5 680	Mining	5 153	Manufacturing	-2 750
South Australia	Construction	1 981	Financial services	1 945	Health Care	1 535	Administrative services	-247
Western Australia	Mining	36 721	Construction	8 750	Professional Services	5 675	Agriculture	-2 962
Tasmania	Health care	501	Financial services	368	Agriculture	213	Manufacturing	-431
Northern Territory	Mining	981	Construction	731	Manufacturing	622	Administrative services	-14
Australian Capital Territory	Public administration	1 899	Professional services	1 116	Construction	740	Manufacturing	-86
Australia	Mining	49 142	Construction	30 118	Financial services	28 558	Manufacturing	-1 551

Notes:

1. Administrative services - Administrative and support services, Financial services - Financial and insurance services, Health care - Health care and social assistance, Public administration - Public administration and safety, Agriculture - Agriculture, forestry and fishing, and Professional Services - Professional, scientific and technical services.

2. GVA figures are based on Year ending June and GVA estimates are all expressed in Chain Volume terms.

Source: ABS (2013b).

Industry employment

The main focus of this research is to understand spatial changes in employment by industry sectors since 2006. Overall, nearly 11.5 million Australians are employed in May 2013 and over the seven year period from May 2006 to May 2013, there were more than 1.4 million new jobs nationally (Table 4). Table 4 also shows shares of total employment in 2006 and 2013 (year ending May), classified by industry according to ANZSIC 2006 (ABS 2006). These data were derived from the Australian Bureau of Statistics (ABS) monthly Labour Force Survey and relate to the civilian population aged 15 years and over.

From an industry perspective, the *Health care and social assistance* industry had the greatest jobs growth (309 700 persons) between May 2006 and May 2013, followed by *Professional, scientific and technical services* (186 800 persons) and *Accommodation and food services* (150 400 persons). However, the *Manufacturing*, *Agriculture, forestry and fishing* and *Information media and telecommunications* industries experienced employment decline during this period.

Between 2006 and 2013, *Health care and social assistance's* share of total employment increased by 1.4 percentage points, whilst the share of total employment in the *Retail trade* industry declined by 1.7 percentage points, *Construction* industry's share declined by 0.7 percentage points and the *Manufacturing* industry's share declined by 2.5 percentage points.

Table 4 Employment change by industry, Australia, 2006 to 2013

Industry ^a	Employment ('000)			Average annual growth (Per cent)
	2006	2013	Change (2006-2013)	
Agriculture, forestry and fishing	333.4	299.9	-33.5	-1.5
Mining	131.4	260.3	129.0	10.3
Manufacturing	1 012.2	916.7	-95.5	-1.4
Electricity, gas, water and waste services	109.9	148.8	39.0	4.4
Construction	876.5	990.2	113.7	1.8
Wholesale trade	388.7	426.0	37.4	1.3
Retail trade	1 158.3	1 236.3	78.1	0.9
Accommodation and food services	651.1	801.5	150.4	3.0
Transport, postal and warehousing	509.9	583.6	73.7	1.9
Information media and telecommunications	243.0	219.5	-23.5	-1.4
Financial and insurance services	383.6	423.8	40.2	1.4
Rental, hiring and real estate services	182.9	193.5	10.6	0.8
Professional, scientific and technical services	720.6	907.5	186.8	3.3
Administrative and support services	343.4	390.7	47.3	1.9
Public administration and safety	626.1	730.7	104.6	2.2
Education and training	739.3	915.8	176.5	3.1
Health care and social assistance	1 061.8	1 371.4	309.7	3.7
Arts and recreation services	181.6	221.9	40.3	2.9
Other services	428.4	457.2	28.8	0.9
All industries	10 082.1	11 495.6	1 413.5	1.9

Notes:

1. Employment is based on year ending May and population aged 15 years and over.

2. Total employed persons were calculated after excluding industry not stated and inadequately described from denominator.

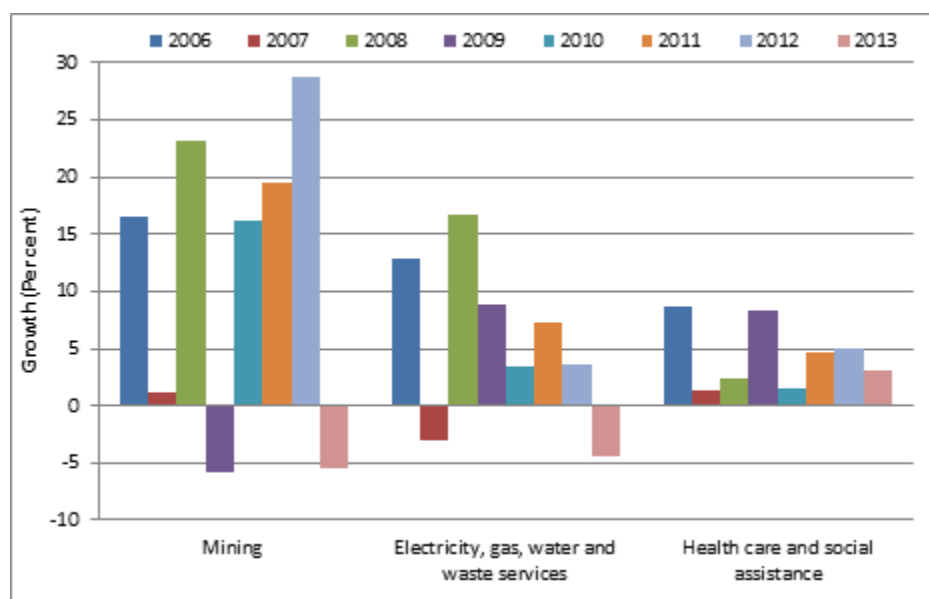
^a Classified according to the *Australian and New Zealand Standard Industrial Classification* (ANZSIC), 2006 (ABS 2006).

Source: ABS (2013c).

Between 2006 and 2013, the average annual rate of employment growth at the national level by all industries was 1.9 per cent. From an industry perspective, job growth in the *Mining* industry was much faster (10.3 per cent per annum) compared to other industries. The *Electricity, gas, water and waste services* industry job growth was 4.4 per cent per annum, followed by the *Health care and social assistance* industry (3.7 per cent per annum) and *Professional, scientific and technical services* (3.3 per cent). Conversely, jobs declined in three industries (i.e. *Agriculture, forestry and fishing*, *Information media and telecommunications*, and *Manufacturing*). There are several factors that have been advanced as responsible for job decline in the *Manufacturing* industry, such as strong international price competition, labour productivity improvements which have limited employment growth, an increase in outsourcing, and a general shift in the structure of economic activity in most advanced economies towards services (Deloitte Access Economics 2011, p.14).

While average annual growth rates provide an indicator of the broad underlying behaviour of the annual series over several years, these averages smooth the annual movements in the series and mask the highest and lowest movements (ABS 2012a). Year-on-year employment growth between 2006 and 2013 was calculated for the three fastest growth industries (i.e. *Mining*, *Electricity, gas, water and waste services*, and *Health care and social assistance*) and the data is shown in Figure 1. While the average annual growth of employment in *Mining* industry was 10.3 per cent between 2006 and 2013, there was a year-on-year decline in 2009 and 2013 and very small growth in 2007. Similarly, employment growth in the *Electricity, gas, water and waste services* industry was negative in 2007 and 2013. However, employment in the *Health care and social assistance* sector showed no negative growth and the growth was markedly higher in 2006 and 2009 compared to other years.

Figure 1 Employment growth (year-on-year) for selected industries, 2006 to 2013



Note: Employment is based on year ending May and population aged 15 years and over.
Source: ABS (2013c).

Although the number of employed persons was highest for New South Wales in both 2006 and 2013, the largest increase in employment was in Victoria (373 100 persons or 26.4 per cent of the total employment increase nationally) (Table 5). This increase was, however, closely followed by New South Wales (371 100 persons or 26.2 per cent of the total national employment increase). On the other hand, the average annual growth rate of employment was fastest in Western Australia (3.0 per cent per annum). Employment growth was also relatively high in the Northern Territory (2.7 per cent per annum), but was low in Tasmania (0.6 per cent per annum) between 2006 and 2013.

Table 5 Employment change, States and Territories, 2006 to 2013

States and Territories	Employed persons ('000)			Average annual growth rate (Per cent)
	2006	2013	Change (2006-2013)	
New South Wales	3 242.3	3 613.3	371.0	1.6
Victoria	2 492.2	2 865.3	373.1	2.0
Queensland	2 007.1	2 297.5	290.4	1.9
South Australia	746.3	822.1	75.8	1.4
Western Australia	1 075.1	1 324.1	249.0	3.0
Tasmania	226.6	235.5	9.0	0.6
Northern Territory	101.9	122.9	21.0	2.7
Australian Capital Territory	190.6	214.9	24.3	1.7
Australia	10 082.1	11 495.6	1 413.5	1.9

Note: Employment is based on year ending May and population aged 15 years and over.
Source: ABS (2013c).

Table 6 lists the top three growth industries and the main declining industry in terms of employment change by states and territories between 2006 and 2013. *Health care and social assistance* was the industry which generated the most job growth in New South Wales, Victoria, Queensland and South Australia. It was also the second top job growth industry in Western Australia and the third top job growth industry in the Australian Capital Territory. In Western Australia, *Mining* was the top growth industry generating 53 400 new jobs between 2006 and 2013, while *Construction* was the top growth industry in the Northern Territory during the same period. Conversely, *Manufacturing* was the main industry which experienced job losses in Victoria, Queensland, South Australia and the Australian Capital Territory. *Agriculture, forestry and fishing* was the main industry in employment decline in Western Australia and Tasmania.

Table 6 Contribution to job creation and job loss by industry, States and Territories, 2006 to 2013

States and Territories	Key contributors to job growth (with number of persons change)						Key contributors to job loss	
	Top industry	('000)	2nd industry	('000)	3rd industry	('000)	Industry	('000)
New South Wales	Health care	95.8	Accommodation services	54.3	Education and training	53.2	Rental services	-5.6
Victoria	Health care	71.8	Accommodation services	52.8	Education and training	52.5	Manufacturing	-28.4
Queensland	Health care	73.0	Professional services	48.6	Mining	36.3	Manufacturing	-32.9
South Australia	Health care	25.7	Construction	17.8	Education and training	11.7	Manufacturing	-25.1
Western Australia	Mining	53.4	Health care	37.7	Construction	29.6	Agriculture	-18.3
Tasmania	Education and training	5.7	Construction	3.0	Mining	2.1	Agriculture	-3.5
Northern Territory	Construction	4.8	Education and training	3.0	Transport	2.3	Information services	-1.0
Australian Capital Territory	Public administration	12.1	Professional services	5.5	Health Care	3.0	Manufacturing	-1.5
Australia	Health care	309.7	Professional services	186.8	Education and training	176.5	Manufacturing	-95.5

Note: Employment is based on year ending May and population aged 15 years and over.

For full industry names, Administrative services - Administrative and support services, Financial services - Financial and insurance services, Health care - Health care and social assistance, Public administration - Public administration and safety, Agriculture - Agriculture, forestry and fishing, Rental services - Rental, hiring and real estate services, and Professional Services - Professional, scientific and technical services.

Source: ABS (2013c).

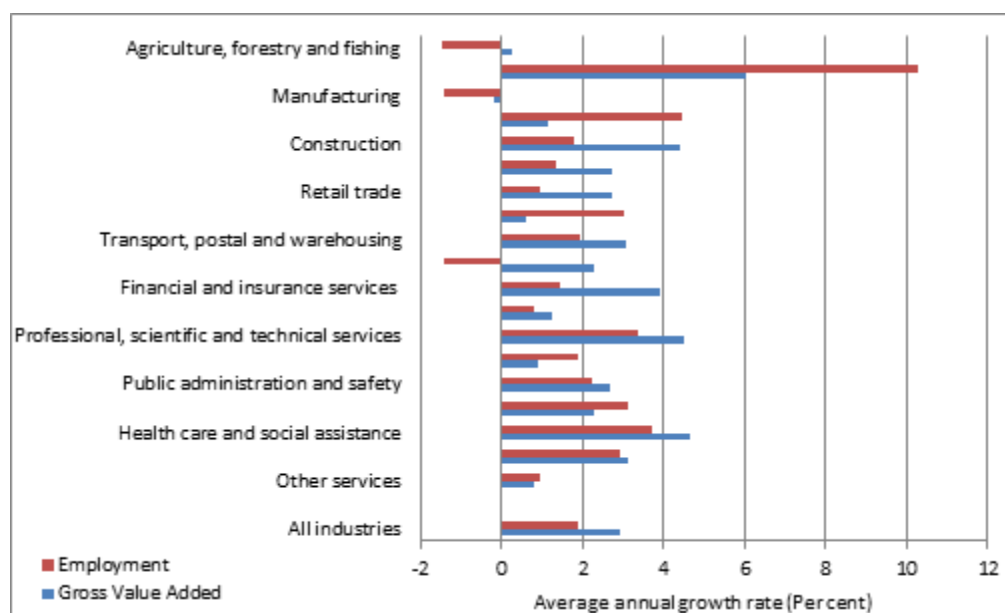
Comparison of Gross Value Added growth and employment growth by industry

As shown previously in Table 4, between May 2006 and May 2013, employment at the national level increased by an average annual growth rate of 1.9 per cent, while the national economy recorded by Gross Value Added (GVA) grew faster than employment growth, at an average annual rate of 2.9 per cent (see Table 1). The average annual growth in employment for each industry was generally lower than the respective industry GVA growth, except for a few industries, such as *Mining, Electricity, gas, water and waste services, Accommodation and food services, Education and training, and Administrative and support services*. For the *Agriculture, forestry and fishing* and *Information media and telecommunications* industries the employment decline between 2006 and 2013 was accompanied by an increase in GVA (although the increase was modest for *Agriculture, forestry and fishing*). Figure 2 shows the comparison of the average annual growth rates of Gross Value Added and employment by industries between 2006 and 2013.

Another way of looking at industry change is the value added per employee or GVA per employed person. GVA per employed person by industries for 2006 and 2013 has been calculated in order to compare the changes during this period. The results are shown in Figure 3, and provide a proxy to labour productivity.

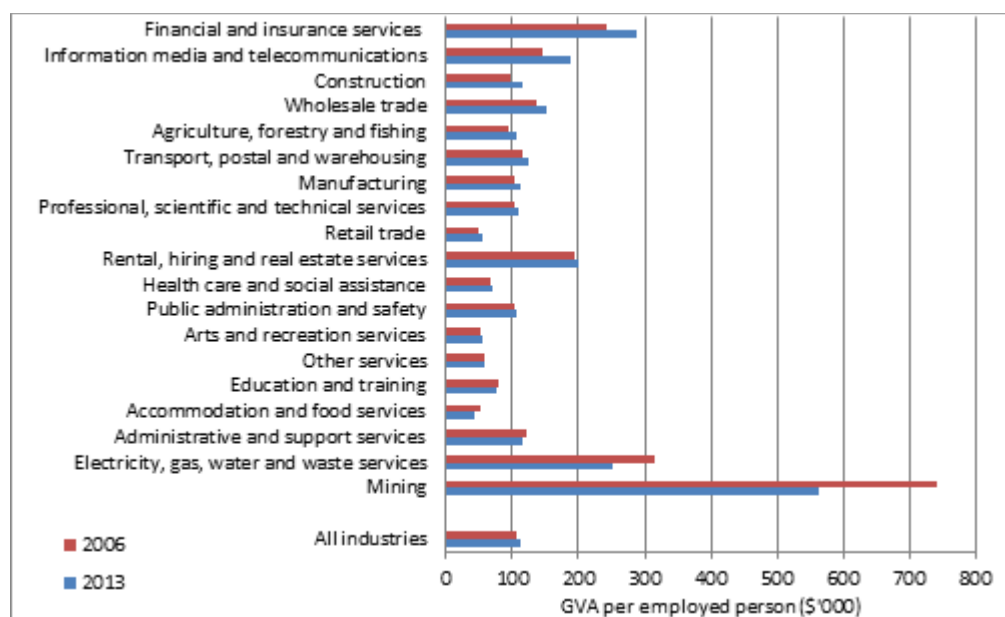
Nationally, GVA per employed person was \$7 800 higher in 2013 compared to 2006 (\$113 500 versus \$105 800). Between 2006 and 2013, the industries which experienced the highest increase in GVA per employed person were *Financial and insurance services* (\$44 400) and *Information media and telecommunications* (\$42 600). Several industries (e.g. *Mining, Electricity, gas, water and waste services, Administrative and support services, Accommodation and food services*) showed higher GVA per employed person in 2006 than in 2013. Productivity Commission (2014) attributes the Mining industry's recent productivity decline to a strong rise in industry inputs without a simultaneous rise in production, as well as the recent decline in mineral prices.

Figure 2 Average annual growth rates of employment and Gross Value Added by industry, 2006 and 2013



Source: Table 1 and Table 4.

Figure 3 Gross Value Added per employed person by industry, 2006 and 2013



Source: Table 1 and Table 4.

Employment change in regions, 2006 to 2011

This section provides information on employment change between 2006 and 2011 for the broad regional types and BITRE WZs. The analysis is based on 2006 Australian Statistical Geographical Classification (AGSC) boundaries. Census 'Place of Usual Residence' or PUR data for 2011 SLAs was concorded back to 2006 SLAs boundaries. The SLA data for 2006 and 2011 was then aggregated to each geographic classification specified above. For analysis of industry employment shares, industry 'not stated' and 'inadequately described' responses were excluded from the denominator.⁴

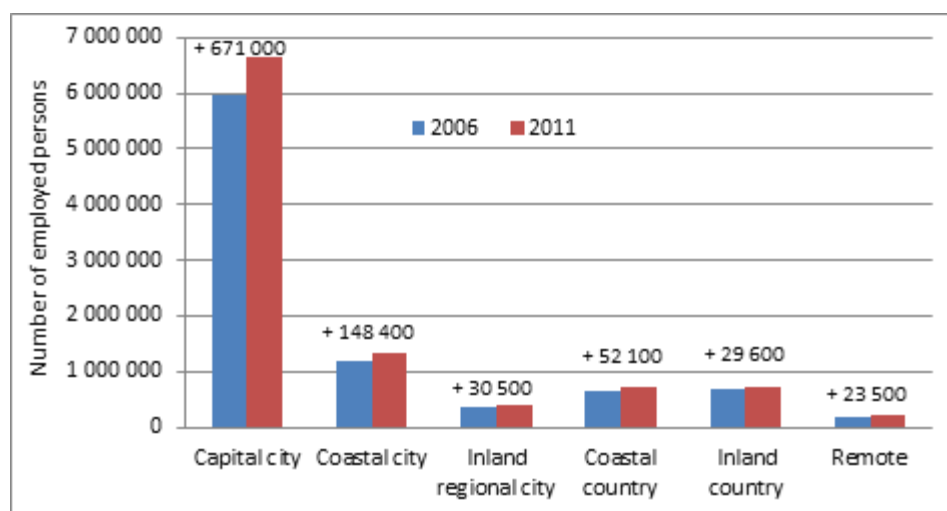
⁴ These two categories together account for 2.3 per cent (233 886 persons) of total employed people in the 2011 Census.

Employment change by region type

This section uses a regional summary classification to see how the industry drivers of employment growth vary across different types of regions. It presents employment change by industry between 2006 and 2011 based on six broad types of geographical area⁵ utilising the 2006 ASGC. These six geographical (regional) classifications are: Capital cities, Coastal cities, Inland cities, Coastal country areas, Inland country areas and Remote areas. Details of the classification can be found in BITRE (2011a, p.6, Footnote 7).

According to the ABS 'Basic Community Profile', nationally there were 954 100 additional employed persons in 2011, compared to 2006, representing an average annual growth rate of 2.1 per cent per annum. Figure 4 shows employed persons by the region type classification in 2006 and 2011. It also presents the employment change between 2006 and 2011.

Figure 4 Total employed persons by region type, 2006 and 2011



Notes:

1. Based on 'Place of Usual Residence' and 2006 AGSC boundaries.
 2. 'Off-shore areas and migratory', 'External territories' and 'No-fixed address' categories were excluded.
 3. Numbers are the employment change between 2006 and 2011 and rounded to nearest 100.
- Source: BITRE analysis of ABS (2008, 2013d).

Capital city employment growth was more than two-thirds (70 per cent) of total growth (671 000 persons, out of 955 000 persons⁶). The second most employment growth was observed for Coastal cities (148 400 persons or nearly 16 per cent of total growth). The share of total employment growth for other areas ranged between 2.5 per cent (Remote areas) and 5.5 per cent (Coastal country).

Between 2006 and 2011, the average annual employment growth rate was fastest in Coastal cities (2.4 per cent), followed closely by Remote areas (2.3 per cent) and Capital cities (2.1 per cent). The increase in employment in Remote areas is due to the expansion of the resources sector, especially the mining industry (Connolly and Orsmond 2011). Employment growth rates in these three areas are higher than the national average annual employment growth rate (2.0 per cent). In contrast, Inland country has the lowest average annual growth rate (0.8 per cent), while employment grew in Inland regional city and Coastal country by around 1.6 per cent per annum each. Therefore, there is a pattern of employment growth (excluding Remote areas), being higher in city areas and lower in country areas.

⁵ Brief description of six regional classifications are:

1. Capital cities—Capital city Statistical Divisions (SDs) from each of the states and territories as defined by the ABS.
2. Coastal cities—ABS Statistical Districts (for details, refer BITRE 2011a, p.5, Footnote 6) which are primarily urban and have 25 000 persons or more. These cities border the coastline or have their geographic centre within 50 kilometres of the coast.
3. Inland cities—ABS Statistical Districts which are primarily urban and have 25 000 persons or more. These cities do not border a coastline or have their geographic centre within 50 kilometres of the coast.
4. Coastal country area—SLAs that border the coastline or have their geographic centre within 50 kilometres of the coast and are not classified as either remote or very remote (based on the ABS Remoteness structure) or as a coastal city.
5. Inland country areas—SLAs whose geographic centre is not within 50 kilometres of the coast and not otherwise classified as an inland city based on Statistical Districts or classified as remote or very remote (based on the ABS Remoteness structure).
6. Remote areas—Any SLA region that is predominantly classified as remote or very remote under the 2006 ABS Remoteness Structure (remote SLAs located in capital city SDs will remain with the capital city).

⁶ 'Off-shore areas and migratory', 'External territories' and 'No-fixed address' categories were excluded.

Table 7 identifies the industries that added the most jobs between 2006 and 2011 for each of the six types of regions. *Health care and social assistance* was the main contributor to job growth in all areas, except Remote areas, where *Mining* was the main contributor to job growth. *Mining* was also the second top contributor to job growth in Inland country. The *Professional, scientific and technical services* industry was the second top contributor to job growth in Capital cities, while the second top contributor was *Education* in Coastal cities, *Public administration and safety* in Inland regional cities, and *Construction* in Coastal country and Remote areas.

Between 2006 and 2011, *Agriculture, forestry and fishing* was the major job loss industry in Coastal cities, Coastal country, Inland country and Remote areas, while *Manufacturing* recorded the largest net job loss in Capital cities and Inland regional cities.

Table 7 Principal industry contributors to employment change at regional scale, 2006 to 2011

Regional classification	Key contributors to job growth (with persons in brackets)		Key contributors to job decline (with persons in brackets)
	Top industry	2nd top industry	
Capital city	Health Care (+134 800)	Professional (+103 800)	Manufacturing (–38 400)
Coastal city	Health Care (+39 400)	Education (+16 600)	Agriculture (–2 000)
Inland regional city	Health Care (+9 900)	Public Administration (+4 100)	Manufacturing (–2 700)
Coastal country	Health Care (+15 000)	Construction (+7 600)	Agriculture (–7 200)
Inland country	Health Care (+11 500)	Mining (+7 900)	Agriculture (–14 700)
Remote	Mining (+12 000)	Construction (+5 700)	Agriculture (–3 700)
Australia	Health Care (+211 400)	Professional (+127 800)	Manufacturing (–48 900)

Notes:

1. Based on 'Place of Usual Residence'.
2. Health Care = Health care and social assistance, Professional = Professional, scientific and technical services, Education = Education and training, Public Administration = Public administration and safety, and Agriculture = Agriculture, forestry and fishing.
3. Numbers are the employment change between 2006 and 2011 and rounded to nearest 100.

Source: BITRE analysis of ABS (2008, 2013d).

Employment change by working zone

In this section, employment change between 2006 and 2011 is investigated using the BITRE working zone (WZ) classification. Each WZ represents a functional labour market, as reflected by commuting patterns. The rationale for using this classification was explained earlier in Box 1.

Distribution of industry employment change across working zones

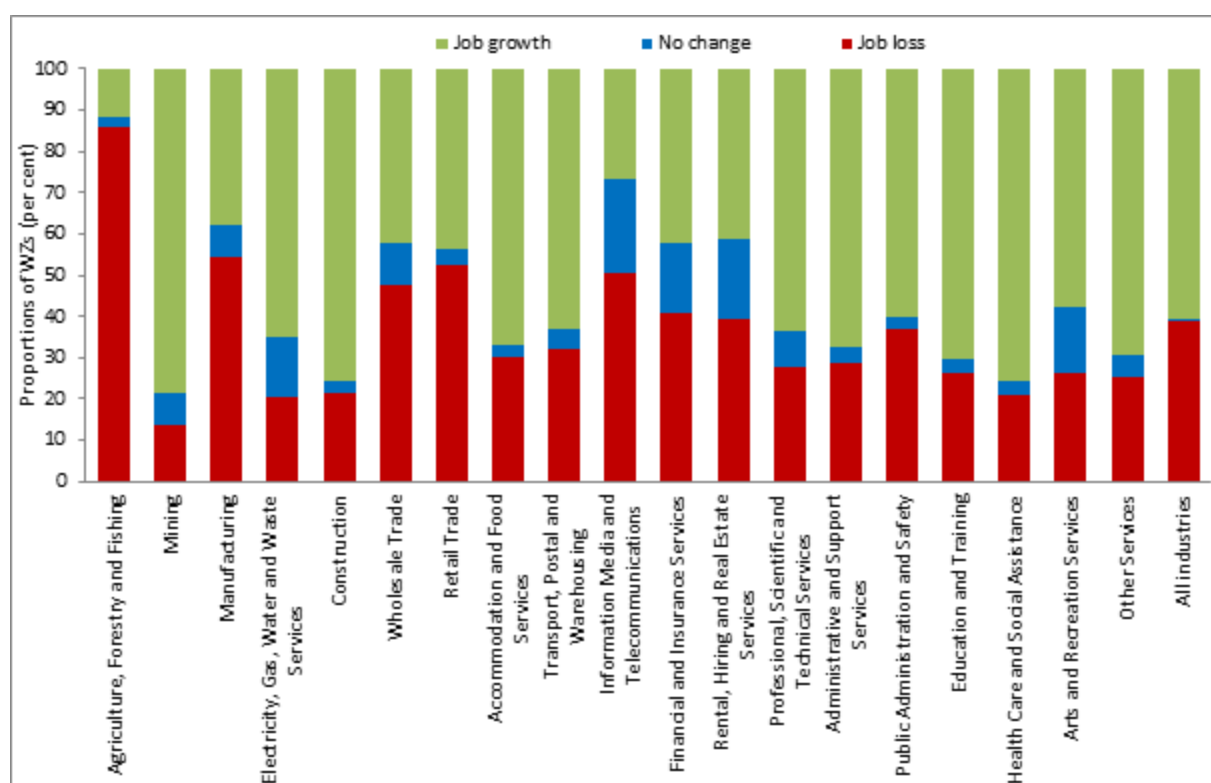
This subsection provides results of distribution of industry employment change across all working zones in Australia between 2006 and 2011.

Of the 391 (WZs) in Australia, 60.6 per cent experienced employment growth between 2006 and 2011, while 38.9 per cent experienced employment decline, and 0.5 per cent recorded no change. According to the census data, the only two industries which experienced a net loss of jobs nationally between 2006 and 2011 were *Manufacturing* (–48 900) and *Agriculture, forestry and fishing* (–30 900).

Figure 5 shows that *Agriculture, forestry and fishing* is the industry which declined most frequently across WZs, with 86 per cent of WZs experiencing job loss, and only 12 per cent experiencing job growth. National employment in this industry declined by 11 per cent over the period, and the rate of decline was fairly homogenous, with 71 per cent of WZs recording a decline in the 0-20 per cent range. For *Manufacturing*, the picture was more mixed, with 54 per cent of WZs recording job loss and 38 per cent recording job growth.

For the 2006 to 2011 period, *Mining* is the industry which is most frequently growing across WZs (79 per cent of WZs experienced job growth), followed by *Health care and social assistance* and *Construction* (76 per cent each). While *Mining* industry employment rose in the great majority of WZs, there was a great deal of variation in the extent of that growth, with 29 per cent of WZs more than doubling their *Mining* industry employment, and others recording much more modest growth rates. The *Construction* industry also displayed considerable variation in employment growth rates across WZs, while WZ growth rates showed less variation for *Health care and social assistance*.

Figure 5 Distribution of employment change for each industry, 2006 to 2011



Notes:

1. One digit level of industry, classified according to ANZSIC 2006 (ABS 2006).

2. Employment is based on 'Place of Usual Residence' (PUR).

Source: BITRE analysis of ABS (2008, 2013d).

The coefficient of industry localisation (see Kim, 1995) provides an indication of the extent to which an industry's employment is dispersed across Australia's regions. A coefficient of zero means that industry employment is distributed across the WZs in line with total employment, while a coefficient of 100 per cent indicates employment is fully localised in a single WZ.

In 2011, the distribution of *Education and training* industry jobs across Australia's 388 WZs was very closely aligned with the distribution of total employment across those WZs (Localisation coefficient = 4.8 per cent). The same was true for the *Other Services* (4.5 per cent) and *Retail trade* (5.9 per cent) industries. The *Health care and social assistance*, *Construction*, *Accommodation and food services*, *Administrative and support services*, and *Transport, postal and warehousing* industries all had coefficients in the 7-10 per cent range.

At the other end of the spectrum, Australia's most localised industries were *Mining* (68.5 per cent) and *Agriculture, forestry and fishing* (67.8 per cent). This reflects *Mining* and *Agriculture, forestry and fishing* jobs tending to be heavily concentrated in WZs with a relatively low population and employment base. The *Financial and insurance services* (25.6 per cent) and *Information, media and telecommunications* (26.9 per cent) industries are also somewhat localised. For these industries, employment is very heavily concentrated in the largest cities, to a much greater extent than is general employment.

For most industries, the localisation coefficient was fairly stable between 2006 and 2011. However, there was a significant rise in the localisation coefficient for *Information media and telecommunications* (3.5 percentage points) and *Finance and insurance services* (2.4 percentage points) as the spatial distribution of jobs in these industries became increasingly concentrated within Sydney and Melbourne. The localisation coefficient declined by between 2 and 3 percentage points for *Mining*, *Electricity gas water and waste services* and *Rental hiring and real estate services* between 2006 and 2011. The spatial distribution of employment in these industries became less localised and increasingly aligned with the spatial distribution of total employment across WZs. For example, the mining boom resulted in a larger number of WZs being specialised in *Mining* in 2011 (compared to 2006), with extremely rapid *Mining* industry employment growth rates in some (previously) non-specialised WZs, such as Brisbane, Gold Coast, Sunshine Coast, Bathurst, Narrabri, Mildura and Bundaberg.

Employment change for selected working zones

There are 38 working zones (WZs) in Australia with an estimated resident population (ERP) of 50 000 or more in 2011. This section compares ABS *Census of Population and Housing* PUR data for 2006 and 2011 and identifies employment changes in these 38 WZs. The results are presented in Table 8.

Table 8 Employment change by working zones, 2006 to 2011

Working Zone	Number of employed persons (2011)	Change in employed persons (2006-2011)	Average annual growth rate (Per cent)	Share of total employment (Per cent)		Estimated Resident Population (2011)
				2006	2011	
Sydney and surrounds	2 063 261	159 746	1.6	20.9	20.5	4 608 874
Melbourne and surrounds	1 976 615	222 834	2.4	19.3	19.7	4 279 251
Brisbane and surrounds	1 021 057	113 733	2.4	10.0	10.2	2 169 379
Perth and surrounds	865 468	128 980	3.3	8.1	8.6	1 851 906
Adelaide and surrounds	612 307	45 774	1.6	6.2	6.1	1 347 289
Gold Coast-Tweed	259 766	30 731	2.6	2.5	2.6	594 981
Newcastle and surrounds	236 251	24 501	2.2	2.3	2.4	550 540
Canberra and surrounds	232 069	24 032	2.2	2.3	2.3	437 968
Sunshine Coast	135 069	15 454	2.5	1.3	1.3	318 279
Wollongong and surrounds	119 451	8 588	1.5	1.2	1.2	289 092
Geelong and surrounds	114 357	12 538	2.3	1.1	1.1	256 521
Hobart and surrounds	107 989	7 730	1.5	1.1	1.1	244 549
Townsville and surrounds	87 013	10 681	2.7	0.8	0.9	180 114
Toowoomba and surrounds	75 413	5 162	1.4	0.8	0.8	170 389
Cairns and surrounds	69 503	5 860	1.8	0.7	0.7	153 587
Darwin and surrounds	63 499	8 942	3.1	0.6	0.6	130 326
Bendigo and surrounds	54 796	5 340	2.1	0.5	0.5	124 383
Launceston and surrounds	52 720	2 924	1.1	0.5	0.5	123 484
Ballarat and surrounds	53 061	5 374	2.2	0.5	0.5	120 333
Lismore, Casino, Ballina and surrounds	46 596	1 360	0.6	0.5	0.5	117 349
Mackay and surrounds	57 348	9 256	3.6	0.5	0.6	115 960
Rockhampton and surrounds	49 837	5 903	2.6	0.5	0.5	112 333
Albury-Wodonga and surrounds	47 924	2 179	0.9	0.5	0.5	103 139
Burnie, Devonport and surrounds	39 312	2 292	1.2	0.4	0.4	99 196
Shoalhaven	33 848	2 553	1.6	0.3	0.3	96 203
Hervey Bay, Maryborough and surrounds	30 880	2 238	1.5	0.3	0.3	93 983
Bunbury and surrounds	41 087	5 840	3.1	0.4	0.4	89 831
Bundaberg and surrounds	31 408	2 249	1.5	0.3	0.3	84 723
Coffs Harbour and surrounds	32 770	2 593	1.7	0.3	0.3	83 895
Latrobe Valley	34 556	2 509	1.5	0.4	0.3	83 087
Wagga Wagga and surrounds	34 256	1 653	1.0	0.4	0.3	75 247
Hastings	27 622	2 509	1.9	0.3	0.3	75 232
Shepparton and surrounds	28 137	1 061	0.8	0.3	0.3	65 261
Orange and surrounds	26 387	2 306	1.8	0.3	0.3	59 847
Tamworth Regional	24 895	1 536	1.3	0.3	0.2	58 228
Mildura and Wentworth	22 687	-50	0.0	0.3	0.2	55 184
Gladstone and surrounds	26 196	4 254	3.6	0.2	0.3	53 788
Gympie and surrounds	18 715	1 649	1.9	0.2	0.2	50 515
Other Working Zones	1 188 703	61 179	1.1	12.4	11.8	2 811 634
All Working Zones	10 042 830	953 994	2.0	100.0	100.0	22 336 442

Notes:

1. Working Zones are based on estimated resident population or ERP (2011) of 50 000 or more.

2. One digit level of industry, classified according to ANZSIC 2006 (ABS 2006).

3. Employment is based on 'Place of Usual Residence' (PUR).

Source: BITRE analysis of ABS (2008, 2013d).

Between 2006 and 2011, the average annual growth of employment for Australia was 2.1 per cent. There were 16 of the 38 WZs which grew faster than the national average employment growth. The average annual growth rate of employment was highest for Mackay and surrounds (3.7 per cent), followed by Gladstone and surrounds (3.6 per cent). The employment growth in the two regional Queensland WZs relates to the expansion of mining capacity in central Queensland. Mildura and surrounds experienced the lowest growth in employment, in both absolute and relative terms, among these 38 WZs listed in Table 8.

Although Melbourne and surrounds added the most jobs to its employment base during this period (an additional 220 845 jobs), Melbourne's average annual growth of employment was lower (2.5 per cent per annum) than Perth and surrounds, which added nearly 130 000 jobs and grew at an average rate of 3.4 per cent per annum. Sydney and surrounds added nearly 159 000 jobs between 2006 and 2011, but the average annual growth rate was lower (1.7 per cent).

The combined average annual rate of employment growth for the non-selected WZs (each of which had ERP of less than 50 000 in 2011) was only 1.1 per cent. The Queensland state balance (i.e. that part of Queensland outside of the Brisbane WZ) added the most employment (104 300 persons) between 2006 and 2011, followed by the state balances of New South Wales, Victoria and Western Australia. The state balances of South Australia, Tasmania and Northern Territory experienced small increases in employment between 2006 and 2011. The average annual growth rate of employment between 2006 and 2011 was highest for Western Australia state balance (3.0 per cent), followed by Queensland state balance (2.1 per cent) and lowest for South Australia state balance (0.6 per cent).

Employment change in Capital city working zones

Since industries have different preferences as to where they locate, the industry mix of job growth in each city has implications for the spatial distribution of employment, and in turn, for commuting patterns. For each capital city WZ, Table 9 presents the three main industry contributors to employment growth and the top contributor to industry employment decline between 2006 and 2011.

Table 9 Principal industry contributors to employment change for capital city working zones, 2006 to 2011

Capital city working zone	Net job creation (Number)	Key contributors to job growth (with persons in brackets)			Key contributors to job decline
		Top industry	2nd top industry	3rd top industry	
Sydney	159 746	Health care (+35 600)	Professional services (+28 600)	Education and training (+20 000)	Manufacturing (-9 700)
Melbourne	222 834	Health care (+42 800)	Construction (+33 100)	Professional services (+31 600)	Manufacturing (-12 000)
Brisbane	113 733	Health care (+28 500)	Professional services (+19 600)	Public Administration (+11 500)	Manufacturing (-6 000)
Adelaide	45 774	Health care (+12 400)	Construction (+8 400)	Public Administration (+7 000)	Manufacturing (-9 200)
Perth	128 980	Construction (+19 300)	Professional services (+18 300)	Mining (+17 600)	Agriculture (-800)
Hobart	7 730	Construction (+1 500)	Education and training (+1 500)	Health care (+1 400)	Manufacturing (-1 100)
Darwin	8 942	Public Administration (+2 100)	Construction (+1 500)	Health care (+1 400)	Agriculture (-100)
Canberra	24 032	Public Administration (+13 100)	Construction (+3 200)	Health care (+2 800)	Manufacturing (-800)

Notes:

1. Working Zones are based on estimated resident population or ERP (2011) of 50 000 or more.
2. Health care - Health care and social assistance, Professional services - Professional, scientific and technical services; Public Administration - Public administration and safety, and Agriculture - Agriculture, forestry and fishing.
3. One digit level of industry, classified according to ANZSIC 2006 (ABS 2006).
4. Employment is based on 'Place of Usual Residence' (PUR).
5. Numbers of job growth or decline were rounded to nearest 100.
6. The Canberra and surrounds WZ includes Queanbeyan and Yass.

Source: BITRE analysis of ABS (2008, 2013d).

Health care and social assistance was the industry experiencing the greatest job growth in Sydney, Melbourne, Brisbane and Perth WZs. It also had the third highest job growth in the Hobart, Darwin and Canberra WZs. *Construction* was the industry which experienced the highest employment growth in the Perth and Hobart WZs. *Construction* was also the second largest growth industry in the Melbourne, Adelaide, Darwin and Canberra WZs. *Public administration and safety* was the industry which experienced the highest employment growth in the Darwin and Canberra WZs.

Table 9 also shows that *Manufacturing* was the industry which suffered from the strongest decline in six of the eight capital city WZs, while *Agriculture, forestry and fishing* was the main job loss industry for Perth and Darwin WZs.

Employment change in non-capital working zones

Table 10 identifies the principal industry contributors to employment growth and decline in each of the 30 selected non-capital WZs (with more than 50 000 people) between 2006 and 2011. *Health care and social assistance* added the most jobs in 24 of the non-capital WZs. *Mining* and *Construction* were two other industries making an important contribution to regional job growth between 2006 and 2011. The *Mining* industry is the main contributor to growth for three non-capital WZs—Mackay and surrounds, Burnie, Devonport and surrounds, and Orange and surrounds. The *Construction* industry is the main contributor to growth for the other three non-capital WZs—Launceston and surrounds, Bunbury and surrounds, and Gladstone and surrounds. The table also shows that *Construction* was the second top industry contributor to employment growth in nine non-capital WZs, followed by *Mining* in five non-capital working zones, *Health care and social assistance* in four non-capital WZs, and *Education and training* in another four non-capital WZs.

On the other hand, the *Agriculture, forestry and fishing* industry was the industry that suffered from the strongest employment decline in 14 of the 30 non-capital WZs between 2006 and 2011. This is followed by the *Manufacturing* industry which was the main contributor to employment decline in nine non-capital WZs. *Retail trade* was the main industry source of job loss in three non-capital WZs, while the *Construction* and *Information media and telecommunications* industries were the main source of job loss in two non-capital WZs each.

Key growth industries—*Health care and social assistance* and *Construction*

The *Health care and social assistance* industry was the largest growth industry for employment in Australia between 2006 and 2011, adding more than 300 000 jobs. It was also the main contributor to employment growth for 28 of the 38 presented WZs between 2006 and 2011. Similarly, the *Construction* industry frequently features as an important contributor to employment growth in both the capital city and non-capital city WZs (see Tables 10 and 11), Table 11 presents the employment change in the *Health care and social assistance* and *Construction* industries by capital and non-capital WZs between 2006 and 2011.

Among the eight capital city WZs, Melbourne, Sydney and Brisbane experienced the highest employment growth of more than 28 500 people in the *Health care and social assistance* industry between 2006 and 2011. All 30 non-capital WZs experienced employment growth of more than 300 people in the *Health care and social assistance* industry.

For the *Health care and social assistance* industry, the lowest average annual growth rate of employment was in Launceston (1.7 per cent) and Hobart (2.2 per cent). Several WZs in regional Queensland experienced an average annual growth rate of more than 6.0 per cent (such as Cairns and surrounds, Gold Coast-Tweed, Bundaberg and surrounds, Sunshine Coast, Hervey Bay, Maryborough and surrounds, and Gympie and surrounds).

The largest increase in *Construction* industry employment between 2006 and 2011 occurred in Melbourne and surrounds, but the employment growth was fastest in Darwin and surrounds (6.2 per cent per annum), Gladstone and surrounds (6.1 per cent) and Perth and surrounds (5.2 per cent). The Sydney and Brisbane WZs both added around 11 000 *Construction* jobs during this period, but the average annual growth rate was not particularly high (1.8 per cent and 2.8 per cent per annum, respectively).

Among non-capital city WZs, the highest employment growth in the *Construction* industry was in Geelong and surrounds (2251 persons), followed by Newcastle and surrounds (1869 persons) and Gold Coast-Tweed (1569 persons). However, three WZs (i.e. Hervey Bay, Maryborough and surrounds, Cairns and surrounds,

Table 11 Employment change in Health care and social assistance and Construction industries, capital and non-capital working zones, 2006 to 2011

Working zones	Health care and social assistance			Construction		
	Employed persons in 2011 ('000)	Change in employed persons (2006-2011) ('000)	Average annual growth rate (Per cent)	Employed persons in 2011 ('000)	Change in employed persons (2006-2011) ('000)	Average annual growth rate (Per cent)
Capital city working zones						
Sydney and surrounds	224 827	35 599	3.5	145 517	10 892	1.6
Melbourne and surrounds	219 030	42 754	4.4	163 301	33 094	4.6
Brisbane and surrounds	126 081	28 537	5.3	85 225	11 004	2.8
Perth and surrounds	94 302	16 236	3.9	86 417	19 327	5.2
Adelaide and surrounds	86 200	12 448	3.2	46 940	8 428	4.0
Hobart and surrounds	13 637	1 431	2.2	8 274	1 485	4.0
Darwin and surrounds	5 873	1 403	5.6	5 772	1 497	6.2
Canberra and surrounds	21 010	2 823	2.9	15 570	3 155	4.6
Non-capital city working zones						
Geelong and surrounds	15 282	3 440	5.2	11 491	2 251	4.5
Gold Coast-Tweed	30 269	8 437	6.8	29 008	1 569	1.1
Newcastle and surrounds	32 603	5 606	3.8	18 991	1 869	2.1
Sunshine Coast	17 996	4 873	6.5	15 626	352	0.5
Wollongong and surrounds	15 867	3 085	4.4	9 391	453	1.0
Townsville and surrounds	10 911	2 569	5.5	8 550	993	2.5
Toowoomba and surrounds	9 942	1 707	3.8	5 885	730	2.7
Cairns and surrounds	8 911	2 714	7.5	6 125	-226	-0.7
Bendigo and surrounds	8 217	1 579	4.4	4 827	735	3.4
Launceston and surrounds	6 478	531	1.7	4 011	670	3.7
Ballarat and surrounds	7 782	1 440	4.2	4 691	927	4.5
Lismore, Casino, Ballina and surrounds	7 384	1 098	3.3	3 546	219	1.3
Mackay and surrounds	4 980	1 130	5.3	5 911	1 052	4.0
Rockhampton and surrounds	6 370	1 355	4.9	4 368	588	2.9
Albury-Wodonga and surrounds	6 428	1 202	4.2	3 994	174	0.9
Burnie, Devonport and surrounds	4 624	599	2.8	3 108	584	4.3
Shoalhaven	4 786	1 109	5.4	3 149	27	0.2
Hervey Bay, Maryborough and surrounds	5 031	1 291	6.1	2 722	-378	-2.6
Bunbury and surrounds	4 047	967	5.6	5 482	1 083	4.5
Bundaberg and surrounds	4 784	1 335	6.8	2 537	67	0.5
Coffs Harbour and surrounds	5 000	1 112	5.2	3 071	539	3.9
Latrobe Valley	4 373	830	4.3	3 392	223	1.4
Wagga Wagga and surrounds	4 495	833	4.2	2 489	366	3.2
Hastings	4 414	1 085	5.8	2 527	104	0.8
Shepparton and surrounds	3 959	710	4.0	2 197	242	2.4
Orange and surrounds	3 915	689	3.9	1 877	251	2.9
Tamworth Regional	3 545	680	4.4	1 862	284	3.4
Mildura and Wentworth	2 674	482	4.1	1 553	-44	-0.6
Gladstone and surrounds	1 704	313	4.1	3 602	924	6.1
Gympie and surrounds	2 105	555	6.3	1 685	164	2.1
All other working zones	125 354	15 630	2.9	91 744	12 401	3.1
Australia	1 165 191	210 218	4.1	826 428	118 075	3.1

Notes:

1. Working Zones are based on estimated resident population or ERP (2011) of 50 000 or more.

2. One digit level of industry, classified according to ANZSIC 2006 (ABS 2006).

3. Employment is based on 'Place of Usual Residence' (PUR).

Source: BITRE analysis of ABS (2008, 2013d).

Box 2: Changes in employment in Australia's Health care and social assistance industry, 2006 to 2011

Between the 2006 and 2011 censuses, the *Health care and social assistance* industry was one of the fastest growing industries in Australia and has overtaken the *Retail trade* industry to become the largest employing sector. It increased its workforce by 211 500 persons (from 956 100 in 2006 to 1 167 600 in 2011), an average annual growth rate of 4.1 per cent or total growth of 22.1 per cent. It contributed 22.2 per cent of the national increase in employment between 2006 and 2011.

The *Health care and social assistance* sub-industries that held the largest share of all employed persons were *Hospitals* (around 31 per cent) and *Residential care services* (15–16 per cent) (Table 12). Between 2006 and 2011, *Hospitals* had the largest increase of 57 100 persons, which was 27.0 per cent of the increase in employment, while *Residential care services* added 42 100 new jobs. The other major employing industry sectors (3-digit level) include *Child care services*, *Other social assistance services*, *Allied health services* and *Residential care services* (which mainly relates to Aged Care (4-digit level)). Between 2006 and 2011, employment in *Medical services* grew relatively slowly (2.8 per cent per annum).

Table 12 Contribution to job creation in the Health care and social assistance industry, 2006 to 2011

Industry Sector (3-digit level)	Change in employed persons (2006–2011)	Share of growth (Per cent)	Sectoral share of employment (Per cent)		Average annual growth rate (Per cent)
			2006	2011	
Hospitals	57 085	27.0	31.8	30.9	3.5
Residential Care Services	42 052	19.9	14.9	15.8	5.3
Other Social Assistance Services ¹	32 764	15.5	10.5	11.4	5.8
Allied Health Services ²	32 504	15.4	10.4	11.3	5.8
Child Care Services	24 901	11.8	7.8	8.5	6.0
Medical Services	12 954	6.1	9.1	8.6	2.8
Other Health Care Services ³	6 915	3.3	1.9	2.1	6.8
Pathology and Diagnostic Imaging Services	5 285	2.5	3.0	2.9	3.4
Health care and social assistance, nfd [*]	12 868	6.1	3.6	4.0	6.6
Social Assistance Services, nfd [*]	-980	-0.5	3.2	2.5	-0.6
Medical and Other Health Care Services, nfd [*]	-14 864	-7.0	3.8	1.9	-9.8
Total employment ('000)	211.5	100	956.1	1 167.6	4.1

Note:

Three digit level of Industry, classified according to ANZSIC, 2006 (ABS 2006).

¹ Other Social Assistance Services includes Adoption service, Adult day care centre operation, Aged care assistance service, Alcoholics anonymous operation, Disabilities assistance service, Marriage guidance service, Operation of soup kitchen (including mobile), Welfare counselling service and Youth welfare service.

² Allied Health Services includes Dental Services, Optometry and Optical Dispensing, Physiotherapy Services, Chiropractic and Osteopathic Services and Other Allied Health Services.

³ Other Health Care Services includes Ambulance Services which provide Aerial ambulance service and Ambulance services.

* Not further defined.

Source: BITRE analysis of ABS Census of Population and Housing place of usual residence data for 2006 and 2011 (data extracted using TableBuilder Pro).

Between 2006 and 2011, key characteristics of employment growth in the *Health care and social assistance* industry include:

- Employment growth was dominantly by females who contributed 80.7 per cent of the increase in employed persons.
- It was concentrated amongst employed persons working 35 to 39 hours per week (26.8 per cent) and 25 to 34 hours per a week (20.7 per cent).
- It was focused in the 25 to 29 year age group (16.5 per cent), and in the over 50 year categories particularly amongst 50 to 54 year olds (14.2 per cent), 55 to 59 year olds (13.9 per cent) and 60 to 64 year olds (15.8 per cent). The average age of males (44.0 years) remains slightly higher than that of females (42.7 years).

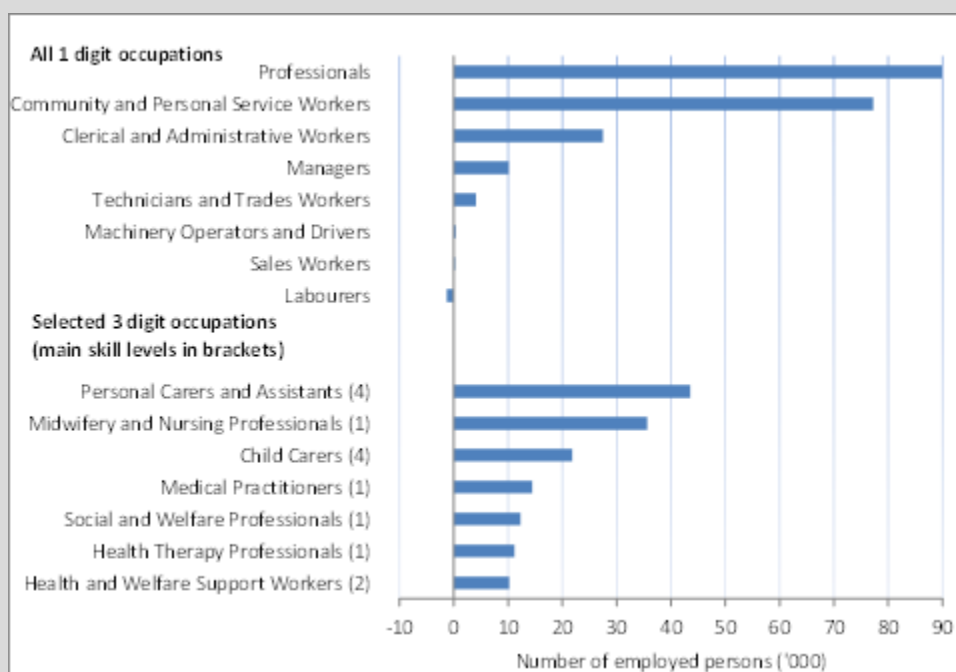
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- The private sector provided 72.5 per cent of additional employment, and maintained a 73.6 per cent share of total employment in the industry. State Governments provided a further 26.2 per cent of employment growth, mainly within hospitals (22.3 per cent).
- The mean weekly income of employed persons increased from \$834 in 2006 to \$1021 in 2011 (or 22.5 per cent), similar to the increase of 23.0 per cent observed across all industries.

Generally, areas with higher proportions of employed people working in the *Health care and social assistance* industry tend to be clustered around secondary employment hubs, such as hospitals, rather than Central Business Districts (CBDs) (DIT 2013).

In addition, the skill levels of people employed in the *Health care and social assistance* industry also changed between 2006 and 2011. Figure 6 shows the growth in employed persons for selected occupations. The occupations (1 digit level) that added the most employed persons were *Professionals* (around 89 900 persons), *Community and personal service workers* (77 200), and *Clerical and administrative workers* (27 400). *Personal carers and assistants* were identified as the major sub-occupation (3 digit level) contributing to employment growth (43 600), which was mainly due to growth in *Aged and disabled carers* (28 600), and *Nursing support and Personal care workers* (11 800). *Child carers* also increased significantly (21 800) between 2006 and 2011, and were a major contributor to employment growth behind *Midwifery and nursing professionals*, which increased by 35 600 persons. When these occupations are classified using the ANZSCO, growth is identified to be concentrated at both the top and bottom ends of the skills-spectrum (Figure 6).

Figure 6 Growth of selected 1-digit and 3-digit occupations in the Health care and social assistance industry, 2006 to 2011



Note: Skill level in brackets is based on Australian and New Zealand Standard Classification of Occupations (ANZSCO) which classifies the skill level of occupations from 1 (highest) to 5 (lowest). Skill level 1 is associated with bachelor degree or higher qualifications, and skill level 4 is equivalent to certificate level II or III qualification.

Source: BITRE analysis of ABS Census of Population and Housing place of usual residence data for 2006 and 2011 (data extracted using TableBuilder Pro) and ABS (2009).

The proportion of persons employed in the *Health care and social assistance* industry with post-school qualifications increased from 66.3 per cent in 2006 to 72.6 per cent in 2011. There were 75 900 additional persons with bachelor degrees and 56 500 additional persons with certificate level qualifications in 2011, compared to 2006. Overall, the increases in employed persons with these post-school qualifications correspond with increases in occupations requiring skill levels 1 and 4.

In conclusion, the employment growth in the *Health care and social assistance* industry was dominated by females and by the private sector. It was concentrated amongst *Professionals*, employed persons working 25 to 39 hours per week, and people in the 25 to 29 year age group as well as the over 50 age categories. In addition, this employment growth was spread across a range of different sub-industries.

Box 3: Changes in employment in Australia's *Construction* industry, 2006 to 2011

There were nearly 828 800 people employed by the *Construction* industry in 2011, accounting for 8.4 per cent of all people employed in Australia. Between 2006 and 2011, there was an increase of around 119 100 employed persons, representing an average annual growth rate of 3.2 per cent (Table 13).

Among the various industry sectors (3-digit level), the *Building installation services* and the *Heavy and civil engineering construction* sectors were responsible for the most job growth between 2006 and 2011, accounting for 32 per cent (or 38 200 jobs added) and 24 per cent (or 28 000 jobs added), respectively, of total *Construction* industry employment growth. The other major employing industry sectors include *Non-residential building construction*, *Other construction services*, *Residential building construction* and *Building completion services*. These four sectors together added nearly 37 000 jobs.

While the sectoral share of employment increased for the *Building Installation Services*, *Heavy and Civil Engineering Construction*, *Non-Residential Building Construction* and *Other Construction Services* sectors between 2006 and 2011, it decreased for the *Residential building construction* and *Building completion services* sectors. When comparing employment growth rates, the *Heavy and civil engineering construction* sector grew strongly, followed by the *Non-residential building construction* and *Building installation services* sectors. Employment growth in *Heavy and civil engineering construction* was mainly in Queensland and Western Australia.

Table 13 Contribution to job creation in *Construction* industry, 2006 to 2011

Construction industry sector (3 digit Level)	Employed persons in 2011 ('000)	Change in employed persons (2006-2011)	Share of growth (Per cent)	Sectoral share of employment (Per cent)		Average annual growth rate (Per cent)
				2006	2011	
Building Installation Services ^a	177.1	38 191	32.1	19.6	21.4	5.0
Heavy and Civil Engineering Construction	81.4	28 038	23.5	7.5	9.8	8.8
Non-Residential Building Construction	48.9	11 135	9.3	5.3	5.9	5.3
Other Construction Services ^b	58.2	10 135	8.5	6.8	7.0	3.9
Residential Building Construction	171.4	8 114	6.8	23.0	20.7	1.0
Building Completion Services	131.8	7 614	6.4	17.5	15.9	1.2
Land Development and Site Preparation Services	39.9	5 473	4.6	4.8	4.8	3.0
Building Structure Services	30.9	4 135	3.5	3.8	3.7	2.9
Building Construction, nfd ^c	62.1	3 710	3.1	8.2	7.5	1.2
Construction, nfd ^c	21.2	1 654	1.4	2.8	2.6	1.6
Construction Services, nfd ^c	6.0	907	0.8	0.7	0.7	3.3
Total employment ('000)	828.8	119 106	100.0	100.0	100.0	3.2

Notes: Three digit level of Industry, classified according to ANZSIC 2006 (ABS 2006). Data are based on 'Place of Usual Residence'.

^a Building Installation Services include Plumbing Services, Electrical Services, Air Conditioning and Heating Services, Fire and Security Alarm Installation Services, and Other Building Installation Services.

^b Other Construction Services includes Landscape Construction Services, Hire of Construction Machinery with Operator and Other Construction Services.

^c The code 'nfd' stands for 'not further defined'.

Source: BITRE analysis of ABS (2008, 2013d).

Between 2006 and 2011, selected characteristics of employment change in the *Construction* industry include:

- Males accounted for 88.4 per cent of the increase in employed persons.
- The increase in employment was focused in the 25 to 29 age group (20.5 per cent), followed by the 20 to 24 age group (15.2 per cent).
- The private sector provided more than 99.5 per cent of additional jobs, and maintained a 99.6 per cent share of total employment in the industry.
- Full-time workers provided 78 per cent of job growth in *Construction* between 2006 and 2011. Employment growth was concentrated amongst employees working 49 hours and over per week (31.5 per cent).
- Between 2006 and 2011, nearly half (49 per cent or 58 800 persons) of the jobs growth in the *Construction* industry was in the *Technicians and Trades Workers* occupation (1 digit level).
- The proportion of employed persons in the *Construction* industry with *Certificate Level* qualifications increased from 45 per cent in 2006 to 47 per cent in 2011, and this growth equates to 59 per cent (or 70 200 persons) of total employment growth in this industry.

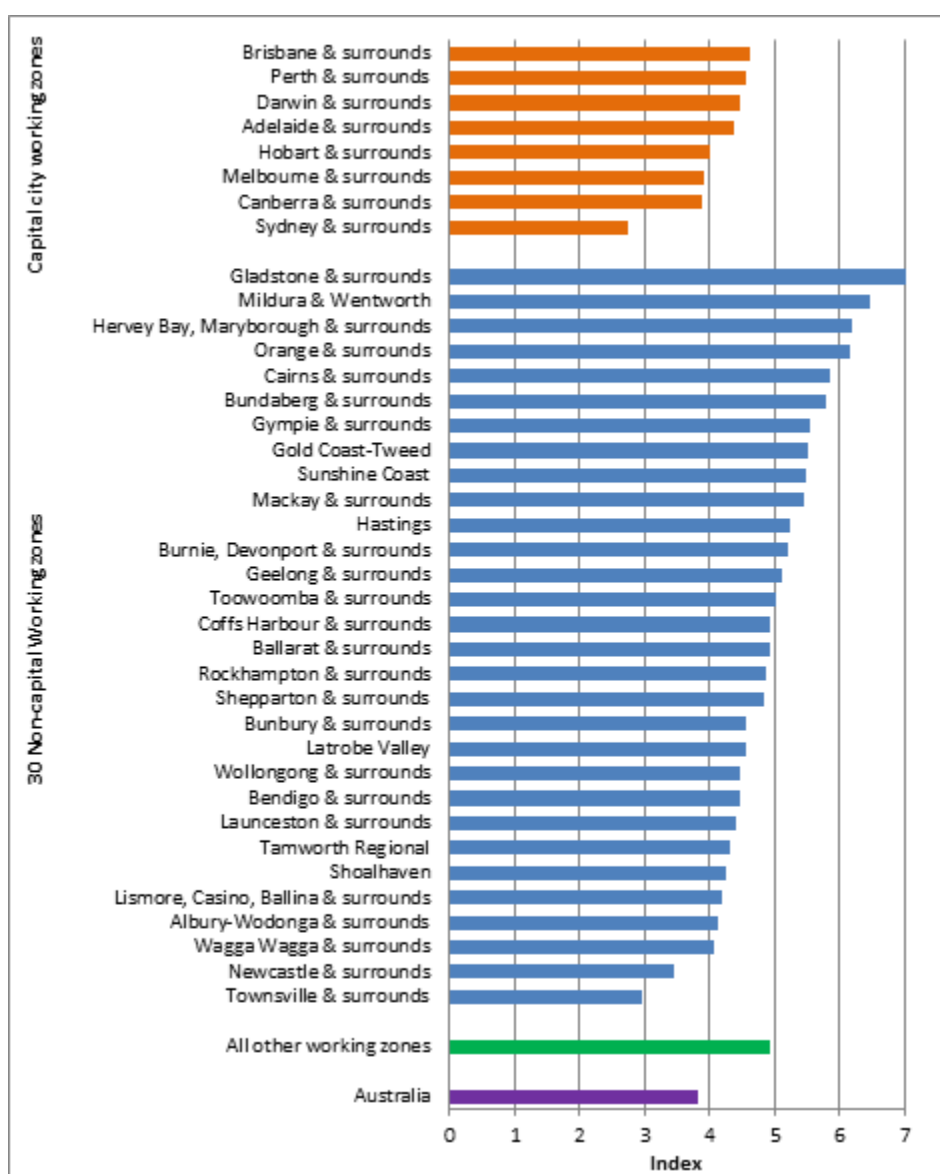
In summary, the employment growth in the *Construction* industry is male dominated, concentrated in the *Technicians and Trades Workers* category and amongst full-time workers and those aged 20 to 29 years.

Structural change

The industry distribution of the labour market is changing and the phenomenon is called structural change. A structural change index⁷ (SCI) was estimated between 2006 and 2011 for each of the 38 WZs which had estimated resident population (ERP) of 50 000 or more people in 2011 and the results are shown in Figure 9. It also shows the national SCI value between 2006 and 2011.

Between 2006 and 2011, the SCI value for Australia was 3.8 (Figure 7). This can be interpreted as 3.8 per cent of employed persons in 2011 having to change industries in order to restore the employment mix in existence in 2006. The SCI values for the eight capital city WZs ranged from a low of 2.7 (Sydney) to a high of around 4.6 (Brisbane and Perth).

Figure 7 Structural change index values by working zones, 2006 to 2011



Note: Structural change index based on methodology used in Productivity Commission (1998).

Source: BITRE analysis of ABS (2008, 2013d).

⁷ The Structural change index (SCI) is a measure of the extent of structural change occurring in a region, based on the change in the industry mix of employment between two points in time. The index can be thought of as the total number of percentage points of economic activity that has moved industries within a given time period (Productivity Commission 2013). However, there is no universally accepted measure of the rate of structural change, but a commonly used approach is to calculate structural change indices (Connolly and Lewis 2010). The index provides useful contextual information on the extent to which a region's economy is impacted by a changing industry base. A SCI of zero indicates no structural change during the period, and a SCI of 100 indicates a complete reversal of the industry structure (OECD 1994).

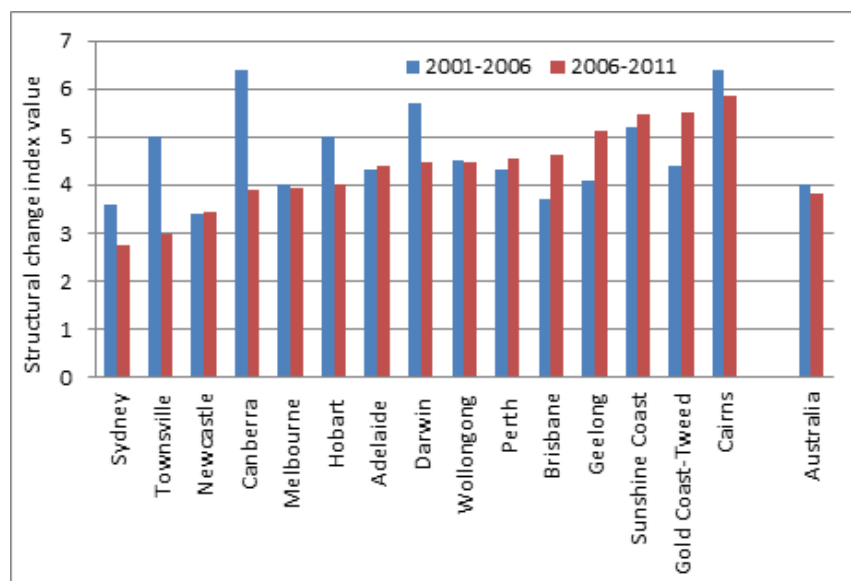
SCI values in the 30 non-capital WZs (with ERP 50 000 or more) ranged from 3.0 to 7.3. The top four WZs experiencing the most structural change (SCI value of 6 and above) were Gladstone and surrounds (7.3 per cent), Mildura and Wentworth (6.5 per cent), Hervey Bay, Maryborough and surrounds (6.2 per cent) and Orange and surrounds (6.1 per cent). On the other hand, Townsville and surrounds had the lowest SCI value (3.0 per cent) among the 30 non-capital WZs, followed by Newcastle and surrounds (3.4 per cent).

Relatively high index values are evident for regions that are going through a very pronounced phase of industry transition, irrespective of whether that transition relates to major industry decline or growth. Between 2006 and 2011, Gladstone and surrounds had the highest SCI and the second highest average annual growth rate of employment. *Construction* was the industry which generated the most new jobs. Mildura and surrounds had very little change in its total employment count between 2006 and 2011 (with a net decrease of 50 jobs), but the region had a considerable underlying change in the industry mix of employment, with the second highest SCI during this 5-year period, and with 660 jobs lost in the *Manufacturing* industry between 2006 and 2011. Hervey Bay, Maryborough and surrounds had a SCI of more than 6, but the average annual growth of employment was moderate (at 1.5 per cent), with *Health care and social assistance* growing strongly (adding 1291 jobs) and *Construction* experiencing decline (losing 378 jobs).

In general, capital city WZs had SCI values lower than the non-capital city WZs. Department of Home Affairs and the Environment (1982) found large Australian cities underwent less structural change than small cities between 1961 and 1976. Productivity Commission (1998) reports that the relatively low rates of structural change experienced by metropolitan regions mainly reflects their greater size in terms of overall levels of employment and diversity of activity. Similarly, Productivity Commission (1998) found smaller regions experienced the greatest rates of structural change. While the detailed results are not presented here, generally WZs with a small employment base were somewhat more likely to experience high rates of structural change between 2006 and 2011.

Comparison of SCI values between 2001–2006 and 2006–2011 for selected capital and non-capital city working zones (WZs) are shown in Figure 8. The SCI value for Australia between 2006 and 2011 was slightly lower than the SCI value between 2001 and 2006 (3.8 per cent versus 4.0 per cent). The SCI value for Australia was higher (12 per cent) between 1991 and 2001 (BTRE 2003). Connolly and Lewis (2010) listed a range of driving factors which are responsible for structural changes in the Australian economy, including rising consumer demand for services, the industrialisation of East Asia, economic reform and technical change. Australia's industry structure is likely to continue to change over time and some regions will be winners from this longer term structural change while others will be losers (Deloitte Access Economics 2011).

Figure 8 Comparison of structural change index values between 2001–2006 and 2006–2011, selected working zones



Note: Sorted, based on 2006–2011 structural change index.

Source: BITRE analysis of ABS (2008, 2013d) and BITRE (2009).

Among the selected WZs (both capital and non-capital), several WZs had a lower SCI for 2006–2011 than for 2001–2006 (i.e. Canberra, Townsville, Darwin, Hobart, Sydney, Cairns and Melbourne), while several other WZs had a higher SCI for 2006–2011 than for 2001–2006 (i.e. Adelaide, Perth, Sunshine Coast, Brisbane, Geelong and Gold Coast-Tweed).

The Productivity Commission (1998) found that:

- since the early 1980s, both the level and the variability of structural change have been greater in country Australia than the cities,
- high rates of structural change in country Australia do not necessarily involve employment losses, and
- low rates of structural change are not always associated with high employment growth.

This analysis confirms these findings for the period of 2006 to 2011.

Small Area Analysis

Looking at more disaggregated areas (i.e. Statistical Local Areas or SLAs) allows us to get a more detailed picture of the way that the industry mix has changed. This small area analysis is based on 'place of work' (POW) data, because 'place of usual residence' (PUR) employment data is not very informative at this scale (since only a minority of residents generally work within their home SLAs). Analysis of changes in POW data need to be treated with caution, due to the methodological changes explained in Appendix A.

Table 14 summarises the main industry drivers of job growth for the 20 SLAs that added more than 5000 jobs between 2006 and 2011, and the principal industry drivers of decline for the five SLAs which lost more than 2000 jobs between 2006 and 2011. The main industry drivers of job growth vary considerably by place, indicating a high degree of diversity is evident in the industry mix of these high growth SLAs. In Melbourne–Southbank-Docklands and Sydney Inner, job growth is coming particularly from the *Financial and insurance services* industry. Between 2001 and 2006, the Melbourne–Southbank-Docklands SLA had the largest jobs growth in the *Finance and insurance services* industry (BITRE 2011b).

The *Professional, scientific and technical services* industry has the highest representation (seven SLAs) among the top 20 employment growth SLAs, followed by *Construction* and *Public administration and safety* (three SLAs each). The *Information media and telecommunications* industry was the main contributor to employment growth in Ryde (Sydney) and Sydney–West between 2006 and 2011. However, this pattern is somewhat different to the job growth between 2001 and 2006. In Sydney West, the job growth between 2001 and 2006 was primarily occurring in the *Education* industry, while in Ryde the job growth was primarily occurring in the *Wholesale trade* industry (BITRE 2012, p.173). Between 2006 and 2011, the *Transport, postal and warehousing* industry was the principal contributor to employment growth in Belmont in Perth and Hume-Craigieburn in Melbourne, presumably due to the airport location in these two cities. BITRE (2013c) found that airport employment growth between 2006 and 2011 was considerably higher than the city's overall rate of employment growth in all cities, except Sydney. *Health care and social assistance* was the main industry which experienced jobs growth in Melbourne-Remainder, which contains several major hospitals.

The four SLAs with the largest employment decline are located in Sydney. The Willoughby SLA's employment decline was generally due to job loss in *Information media and telecommunications*. Among the five SLAs which experienced the largest jobs decline, *Manufacturing* was the main source of job loss in three of them.

Table 15 compares the top job growth industry for the Inner SLA of four major cities between 2001–2006 and 2006–2011. The main industry contributor to job growth in Sydney Inner was *Financial and insurance services* between 2001 and 2006 and between 2006 and 2011 (BITRE 2012). *Government administration and defence services* was the main industry contributor to job growth in Melbourne and Brisbane Inner between 2001 and 2006 (BITRE 2011b, 2013a), while the *Professional, scientific and technical services* industry was the main contributor to job loss in these areas between 2006 and 2011.

Table 14 Main industry contributors to employment growth and decline for Statistical Local Areas (SLAs) that added more than 5000 jobs or declined by 2000 and more jobs, 2006 to 2011

SLA name	Capital city	Total jobs change	Top growth or decline industry (+ or – employed persons)
Largest jobs growth			
Southbank-Docklands	Melbourne	27 858	Financial and insurance services (+7 997)
Sydney - Inner	Sydney	20 120	Financial and insurance services (+7 986)
Melbourne - Inner	Melbourne	19 527	Professional, scientific and technical services (+8 293)
Perth - Inner	Perth	13 208	Professional, scientific and technical services (+5 191)
Melbourne - Remainder	Melbourne	12 452	Health care and social assistance (+4 012)
Ryde	Sydney	10 924	Information media and telecommunications (+5 118)
Adelaide	Adelaide	10 689	Public administration and safety (+2 881)
North Sydney	Sydney	9 823	Professional, scientific and technical services (+4 332)
Hobart - Inner	Hobart	9 461	Public administration and safety (+3 284)
Swan	Perth	8 989	Construction (+1 231)
Sydney - West	Sydney	8 730	Information media and telecommunications (+2 317)
City - Inner	Brisbane	8 639	Professional, scientific and technical services (+3 438)
Cockburn	Perth	8 059	Construction (+1 852)
Belmont	Perth	7 402	Transport, postal and warehousing (+1 722)
South Brisbane	Brisbane	6 625	Professional, scientific and technical services (+1 910)
Hume - Craigieburn	Melbourne	6 518	Transport, postal and warehousing (+2 776)
Stirling - Central	Perth	6 119	Construction (+1 925)
City - ACT	Canberra	6 100	Public administration and safety (+5 934)
Perth - Remainder	Perth	6 057	Professional, scientific and technical services (+2 804)
Sydney - East	Sydney	5 554	Professional, scientific and technical services (+2 155)
Largest jobs decline			
Willoughby	Sydney	-4 760	Information media and telecommunications (-1 717)
Holroyd	Sydney	-3 866	Manufacturing (-2 196)
Rockdale	Sydney	-2 240	Retail trade (-525)
Lane Cove	Sydney	-2 190	Manufacturing (-467)
Kingston - North ^a	Melbourne	-2 007	Manufacturing (-2 320)

Note: Cut-off more than 5000 jobs growth or less than 2000 jobs decline.

^a Total jobs decline is less than jobs decline in *Manufacturing* industry, due to jobs growth in other industries.

Source: BITRE analysis of ABS Census of Population and Housing 2006 and 2011 place of work data for SLAs.

Table 15 Comparison of top job growth industry in Inner SLA of four major cities between 2001–2006 and 2006–2011

SLA	2001–2006		2006–2011	
	Industry	Jobs increase	Industry	Jobs increase
Sydney Inner	Finance and insurance services	5 205	Financial and insurance services	7 986
Melbourne Inner	Government administration and defence	6 065	Professional, scientific and technical services	8 293
Brisbane Inner	Government administration and defence	3 949	Professional, scientific and technical services	3 438
Perth Inner	Property and business services	4 302	Professional, scientific and technical services	5 191

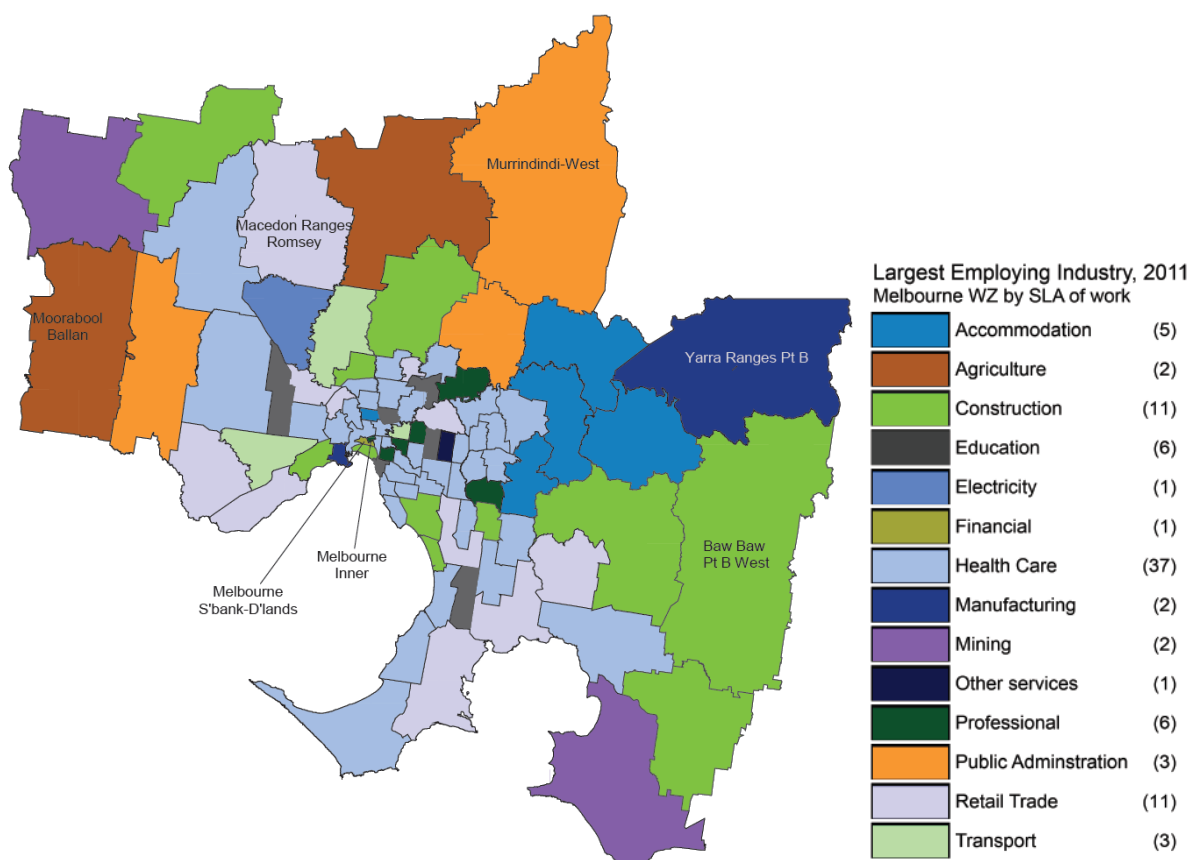
Note: Analysis for 2001–2006, based on ANZSIC 1993 classification, while analysis for 2006–2011, based on ANZSIC 2006 classification.

Source: BITRE analysis of ABS Census of Population and Housing 2006 and 2011 place of work data for SLAs and BITRE (2010, 2011b, 2012, 2013a).

Map 1 captures the spatial distribution of the different industries that have contributed to the employment growth of SLAs within the Melbourne working zone between 2006 and 2011. Job growth within the Melbourne working zone is coming from a diverse set of industries. Out of 91 SLAs in the Melbourne working zone, the *Health care and social assistance* industry is well represented with 37 SLAs having this industry as the main source of growth. The *Retail trade* and *Construction* industries are the next two top industries which were the main source of employment growth in 11 SLAs each. In contrast, Melbourne–Southbank–Docklands is the only SLA for which the main contributor is the *Financial and insurance services* industry. Similarly, *Electricity, gas, water and waste services* and *Other services* industries were the main contributor in only one SLA each (Hume–Sunbury and Whitehorse–Nunawading West, respectively).

Comparing Map 1 (below) with Map 5.2 in BITRE Report 125 (p.148) (BITRE 2011b), 27 of the 91 SLAs contained the same industry as the top source of employment growth between 2001–2006 and 2006–2011.

Map 1 Main industry contributor to employment growth by SLA, Melbourne working zone, 2006 to 2011



Source: BITRE analysis of ABS Census of Population and Housing 2006 and 2011 with adjusted boundaries.

Since Greater Western Sydney experienced substantial employment growth between 2001 and 2006 (BITRE 2012) and is also anticipated to have significant future employment growth (NSW Government 2010), industry employment changes between 2006 and 2011 are further explored and the results are presented in Box 4.

Box 4: Changes in industry employment in Greater Western Sydney, 2006 to 2011

Greater Western Sydney (GWS) is defined by the NSW State Government as comprising of the following LGAs: The Hills Shire, Blacktown, Penrith, Hawkesbury, Blue Mountains, Liverpool, Campbelltown, Camden, Wollondilly, Auburn, Parramatta, Fairfield, Holroyd and Bankstown.

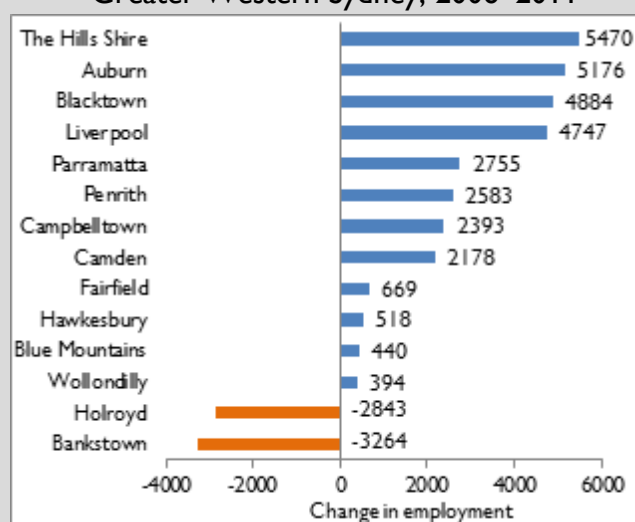
Based on 2011 Census 'Place of work' data, the four largest industry employers in 2011 in GWS were *Manufacturing* (92 700 persons), *Health care and social assistance* (73 900 persons), *Retail trade* (72 300 persons) and *Education and training* (53 600 persons).

Between the 2006 and 2011 censuses, there were 26 100 jobs added in Greater Western Sydney, representing average annual growth of 0.9 per cent, compared to 1.6 per cent for the Sydney WZ as a whole. The biggest increases in employment in GWS by industry took place in *Health care and social assistance* (10 900 persons), *Education and training* (4 800 persons) and *Public administration and safety* (4 200 persons). The largest decrease in employment by industry took place in *Manufacturing* (6 800 persons), followed by *Retail trade* (1 200 persons) and *Information media and telecommunications* (1 000 persons).

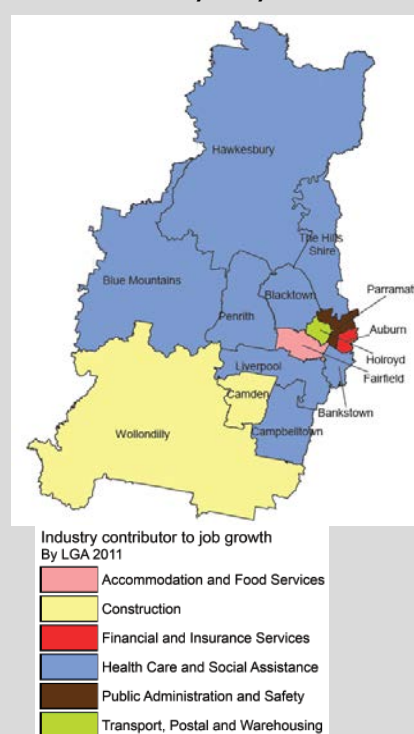
Between the 2006 and 2011 censuses, the LGAs which experienced the largest increase in total employment were The Hills Shire, Auburn, Blacktown and Liverpool (Figure 9). Among these four LGAs, *Health care and social assistance* was the largest jobs growth industry in The Hills Shire, Blacktown and Liverpool, while *Financial and insurance services* was the largest jobs growth industry in Auburn. Only two LGAs experienced job losses (i.e. Bankstown and Holroyd) between the 2006 and 2011 censuses (Figure 9). In both LGAs, *Manufacturing* was responsible for the majority of the decline in employment, especially *Machinery and equipment manufacturing* in Bankstown, and *Fabricated metal product manufacturing* and *Transport equipment manufacturing* in Holroyd. The average annual growth rate of employment was highest for Camden (2.9 per cent per annum), followed by Auburn (2.4 per cent per annum) and the Hills Shire (2.0 per cent per annum).

Map 2 captures the spatial distribution of the different industries that have contributed to the employment growth of various LGAs within Greater Western Sydney. Spatial patterns are evident with the *Health care and social assistance* industry being the main source of job growth for most of the LGAs. *Construction* was the main industry of employment growth in the south-west residential growth areas of Camden and Wollondilly, while *Financial and insurance services* was the main job growth industry in Auburn, *Accommodation and food services* in Fairfield and *Transport, postal and warehousing* in Holroyd.

Figure 9 Total employment growth by LGA, Greater Western Sydney, 2006–2011



Map 2 Main industry contributor, Greater Western Sydney, 2006–2011



Note: Baulkham Hills LGA in 2006 is called The Hills Shire in 2011. Estimates are based on 'place of work' data.

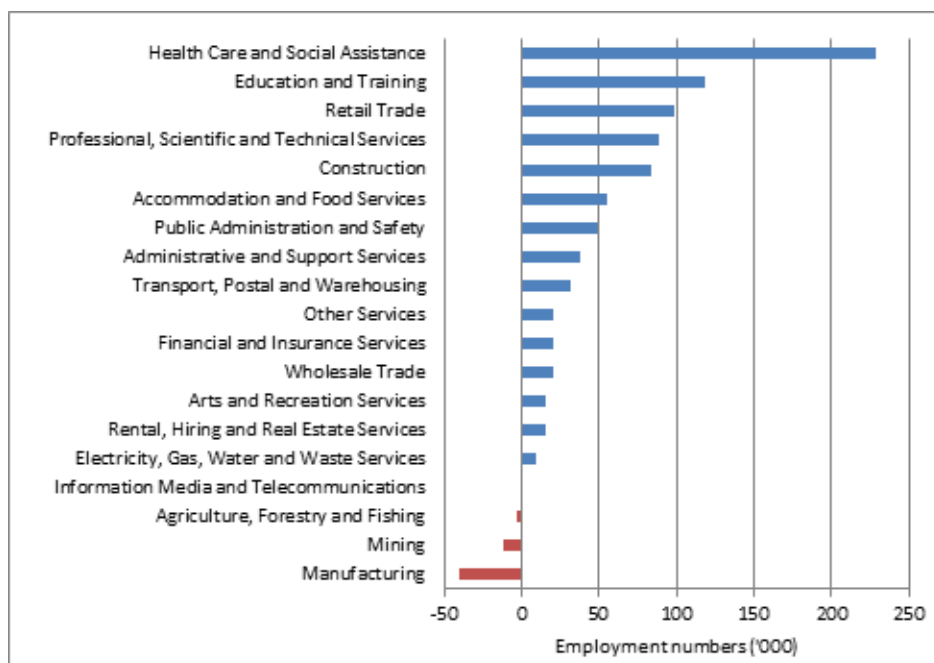
Source: BITRE analysis of ABS Census of Population and Housing 'place of work data' for 2006 and 2011 (using TableBuilder Pro).

Employment projections in Australia by industry, 2013 to 2018

National employment projections⁸ for industries from November 2013 to November 2018 are drawn from Department of Employment (2014).

Over the five years from November 2013 to November 2018, total employment in Australia is projected to grow by 838 100 persons, at an average annual growth rate of 1.4 per cent. Employment is projected to grow in 16 of the 19 ANZSIC industries over the five years to November 2018, with declines in employment projected for *Manufacturing*, *Mining* and *Agriculture, forestry and fishing*, as shown in Figure 10.

Figure 10 Projected employment growth by industry, November 2013 to November 2018



Note: These projections are based on ABS employment data for November 2013 and the Government's forecasts and projections in the December 2013 Mid-Year Economic and Fiscal Outlook (MYEFO).

Source: Department of Employment (2014).

Among the industries which are projected to grow, *Health care and social assistance* has been the primary provider of new jobs in the Australian labour market in the short, medium and long term. Over the next five years, the industry is projected to contribute one quarter of the total employment growth, increasing by 229 400 employed persons (or 16.3 per cent). The Department of Employment (2014) has identified several factors which will be contributing to this strong projected growth. These include the implementation of the National Disability Insurance Scheme, Australia's ageing population, and increasing demand for childcare and home based care services. The *Education and training* industry has the second highest projected growth (118 800), followed by *Retail trade* (98 200), *Professional, scientific and technical services* (88 700) and *Construction* (83 500). These top five industries together are projected to provide more than two thirds of the employment growth during this five-year period. The top three projected growth industries are all industries for which employment is widely dispersed across Australia's cities and regions.

Concluding remarks

This study investigates the spatial changes in industry structure at a national, state, city and regional level since 2006. It is essentially the update of BITRE *Information Sheet 32* (BITRE 2009) which analysed changes in industry structure between 2001 and 2006.

⁸ The projections have been derived from best practice time series models that summarise the information that is in a time series and convert it into a forecast (for detailed methodology, see Department of Employment 2014).

The national average annual growth rate of employment was slower than that of GVA between May 2006 and May 2013. Total employment growth between 2006 and 2011 was 2.1 per cent per annum (with an increase of 956 343 persons, see Table 8), while national employment growth between 2001 and 2006 was a little slower, at 1.9 per cent per annum (BITRE 2009). Looking forward, the employment growth rate is projected to be considerably slower (at 1.4 per cent per annum) from November 2013 to November 2018 (Department of Employment 2014). *Health care and social assistance* industry was the key contributor to employment growth in the past two periods (2001–2006 and 2006–2011) and is projected to continue to dominate employment growth looking forward (i.e. 2013–2018).

The results and analysis presented in this Information Sheet will complement the recently released publication *'Progress in Australian Regions 2014'* (Department of Infrastructure and Regional Development 2014), which presented data on the change in the number of employed persons between 2001 and 2011 at a range of geographic scales (e.g. SA4, capital city, state balance and remoteness classes).

This Information Sheet provides an overview of recent spatial changes in Australia's industry structure, but there is considerable potential for further research to be undertaken on industry change using census-based datasets, such as in-depth analysis of the change processes affecting particular cities, regions or industries. BITRE plans to undertake some further research relating to the spatial aspects of employment transitions, using the newly released census longitudinal dataset. This new research has the potential to provide valuable insights into geographic labour mobility and how structural adjustment processes play out in Australia's regions.

This Information Sheet has provided some insight into the changes in employment and industry structure that have been occurring in capital cities, other cities and different types of regional areas in Australia between 2006 and 2011. The results will be useful for government policy makers, business, industry and other stakeholders to inform decision making concerning spatial policy and infrastructure investment across Australia's regions.

Appendix A Limitations of census data

There are three identified data limitations that impact on census-based measures of employment change between 2006 and 2011. These are described, in turn, below.

1. Differences between employment estimates from the ABS Labour Force Survey and ABS Census

According to the 2011 census, there were 10.058 million employed persons in Australia, which is 11 per cent lower than the *Labour Force Survey* estimate of 11.344 million for August 2011. ABS (2013a) outlines the methodology and scope differences between the two collections. Census data therefore provides a conservative estimate of total Australian employment.

While the LFS is the preferred source of employment data at the national and state/territory scales, census data was preferred over LFS data for the sub-state analysis in this study as it provides much greater capacity to disaggregate employment by industry and region (without sacrificing reliability).

2. Changes to geographic boundaries between 2006 and 2011

The ABS overhauled its statistical geography between the 2006 and 2011 censuses, with the introduction of the Australian Statistical Geography Standard (ASGS) to replace the Australian Standard Geographical Classification (ASGC).

The 2011 and 2006 census POW data have not been made publicly available on a common set of geographic boundaries. However, the comparability issues resulting from the changed geographical boundaries can be resolved through purchase of customised ABS tabulations that relate to a common set of geographic boundaries (e.g. ASGC 2006).

The 2011 and 2006 census PUR data are more readily available on common geographic boundaries, such as Statistical Area Level 2s (SA2s)⁹ or Statistical Local Areas (SLAs). BITRE concurred the 2011 Basic Community Profile data on employment by industry for 2011 SLA boundaries back to 2006 SLA boundaries.

⁹ SA2s are a small area geographic unit and key building block within the ABS' Australian Statistical Geography Standard (ASGS). There are 2196 SA2s in Australia, and SA2s typically have a population of between 3000 and 25000 (ABS 2010).

These data were directly compared to our existing holdings of 2006 Basic Community Profile for SLAs, and were used to measure employment change by industry.

3. Changes to POW coding methods between 2006 and 2011

For 2011, the POW count of total employment is about 12 per cent lower than the PUR count, because 2.5 per cent of employed usual residents do not respond to the place of work question, 3.8 per cent report no fixed place of work, and 5.8 per cent of responses could not be coded to an SA2 of work (ABS 2012a).

The non-response rate to the POW question was considerably higher in 2006 (4.9 per cent) than it was in 2011 (2.5 per cent), but the proportion coded to the 'capital city undefined' and 'state/territory undefined' categories was much lower in 2006 (1.1 per cent) than it was in 2011 (5.8 per cent). ABS notes that this reflects changes in coding methodology between 2006 and 2011, and that the greater disaggregation of SA2s (compared to SLAs) may also have contributed to the increased numbers in these undefined categories, since addresses may be more difficult to code at the SA2 level of precision.

Between 2006 and 2011, there were about 488 000 additional 'undefined' POW responses nationally. The net increase in non-codable POW data was 297 000 (which takes into account the reduced rate of non-response). Both of these figures are very significant in the context of the overall gain of 954 000 employed persons across Australia from 2006 to 2011.

The number of respondents coded by ABS to an undefined place of work was six times larger in 2011 than in 2006—these changed coding practices mean that a comparison of the 2011 POW data to the 2006 POW data for a particular location will generally underestimate the extent of job growth in the location. The marked increase in the number of employed persons with an unidentified place of work in the 2011 census makes it difficult to identify whether the observed changes in the POW counts reflect real employment changes or the changed coding practices.

Due to these methodological changes, POW-based comparisons of employment change between 2006 and 2011 should be interpreted with caution. Further discussion of these issues is contained in ABS (2012b) and .id (2012).

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