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FOCUS ON REGIONS NO. 1: INDUSTRY STRUCTURE



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FOREWORD

This Information Paper is the first in a new BTRE series — *Focus on Regions*. The paper presents and analyses statistical information about the industry structure of Australia's regional economies. It also explores the relationship between industry structure and regional economic growth. The paper is accompanied by the *Industry Structure Database*, which provides a valuable contextual basis for understanding regional economies and informing regional development.

The *Focus on Regions* series forms part of the Bureau's regional research programme, which aims to improve understanding of the economic and social factors affecting Australia's regions. Future releases will address the issues of *Education, Skills and Qualifications* and *Taxable Income* from a regional perspective.

The project was undertaken by Leanne Johnson, under the general supervision of Judith Winternitz, Deputy Executive Director.

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Executive Director

Bureau of Transport and Regional Economics (BTRE)
Canberra
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EXECUTIVE SUMMARY

The distribution of a region's economic activity across industries is considered a major determinant of the region's level of income, the resilience of its economy and its ability to grow. This information paper presents and analyses statistical information about the industry structure of employment in Australia's regions. Recent national and regional trends in industry structure are identified, and industry specialisation, diversity and structural change are analysed at a regional level. The relationship between industry structure and economic growth is also explored for Australia's regions.

Australia, like many other developed countries, has experienced a decline in the importance of the manufacturing and agriculture sectors over recent decades, and strong growth in the services sector. In particular, Business services accounts for a large and growing share of national value added and employment. Between 1991 and 2001, the Business services industry was the single largest source of employment growth in all States and Territories.

This study finds that a region's industry structure is closely tied to the *size of its economy*. Major cities generally have a very diverse industry structure, which resembles the national distribution of employment across industries. The relative importance of employment in technology and knowledge-intensive industries tends to increase with the size of the regional economy.

A region's industry structure is also closely tied to its level of *remoteness*. For example, the relative importance of employment in Agriculture, Mining and Accommodation, cafes and restaurants rises with increasing remoteness. The relative importance of employment in technology and knowledge-intensive industries tends to decline with increasing remoteness, while a similar pattern is also evident for Manufacturing, Property and business services, Communication services, Wholesale trade, Finance and insurance and Cultural and recreational services.

For service industries such as Retail trade, Health services and Education, employment is distributed across regions roughly in line with the distribution of total employment. This reflects the fact that these industries predominantly cater to local demand. In contrast, employment in primary industries (particularly Mining) tends to be highly localised.

Agriculture was the major employing industry in 276 of the 425 labour market regions, but beyond this industry there was considerable variety in the activities in which regions specialised.

For some industries, national trends of growth/decline between 1991 and 2001 were reflected quite consistently across regions. Most regions shared in the strong national employment growth experienced by the Food retailing, Business services and Community services industries, and in the employment decline experienced by the Finance industry between 1991 and 2001. However, there were many industries for which employment growth rates differed markedly across regions. Agriculture, Metal ore mining, Government administration and Food, beverage and tobacco manufacturing are examples of industries which grew strongly in some regions, while declining in others. Overall, national trends of industry growth and decline were not reflected consistently across regions.

Regions with a highly diverse industry structure were found to experience more stable economic performance than other regions. However, the analysis does not support the claim that a highly diverse industry structure is associated with greater regional growth prospects. Between 1991 and 2001, regions outside the major cities (on the whole) developed a more diverse economic base. Such increases in diversity work to insulate regional economies from the effect of both positive and negative shocks, and tend to be associated with less volatile growth paths.

The information paper concludes that *the industry structure of employment plays a significant, but not dominant, role in explaining regional differences in economic growth.* While a high share of employment in the Property and business services or Construction industries was associated with stronger economic growth for regions between 1991 and 2001, different industries may be associated with economic growth over the next decade. Therefore, no prescriptive conclusions can be drawn about how industry structure can be changed to improve economic performance. Rather, strategies for regional development need to build upon local comparative advantage.

About 20% of the variation in employment growth rates across labour market regions between 1991 and 2001 could be explained by the industry structure of regional employment in 1991, and subsequent national growth trends by industry. Therefore, the industry structure of employment can provide only a partial understanding of why regions grow. Other potentially important influences on regional economic growth include amenity, remoteness, investment, leadership and the region's resource and skill base.

In conjunction with this information paper, BTRE is releasing an *Industry Structure Database* (<http://www.btre.gov.au>). The database contains a wealth of regional data on the distribution of employment across industries, and will provide a valuable resource for understanding regional economies and informing regional development.

CHAPTER 1 INTRODUCTION

Industry structure refers to the *distribution* of economic activity, such as output or employment, across industries. Economic activity is typically measured using Gross Domestic Product (GDP), or its regional equivalent, Gross Regional Product (GRP). The industrial composition of GDP/GRP is important contextual information for understanding what is driving the economic wellbeing of a region and exploring the longer-term sustainability implications of economic performance.

The industrial composition of a region's output can differ considerably from the industrial composition of the region's employment. Due to the unavailability of GRP data at a small-area level, previous Australian analyses of regional industry structure have typically used employment as the measure of economic activity. This paper also focuses on the distribution of *employment* across industries for Australia's regions. However, the employment-based analysis of industry structure is complemented by contextual information about the industry structure of national GDP and national trends in industry output.

From a regional perspective, it is not only the distribution of economic activity by industry within particular regions which is of interest, but also the extent to which national activity in particular industries is distributed across regions.

The information paper pays particular attention to some key aspects of industry structure, namely:

- growth and decline of industries over the last ten years;
- industry specialisation and localisation;
- the regional presence of selected industries (e.g. technology and knowledge-intensive industries, primary industries);
- the diversity of the industrial base of regions;
- structural change; and
- the relationship between industry structure and regional economic growth and stability.

The paper builds upon previous research by bringing together information on many different aspects of regional industry structure, by adopting a

disaggregated regional and industry perspective, and by using newly available 2001 census data.¹

The information paper is accompanied by the BTRE's *Industry Structure Database* (see Chapter 6), and to illustrate the potential uses of this database, a case study of the region surrounding Bendigo in Victoria is presented. Data sources and methodology are detailed in Appendix I.

¹ The concept of industry structure encompasses additional issues which are not addressed in this factsheet, such as inter-industry trade; imports, exports and leakages; and the role of small, medium and large businesses.

CHAPTER 2 INTERNATIONAL CONTEXT

A decline in the importance of the manufacturing and agricultural sectors, and strong growth in the services sector, have been common features of economic development across many developed countries in recent decades.

When Australia's industry structure is compared to that of selected OECD (Organisation of Economic Co-operation and Development) countries for 2000 (Table 1), the following key points emerge:

- Australia's industry structure is broadly similar to that of OECD countries such as the United States (US), United Kingdom (UK) and France, but it is quite dissimilar to Japan and Korea.
- Like many developed countries, Australia's 'Financial intermediation, real estate, renting and business activities' sector is the largest contributor to gross value added (GVA).²
- The 'Wholesale & retail trade, repairs, hotels & restaurants, transport' and 'Other service activities' sectors are significant components of the Australian economy and the economies of most of the other selected countries.
- The GVA share of Australia's 'Industry' sector (which includes mining, manufacturing and energy) is comparable to the US, but is generally below that of the other selected countries.
- The 'Construction' sector accounts for between 4% and 8% of GVA in each country.
- The 'Agriculture' sector (which includes hunting, forestry and fishing) contributes only 4% of the value of Australian production, somewhat higher than its contribution to production in most of the other countries.

Between 1970 and 2000, of the selected OECD countries, Australia and the US recorded the strongest growth in 'Agriculture' GVA. However, agriculture's share of total GVA still declined in both countries over the period. The GVA share of the 'Industry' and 'Construction' sectors has also declined in all selected countries, except Korea. Productivity Commission (2003) attributes the relative decline of manufacturing to strong labour force productivity growth within the industry and the shift in consumer preferences to services as national income has risen.

² GVA is the preferred national accounts measure of the value of industry production. GVA differs from GDP in that it excludes taxes and subsidies on products.

Australia, like many other developed economies, recorded strong service sector growth between 1970 and 2000, but the composition of this growth differed from other countries. Of the selected OECD countries, only Australia experienced a decline in the GVA share of the 'Wholesale and retail trade, repairs, hotels and restaurants, transport' sector. Australia was also the only country in which the GVA share of the 'Other service activities' sector increased. Between 1970 and 2000, the key industry structure trend for Australia and the other selected countries was the rapid growth of the 'Financial intermediation, real estate, renting and business activities' sector.

TABLE 1 COMPARISON OF INDUSTRY STRUCTURE FOR SELECTED OECD COUNTRIES, 1970 TO 2000

OECD COUNTRY	<i>Agriculture, hunting & forestry; fishing</i>	<i>Industry, including energy & mining</i>	<i>Construction</i>	<i>Wholesale & retail trade, repairs; hotels & restaurants; transport</i>	<i>Financial intermediation; real estate, renting & business activities</i>	<i>Other service activities</i>	<i>All industries</i>
<i>Industry shares of gross value added at constant 1995 prices, own currency, 2000</i>							
Australia	4%	20%	6%	23%	28%	19%	100%
Canada	3%	26%	5%	22%	25%	19%	100%
France	3%	22%	4%	20%	28%	23%	100%
Germany	1%	24%	5%	19%	30%	21%	100%
Italy	3%	24%	5%	25%	25%	18%	100%
Japan	1%	25%	7%	20%	18%	29%	100%
Korea	5%	37%	8%	21%	17%	12%	100%
UK	2%	24%	5%	23%	26%	20%	100%
US	2%	21%	4%	24%	28%	20%	100%
<i>Average annual growth in value added, 1970 to 2000</i>							
Australia	2.7%	2.7%	2.4%	3.4%	4.4%	3.8%	3.5%
Canada	1.2%	2.9%	1.9%	3.9%	3.8%	2.3%	3.2%
France	1.4%	2.6%	-0.2%	3.3%	3.6%	2.7%	2.7%
Germany	1.5%	1.1%	0.3%	2.9%	4.7%	2.5%	2.5%
Italy	0.6%	2.1%	0.4%	3.1%	3.6%	2.0%	2.5%
Japan	-0.7%	3.4%	1.1%	4.3%	4.9%	3.4%	3.5%
Korea	2.3%	11.3%	7.5%	8.5%	8.8%	4.4%	7.5%
UK	1.6%	1.5%	1.0%	2.7%	3.4%	2.1%	2.2%
US	2.7%	2.4%	1.3%	4.2%	4.1%	1.8%	3.0%

Source Derived by BTRE from OECD National Accounts, [http:// www.oecd.org/topicstatsportal/](http://www.oecd.org/topicstatsportal/), Downloaded May 2003.

CHAPTER 3 INDUSTRY STRUCTURE IN AUSTRALIA

3.1 HISTORIC TRENDS

Since federation, Australia has evolved from an economy heavily reliant on primary industries and manufactured goods, to an economy in which the provision of services is increasingly important.

Long-term analysis of Australia's industry structure by the Australian Bureau of Statistics (ABS, 2002a) highlights the following trends:

- Agriculture, forestry, fishing and hunting accounted for 26% of employment in 1910-11. While there was a brief resurgence during the Depression, the industry's share of national employment has declined fairly steadily since then, with the rate of decline slowing in recent years. In 2002, this sector accounted for less than 5% of employment.
- In 1910-11, 6% of employed persons worked in mining. This fell to 2% by 1927-28, and to less than 1% in 2002.
- In 1910-11, manufacturing accounted for 21% of Australian employment. Manufacturing employment grew rapidly after the Depression, peaking at 33% in the mid-1940s. In the mid-1960s, manufacturing employment stood at 25%, but has since fallen steadily, accounting for only 12% of employment in 2002.
- Service industries grew gradually to become the major employers at the end of the century. Much of the growth in services has occurred in recent decades.

3.2 AUSTRALIA'S CURRENT INDUSTRY STRUCTURE, 1985 TO 2002

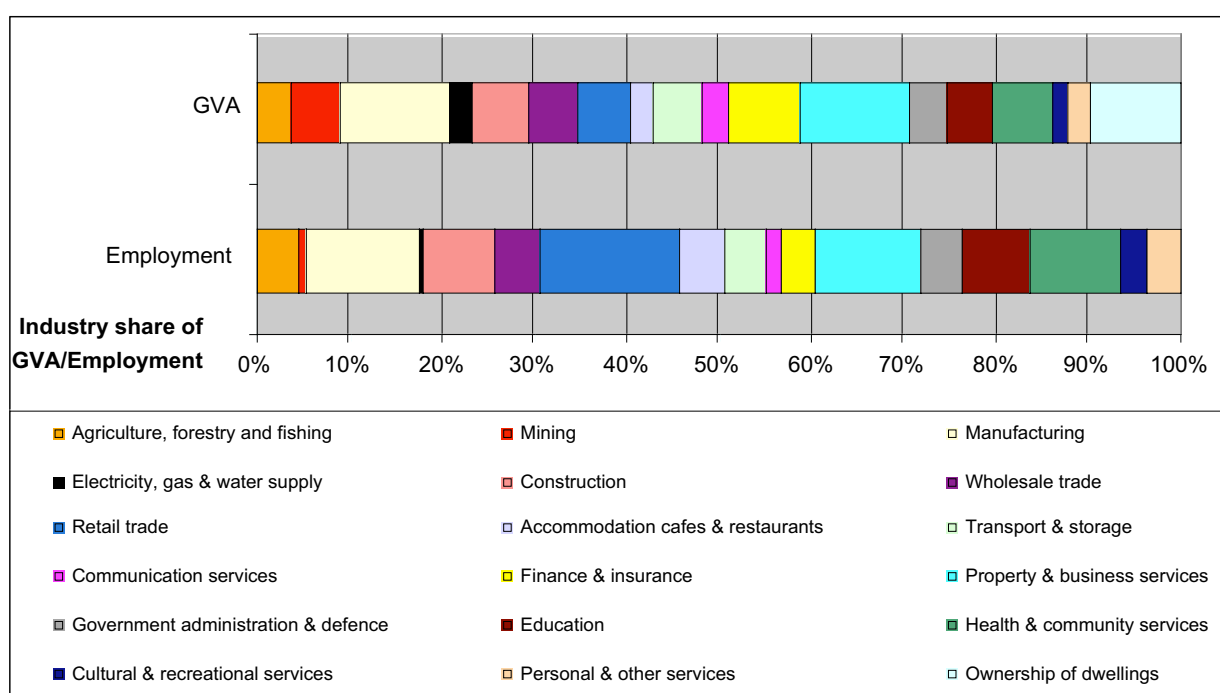
This section examines the extent to which different industries contribute to the national economy, in terms of employment and gross value added (GVA). It is based on ABS Labour Force Survey (LFS) and National Accounts data, presented using the Australian and New Zealand Standard Industrial Classification (ANZSIC).³

³ Within ANZSIC, the most aggregated classification of industries is to ANZSIC divisions (as adopted in Figure 1). Each ANZSIC division contains one or more ANZSIC subdivisions. For example, the 'Property and business services' division consists of the 'Property services' and 'Business services' subdivisions. In this section, the phrase "at a more detailed level" indicates the analysis relates to ANZSIC subdivisions. Other analysis relates to ANZSIC divisions.

Relative size of industries

Figure 1 shows the largest contributors to the value of Australian production in 2002 were Property and business services (12%) and Manufacturing (12%). The major employing industries in Australia were Retail trade (15%), Manufacturing (12%) and Property and business services (12%). Retail trade and Accommodation, cafes and restaurants made a much more important contribution to employment than to GVA. In contrast, Mining and Electricity, gas and water made a minor contribution to employment, but accounted for much larger shares of GVA.

FIGURE 1 INDUSTRY CONTRIBUTIONS TO GROSS VALUE ADDED (GVA) AND EMPLOYMENT, AUSTRALIA, 2002



Source Derived by BTRE based on ABS Cat. 5204.0, 2001-02 (downloaded from www.abs.gov.au, 16 April 2003) and ABS Cat. 6291.0.55.001, 2002 (downloaded from www.abs.gov.au, March 2003).

At a more detailed level of industry disaggregation, the major employing industries were Business services (10%), Health services (7%), Education (7%), Personal and household good retailing (6%) and Food retailing (6%).

Industry trends

Between 1985 and 2002, Australia's economy grew at an annual average rate of 3.5% in real terms, while employment grew at 2.0%. Employment growth was strongest pre-1990, while GVA bottomed out between 1990 and 1992, and has grown strongly since then.

From Table 2 it is evident that all industries recorded positive rates of GVA growth between 1985 and 2002. The fastest growing industries were Communication services, Property and business services and Finance and insurance. The slowest growing industry was Manufacturing, partly due to a decline in Textiles, clothing, footwear and leather (TCF) manufacturing.

The 1985 to 2002 period was one of rapid change in Communication services. While GVA grew strongly, employment growth was limited. A similar pattern was evident for Finance and insurance. In contrast, Property and business services recorded strong growth in both employment and GVA. Other industries with high rates of employment growth were Cultural and recreational services and Accommodation, cafes and restaurants. Electricity, gas and water employment declined markedly over the period.

At a more detailed level, the most rapidly growing industries in terms of employment were Services to finance and insurance (average annual growth of 7% between 1985 and 2002), Storage (6%), Community services (6%), Business services (6%) and Libraries, museums and the arts (6%). Industries with declining employment included Rail transport (-6%), Water supply, sewerage and drainage (-4%), Electricity and gas supply (-4%) and Coal mining (-4%).

Property and business services (particularly the Business services component) accounts for a large and growing share of Australian employment and GVA. Some of this growth can be attributed to outsourcing of activities (e.g. legal services, IT training services) that were previously provided within large manufacturing businesses or within the public sector.

Industry stability

An instability index (based on Malizia and Ke, 1993) has been derived from quarterly employment data for the 1985 to 2002 period, and provides a guide to the relative volatility of employment across industries. Stability is defined in Kaufman (1993) as "a type of inertia, the ability to withstand change exerted by outside influences. As such, stability should not be confused with the lack of movement, such as slow growth." The instability index measures the extent of deviation of a time-series from a long-run linear trend. The index will have a value of zero if the time-series remains unchanged or exactly follows a linear trend path. The index will have a high value when a time-series displays extreme movements over time, or when growth rates are well above or below the long run trend for sustained periods.

Table 2 shows that Electricity, gas and water and Communication services had the most unstable employment, while employment in Health and community services and Retail trade was very stable over time.

An instability index was also derived for GVA between 1985 and 2002, based on annual data for ANZSIC divisions. The most unstable industry was Communication services, which also exhibited unstable employment. For the Agriculture, forestry and fishing industry, GVA was less stable over time than

employment. Industries with very stable GVA included Education, Health and community services and Government administration and defence.

TABLE 2 INDUSTRY GROWTH AND STABILITY, AUSTRALIA, 1985 TO 2002

<i>Industry Division</i>	<i>Average annual growth</i>		<i>Instability index</i>	
	<i>GVA</i>	<i>Employment</i>	<i>GVA</i>	<i>Employment</i>
Agriculture, forestry & fishing	2.5%	-0.1%	7.4%	3.9%
Mining	4.9%	-1.1%	3.3%	5.2%
Manufacturing	2.0%	0.0%	2.9%	3.0%
Electricity, gas & water supply	2.4%	-4.2%	2.1%	10.9%
Construction	2.7%	2.4%	6.8%	5.8%
Wholesale trade	3.3%	0.3%	7.0%	7.1%
Retail trade	2.9%	2.6%	4.7%	2.8%
Accommodation, cafes & restaurants	3.8%	4.3%	4.2%	3.7%
Transport and storage	3.9%	0.7%	3.7%	3.4%
Communication services	8.4%	0.6%	14.3%	8.2%
Finance & insurance	5.3%	1.3%	6.0%	6.6%
Property & business services	5.7%	5.4%	5.3%	5.9%
Government administration & defence	2.4%	1.4%	1.7%	4.9%
Education	2.7%	2.2%	1.5%	3.4%
Health & community services	4.1%	3.2%	1.8%	2.6%
Cultural & recreational services	2.8%	4.1%	2.3%	4.6%
Personal & other services	3.8%	3.1%	3.1%	3.3%
Ownership of dwellings	3.7%	na	2.5%	na
TOTAL	3.6%	2.0%	2.8%	2.1%

Source Derived by BTRE based on ABS Cat 5204.0, 1984-85 to 2001-02 (downloaded from www.abs.gov.au, 16 April 2003) and ABS Cat. 6291.0.55.001, 1985 to 2002 (downloaded from www.abs.gov.au, March 2003).

At a more detailed level, industries with relatively unstable employment included Machinery and motor vehicle wholesaling and Services to finance and insurance (both with an instability index of 11%). Larger industries such as Food retailing, Education and Health services had the most stable employment (each with an instability index of 3%). While Business services employs more people than any other industry, employment is not particularly stable (7%).

Agriculture is often regarded as a relatively unstable industry, subject to seasonal fluctuations and external shocks, such as drought and exchange rate variations. However, Agriculture has relatively stable employment (4%). The importance of self-employment to agriculture is likely to make employment less responsive to shocks in the short-run, and may explain its relative stability.

CHAPTER 4 INDUSTRY STRUCTURE OF EMPLOYMENT IN REGIONS

This chapter examines the industry structure of employment at different levels of regional aggregation for 1991, 1996 and 2001. The analysis relies on census data, and except where otherwise stated, is based on ANZSIC industry subdivisions.

4.1 STATES AND TERRITORIES

Major employing industries

In 2001, Business services accounted for 9.8% of national employment.⁴ It was the single largest industry in New South Wales (NSW), Victoria, Queensland and Western Australia (WA), and one of the top 3 industries in all States and Territories. Of the States and Territories, Tasmania and the Northern Territory (NT) stood out as having relatively little employment in Business services (see Table 3).

Education featured as the 2nd or 3rd largest industry in all States and Territories. In South Australia (SA) and Tasmania, Health services was the largest industry, and it was also amongst the top 3 industries in the other States. Government administration was the major employer in the Australian Capital Territory (ACT) and the NT. The Food retailing and Personal and household good retailing industries were also important employing industries in all States and Territories.

⁴ Examples of activities in this industry include computing, legal, accounting, marketing, scientific research, architectural, employment placement, interior design, security and cleaning services.

TABLE 3 MAJOR EMPLOYING INDUSTRIES WITHIN EACH STATE AND TERRITORY AND THEIR EMPLOYMENT SHARE, 2001

<i>Five major employing ANZSIC industry subdivisions within each State/Territory</i>					
	1	2	3	4	5
NSW	Business services (10.8%)	Health services (7.3%)	Education (7.0%)	Personal & household good retailing (6.7%)	Food retailing (5.4%)
VIC	Business services (10.4%)	Health services (7.3%)	Education (7.3%)	Personal & household good retailing (6.8%)	Food retailing (5.7%)
QLD	Business services (8.2%)	Education (7.9%)	Health services (7.2%)	Personal & household good retailing (6.7%)	Food retailing (6.1%)
SA	Health services (8.9%)	Business services (8.2%)	Education (7.3%)	Personal & household good retailing (6.3%)	Food retailing (5.9%)
WA	Business services (9.4%)	Education (7.6%)	Health services (7.3%)	Personal & household good retailing (6.5%)	Food retailing (6.2%)
TAS	Health services (8.9%)	Education (8.6%)	Business services (6.7%)	Personal & household good retailing (6.6%)	Food retailing (6.2%)
NT	Government administration (12.2%)	Education (8.5%)	Business services (7.3%)	Health services (6.3%)	Accommodation, cafes & restaurants (6.3%)
ACT	Government administration (19.4%)	Business services (13.6%)	Education (9.1%)	Personal & household good retailing (5.7%)	Health services (5.6%)

Source Derived by BTRE using unpublished data from ABS 2001 Census of Population and Housing (persons enumerated at home).

Industry trends

Queensland exhibited the highest rate of employment growth between 1991 and 2001, closely followed by WA and the NT. Employment growth in Tasmania and SA was relatively slow, but still positive.

From Table 4 it is evident that the employment share of Business services grew strongly across all States and Territories between 1991 and 2001. In the ACT, this industry grew from 6.7% of employment in 1991 to 13.6% in 2001, while Victoria (4.9% to 10.4%) and NSW (5.6% to 10.8%) also recorded very strong growth.

Food retailing also grew in importance across all States and Territories, most strongly in Queensland and Tasmania. There was an associated, but more modest, fall in the employment share of Personal and household good retailing across all States and Territories.

The employment share of Petroleum, coal, chemical and associated product manufacturing grew strongly for Victoria and SA between 1991 and 2001, while the employment share of Construction trade services grew strongly for WA and Victoria.

TABLE 4 CHANGE IN EMPLOYMENT SHARES BY INDUSTRY FOR STATES AND TERRITORIES, 1991 TO 2001

Industry Subdivision	Percentage point change in industry's share of State/Territory employment							
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Agriculture	-0.7%	-0.7%	-1.3%	-0.4%	-1.1%	-0.5%	-0.7%	0.0%
Metal ore mining	0.0%	0.0%	-0.2%	0.1%	-0.8%	-0.4%	-1.1%	0.0%
FBT manufacturing	-0.4%	-0.1%	-0.9%	0.0%	-0.4%	-0.6%	-0.4%	-0.2%
TCF manufacturing	-0.5%	-1.0%	-0.1%	-0.5%	0.0%	-0.2%	0.0%	0.0%
Wood & paper product manuf.	-0.5%	-0.6%	-0.7%	-0.5%	-0.7%	-1.6%	-0.1%	0.0%
Petroleum, coal, chemical & associated product manufacturing	0.3%	0.9%	0.5%	0.7%	0.4%	0.0%	0.1%	0.0%
Metal product manufacturing	-0.7%	-0.4%	-0.1%	-0.6%	0.0%	-0.4%	-0.5%	-0.1%
Machinery & equipment manuf.	-0.5%	-0.7%	0.1%	-0.1%	-0.1%	0.1%	0.1%	0.0%
Other manufacturing	0.0%	-0.1%	0.4%	0.1%	0.6%	0.3%	0.2%	0.3%
Electricity & gas supply	-0.5%	-0.7%	-0.1%	-0.5%	-0.3%	-0.8%	-0.1%	0.1%
General construction	0.1%	0.2%	-0.5%	-0.2%	0.0%	-0.6%	-0.6%	-0.8%
Construction trade services	0.3%	0.7%	0.3%	0.5%	1.0%	0.2%	0.5%	0.2%
Basic material wholesaling	-1.0%	-1.0%	-1.0%	-0.8%	-0.9%	-0.8%	-0.6%	-0.5%
Food retailing	2.4%	2.4%	2.7%	2.5%	2.5%	2.7%	1.9%	1.9%
Personal & household good retailing	-0.8%	-1.0%	-1.6%	-1.4%	-1.3%	-1.3%	-1.5%	-1.1%
Motor vehicle retailing & services	-0.5%	-0.3%	-0.5%	-0.4%	-0.4%	-0.1%	-0.3%	-0.2%
Accommodation, cafes, restaurants	0.6%	0.9%	0.8%	0.6%	0.5%	0.6%	-0.4%	1.0%
Rail transport	-0.5%	-0.5%	-0.6%	-0.5%	-0.5%	-0.3%	-0.1%	0.0%
Services to transport	-0.2%	-0.2%	-0.2%	-0.2%	-0.4%	-0.3%	-0.8%	-0.3%
Finance	-1.4%	-1.3%	-1.0%	-1.2%	-1.5%	-1.3%	-1.1%	-1.3%
Insurance	-0.2%	-0.5%	-0.4%	-0.6%	-0.4%	-0.5%	-0.1%	-0.2%
Services to finance & insurance	-0.6%	-0.7%	-0.5%	-0.4%	-0.8%	-0.1%	-0.8%	-1.5%
Property services	0.4%	0.5%	0.3%	0.2%	0.4%	0.5%	0.7%	0.4%
Business services	5.3%	5.5%	3.5%	3.8%	4.6%	3.1%	2.8%	6.9%
Government administration	-0.8%	-1.9%	-0.7%	-0.8%	-0.4%	-0.6%	1.6%	-2.6%
Defence	-0.6%	-0.6%	-0.4%	-0.2%	-0.2%	-0.1%	3.0%	-2.5%
Education	0.2%	-0.1%	0.5%	-0.3%	-0.1%	0.7%	0.3%	0.1%
Health services	0.2%	-0.2%	0.3%	-0.4%	-0.8%	-0.2%	-0.4%	0.2%
Community services	0.5%	0.8%	1.0%	0.6%	0.9%	1.0%	0.6%	0.5%
Libraries, museums & the arts	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.8%	0.4%
Sport & recreation	0.2%	0.5%	0.2%	0.0%	0.2%	0.0%	-0.3%	0.4%
Personal services	0.5%	0.4%	0.5%	0.5%	0.5%	0.6%	0.4%	0.6%
Other services	-0.1%	-0.2%	-0.1%	-0.3%	-0.3%	0.0%	-3.2%	-0.6%

Source Derived by BTRE using unpublished data from ABS 2001 & 1991 Censuses of Population and Housing (persons enumerated at home).

Note Only industries which experienced greater than a 0.5 percentage point change for at least one State or Territory are presented in the table. Changes of more than 2 percentage points are in bold.

Across-the-board growth in employment shares was also recorded for the following industries:

- Property services (especially in the NT);
- Community services (especially in Queensland, Tasmania and WA);
- Libraries, museums and arts (especially in the NT);
- Personal services; and
- Accommodation, cafes and restaurants (except in the NT).

Agriculture's share of employment declined in all States between 1991 and 2001, most significantly in Queensland and WA. Metal ore mining's employment share declined considerably in the NT and WA. Wood and paper product manufacturing's employment share fell in all States, most markedly in Tasmania. Electricity and gas supply's employment share also fell across all States, most markedly in Victoria and Tasmania. Other significant changes included a decline in the employment share of TCF manufacturing from 2.5% to 1.5% in Victoria, a decline from 3.2% to 2.3% for Queensland Food, beverage and tobacco manufacturing employment, and a decline from 6.8% to 3.6% for NT Other services employment. Across-the-board declines in employment shares were recorded for Basic material wholesaling, Finance, Insurance and Services to finance and insurance.

The employment share of the Government administration and Defence industries rose in the NT between 1991 and 2001, but declined elsewhere. The decline in Defence's employment share was most evident in the ACT, while Government administration's decline was most marked for Victoria and the ACT.

Specialisations

A State/Territory can be viewed as specialised in a particular activity when the industry's share of employment within the State/Territory exceeds the industry's national share of employment. In 2001, the top specialisations were:⁵

- NSW: Coal mining; Air and space transport; Motion picture, radio and TV; Services to finance and insurance; Insurance.
- Victoria: TCF manufacturing; Petroleum, coal, chemical and associated product manufacturing; Machinery and equipment manufacturing; Storage; Printing, publishing and recorded media.
- Queensland: Coal mining; Rail transport; Water transport; Agriculture; Electricity and gas supply.
- SA: Commercial fishing; Machinery and equipment manufacturing; Oil and gas extraction; Agriculture; FBT manufacturing.
- WA: Metal ore mining; Oil and gas extraction; Services to mining; Other mining.

⁵ Location quotients (LQs) were calculated as the ratio of an industry's employment share for a State/Territory to the industry's national employment share. For each State/Territory, the industries with the highest LQs were regarded as the top specialisations.

- Tasmania: Forestry and logging; Commercial fishing; Wood and paper product manufacturing; Water transport; Electricity and gas supply.
- NT: Defence; Metal ore mining; Government administration; Commercial fishing; Water transport.
- ACT: Defence; Government administration; Libraries, museums and the arts; Business services.

A number of patterns emerge, including NSW's specialisation in several knowledge-based service industries. Victoria has multiple manufacturing-related specialisations, while WA's top specialisations are mining-related and Tasmania's relate to key primary industries and their downstream processing.

4.2 REMOTENESS CLASSES

This section examines industry structure using the ABS Remoteness Structure, which groups Census Collection Districts (CCDs) into five broad classes of remoteness sharing common characteristics in terms of physical distance from services and opportunities for social interaction. The classes are Major cities of Australia; Inner regional Australia; Outer regional Australia; Remote Australia and Very remote Australia.

The concept of remoteness is based upon road distance from any point to the nearest ABS Urban Centre in each of 5 population size classes. For example, any location within close proximity of an urban centre of more than 250 000 persons belongs to the Major Cities of Australia class. The population size of the urban centre is a proxy for the availability of a range of services.

BTRE has developed employment by industry estimates for remoteness classes based on ABS coding of CCDs to the 2001 Remoteness Structure. Remote and Very Remote Australia were combined into a single category, while offshore and migratory areas were excluded.

Relative importance of industries

Figure 2 provides a snapshot of industry structure for each remoteness class in 2001, at the ANZSIC division level. In 2001, Retail trade was the largest employer in Major cities and Inner regional, but was surpassed in importance by Agriculture, forestry and fishing in Outer regional and Remote/Very remote Australia.

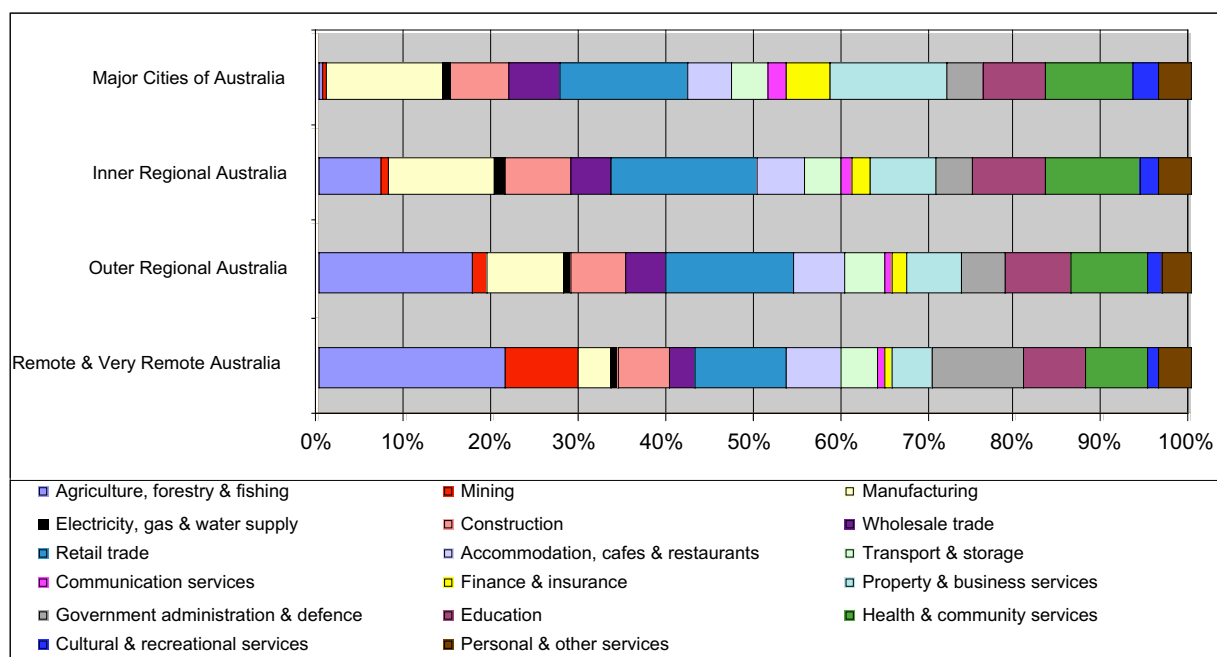
A number of industry groupings can be identified:

- The relative importance of employment in Agriculture, forestry and fishing, Mining and Accommodation, cafes and restaurants rises with increasing remoteness.
- The importance of Manufacturing, Wholesale trade, Cultural and recreation services, Finance and insurance, Property and business services and Communication services, declines with increasing remoteness. The latter

three industries are much more important to Major cities than to the other remoteness classes.

- The importance of several industries peaks in Inner regional Australia: Electricity, gas and water supply; Retail trade; Health and community services; Education; Construction.
- Government administration and defence peaks in Remote/Very remote Australia, which can partly be attributed to participation by indigenous persons in the Community Development Employment Programme (CDEP – see Appendix I).

FIGURE 2 EMPLOYMENT SHARES BY INDUSTRY FOR REMOTENESS CLASSES, 2001



Source Derived by BTRE using unpublished data from ABS 2001 Census of Population and Housing (persons enumerated at home).

At the more detailed ANZSIC subdivision level, Business services was the most important industry for Major cities in 2001. Education was the most important source of employment in Inner regional Australia, while Agriculture was the major source of employment in Outer regional and Remote/Very remote Australia.

Industry trends

Between 1991 and 2001, total employment growth was strongest in Inner regional (20%), followed by Major cities (18%), Outer regional (10%) and Remote/Very remote Australia (1%).

Table 5 shows that Business services grew strongly across all remoteness classes, but growth was strongest in Major cities, where the industry's

employment share increased from 5.9% to 11.1%. Food retailing was also a growth industry, and grew particularly strongly in Inner regional Australia. Other industries contributing to employment growth across all remoteness classes included Community services (particularly in Inner regional and Outer regional Australia), Construction trade services and Accommodation, cafes and restaurants.

Government administration increased its share of Remote/Very remote employment from 5.2% in 1991 to 9.7% in 2001, which is partly attributable to changed treatment of CDEP (see Appendix I). The employment share of Government administration declined in other remoteness classes.

Between 1991 and 2001, Agriculture's employment share declined in Inner regional (from 7.7% to 6.2%), Outer regional (18.6% to 15.7%) and Remote/Very remote Australia (21.9% to 19.3%), while remaining unchanged in Major cities. Metal ore mining accounted for 8.9% of Remote/Very remote employment in 1991, but this had declined to 5.5% by 2001. The employment share of Finance, Personal and household good retailing and Basic material wholesaling declined significantly for all remoteness classes.

Specialisations

In 2001, the top specialisations of each Remoteness class were:

- *Major cities:* Services to finance and insurance; Insurance; Petroleum, coal, chemical and associated manufacturing.
- *Inner regional:* Forestry and logging; Coal mining; Services to agriculture, hunting and trapping.
- *Outer regional:* Agriculture; Services to agriculture, hunting and trapping; Commercial fishing.
- *Remote/Very remote:* Metal ore mining; Commercial fishing; Other mining.

TABLE 5 CHANGE IN EMPLOYMENT SHARES BY INDUSTRY FOR REMOTENESS CLASSES, 1991 TO 2001

Industry Subdivision	Percentage point change in industry's share of Remoteness Class employment			
	Major cities	Inner regional	Outer regional	Remote & Very remote
Agriculture	0.0%	-1.5%	-2.9%	-2.6%
Coal mining	-0.1%	-0.3%	-0.2%	-1.1%
Metal ore mining	0.0%	0.0%	-0.2%	-3.4%
FBT manufacturing	-0.4%	-0.4%	-0.5%	-0.3%
TCF manufacturing	-0.6%	-0.4%	0.0%	0.1%
Wood & paper product manuf.	-0.6%	-0.5%	-0.6%	-0.1%
Petroleum, coal, chemical & associated product manufacturing	0.6%	0.3%	0.2%	0.1%
Metal product manufacturing	-0.6%	0.0%	-0.2%	0.2%
Machinery & equipment manuf.	-0.7%	0.1%	0.2%	-0.1%
Electricity & gas supply	-0.3%	-1.0%	-0.4%	-0.5%
Construction trade services	0.5%	0.6%	0.7%	0.8%
Basic material wholesaling	-1.1%	-0.9%	-0.7%	-0.2%
Personal & household good w/s	0.0%	0.5%	0.6%	0.6%
Food retailing	2.4%	2.9%	2.3%	1.5%
Personal & household good retailing	-1.2%	-1.1%	-0.8%	-0.8%
Accommodation, cafes, restaurants	0.8%	0.7%	0.6%	0.3%
Rail transport	-0.4%	-0.6%	-0.7%	-0.6%
Finance	-1.5%	-1.0%	-0.8%	-0.6%
Services to finance & insurance	-0.8%	-0.3%	-0.2%	-0.3%
Property services	0.4%	0.4%	0.4%	0.5%
Business services	5.8%	2.7%	2.2%	1.7%
Government administration	-1.3%	-1.0%	-0.7%	4.5%
Defence	-0.6%	-0.6%	0.2%	-0.2%
Education	0.1%	0.1%	0.2%	0.5%
Community services	0.6%	1.1%	1.1%	0.8%
Libraries, museums & the arts	0.5%	0.4%	0.4%	0.5%
Personal services	0.5%	0.5%	0.5%	0.4%
Other services	-0.2%	0.0%	0.0%	-1.9%

Source Derived by BTRE using unpublished data from ABS 2001 & 1991 Censuses of Population and Housing (persons enumerated at home).

Note Only industries which experienced greater than a 0.5 percentage point change for at least one remoteness class are presented in the table. Changes of more than 2 percentage points are in bold.

4.3 BTRE LABOUR MARKET REGIONS

ABS census data on industry employment was obtained for all Statistical Local Areas (SLAs) in Australia for 1991, 1996 and 2001. *The data relates to where people live, not where they work.*

In many cases, the majority of employed people enumerated in a SLA do not work in that SLA, but instead commute to work in a nearby SLA. This is particularly the case for Australia's major cities, but also applies to the surrounds of regional centres. When a high proportion of people who live in a SLA work outside the SLA, analysis of industry structure data is likely to identify residential clustering as much as industry clustering.⁶ This paper examines the industry structure of Australia's regional economies, rather than the social characteristics of neighbourhoods. Consequently, the analysis focuses on *BTRE-defined labour market regions*.

In concept, labour market regions reflect the area within which people are willing to commute from their place of residence to their place of employment. From the set of approximately 1350 SLAs, BTRE has defined 425 labour market regions, based on commuting patterns revealed by the 2001 census.⁷ For each labour market region, 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.

A labour market region was defined by BTRE for each capital city. It typically included the capital city statistical division, plus any adjoining SLAs in which less than 70% of employed residents worked in the SLA (i.e. more than 30% commuted elsewhere). Similarly, SLAs which adjoined regional centres and had more than 30% of employed residents commuting elsewhere, were included within the labour market region for the regional centre. Where there were a number of similarly sized towns in close proximity and commuting patterns were multi-directional, a broader labour market region was defined (e.g. Riverland SA).

Six of the labour market regions cross State/Territory borders.⁸ Of the 425 BTRE labour market regions, 337 are standalone SLAs and 88 represent a combination of two or more SLAs.⁹

⁶ Residential clustering refers to where people with similar socio-economic characteristics settle in close proximity (e.g. due to housing costs).

⁷ Offshore and migratory SLAs, and SLAs with zero employed persons were excluded prior to defining the regions.

⁸ Canberra & surrounds; Gold Coast-Tweed; Mildura & Wentworth; Echuca & surrounds; Albany-Wodonga & surrounds; Yarrawonga, Corowa & surrounds.

⁹ For all such composite labour market regions, at least 75% of employed residents work in the region. However, for 15 of the 337 standalone SLAs, only 50 - 70% of employed residents worked in the SLA, and commuting patterns were not sufficiently clearcut to include the SLA within a broader labour market region. These regions are flagged in the *Industry Structure Database*.

The BTRE labour market regions are based on SLA boundaries, rather than CCDs, and reflect only partial information on commuting patterns. They were developed for the purposes of this study, and simply represent a first attempt at developing a set of labour market regions consistent with 2001 ASGC boundaries.

Maps of BTRE labour market regions are included in Appendix II. The *Industry Structure Database* contains details of the labour market region classification and data on the industry structure of employment for each labour market region.

Major Employing Industries

While Agriculture accounted for just 3.5% of national employment in 2001, it was the single largest industry in 276 of the 425 BTRE labour market regions. Several industries featured as the major source of employment in 20 to 30 regions, namely Government administration, Metal ore mining, Education, Health services and Accommodation, cafes and restaurants. Despite its national prominence, Business services was the major employing industry in just 5 regions (those centred on Sydney, Melbourne, Brisbane, Perth and Darwin).

Agriculture was the 2nd or 3rd largest source of employment in a further 52 regions, and appeared amongst the top 3 industries for 77% of regions. Education appeared amongst the top 3 employing industries for 70% of regions, typically as the 2nd or 3rd largest industry in the region. Other industries regularly featured in the top 3 for regions were Health services, Government administration and Accommodation, cafes and restaurants (Table 6).

The major employing industries for regions remained reasonably consistent over the decade. Food retailing was much more likely to feature amongst the top 3 industries for regions in 2001 than in 1991, while the same was true to a lesser extent for Education and Business services. Personal and household good retailing was one of the top 3 employing industries for 58 fewer regions in 2001 than in 1991.

Technology and Knowledge-Intensive Industries

In a knowledge based economy, the production, distribution and use of technology and knowledge is an important driver of growth, wealth creation and employment. While all industries generate and/or use new technology to some extent, some are more technology and knowledge-intensive than others.

Employment in technology and knowledge-intensive industries was estimated for BTRE labour market regions, following OECD (2001) definitions. Industries defined as technology and knowledge-intensive include: Education; Health and community services; Finance and insurance; Communication services; Business

services; Services to mining; and various medium and high-technology manufacturing industries.¹⁰

In 2001, 2.9 million Australians were employed in technology and knowledge-intensive industries (37% of employed persons). Technology and knowledge-intensive industries are of greatest importance to Australia's largest cities and university towns. Coomalie in the NT, home of the Batchelor Institute of Indigenous Tertiary Education, had the highest share of employment in these industries (46%). The labour market regions centred on Sydney, Melbourne and Adelaide also had relatively high employment shares (41%), as did the region centred on Armidale NSW (40%). The only other labour market regions with a share exceeding the national average of 37% were the regions centred on Brisbane, Perth, Orange (NSW), Ballarat (VIC) and Geelong (VIC).

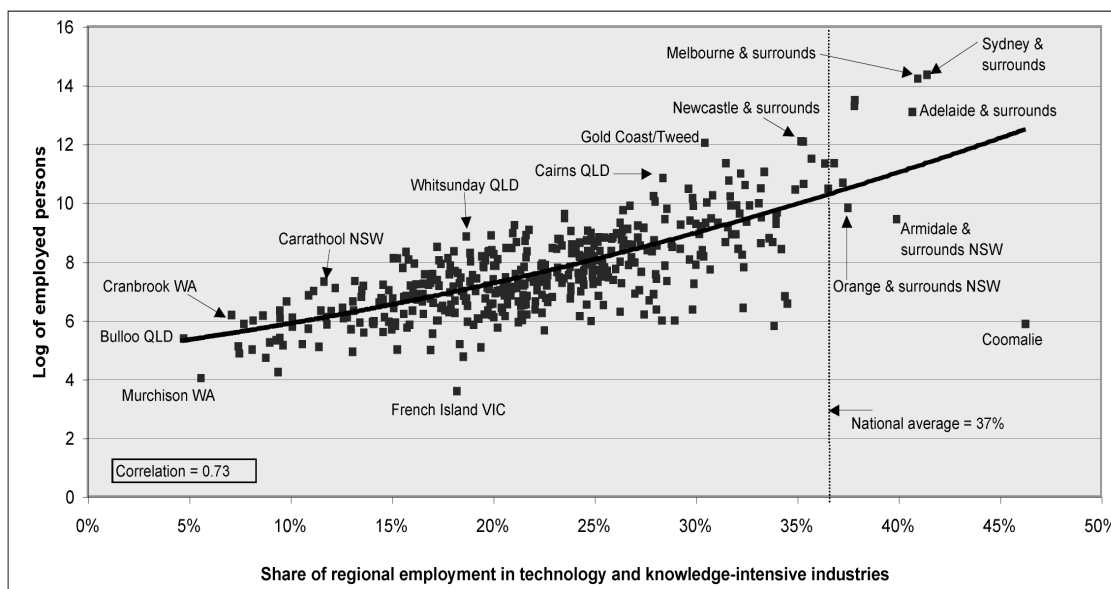
Of labour market regions with more than 300 employed persons, Cranbrook in WA had the lowest share of employment in technology and knowledge-intensive industries (7%).

Figure 3 shows that the share of employment in technology and knowledge-intensive industries tends to increase with the size of the regional economy. While the relationship is strong, there is still considerable variation in shares across regions with a similar number of employed persons (e.g. Cranbrook WA and Coomalie NT).

The share of employment in technology and knowledge-intensive industries also tends to decline as remoteness increases — it was highest for Major cities (40%) and considerably lower for Inner regional (32%), Outer regional (26%) and Remote/Very remote Australia (22%). The relationship with remoteness is also evident at the State/Territory level. In 2001, the employment share of technology and knowledge-intensive industries was lowest in the NT (30%), and highest in Victoria (39%) and NSW (38%).

¹⁰ The technology and/or knowledge-intensity of these industries will vary across regions, and so this indicator should be interpreted with some caution.

FIGURE 3 SIZE OF REGIONAL ECONOMY AND EMPLOYMENT IN TECHNOLOGY AND KNOWLEDGE-INTENSIVE INDUSTRIES, 2001



Source Derived by BTRE for labour market regions using unpublished ABS 2001 Census of Population and Housing data (persons enumerated at home).

Industry Localisation and Specialisation

The coefficient of industry localisation (Kim, 1995) provides an indication of the extent to which an industry is dispersed across Australia's regions. A coefficient of zero for an industry means that industry employment is distributed across Australia's regions in line with total employment, while a coefficient of 100% indicates employment is fully localised in a single region. Localisation coefficients were derived based on the distribution of ANZSIC subdivision employment across labour market regions.

From Table 6 it is evident that Australia's most localised industries in 2001 were Coal mining (with a coefficient of 92%), Metal ore mining (86%), Commercial fishing (78%), Agriculture (70%) and Forestry and logging (68%). Outside the primary industries, the most localised industries were Defence (56%) and Rail transport (43%).

Several service industries had a very low degree of localisation, including Education, Personal and household good retailing and Personal services (all at 7%). For these industries, the regional distribution of industry employment closely approximated the regional distribution of total employment. These service industries predominantly cater to local demand. The finance and insurance related service industries were more localised than most other service

industries. Manufacturing employment was more localised than most service industries, but less localised than primary industries, with coefficients ranging from 16% to 32%.

Between 1991 and 2001, employment became much less localised for:

- Other manufacturing (localisation coefficient declined from 36% to 19%);¹¹
- Services to agriculture, hunting and trapping (73% to 58%);
- Libraries, museums and the arts (29% to 17%);
- Forestry and logging (77% to 68%);
- Property services (23% to 15%); and
- Metal ore mining (93% to 86%).

Between 1991 and 2001, there was a marked increase in localisation for Rail transport (the localisation coefficient increased from 35% to 43%) and Defence (49% to 56%). In both cases, the greater localisation of employment was associated with a significant decline in total industry employment.

The localisation coefficient is a national summary measure of the dispersion of employment in a particular industry across all of Australia's regions. In contrast, location quotients provide region-specific measures of the relative importance of each industry. Location quotients (LQs) relate an industry's employment share for a region to the industry's national employment share. A value of more than one indicates a higher degree of specialisation than the national average, while a value of less than one indicates a lower degree of specialisation. LQs can provide insight into a region's comparative advantage.

It is important to recognise that an industry can be the top specialisation for a region (i.e. have a higher LQ than any other industry), but account for a very small share of regional employment. For example, the top specialisation for Kempsey (NSW) in 2001 was Commercial fishing (LQ=5.2), but this industry accounted for just 0.7% of regional employment.

Table 6 lists the labour market region with the highest LQ ratio for each industry in 2001, and the number of regions in which each industry featured amongst the top 3 specialisations (i.e. had one of the 3 highest LQs).

¹¹ Metal product manufacturing, TCF manufacturing, Machinery and equipment manufacturing and Non-metallic mineral product manufacturing also became less localised over the period. These results are broadly consistent with the Productivity Commission (2003) conclusion that manufacturing employment became less geographically concentrated in the major cities between 1981 and 1996.

TABLE 6 INDUSTRY STRUCTURE OF EMPLOYMENT INDICATORS FOR SELECTED ANZSIC SUBDIVISIONS, 2001

Industry Subdivision	National employment share	National change, 1991 to 2001	Localisation coefficient	Number of regions for which industry is a top 3		Most specialised region (i.e. region with highest LQ)
				Employer	Specialisation	
Agriculture	3.5%	-5%	70%	328	278	Kent WA
Services to agriculture, hunting	0.2%	17%	58%	5	188	Quilpie QLD
Forestry & logging	0.1%	7%	68%	2	92	Manjimup WA
Commercial fishing	0.1%	17%	78%	8	78	Port Lincoln & surrounds SA
Coal mining	0.2%	-35%	92%	12	27	Broadsound QLD
Metal ore mining	0.3%	-14%	86%	36	59	Roxby Downs SA
FBT manufacturing	2.1%	-1%	29%	36	42	King Island TAS
TCF manufacturing	0.9%	-26%	32%	0	10	Wangaratta VIC
Wood & paper product manuf.	0.8%	-32%	28%	12	33	Wattle Range West SA
Printing, publishing, recorded media	1.3%	13%	23%	1	2	Maryborough & surrounds
Petroleum, coal, chemical & associated product manufacturing	1.3%	95%	30%	0	2	Port Pirie SA
Non-metallic mineral product manuf.	0.6%	-2%	16%	1	4	Rylstone NSW
Metal product manufacturing	1.8%	-5%	27%	9	10	Whyalla & surrounds SA
Machinery & equipment manuf.	2.9%	3%	26%	1	3	Orange & surrounds NSW
Other manufacturing	0.9%	37%	19%	0	2	Victor Harbor & surrounds SA
Electricity & gas supply	0.5%	-39%	30%	0	26	Latrobe Valley VIC
Water supply sewerage & drainage	0.2%	-33%	26%	0	33	Murrumbidgee NSW
General construction	2.5%	15%	8%	8	6	Barcardine QLD
Construction trade services	4.3%	33%	8%	4	0	Waroona WA
Basic material wholesaling (w/s)	1.2%	-37%	12%	1	18	Tatiara SA
Machinery & motor vehicle w/s	1.8%	10%	16%	3	8	Carnamah WA
Personal & household good w/s	2.4%	26%	14%	2	2	Loxton Waikerie West SA
Food retailing	5.7%	106%	8%	49	0	Eurobodalla NSW
Personal & household good retailing	6.6%	0%	7%	34	0	Gold Coast-Tweed QLD/NSW
Motor vehicle retailing, services	2.7%	2%	10%	4	6	Dundas WA
Accommodation, cafes, restaurants	5.0%	37%	13%	98	16	Petermann NT
Road transport	2.3%	22%	8%	4	6	Urana NSW
Rail transport	0.4%	-49%	43%	1	28	Flinders QLD
Air & space transport	0.6%	24%	34%	0	5	Petermann NT
Services to transport	0.8%	-8%	21%	1	6	Petermann NT
Storage	0.2%	42%	27%	0	22	Warwick QLD
Communication services	1.8%	21%	17%	0	0	Exmouth WA
Finance	2.1%	-28%	23%	0	0	Sydney & surrounds NSW
Insurance	1.0%	-16%	26%	0	0	Sydney & surrounds NSW
Services to finance & insurance	0.8%	-33%	28%	0	1	Sydney & surrounds NSW
Property services	1.5%	60%	15%	0	2	Magnetic Island QLD
Business services	9.8%	128%	17%	29	0	Canberra & surrounds ACT/NSW
Government administration	3.8%	-8%	24%	84	41	Aurukun QLD
Defence	0.7%	-31%	56%	4	13	Katherine NT
Education	7.4%	20%	7%	299	7	Coomalie NT
Health services	7.4%	16%	8%	170	2	Flinders Ranges SA
Community services	2.6%	64%	10%	3	4	East Arnhem Bal NT
Motion picture, radio & TV services	0.5%	-8%	26%	0	1	Alice Springs NT
Libraries, museums & the arts	0.7%	272%	17%	0	14	Tasman TAS
Sport & recreation	1.3%	49%	15%	0	2	Delatite South VIC
Personal services	1.9%	57%	7%	0	1	Tennant Creek Bal NT
Other services	1.8%	4%	13%	7	12	Halls Creek WA

Source Derived by BTRE for labour market regions using unpublished data from ABS 2001 Census of Population and Housing, persons enumerated at home.

Note National figures reflect sum of BTRE labour market regions, and exclude offshore & migratory SLAs. National employment growth data also excludes Territories of Jervis Bay, Christmas Island & Cocos (Keeling) Islands. Only industries with over 10 000 employed persons Australia-wide are included. The most specialised region is limited to regions with over 300 employed persons. An industry is only considered a regional specialisation when the LQ exceeds 1.1 and more than 5 persons are employed in the industry.

Agriculture was the industry which featured most frequently as the top specialisation (112 regions). It was one of the top 3 specialisations for almost two-thirds of regions, and 86% of regions had an agricultural employment share above the national average of 3.5%. Other primary industries also feature frequently amongst the top 3 specialisations for regions, namely Commercial fishing, Forestry and logging, Metal ore mining and Services to agriculture, hunting and trapping.

Beyond the primary industries, there is considerable variety in the activities in which regions specialise, and only 7 of the 53 industries do not feature amongst the top 3 specialisations for at least one region. Some of the more common specialisations included FBT manufacturing, Wood and paper product manufacturing, Government administration and Water supply, sewerage and drainage.

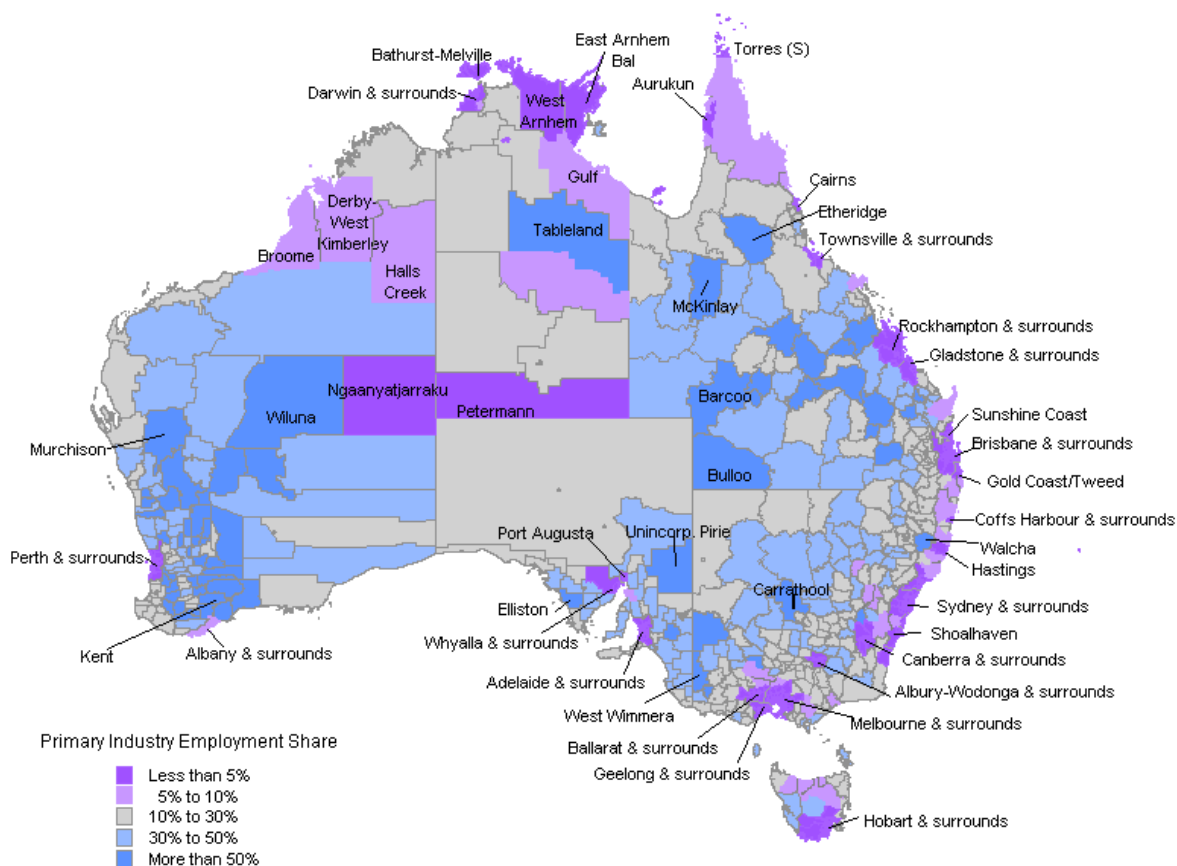
The larger the size of the regional economy, the more likely regional employment will be specialised in Finance and insurance and Business services. Specialisations in other industries are less closely tied to region size.

The majority of Australia's regions are highly specialised in one or more primary industries. Figure 4 shows the contribution of primary industries to employment for labour market regions in 2001. Primary industries are defined as the Agriculture, forestry and fishing and Mining ANZSIC divisions, and account for 4.8% of national employment.

Regions under-specialised in primary industry employment tend to be centred on capital cities and major coastal centres (e.g. Geelong, Townsville, Port Augusta), but there are also clusters in the top end and central Australia. Regions with more than half of all employment in primary industries are particularly strongly clustered in inland south-west and mid-west WA, and inland Queensland.

Regional specialisations change relatively slowly over time. However, there was an increase between 1991 and 2001 in the number of regions for which Government administration was one of the top 3 specialisations (possibly due to changed treatment of CDEP, see Appendix I), and a decline in the number of regions specialised in Rail transport and Other services. Productivity Commission (2003) found that regional dependence on manufacturing employment fell between 1981 and 1996.

FIGURE 4 PRIMARY INDUSTRY EMPLOYMENT SHARE FOR LABOUR MARKET REGIONS, 2001



Source Derived by BTRE for labour market regions using unpublished ABS 2001 Census of Population and Housing data (persons enumerated at home).

Industrial Diversity

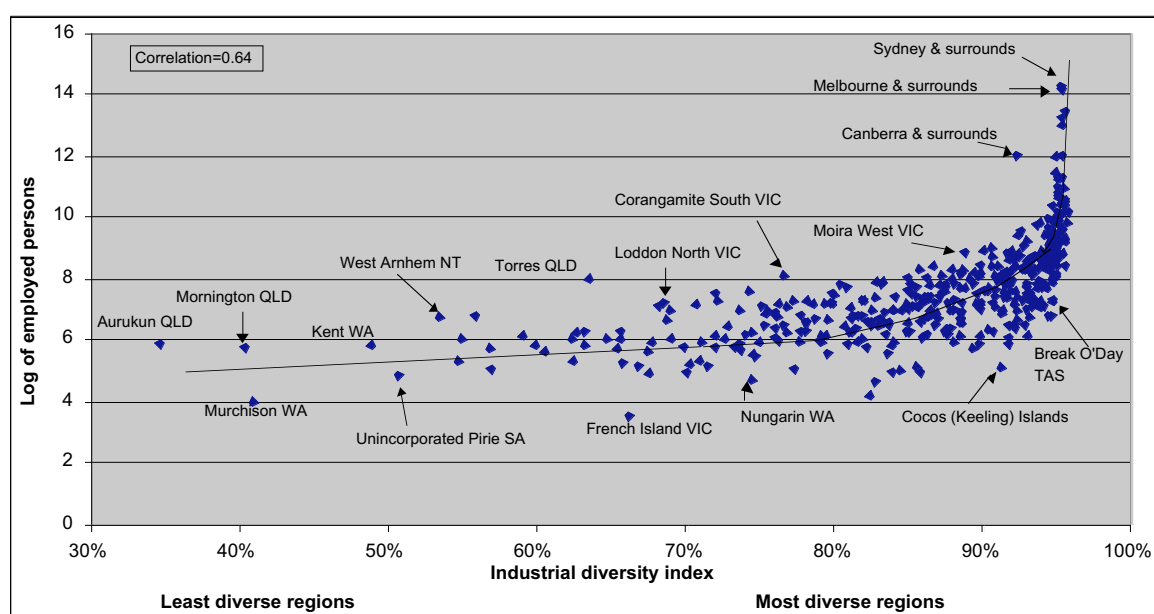
Industrial diversity refers to the overall distribution of employment across industries within a region. Diversity is typically defined in terms of the presence of a wide range of different industries in a region, and in terms of balanced employment across these industries. Concentration of activity in just a few industries may increase the risk of regional economic fluctuations, but also may indicate a region is highly competitive in a particular industry and be associated with higher productivity. A variety of employment opportunity is held to be beneficial not only for stability and long-term economic viability reasons, but also because it presents youth with a range of local employment options, potentially reducing the desire to leave the area.

In contrast to the industry-specific LQs, the industrial diversity index provides a general measure of the extent to which a region is characterized by a relatively

diversified industry structure.¹² An index value of 100% indicates a region is completely diversified (with employment spread evenly across all industries), while an index value of zero indicates a region's employment is fully concentrated in a single industry. The industrial diversity index was derived by BTRE for all labour market regions at the ANZSIC subdivision level.

Figure 5 shows the relationship between industrial diversity and the size of the regional economy in 2001. The larger the economy, the more likely it will have a diverse industrial base. Of the 156 labour market regions with more than 3000 employed persons, only Corangamite South (VIC) and Torres (QLD) have a diversity index below 85%.

FIGURE 5 INDUSTRIAL DIVERSITY AND SIZE OF REGIONAL ECONOMY, 2001



Source Derived by BTRE for labour market regions using unpublished ABS 2001 Census of Population and Housing data (persons enumerated at home).

The regions with the most even distribution of employment across industries in 2001 were Bunbury and surrounds (WA), Devonport and surrounds (TAS), Northam and surrounds (WA), Mackay and surrounds (QLD), Burnie and surrounds (TAS) and Albury-Wodonga and surrounds (VIC/NSW), each with a diversity index of 96%. The least diverse regions tend to be relatively small and/or remote. There are clusters of regions with very low industrial diversity in inland south-west and mid-west WA, in Queensland's interior, in the north-west of Victoria and outside the NT's major population centres.

¹² Several different index formulae can be used to measure industrial diversity. Due to the robustness of the regional analysis to the choice of index, it was decided to focus on just one in this factsheet, namely the Herfindahl index as defined in Bradley and Gans (1998). The industrial diversity index presented in this paper was calculated as 100% minus the Herfindahl index, so that a higher value of the index reflects a higher level of industrial diversity.

There is considerable variation in industrial diversity across regions of a similar size, particularly amongst the smaller regions. Of all regions with more than 10000 employed persons, Canberra and surrounds had the least diverse industry structure, while Echuca and surrounds (VIC/NSW), Armidale and surrounds (NSW) and Griffith (NSW) were also less diverse than their counterparts. All other capital cities had very diverse economies, with an industrial diversity index of 95% or more.

Australia's major cities tend to have an industry structure closely mirroring the national average. The regions centred on Brisbane, Adelaide, Perth, Melbourne, Sydney and Geelong have an industry structure most like the national structure.

Regions with a high share of employment in Agriculture or Government Administration tend to have low measured diversity. In contrast, a high share of employment in Food retailing, Personal and household good retailing, Personal services, Business services or Construction trade services tends to be associated with a relatively high level of industrial diversity for regions.

Several studies have concluded Australia's regions are becoming more industrially diverse.¹³ Nationally, the diversity index has fallen from 96.2% in 1991 to 95.6% in 2001, indicating a small overall decline in industrial diversity. However, Figure 6 shows that many more regions experienced an increase in industrial diversity, than experienced a decline.¹⁴ This seeming contradiction is due to the fact that, of Australia's capital cities, only Darwin experienced an increase in industrial diversity. For example, Sydney's diversity index decreased from 96.2% to 95.2%, meaning employment became rather less evenly distributed across industries over the decade. Between 1991 and 2001, the industry structure of employment has become less diversified for Australia's major cities, while other regions (on the whole) have become more industrially diverse.

The majority of Australia's coastal regions and major population centres experienced little change in industrial diversity between 1991 and 2001. In Victoria, NSW and Tasmania, only a handful of regions experienced a significant decline in diversity. Declines in industrial diversity were more widespread in Queensland and the NT.

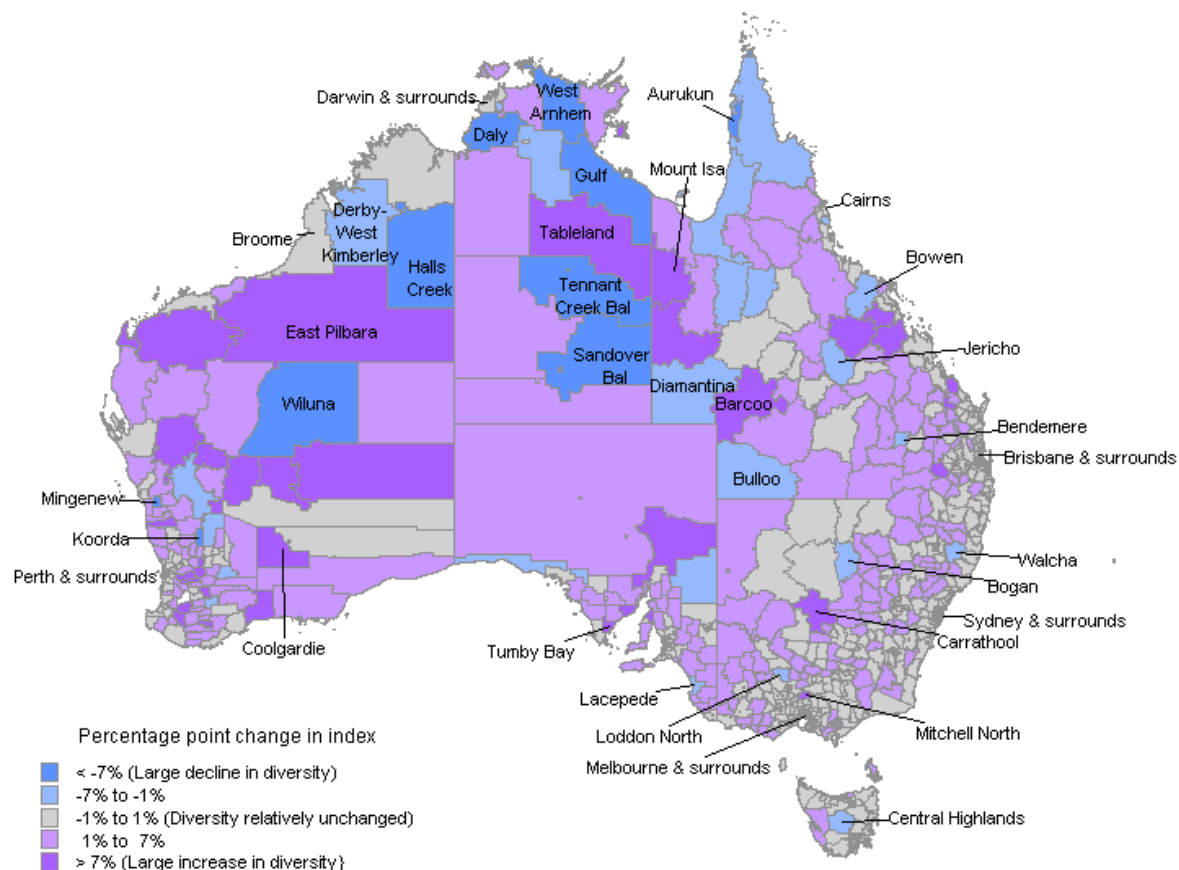
Some regions with relatively strong increases in industrial diversity (e.g. Denmark WA, Roxby Downs SA, Douglas QLD), experienced strong employment growth. Others experienced employment decline (e.g. Whyalla and surrounds SA, Peterborough SA, Broken Hill and surrounds NSW, George Town TAS, West Coast TAS). A more diverse economy is not an end in itself,

¹³ For example, Department of Home Affairs and the Environment 1982, Bradley and Gans 1998 and Hogan et al 1999.

¹⁴ Only 37 labour market regions experienced a decline in industrial diversity (of more than 1 percentage point), while the industrial diversity index increased by more than 1 percentage point for 228 regions.

and may reflect a loss of competitive advantage and declining employment prospects.

FIGURE 6 CHANGE IN INDUSTRIAL DIVERSITY FOR LABOUR MARKET REGIONS, 1991 TO 2001



Source Derived by BTRE for labour market regions using unpublished data from ABS 2001 and 1991 Census of Population and Housing (persons enumerated at home).

Structural change

Structural change refers to changes in the distribution of economic activity and resources across industries. Productivity Commission (1998) analyses structural change in Australia between 1981 and 1996, noting that while "structural change is often essential if communities are to take advantage of growth opportunities . . . it can impose costs and cause difficulties for some groups in the community."¹⁵

¹⁵ The study also found that between 1970 and 1990, Australia experienced less structural change than New Zealand and many Asian countries, but more than OECD countries generally.

A structural change index (SCI) was estimated for each region for the 1991 to 2001 time period, and the two inter-censal subperiods.¹⁶ A SCI of zero indicates no structural change during the period, and a SCI of 100% indicates a complete reversal of the industry structure.

The SCI for Australia between 1991 and 2001 was 12%, meaning that to restore the employment mix in existence in 1991, 12% of employed persons in 2001 would have to change industries. While employment growth was somewhat stronger between 1996 and 2001, structural change was much greater between 1991 and 1996.

All regions experienced some degree of structural change between 1991 and 2001, with 75% of regions experiencing structural change of between 10% and 20%. The regions experiencing the least structural change were Kondinin WA, Bland NSW, Riverland SA, Mornington QLD, Burdekin QLD and Bauhinia QLD (all with a SCI of 9%). High structural change regions tended to be very remote, to lack industrial diversity and have a small employment base (e.g. Aurukun QLD, West Arnhem NT).

Generally, Australia's larger population centres experienced relatively little structural change. Of the capitals, the regions centred on Darwin (SCI=16%) and Melbourne (15%) had the highest structural change, while Adelaide and surrounds (11%) had the least structural change. Of regions with more than 10 000 employed persons in 1991, the greatest structural change occurred in Mount Isa QLD (21%), Whyalla and surrounds SA (19%), Latrobe Valley VIC (18%) and Burnie and surrounds TAS (18%). All four regions experienced a substantial employment decline for a major industry between 1991 and 2001.¹⁷

Department of Home Affairs and the Environment (1982) found large Australian cities underwent less structural change than small cities between 1961 and 1976. Similarly, Productivity Commission (1998) found smaller regions experienced the greatest rates of structural change. While BTRE labour market regions with a small initial employment base were somewhat more likely to experience high rates of structural change between 1991 and 2001, there was a great deal of variation in the SCI amongst regions of a similar size.

Two thirds of regions experienced more structural change between 1991 and 1996, than between 1996 and 2001. A comparison with earlier studies indicates that the same regions do not feature amongst the set of high structural change regions on an ongoing basis. For example, Broken Hill experienced very little structural change in the 1961 to 1976 period, and very high structural change between 1981 and 2001.

¹⁶ Measurement of structural change is sensitive to the level of industry aggregation (in this case ANZSIC subdivisions) and to the time period chosen for comparison — unfortunately, 1991 is not an ideal point of comparison as it is the low point of an economic cycle.

¹⁷ Metal ore mining for Mount Isa; Metal product manufacturing for Whyalla; Electricity and gas supply for the Latrobe Valley; and Wood and paper product manufacturing for Burnie.

Industry growth and decline in regions

For some industries, national trends are reflected quite consistently across regions, while for others, growth rates can vary markedly across regions. This section highlights key trends in industry structure between 1991 and 2001 across 422 labour market regions.¹⁸ It focuses on a small number of ANZSIC subdivisions, each of which made an important contribution to regional employment change over the period.

Between 1991 and 2001, Food retailing contributed the largest absolute employment increase in 118 of the 422 labour market regions. Business services was the major contributor to employment growth in 58 regions, while Government administration was the major contributor in 46 regions. Libraries, museums and the arts was often the most rapidly growing industry within a region, typically from a relatively small employment base. There were 145 regions in which Agriculture experienced a larger absolute employment decline than any other industry between 1991 and 2001. However, Agriculture was the most rapidly declining industry in just 5 regions, while Rail transport was the most rapidly declining industry in 57 regions.

National employment in *Agriculture* fell by 5% between 1991 and 2001. A decline of more than 5 employed persons was experienced by 70% of regions, while 20% recorded an increase of more than 5 employed persons. As the largest source of employment in many regions, agricultural employment declines can have a very negative effect on regional economies, particularly once the flow-on impacts of farmer expenditure are taken into account.

Declines involving more than 200 employed persons occurred for only 16 regions (Table 7). The regions with the largest Agriculture employment declines were Newcastle and surrounds NSW (350 employed persons), Yarrawonga, Corowa and surrounds VIC/NSW (283), Shepparton VIC (278) and West Wimmera VIC (248). The regions with the largest employment increases were Adelaide and surrounds (1260), Melbourne and surrounds (1113), Brisbane and surrounds (575), Johnstone QLD (439) and Riverland SA (313). The growth in agricultural employment in wine-producing regions (e.g. Riverland SA, Cowra NSW, Augusta-Margaret River WA) is a noteworthy trend. Agriculture employment growth has also occurred in the capital city labour market regions — this is likely to be largely due to growth in the horticulture sector, for which proximity to markets can be an important factor.

¹⁸ 1991 data was not available for the Jervis Bay, Christmas Island and Cocos Keeling Islands Territories.

TABLE 7 CHANGE IN AGRICULTURE SUBDIVISION EMPLOYMENT FOR REGIONS, 1991 TO 2001

<i>Employment change</i>	<i>No. regions</i>	<i>Examples</i>
More than 200 job increase	7	Adelaide & surrounds SA, Brisbane & surrounds QLD, Riverland SA, Leeton NSW, Melbourne & surrounds VIC
100 to 200 job increase	11	Emerald QLD, Augusta-Margaret River WA, Cowra NSW, Sydney & surrounds NSW, Burdekin QLD
5 to 100 job increase	65	Tumut NSW, Horsham VIC, Townsville & surrounds QLD, Alice Springs NT, Young NSW, Bunbury & surrounds WA
-5 to 5 job change	41	Kalgoorlie-Boulder WA, Herberton QLD, Katherine NT, Winton QLD, West Coast TAS, Walcha NSW
5 to 100 job decline	228	Bega Valley NSW, Scone NSW, Sunshine Coast QLD, Kangaroo Island SA, Break O'Day TAS, Ararat VIC
100 to 200 job decline	54	Mildura-Wentworth VIC/NSW, Hobart & surrounds TAS, Forbes NSW, The Coorong SA, Colac & surrounds VIC
More than 200 job decline	16	Moree Plains NSW, Gympie & surrounds QLD, Newcastle & surrounds NSW, West Wimmera VIC, Shepparton VIC

Source Derived by BTRE for labour market regions using unpublished data from ABS 1991 and 2001 Censuses of Population and Housing (persons enumerated at home).

Metal ore mining is a major source of employment in several remote regions such as Yalgoo WA (where it accounts for 50% of employment), Ashburton WA (42%), Roxby Downs SA (42%) and Cook - Weipa QLD (41%). Metal ore mining employment declined by 14% in Australia between 1991 and 2001. It was the major source of employment decline in 27 regions and the major source of employment growth in 9 regions. During this period, Metal ore mining employment declined dramatically in Mount Isa QLD (2081 persons), East Pilbara WA (1295) and Broken Hill and surrounds NSW (1173), but increased by 2038 persons in Perth and surrounds. The expansion of Perth's role reflects a shift toward fly-in fly-out mining operations.

More regions are specialised in *Food, beverage and tobacco (FBT) manufacturing* employment than in any other manufacturing industry. Regions specialised in this industry are strongly clustered in south-east Australia (including Tasmania, Victoria, south-east SA and southern NSW), while there are other concentrations along the NSW and Queensland coasts, and in coastal south-west WA. Nationally, FBT manufacturing employment declined by 1% between 1991 and 2001, and its regional performance was mixed. It was the single largest source of employment growth in 20 regions, and the largest source of employment decline in another 20 regions.

Many of the regions with strong growth in FBT manufacturing were Victorian (e.g. Melbourne and surrounds, Shepparton, Echuca and surrounds, Ballarat and surrounds, Bendigo and surrounds). Outside of Victoria, growth regions included Griffith NSW and Gold Coast-Tweed. Over the same period, the regions centred on Brisbane, Sydney, Perth and Townsville recorded large falls in FBT manufacturing employment.

Nationally, *Food retailing* employment more than doubled from 220 000 persons in 1991 to 454 000 in 2001, and the majority of regions shared in this growth. Growth in Food retailing employment of more than 5 persons was experienced by 333 of the 422 regions, while only 11 regions experienced a decline in Food retailing employment of more than 5 persons.

Finance employment declined by 28% between 1991 and 2001. Approximately 70% of regions recorded a decline of more than 5 persons in Finance employment, while only 3 regions recorded an increase of more than 5 persons. The Finance industry is not a major employer, but is of interest due to claims that branch closures and employment reductions have led to a reduced ability to access financial services.

Business services employed approximately 341 000 people throughout Australia in 1991, and this more than doubled to approximately 779 000 in 2001. While it is the largest ANZSIC subdivision nationally, it features amongst the top 3 employing industries in only 29 regions, typically the major cities and larger regional centres. Between 1991 and 2001, 336 regions experienced an increase of more than 5 persons in Business services employment, and only 4 regions experienced a decline of more than 5 persons. Most of Australia's regions have participated in the growth of Business services, but employment growth has been particularly concentrated in the largest cities.

Government administration employment declined by 8% between 1991 and 2001. Government administration employment increased by more than 5 persons in 35% of regions, but declined by more than 5 persons in 48% of regions. The largest employment declines occurred in the regions centred on Melbourne (19287) and Sydney (8545). The largest increases occurred in Torres QLD (1311), Gold Coast/Tweed (1173), Canberra and surrounds (825), Derby-West Kimberley WA (727) and Cairns QLD (726).

The mixed regional fortunes of the industry reflects several factors. The national trend of reduced Government administration employment has been reflected in many regions. Most notably, a large number of Victorian regions experienced large declines in this industry during the 1990s, following local government amalgamations and the implementation of compulsory competitive tenders. Some remote regions have experienced rapid growth in Government administration employment, partly due to increased CDEP employment and changes in industry coding (see Appendix I).

Nationally, *Community services* employment increased by 64% between 1991 and 2001. Regions with a higher than average share of Community services employment are clustered in western Victoria, Tasmania, northern NSW, central Australia and northern WA. The industry's strong employment growth was reflected fairly consistently across regions, with 322 regions experiencing growth of more than 5 persons, and just 10 regions experiencing a decline of more than 5 persons.

CHAPTER 5 INDUSTRY STRUCTURE AND REGIONAL ECONOMIC PERFORMANCE

This chapter explores the nature of the relationship between industry structure and regional economic performance. The industry structure of a region's economy is of interest not simply in its own right, but because of its potential role in determining a region's level of income, the resilience of its economy and its ability to grow.

5.1 NATIONAL INDUSTRY TRENDS AND REGIONAL GROWTH

A possible explanation of differences in regional employment growth rates is that strongly performing regions are specialised in industries which are growing rapidly at the national level, and poorly performing regions are specialised in industries with low or negative growth rates. This issue can be analysed by calculating the growth rate a region would have achieved over a period, given its initial industry structure, if each of its industries had grown at the national average rate for that industry. A comparison of this 'hypothetical' growth rate to actual employment growth during the period can provide some insight into the extent to which a region's performance is due to its industrial base, rather than other factors.

This technique (a form of shift-share analysis) was applied to ANZSIC subdivision employment data for 422 labour market regions for the 1991 to 2001 period. Actual regional employment growth rates were much more widely dispersed than the hypothetical growth rates. Despite this, the actual and hypothetical employment growth rates were positively correlated, and the relationship was statistically significant. About 20% of variation in employment growth rates across regions could be explained by the industry structure of regional employment in 1991, and subsequent national growth trends by industry.

Productivity Commission (1998) undertook a similar analysis for statistical subdivisions over the 1981 to 1996 period, in which 38% of variability in actual employment growth rates was explained. The seemingly lesser role played by industry structure in the BTRE analysis may be due to the more detailed regional perspective. The results confirm that over the past decade, employment growth rates for industries have varied considerably across regions.

5.2 DETERMINANTS OF REGIONAL ECONOMIC GROWTH

Several recent Australian studies have examined regional differences in population, labour force and employment growth:

- Garnaut et al (2001) found metropolitan and coastal regions experienced stronger population and employment growth than inland and remote regions from 1986 to 1996. Inland and remote growth was strongest around the largest towns.
- In a study of Australian regional centres between 1991 and 1996, Beer (1999) found that the highest population growth was recorded by a group of centres characterised by tourism, entertainment and recreation related industries, while a similar pattern was also identified for the 1976 to 1991 period.
- Bradley and Gans (1998) undertook a regression analysis of population and labour force growth in Australian cities for the 1981 to 1991 period. They found that a city's labour force growth was positively related to its previous growth and level of industrial diversity and negatively related to its initial size and the government employment share.
- Lawson and Dwyer (2002) undertook a regression analysis of employment growth across 637 regions between 1986 and 1996. They found regions were more likely to experience employment growth if, at the start of the period, they had high Accommodation, cafes and restaurants employment or high industrial diversity. Regions experiencing high structural change were also more likely to grow. Relatively remote regions and regions with high Electricity, gas and water employment were less likely to experience employment growth. Less significant factors for regions included a coastal location and a high Property and business services employment share, both of which were associated with a higher likelihood of employment growth.
- Productivity Commission (1998) finds no systematic relationship between structural change and regional employment growth between 1981 and 1996. High structural change need not mean low or negative regional employment growth.

These studies identify a range of factors which influence regional growth, including location, region size and various aspects of industry structure (e.g. industry shares, industrial diversity). The specific conclusions of these studies are not necessarily consistent with one another. However, the overall message which emerges is that the industry structure of a region, in conjunction with other factors, plays an important role in explaining differences in growth across regions.

Industry structure also plays a role in determining levels of average income for regions. For example, Department of Home Affairs and the Environment (1982) found urban centres specialised in manufacturing, electricity and transport showed higher than average income levels. Garnaut et al (2001) found average incomes were high in remote regions, reflecting fast employment growth in the mining and welfare sectors, and the need to pay high wages to recruit workers to regions seen to have low amenity.

In a broader study, Baum et al (1999) analysed community opportunity and vulnerability between 1986 and 1996 across metropolitan areas, regional centres and smaller towns. Factors investigated included population, employment and income growth, housing, human capital, industry structure and disadvantaged families. The study found that industry structure was one of the three most important factors discriminating between community opportunity and vulnerability across all three types of region. Other important factors discriminating between community opportunity and vulnerability were educational qualifications, income, labour force engagement and employment change.

Growth of total taxable income and industry structure

This section explores the relationship of industry structure with economic growth and instability for labour market regions. BTRE estimates of growth in total real taxable income between 1990-1991 and 1999-2000 (see p6) are used as a proxy for economic growth.¹⁹ The forthcoming *Focus on Regions No. 3: Taxable Income* will describe this data in considerable detail. While the period for which taxable income data is available does not exactly coincide with the period for which industry structure data is available, it provides a useful approximation.

Table 8 groups regions into quintiles based on the rate of growth of total real taxable income, and highlights differences in the initial (1991) industry structure across the income growth quintiles. The table reveals the following patterns:

- Income growth exceeds employment growth in all but the declining (1st) quintile.
- The two lowest growth quintiles account for a relatively small share of employment. It is primarily regions with a small economic base which are experiencing declining or relatively unchanged income.
- Income instability and growth have a u-shaped relationship, with regions with near average growth rates (quintile 4) being the most stable. Income instability was greatest in the declining and (to a lesser extent) minimal change quintiles.
- The declining quintile has the highest average income per taxpayer. This is possibly due to relatively high pay in the mining sector, which has a significant presence in the declining quintile.
- Agriculture, forestry and fishing employment was particularly important to the minimal change and declining quintiles. The high growth quintile had relatively little employment in this industry.
- Mining and Electricity, gas and water employment were much more important to quintile 1 than to the other quintiles.
- The declining and minimal change quintiles had relatively little Manufacturing and Property and business services employment. The high growth quintile had a particularly large share of employment in Property and business services.

¹⁹ The analysis is based on taxable income data for 419 labour market regions (data was not available for French Island, Menzies or Sandstone).

TABLE 8 INCOME GROWTH QUINTILES AND INDUSTRY STRUCTURE

QUINTILE	1	2	3	4	5
<i>Description of change in total regional income, 1990-1991 to 1999-2000</i>	<i>Declining</i>	<i>Minimal change</i>	<i>Modest growth</i>	<i>Solid growth</i>	<i>High growth</i>
<i>Summary measures for each quintile</i>					
Change in total income, 1990-1991 to 1999-2000	-15%	3%	16%	27%	43%
Change in employed persons, 1991 to 2001	-14%	-2%	6%	16%	24%
Total number of employed persons, 1991	181 141	220 870	987 044	2 013 895	3 367 420
Average real taxable income per taxpayer, 1990-1991	\$34 033	\$28 815	\$31 008	\$32 529	\$33 446
Median value of income instability index	9.1%	5.9%	4.4%	2.9%	3.8%
<i>Share of quintile total employment for ANZSIC divisions, 1991</i>					
Agriculture, forestry & fishing	14.5%	24.8%	7.3%	4.3%	2.6%
Mining	12.9%	3.5%	1.5%	0.8%	0.6%
Manufacturing	10.1%	9.8%	14.3%	17.4%	13.1%
Electricity, gas & water supply	5.3%	1.9%	1.6%	1.2%	1.2%
Construction	4.8%	4.8%	6.0%	6.0%	6.9%
Wholesale trade	3.0%	4.0%	5.5%	6.4%	6.8%
Retail trade	11.6%	12.3%	14.3%	14.4%	14.3%
Accommodation, cafes & restaurants	4.2%	4.1%	4.3%	3.8%	4.6%
Transport & storage	4.3%	3.8%	4.2%	4.7%	5.4%
Communication services	1.1%	1.4%	1.6%	1.9%	1.8%
Finance & insurance	2.5%	2.4%	5.0%	6.2%	7.0%
Property & business services	2.7%	2.7%	5.1%	5.7%	7.2%
Government administration & defence	4.3%	5.5%	5.4%	5.5%	6.6%
Education	7.0%	7.2%	7.8%	7.4%	7.1%
Health & community services	7.6%	8.1%	11.0%	9.2%	9.1%
Cultural & recreational services	0.9%	0.9%	1.8%	1.7%	2.1%
Personal & other services	3.1%	2.8%	3.5%	3.3%	3.6%
TOTAL EMPLOYMENT	100.0%	100.0%	100.0%	100.0%	100.0%

Source BTRE Focus on Regions No. 3: Taxable Income database (forthcoming), as at August 2003. Industry structure and employment estimates

Multivariate regression analysis of income growth between 1990-1991 and 1999-2000 was undertaken for labour market regions to identify whether the industry structure of regions in 1991 played a role in explaining regional growth over the subsequent period.

After controlling for a range of other factors (e.g. State/Territory, size of regional economy, mean income, educational qualifications), 1991 ANZSIC division employment shares proved to be a statistically significant explanator of regional variation in income growth (see Table 9).²⁰ This conclusion proved

²⁰ The hypothesis that all industry coefficients equalled zero was tested using an F-test, and the hypothesis was rejected at the 1% significance level.

robust to changes in model specification.²¹ Overall, the model explained about 42% of the variation in income growth rates across labour market regions.

More specifically, regions with a relatively high share of employment in Construction²² or Property and business services in 1991, tended to experience more rapid income growth, other factors held constant. Regions with a relatively high share of 1991 employment in industries such as Communication services, Retail trade, Health and community services and Electricity, gas and water tended to experience lower income growth over the period.

A number of variables unrelated to industry structure also proved statistically significant.²³ Regions with a relatively small employment base experienced significantly lower income growth, while a higher mean income in 1990-91 was also associated with significantly lower income growth for regions. Regions in Queensland and Western Australia experienced more rapid income growth than otherwise comparable regions.

Industry structure variables also proved to be statistically significant predictors of income instability across labour market regions. Regions with a relatively high share of employment in industries such as Wholesale trade, Communication services, Agriculture, forestry and fishing and Mining tended to experience a less stable pattern of income growth during the 1990s.

²¹ For example, inclusion of region type (metropolitan/coastal/inland/remote) and size of largest urban centre variables in the regression did not alter this basic conclusion. Nor did inclusion of an employment growth variable, or omission of variables which were highly correlated with other explanatory variables.

²² Construction is often regarded as a leading indicator of economic activity. A high proportion of employment in Construction for a region may occur due to the building of new infrastructure (e.g. a railway), the start-up or expansion of businesses (e.g. a mine) or due to population growth (i.e. new housing). Therefore a high proportion of employment in Construction is likely to reflect the influence of other factors, and not itself be the cause of economic growth in a region.

²³ The model suggests that regions with a higher proportion of people with bachelor degrees tended to experience lower growth in total incomes, other factors held constant. However, this variable proved insignificant in alternate specifications of the model. The relationship between educational qualifications and economic growth is explored in the BTRE's forthcoming *Focus on Regions No. 2: Skills, Education and Employment*.

TABLE 9 INCOME GROWTH AND INSTABILITY REGRESSION RESULTS FOR BTRE LABOUR MARKET REGIONS

<i>Explanatory variables (all relate to 1990-1991)</i>	<i>Total real taxable income growth, 1990-1991 to 1999-2000</i>	<i>Instability of total taxable income, 1990-1991 to 1999-2000</i>
Intercept	1.512***	0.236***
Average real taxable income (\$000)	- 0.017***	ns
Natural log of total real taxable income	ns	- 0.009***
Less than 500 employed persons in region	- 0.159***	0.025***
Share of working age population with bachelor degree or higher level qualification	- 1.802**	0.335**
Industrial diversity index	ns	- 0.139***
Agriculture, forestry & fishing employment share	- 1.197***	0.083***
Mining employment share	- 1.323***	0.106***
Manufacturing employment share	- 0.810***	ns
Electricity, gas & water employment share	- 1.676***	ns
Construction employment share	2.004***	ns
Wholesale trade employment share	ns	0.434***
Retail trade employment share	- 2.081***	ns
Transport & storage employment share	- 1.150**	ns
Communication services employment share	- 7.138***	0.859**
Finance & insurance employment share	ns	0.324*
Property & business services employment share	3.037***	ns
Health & community services employment share	- 1.863***	ns
Education employment share	ns	0.188**
Queensland	0.077**	ns
South Australia	ns	0.015**
Western Australia	0.092***	0.033***
Tasmania	- 0.124*	ns
R-squared	41.6%	59.1%
Number of observations	419	419
Number of explanatory variables	16	13
F-test of hypothesis that industry structure variables are insignificant in model	20.4***	17.3***

Source BTRE *Focus on Regions No. 3: Taxable Income* database (forthcoming), as at August 2003. Industry structure and educational qualifications estimates derived by BTRE for labour market regions using unpublished data from ABS 1991 Census of Population and Housing (persons enumerated at home).

Note ns means the variable was statistically insignificant at the 10% level; *** denotes statistical significance at 1% level, ** at 5% level and * at 10% level; Regressions were estimated using SAS linear regression, backwards estimation procedure. State/Territory & industry variables which were insignificant in both regressions were not presented in Table 9.

The shift-share analysis, the results of previous Australian studies, Table 8 and the regression analysis all support the conclusion that industry structure plays an important role in explaining variation in economic growth across regions. However, industry structure cannot provide a complete understanding of why regions grow. There are clearly other factors in operation which have led to

industry growth rates differing across regions, such as the resource base, infrastructure and investment, amenity, proximity to markets, community leadership, skills and human capital.

Industrial diversity, growth and stability

There is considerable literature exploring the relationship between economic growth, instability and industrial diversity. Economic theory suggests growth is derived from specialisation based on comparative advantage, and stability is achieved through diversity by spreading risk across a range of activities.

Kaufman (1993) notes that there is little empirical evidence of a direct relationship between industrial diversity and the economic performance of regions, but empirical studies have provided more support for the argument that diversity is positively related to the stability of regional performance.

Kaufman (1993) undertook an empirical study of the relationship between diversity, stability, performance and energy price shocks in US metropolitan areas. He found that a diverse employment base creates stability and this stability buffers economic performance against the effects of an economic shock. Highly diverse areas outperformed their less diverse counterparts in years when a negative shock occurred (one which depressed economic activity), but underperformed in years when there was a positive shock. For periods when there was no shock, there was no relationship between diversity and performance. Thus, increasing diversity (by making the distribution of employment across industries more even) does not ensure better performance. Rather, it works to insulate the economy from the effects of a shock (whether positive or negative). A drive for diversity therefore should reflect preferences for slow and steady growth over a boom and bust economy.²⁴

A region's level of industrial diversity is closely tied to its economic size and to the employment share of particular industries within the region. This makes it difficult to isolate the relationship between diversity and economic growth/stability. Across the labour market regions, there is evidence of a strong and statistically significant association between industrial diversity and the income instability index (correlation coefficient = - 0.61). That is, regions with a low level of industrial diversity in 1991 tended to have relatively unstable total incomes between 1990-1991 and 1999-2000. The relationship between industrial diversity and total real taxable income growth was weaker (correlation coefficient = 0.26), but in accordance with the proposition that more diverse economies tend to experience higher growth.

It is possible this bivariate correlation between industrial diversity and income growth is evident only because another factor (e.g. size of regional economy) is

²⁴ A separate strand of research based on portfolio theory (e.g. Lande, 1994) notes simple diversification will not necessarily reduce instability, since employment growth is correlated across industries. Consequently, it is desirable to encourage stabilizing industries (that reduce instability of total regional employment) rather than stable industries (with low variation in industry employment).

closely related to both industrial diversity and income growth. To investigate further, multivariate regression analysis was undertaken of income growth (and separately, instability) against the 1991 industrial diversity index, controlling for State/Territory, the size of the regional economy, average income, bachelor degree qualifications and ANZSIC division employment shares in 1991.

Table 9 shows that the initial level of industrial diversity was a statistically significant explainer of variation in the degree of income instability across regions, but was not a significant explainer of variation in income growth across regions. The results are consistent with the predictions of Kaufman (1993), and support the conclusion that *industrial diversity is closely linked to stability of economic performance, rather than to economic growth per-se*. Regions with a relatively high level of industrial diversity tended to experience more stable income growth between 1990-1991 and 1999-2000, holding other factors constant. This conclusion proved robust to changes in model specification (such as adding region type or size of largest urban centre variables).

CHAPTER 6 INDUSTRY STRUCTURE DATABASE

The database is available in Microsoft Excel 1997 format from the BTRE website (<http://www.btre.gov.au>). It contains the regional statistics underlying this information paper, and has been developed by BTRE from ABS Census of Population and Housing data for 1991, 1996 and 2001. Two separate datasets are included: one based on the BTRE labour market region classification and another for SLAs (as defined in 2001). The following information is included in the database for each labour market region and SLA:

- Total persons employed (1991, 1996, 2001);
- Employment shares by ANZSIC subdivision (1991, 1996, 2001);
- Persons employed in technology and knowledge-intensive industries (2001);
- Three largest industries (1991, 1996, 2001);
- Three top specialisations (1991, 1996, 2001);
- Industrial diversity index (1991, 1996, 2001);
- Structural change index (1991 to 1996, 1996 to 2001, 1991 to 2001);
- Change in employed persons by ANZSIC subdivision (1991 to 2001);
- Major industry contributing to employment decline/growth (1991 to 2001);
- Data quality flags;
- Geographic variables (State/Territory, Region type, Size of largest urban centre); and
- Metadata (descriptions of data items and methods, including details of the BTRE labour market region classification).

The SLA-level information in the database can be used to analyse the industry structure of user-defined regions. The following case study of the 'Bendigo and surrounds' labour market region illustrates how the database can be used to profile a region's industry structure. Through linkage with other regional information sources (including the BTRE's forthcoming *Taxable Income and Education, Skills and Qualifications* databases), a richer understanding can be gained of relationships between industry structure and regional wellbeing.

6.1 CASE STUDY: BENDIGO AND SURROUNDS, VICTORIA

Bendigo is Victoria's 4th largest urban centre, and is located 150km north-west of Melbourne. The Bendigo region developed from the wealth injected by the huge reserves of gold mined for over 100 years, commencing in the 1850s.

Today the city serves as an important manufacturing centre and service centre for central and northern Victoria.

The Bendigo and surrounds labour market region consists of the City of Greater Bendigo and the Loddon South SLA, from which there is significant commuting. At the 2001 census, only 8% of employed Bendigo and surrounds residents commuted to a workplace outside the region. The labour market region had a population of 95 495 in 2001, representing a 10% increase since 1991 (less than the national increase of 13%). Employment increased by 20% between 1991 and 2001, exceeding national growth of 17%, and reflecting increased labour force participation. Most of the region's growth occurred after 1996.

Between 1990-1991 and 1999-2000, the number of taxpayers in Bendigo and surrounds rose by 8%, just below the national rate of 9%. Total real taxable income growth (23%) was below the national growth rate (32%), but well above the median growth rate for labour market regions of 12%. Average income per taxpayer (expressed in 2001-02 dollars) was \$32 466 in 1999-2000, well below the national average of \$39 472.

In 2001, there were 35 877 persons employed in Bendigo and surrounds. Major employers include Bendigo Health Care Group, LaTrobe University, City of Greater Bendigo, Bendigo Regional Institute of TAFE, Bendigo Bank, Empire Rubber, Hazeldene's Chicken Farms and Australian Defence Industries.

The major employing ANZSIC subdivisions were Health services (10.0%), Education (8.3%), Personal and household good retailing (7.6%), Food retailing (7.0%) and Business services (5.8%). In 2001, only 10 of the 425 labour market regions had a higher employment share in technology and knowledge-intensive industries than Bendigo and surrounds (36.5%). The region has a very diverse economic base (an industrial diversity index of 4.7% places it 21st out of 425 regions in 2001), and its employment by industry distribution broadly resembles the national industry structure.

The Bendigo and surrounds region is particularly specialised in TCF, FBT and Non-metallic mineral product manufacturing. In 2001, it was the second most specialised Australian region in Communication services, which accounted for 2.7% of regional employment (or 951 persons). Bendigo is the hub for Telstra's domestic satellite operations and is the leading regional city in Australia for call centres. Due to the presence of the Bendigo Bank and the Bendigo Stock Exchange, it was one of only 9 regions (alongside Melbourne and Sydney) to have a Finance employment share above the national average of 2.1%.

Between 1991 and 2001, Bendigo and surrounds experienced above-average structural change (SCI=15%), which was largely concentrated in the 1991 to 1996 period.

The major contributor to employment growth in the region between 1991 and 2001 was Food retailing (with 1307 additional jobs) and the major contributor to employment decline was TCF manufacturing (with 507 fewer jobs). Industries which significantly increased their regional employment share over the period

included Machinery and equipment manufacturing (employment share rose from 1.8% to 2.9%), Food retailing (from 4.1% to 7.0%), Business services (2.8% to 5.8%) and Community services (2.0% to 3.4%). The following industries made a lesser contribution to regional employment in 2001 than in 1991:

- Agriculture (employment share fell from 5.9% to 4.8%);
- TCF manufacturing (from 3.5% to 1.5%);
- Personal and household good retailing (8.9% to 7.6%);
- Government administration (4.8% to 3.1%);
- Defence (1.3% to 0.3%); and
- Health services (11.6% to 10.0%).

Between 1991 and 2001, employment in Bendigo and surrounds grew somewhat more rapidly than would be predicted based on the region's industry structure in 1991 and subsequent national industry employment growth rates. In particular, there was strong regional employment growth in FBT and Machinery and equipment manufacturing, despite minimal change in employment for these industries nationally. The highly diverse industry structure, focus on technology and knowledge-intensive industries and recent population and employment growth, provide a solid foundation for economic growth and stability into the future.

CHAPTER 7 CONCLUSION

Australia, like many other developed countries, has experienced a decline in the relative importance of the agriculture and manufacturing sectors over recent decades, and strong growth in the services sector (particularly in Business services).

Agriculture was the major employing industry in the majority of Australia's labour market regions, but beyond this industry there was considerable variety in the activities in which regions specialised.

Differences in regional industry structure play a significant, but not dominant, role in explaining differences in regional economic growth. About 20% of the variation in employment growth rates across labour market regions between 1991 and 2001 could be explained by the industry structure of regional employment in 1991, and subsequent national growth trends by industry. Other potentially important influences on regional economic growth include amenity, remoteness, investment, leadership and the region's resource and skill base.

The industry structure of regional employment provides only a partial understanding of why regions grow, with employment growth rates for most industries varying considerably across Australia's regions. For example, the Bendigo and surrounds case study showed that industries with little employment growth at the national level (such as FBT and Machinery and equipment manufacturing) have been important sources of employment growth in specific regions. Furthermore, trends in industry output can differ markedly from trends in industry employment.

The particular industries which are the major sources of employment growth also differ depending on the time period being studied. While a high share of employment in the Property and business services or Construction industries was associated with stronger economic growth for regions between 1991 and 2001, different industries may be associated with economic growth over the next decade. No prescriptive conclusions can be drawn about how industry structure can be changed to improve regional economic performance. Rather, strategies for regional development need to build upon local comparative advantage, and capitalise on region-specific resources, knowledge and location.

Regions with a highly diverse industry structure tend to experience more stable economic performance than regions in which employment is specialised in just a few major industries. However, the regression analysis does not support the

claim that a highly diverse industry structure is associated with greater regional growth prospects.

Between 1991 and 2001, regions outside the major cities (on the whole) developed a more diverse economic base. Only 37 labour market regions experienced a decline in industrial diversity (of more than 1 percentage point), while the industrial diversity index increased by more than 1 percentage point for 228 regions. Increasing the diversity of a region's economic base does not in itself ensure better performance, rather it works to insulate the economy from the effect of shocks (whether positive or negative). A regional push for greater industrial diversity should therefore reflect preferences for slow and steady growth over a boom and bust economy.

A region's industry structure is closely tied to the size of its economy and its level of remoteness. For example, the relative importance of employment in Agriculture, Mining and Accommodation, cafes and restaurants rises with increasing remoteness, while the relative importance of employment in technology and knowledge-intensive industries tends to decline with increasing remoteness.

This information paper has provided an overview of key spatial patterns and trends in industry structure across Australia's regions between 1991 and 2001. It has brought together information on many different aspects of regional industry structure, including the presence of technology and knowledge-intensive industries, industry specialisation and structural change.

The accompanying *Industry Structure Database* contains a wealth of detailed data on the distribution of regional employment across industries, and provides a valuable contextual basis for understanding regional economies and informing regional development.

APPENDIX I DATA SOURCES

ABS AUSTRALIAN NATIONAL ACCOUNTS

This data source was used to compare the size and growth of industries, based on national estimates of industry GVA. GVA plus taxes on commodities (net of subsidies) is equal to GDP. Industry GVA data for 1984-85 to 2001-02 was sourced from ABS Cat. 5204.0 Table 10. The estimates are chain volume indices with a reference year of 2000-01, valued at basic prices.

OECD NATIONAL ACCOUNTS

Industry GVA data was sourced from the National Accounts part of the OECD website. Industry GVA is valued at basic prices and measured in constant (1999) price terms. Each country's data is measured in its own currency. While all selected countries have adopted the System of National Accounts 1993, differences in methods may impact upon comparisons.

ABS LABOUR FORCE SURVEY (LFS)

This is the official source of employment estimates for Australia. Table 6 of ABS Cat. 6291.0.55.001 provides national estimates of employed persons in each ANZSIC subdivision from the November quarter 1984 to the November quarter 2002. Section 3.2 is based on annual LFS employment estimates, derived by BTRE as the annual average of the quarterly figures. The LFS's main limitation, in the context of this study, is that it cannot provide reliable estimates of industry employment for small areas, due to its sampling methodology.

ABS CENSUS OF POPULATION AND HOUSING (CENSUS)

This paper's analysis of regional industry structure is based on census data. The accompanying *Industry Structure Database* was developed by BTRE from ANZSIC subdivision employment data from the 1991, 1996 and 2001 censuses. Data for all three years was provided according to the Statistical Local Area (SLA) boundaries defined in the 2001 Australian Standard Geographic Classification (ASGC).

This paper focuses on the single concept of **employed persons (aged 15 and over)** by industry. However, factors such as gender, full-time/part-time status

and self-employment/employee status are also important to gaining a more complete understanding of regional industry structure. People were classed as employed if they worked for payment or profit, worked unpaid in a family business or were temporarily absent from their job (on holidays, paid leave, on strike or temporarily stood down). The question used to define employed persons remained unchanged from 1991 to 2001. Changes to the explanatory text did not substantively impact upon comparability (Source: ABS 1999).

Consistent small-area data for 1991, 1996 and 2001 could only be obtained on a **place of enumeration basis** (i.e. where people were counted on census night). Place of usual residence or place of work data was not available for a consistent set of regions across the three census years. Unfortunately, place of enumeration data can be misleading for winter-touristed regions, such as the skifields and more remote SLAs in Queensland, NT and northern WA. In 2001, there were 112 SLAs where domestic visitors represented more than 20% of employed persons on census night. For these SLAs, analysis of industry structure data will be misleading if visitors tend to work in a different set of industries to residents.

Due to the number of regions significantly affected by this issue, it was decided to focus on **employed persons enumerated at home**, and to **exclude visitors** (domestic and overseas) from the analysis. Excluding domestic visitors has several limitations:

- Nationally, 4.4% of employed persons are excluded from the scope of the analysis in 2001;
- Residents temporarily absent from the region are missing from the industry employment data (in no region were more than 15% of employed usual residents absent on census night);
- A minority of excluded domestic visitors will actually be visitors from elsewhere in the region (in no region does the exclusion of visitors from elsewhere in the region involve more than 5% of employed persons);
- Some of the excluded domestic visitors may be working in the region (temporary workers), and so their industry of employment would be relevant to analysis of the region's economy. While such temporary workers account for less than 1% of Australian employed persons, the issue is important for a number of remote, mining-based regions.

Industry of employment is defined based on the **major activity undertaken by the employing establishment**. In 1991 and 1996, the name and address of the employer was the primary information used to determine industry. In 2001, industry coding was largely based on the main goods and services produced by the employer and the nominated industry. Miscoding of employment data to industry can be an issue, and the methodology change may have impacted upon the comparability of data over time. Changing business structures (e.g. outsourcing) can also influence observed industry structure trends. Furthermore, census data was collected in August, and may be unrepresentative of the regional importance of seasonal industries, such as agriculture and tourism.

Indigenous persons participating in the **Community Development Employment Programme (CDEP)** are classed as employed. In many remote regions, a large share of employed persons are CDEP participants. Changes to the census' Special Indigenous Personal Form between 1996 and 2001 impacted upon comparability of industry structure data over time for such regions. In 2001, CDEP participants were coded to Government administration, while in 1996, a large proportion appear to have been coded to Community services.

Census data is also subject to ABS **confidentialisation** processes. When a cell has a value of between 1 and 3, it is randomly confidentialised to either 0 or 3. This process can impact upon analysis of industry structure for regions with a small employment base. It also causes the sum of employment across all industries for a region to differ from official census employment estimates.

These **limitations** should be kept in mind when using regional industry structure data. Regions significantly affected by the absent resident, temporary worker, small employment base and CDEP issues are identified in the *Industry Structure Database*.

COMPARISON OF CENSUS AND LFS DATA

ABS (2000) states that "Although the census and labour force survey both collect data on industry, they are not strictly comparable due to differences in the scope, coverage, timing, measurement of underlying concepts and collection methodology."

LFS employment estimates are 11-14% higher than census employment estimates. Census under-enumeration and residents temporarily overseas are the main contributors to the difference. The difference in employment estimates is greatest for Agriculture, forestry and fishing. While the two data sources lead to similar conclusions about Australia's major employing industries, national industry growth rates differ considerably across the two sources.

BTRE ESTIMATION OF EMPLOYMENT BY INDUSTRY

For each region, employed persons whose industry was not stated or non-classifiable were allocated proportionately across ANZSIC subdivisions. These categories accounted for 2.3% of employed persons in 2001.

The ABS codes census industry data to the most detailed industry level possible, leading to a 'not further defined' category within each ANZSIC division. In 2001, 2.6% of employed persons were in an ANZSIC division 'not further defined' category. Employed persons in this category were, for each ANZSIC division, proportionately allocated across the component ANZSIC subdivisions by BTRE.

BTRE TAXABLE INCOME DATABASE, AS AT AUGUST 2003

BTRE has developed estimates of the number of taxpayers, total taxable income, and average income per taxpayer for SLAs for the 1990-1991 to 1999-2000 period. The estimates reflect real taxable incomes, deflated using the CPI and measured in 2001-02 prices. The estimates have been developed from taxable income by postcode data published by the Australian Tax Office. The methodology will be detailed in a forthcoming BTRE release, *Focus on Regions No. 3: Taxable Income*.

APPENDIX II BTRE LABOUR MARKET REGION MAPS

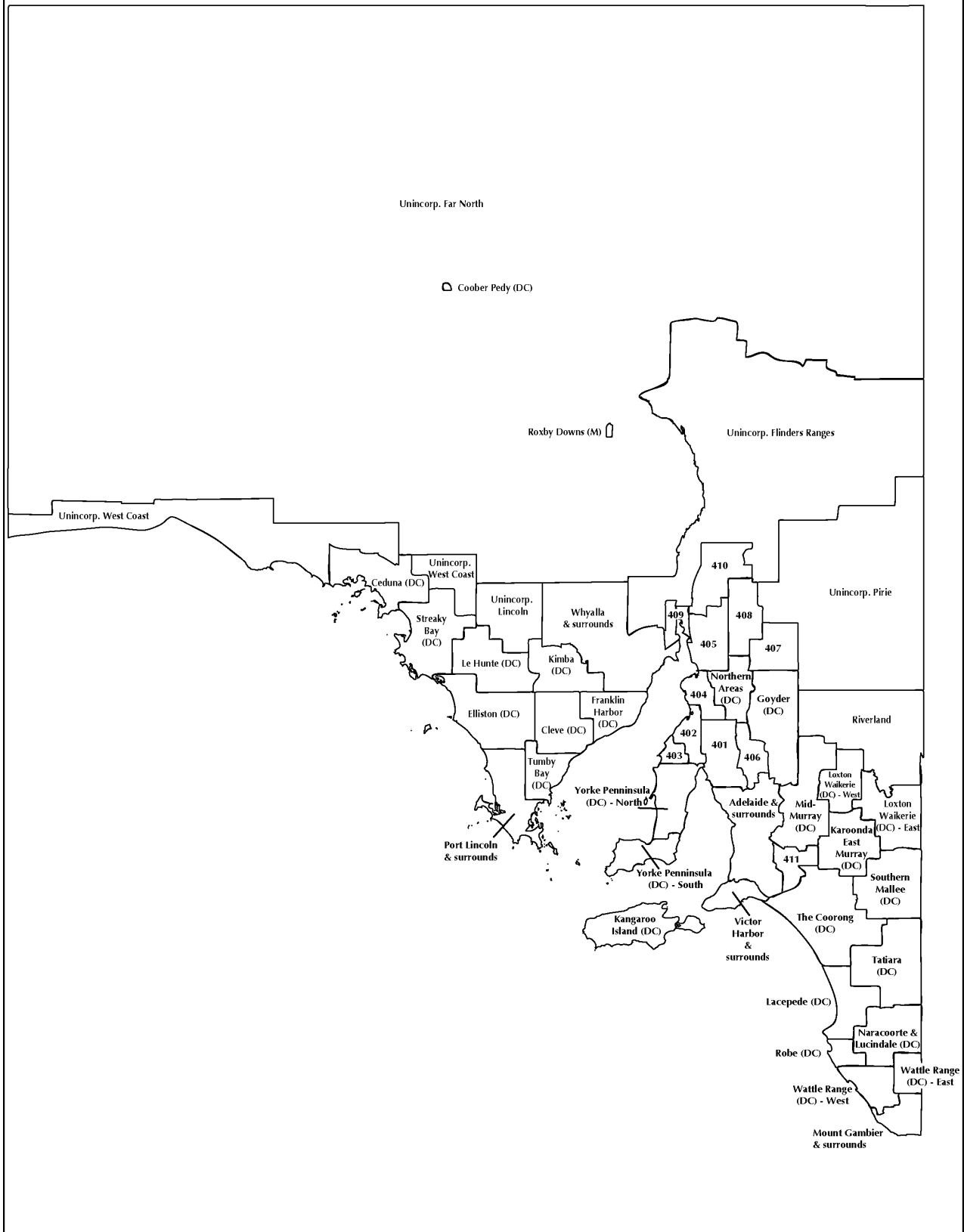
This appendix provides maps illustrating the 425 BTRE-defined labour market regions.²⁵ These labour market regions form the basis of the regional analysis of industry structure presented in Section 4.3 and Chapters 5 and 6.

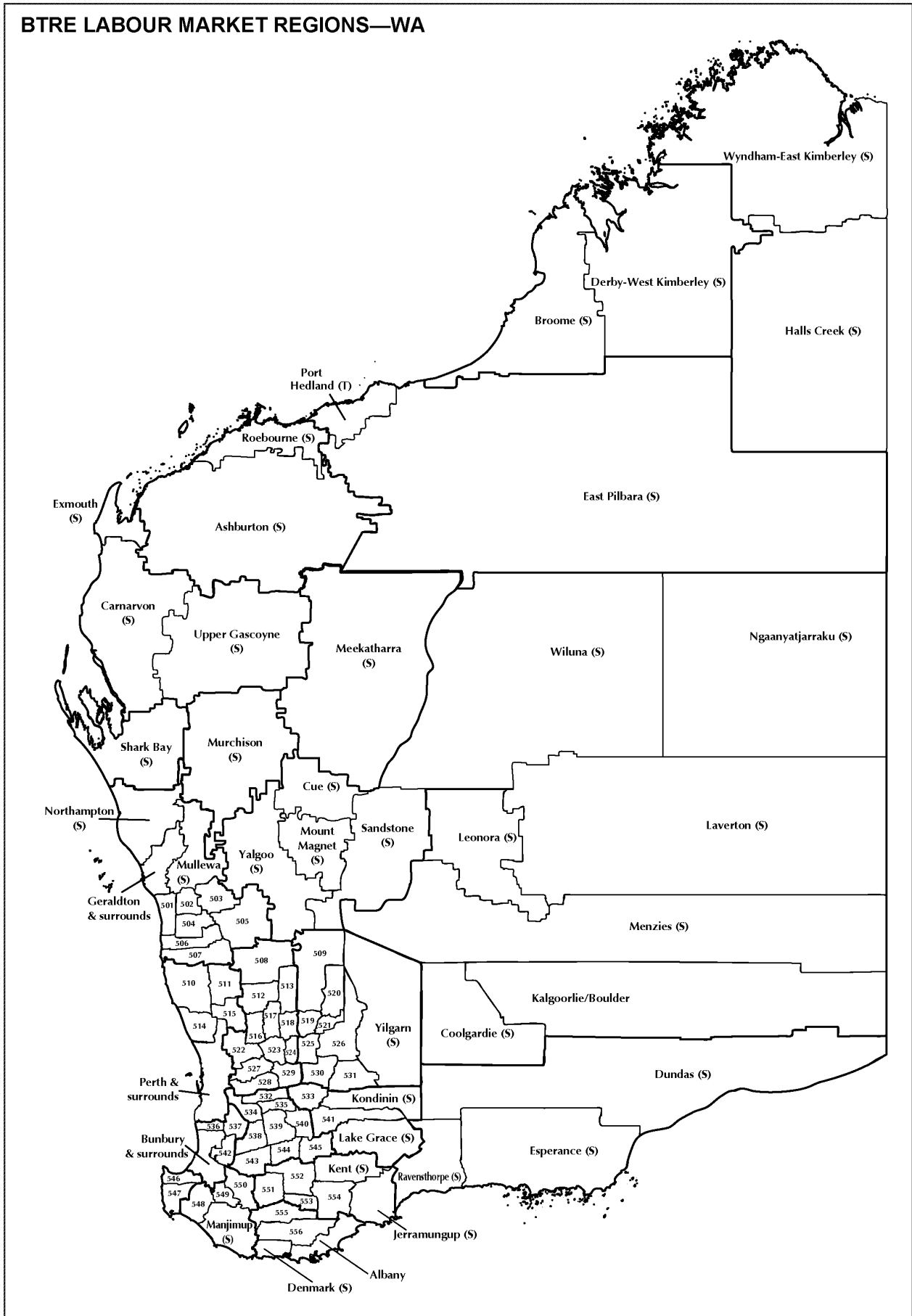
For Queensland, South Australia and Western Australia, space constraints prevent all labour market region names from being detailed on the maps. The regions are identified by a number, and the full region name is provided on page 62.

Further detail on BTRE labour market regions, including details of the SLAs which contribute to each labour market region, is available from the *Industry Structure Database* (<http://www.btre.gov.au>).

²⁵ The labour market regions covering the Territories of Christmas Island and Cocos (Keeling) Islands have not been separately mapped.

BTRE LABOUR MARKET REGIONS—SA





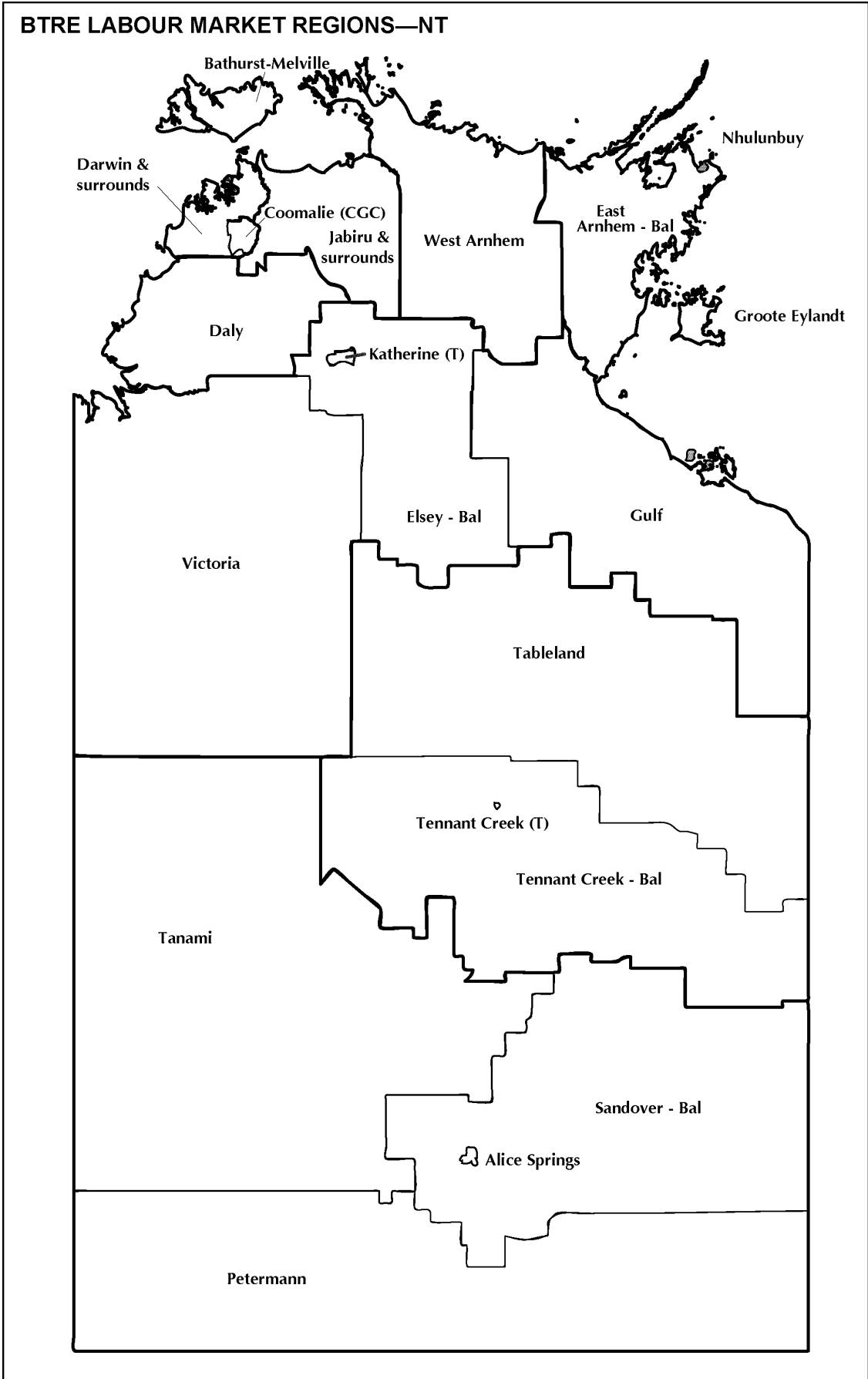




TABLE 10 BTRE LABOUR MARKET REGION NAMES

No.	Region name	No.	Region name	No.	Region name
Queensland		Western Australia			
301	Kolan (S)	501	Irwin (S)	530	Bruce Rock (S)
302	Perry (S)	502	Mingenew (S)	531	Narembeen (S)
303	Eidsvold (S)	503	Morawa (S)	532	Brookton (S)
304	Isis (S)	504	Three Springs (S)	533	Corrigin (S)
305	Biggenden (S)	505	Perenjori (S)	534	Wandering (S)
306	Gayndah (S)	506	Carnamah (S)	535	Pingelly (S)
307	Mundubbera (S)	507	Coorow (S)	536	Waroona (S)
308	Chinchilla (S)	508	Dalwallinu (S)	537	Boddington (S)
309	Murilla (S)	509	Mount Marshall (S)	538	Williams (S)
310	Bendemere (S)	510	Dandaragan (S)	539	Narrogin & surrounds
311	Kingaroy (S)	511	Moora (S)	540	Wickepin (S)
312	Dalby & surrounds	512	Wongan-Ballidu (S)	541	Kulin (S)
313	Millmerran (S)	513	Koorda (S)	542	Collie (S)
314	Warwick & surrounds	514	Gingin (S)	543	West Arthur (S)
315	Inglewood (S)	515	Victoria Plains	544	Wagin (S)
316	Stanthorpe (S)	516	Goomalling (S)	545	Dumbleyung (S)
317	Nanango (S)	517	Dowerin (S)	546	Busselton (S)
South Australia		518	Wyalkatchem (S)	547	Augusta-Margaret River (S)
401	Wakefield (DC)	519	Trayning (S)	548	Nannup (S)
402	Barunga West (DC)	520	Mukinbudin (S)	549	Bridgetown-Greenbushes (S)
403	Copper Coast (DC)	521	Nungarin (S)	550	Boyup Brook (S)
404	Port Pirie	522	Northam & surrounds	551	Kojonup (S)
405	Mount Remarkable (DC)	523	Cunderdin (S)	552	Katanning & surrounds
406	Clare & Gilbert Valleys (DC)	524	Tammin	553	Tambellup (S)
407	Peterborough (DC)	525	Kellerberrin (S)	554	Gnowangerup (S)
408	Orroroo/Carrieton (DC)	526	Merredin & surrounds	555	Cranbrook (S)
409	Port Augusta (C)	527	York (S)	556	Plantaganet (S)
410	Flinders Ranges (DC)	528	Beverley (S)		
411	Murray Bridge (RC)	529	Quairading (S)		

GLOSSARY

Diversity	Refers to the overall distribution of economic activity (e.g. employment, output) across industries within a region. Diversity is typically defined in terms of the presence of a wide range of different industries in a region, and in terms of balanced employment across these industries (see <i>Industrial diversity index</i>).
Gross Domestic Product	An estimate of the total value of final goods and services produced within a country in a specified period of time, usually a year. The criterion of value is the price which may be obtained in the market.
Gross Value Added	This is the preferred national accounts measure of the value of industry production. Gross value added differs from Gross Domestic Product in that it excludes taxes and subsidies on products.
Industrial diversity index	The industrial diversity index measures the extent to which a region is characterized by a relatively diversified industry structure (see <i>Diversity</i>). An index value of 100% indicates a region is completely diversified (with employment spread evenly across all industries), while a value of zero indicates a region's employment is fully concentrated in a single industry.
Industry structure	Refers to the distribution of economic activity, such as output or employment, across industries.
Instability index	Measures the degree of stability or instability of a time-series by reference to its deviation from a long-run linear trend. The index has a value of zero if the time-series remains unchanged or exactly follows a linear trend path. It has a high value when the time-series displays extreme movements over time, or when growth rates are well above or below the long run trend for sustained periods (see <i>Stability</i>).

Labour market region	A spatial unit which reflects the area within which people are willing to commute from their place of residence to their place of work. For the purposes of this paper, BTRE has defined a set of 425 labour market regions using the commuting patterns revealed in the 2001 ABS Census of Population and Housing. For each labour market region, the majority of employed residents work in the same region in which they live.
Localisation coefficient (or Coefficient of industry localisation)	Provides a summary measure of the extent to which employment in a particular industry is dispersed across Australia's regions. A coefficient of zero for an industry means that employment in that industry is distributed across Australia's regions in line with total employment, while a coefficient of 100% indicates employment is fully localised in a single region.
Location quotient	Provides a region-specific measure of the relative importance of each industry. Location quotients relate an industry's employment share for a region to the industry's national employment share. A value of more than one indicates a higher degree of specialisation than the national average, while a value of less than one indicates a lower degree of specialisation. Location quotients can provide insight into a region's comparative advantage.
National accounts	A statistical report on the value of income, expenditure and production in the economy. A variety of economic variables are estimated, the most well known being <i>gross domestic product</i> (see separate entry).
Specialisation	An industry specialisation exists for a region when the industry accounts for a larger share of total regional activity, than of national activity. The top specialisations for a region are identified using <i>location quotients</i> (see separate entry).
Stability	A type of inertia, the ability to withstand change exerted by outside influences. Stability should not be confused with the lack of movement, such as slow growth. The degree of stability or instability of a time-series is measured using an <i>Instability index</i> (see separate entry).
Structural change	Refers to changes in the distribution of economic activity and resources across industries (see <i>structural change index</i>).

Structural change index	Used to measure changes in the distribution of employment across industries over time. An index value of zero indicates no structural change over the period, and an index value of 100% indicates a complete reversal of the industry structure.
Technology and knowledge intensive industries	In a knowledge based economy, the production, distribution and use of technology and knowledge are a key driver of growth, wealth creation and employment. While all industries generate and use new technology and knowledge to some extent, some are more technology and knowledge-intensive than others. For the purposes of this study, employment in technology and knowledge-intensive industries was estimated based on OECD (2001) definitions, and so included employment in Education, Health and community services, Finance and insurance, Business services, Services to mining, and various manufacturing industries.

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ABBREVIATIONS AND ACRONYMS

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANZSIC	Australian and New Zealand Standard Industrial Classification
BTRE	Bureau of Transport and Regional Economics
CCD	Census Collection District
CDEP	Community Development Employment Programme
FBT	Food, beverage and tobacco
GDP	Gross Domestic Product
GRP	Gross Regional Product
GVA	Gross Value Added
LFS	Labour Force Survey
LQ	Location quotient
Manuf.	Manufacturing
Na	Not applicable
No.	Number
ns	not statistically significant
NSW	New South Wales
NT	Northern Territory
OECD	Organisation of Economic Co-operation and Development
QLD	Queensland
SA	South Australia
SCI	Structural change index
SLA	Statistical Local Area
TAS	Tasmania
TCF	Textiles, clothing, footwear and leather
UK	United Kingdom
US	United States
VIC	Victoria
WA	Western Australia
W/s	Wholesaling