

The geographical organisation of Australia's major cities is changing— that is, the way that land uses are arranged within cities is changing. High-growth, knowledge-intensive industries are becoming concentrated in the inner suburbs of major cities, while in outer areas where more people live, employment growth is concentrated in lower productivity, lower paying and increasingly casualised service industry jobs. This is also changing the nature of travel modes and behaviour, and the social fabric of Australia's major cities . Access to a range of jobs, particularly higher-paying jobs, is increasing in central areas, drawing well-educated people to the residential areas in the inner ring.

This chapter examines how the productivity of Australia's major cities is being influenced by these changes and the challenges they present. Industry structure, a key influence on the type and location of jobs in Australia's cities is also studied, with particular consideration of gender. The chapter also looks at human capital in major cities.

For the first time, maps have been used in State of Australian Cities reporting to depict the geography of industry structure, workforce participation and part-time and full-time work rates within major cities. These maps can be found online using the [supplementary online map application](#).

Four feature articles are included in this chapter. The first is on spatial disadvantage in the Western Sydney region and draws on the recent work of Professor Phillip O'Neill. The second, by the National Growth Areas Alliance (NGAA), examines challenges faced by fast-growing areas on the outskirts of Australia's capital cities. The third looks at the importance of night-time activities to the economies of major cities. The fourth examines the impact of the mining sector on major cities, including the effects of fly in, fly out and drive in, drive out practices.

### Key findings

- Productivity growth could be increased by improving the urban structure of major cities.
- Major ports and airports are important to the productivity of major cities and they influence the urban structure of cities.
- Major cities have experienced a large increase in the number of knowledge-intensive jobs – jobs that require significant expertise, intellectual effort and innovation. This increase has tended to be concentrated in central areas.
- While knowledge-intensive jobs account for only a small proportion of all jobs in major cities, they are increasingly important to productivity and they increase employment opportunities and salaries.

- The manufacturing and retail sectors, which once drove jobs growth, are now employing a smaller proportion of Australians.
- An increasing number of people are living further away from the centres of major cities while higher-skill, higher-paying jobs are becoming concentrated in central areas. This means that a greater number of people are living further from their work.
- There are three ways that the connection between work and homes in major cities could be improved: firstly, by bringing workplaces closer to homes; secondly, by increasing the number of dwellings in areas that have the greatest number of jobs so that people can live closer to work; and, thirdly, by improving transport links between work and home (Kelly et al. 2013).
- Australia's cities tend to have higher rates of private transport use than public transport use when compared with overseas cities.
- Average income appears to influence the type of transport used for journeys to work. Those who use public transport tend to have higher average weekly individual incomes than those who use other means of transport.
- Private vehicles provide easier access to a higher number of jobs than mass transit in Australia's major cities.
- Industry structure differs widely between the major cities. Each city plays a unique role in the nation's economic system. The participation of males and females in particular types of industry also differs widely.
- The mining sector and associated fly in, fly out and drive in, drive out practices influence the economies of some major cities, particularly Perth and Brisbane, as well as demand for office space and aviation services.
- Major ports and airports are important to the productivity of major cities and they influence the organisation of cities.
- Labour force participation rates and the participation rates of males versus females differ between and within major cities. The proportion of employed persons working full-time and part-time and the proportion of males and females working in these categories also differ between and within major cities.
- A higher proportion of people with bachelor degree level qualifications or higher tend to live in central areas of major cities while those with certificate level qualifications or no post-school qualifications tend to live in outer areas.

## Productivity and the geographic organisation of major cities

'Productivity' is defined as the quantity of output that can be produced with a given amount of input. Productivity growth can be achieved by producing more outputs (goods and services) with the same amount of or fewer inputs (workers and capital). Productivity can grow through technological advances, new products; capital intensity and the flexibility and efficiency of the allocation of labour and capital (Australian Government 2010).

Public policy approaches to increasing productivity and workforce participation in Australia in the past have focused on regulatory reform, workplace relations, alterations to tax systems and improving health, education and training. These approaches have typically not had

spatial dimensions (Kelly et al. 2013). While these approaches have been effective to this point, there are concerns that they may not deliver the same levels of productivity growth in the future (Australian Government 2010, Rawnsley and Szafraneic 2010).

Productivity growth could also be increased by changing the spatial organisation of major cities so that labour and capital can be used more efficiently and flexibly (SGS Economics and Planning 2012). However, this could be challenging given the lack of data and lack of understanding about how the various parts of Australia's major cities function spatially (Rawnsley and Szafraneic 2010). For example, it is difficult to determine economic performance at a city or regional level using measures like Gross Domestic Product (GDP) and Gross Value Added (GVA). Micro or business level data would be particularly useful for measuring the economic effects of agglomeration (that is, the clustering in one location of specialised businesses), but this is also lacking.

Some useful literature has begun to emerge – for example, the Grattan Institute report *Productive cities* (Kelly et al. 2013), reports on population growth, jobs growth and commuting flows in Australia's largest cities (BITRE 2010, 2011, 2012, 2013b) and research on effective job density (SGS Economics and Planning 2012, 2013) – but analytical capacity in this area to date has been limited.

Major ports and airports play a critical role in the productivity of major cities. As Australia's business and trade becomes more internationalised (Infrastructure Australia 2013), it is important that land use around ports and airports and access to supporting infrastructure are planned and managed appropriately so that they can continue to encourage the smooth flow of people, goods and services to and from major cities.

## Agglomeration

Agglomeration occurs when businesses perceive that they can benefit from clustering together in one location. For example, businesses that are highly specialised in finance, insurance and business services may cluster together in the central business districts (CBDs) of Australia's largest cities.

Businesses benefit from agglomeration because of greater competition and better job matching in larger labour markets and the spillover or knowledge transfers between businesses (Ahrend 2013). Co-location assists and promotes adaption and innovation (Department of Transport 2012, SGS Economics and Planning 2012).

To a certain point agglomeration benefits increase as cities get larger, possibly because the population size, labour density, the share of services and overall stock of human capital also increases (Ahrend 2013). Larger cities are not just more productive because more highly valued industries are located there; the productivity of individuals actually increases with city size.

Agglomeration also has costs – for example, congestion, environmental degradation, health and social problems. These tend to increase as cities get larger. Up to a certain point, agglomeration benefits grow more rapidly than the costs. However, once a city reaches a certain size, the costs of agglomeration appear to increase at a much faster rate than the benefits (Ahrend 2013). Agglomeration benefits are strongly affected by how well a city's transport systems function. A city with poor transport systems will not maximise its potential agglomeration benefits (SGS Economics and Planning 2012, Ahrend 2013).

The report to the Council of Australian Governments *Productivity and Agglomeration Benefits in Australian Capital Cities* (SGS Economics and Planning 2012) provides a guide for assessing the productivity and human capital benefits and costs of agglomeration in Australia.

### The increase in knowledge-intensive jobs

Australia's major cities have experienced significant increases in their knowledge economies, that is, use of knowledge technologies to produce jobs and economic benefits. As a result, there has been a large increase in the number of knowledge-intensive jobs that require significant expertise, intellectual effort and innovation. These types of jobs tend to be concentrated in central areas, largely because of the benefits of agglomeration discussed above (Rawnsley, Finney and Szafraneic 2011).

While knowledge-intensive jobs account for a small proportion of the total number of jobs in major cities, they are important for productivity and national prosperity in that they increase employment and salaries and create additional jobs in areas nearby. Moretti (2012) researched the recent increase of knowledge-intensive jobs in the United States and their effect on cities and many of these findings are relevant to Australia's major cities.

Moretti (2012) estimated that for each new knowledge-intensive job, five more jobs in other sectors are created. In Australian cities such as Perth and Brisbane, jobs in the mining sector have had the effect of creating new jobs in other sectors. Many of these are local services jobs – for example, electricians, police officers, cleaners and baristas. Local services jobs are often described as 'non-tradeable' because they cannot be transferred outside the area where they currently exist. The majority of jobs in major cities are local services jobs.

Moretti (2012) also found that knowledge-intensive jobs also increase wages for those working nearby. Florida (2013) and Mellander conducted research into the wages that workers receive as well as housing costs in United States cities with high proportions of knowledge-intensive jobs. Their findings also may be applicable to Australian cities. They established that the additional financial benefits for high-skilled workers living in these cities remained after allowing for higher housing costs. However, this was not the case for less skilled workers, even though those less skilled workers typically had higher wages compared with other areas. Nonetheless, while these workers might not be financially better off, they may be better off overall because they have access to good opportunities and social and cultural institutions (Ahrend 2013).

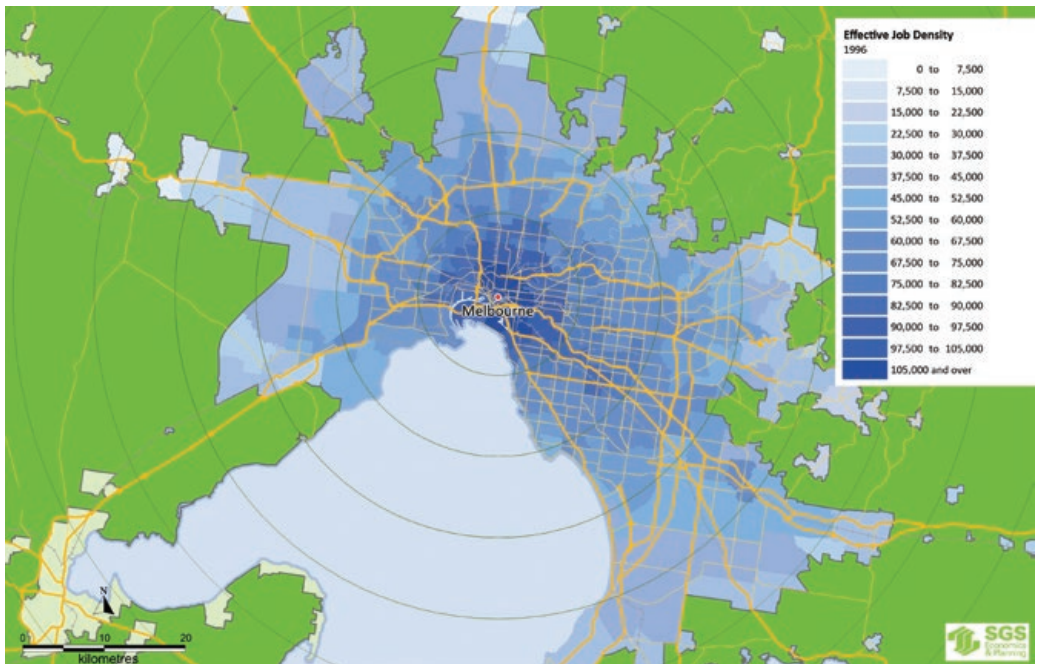
### Effective job density

Agglomeration cannot simply be measured using the employment density of an area. For example, a firm in an area with relatively low employment might experience agglomeration benefits because it is close to a CBD. Effective job density (EJD) is the best way to measure agglomeration because it includes not only the proximity component of agglomeration but also travel time. EJD uses industry employment data at a micro level to map out the number of jobs accessible within a defined travel time. International research shows that areas with high EJD tend to be the most productive locations within a city because they tend to experience the most agglomeration benefits (SGS Economics and Planning 2012). For example, a doubling of EJD in an area of Melbourne might increase its labour productivity by seven per cent (Rawnsley, Finney and Szafraneic 2011, Trubka 2009).

Map 3-1 and Map 3-2 show changes in EJD between 1996 and 2011 in Melbourne (SGS Economics and Planning 2012). The maps show a steady increase in the number of accessible jobs in the metropolitan area. There was a marked increase in the number of accessible jobs in inner suburbs which contributed to an increase in the number of accessible jobs in the middle ring suburbs. This expansion has been helped by Melbourne's substantial public transport, road and services infrastructure.

The increase in the number and density of highly accessible jobs near Melbourne's city centre is a reflection of the growth of its knowledge economy. The growth experienced in middle ring suburbs in Melbourne has occurred because other job markets have grown to service the knowledge economy in the inner suburbs. Other comparable EJD maps are not available for Australia's other major cities, but it is believed that this phenomenon is also occurring in them as well (SGS Economics and Planning 2012).

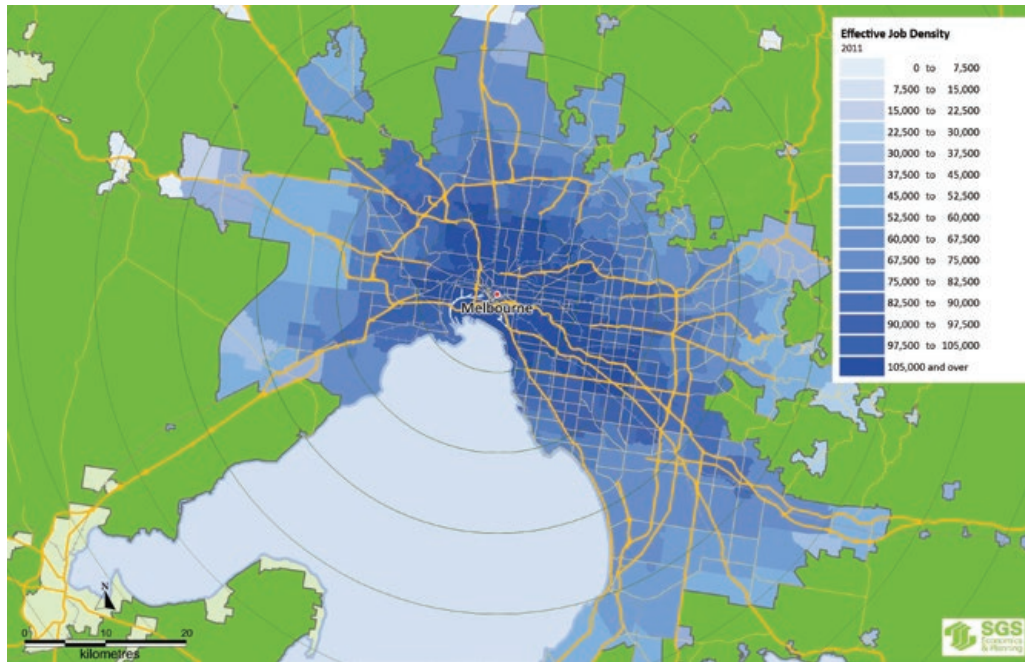
**Map 3-1**      **Effective job density in Melbourne, 1996**



Source: SGS Economics and Planning 2013



Map 3-2 Effective job density in Melbourne, 2011



Source: SGS Economics and Planning 2013

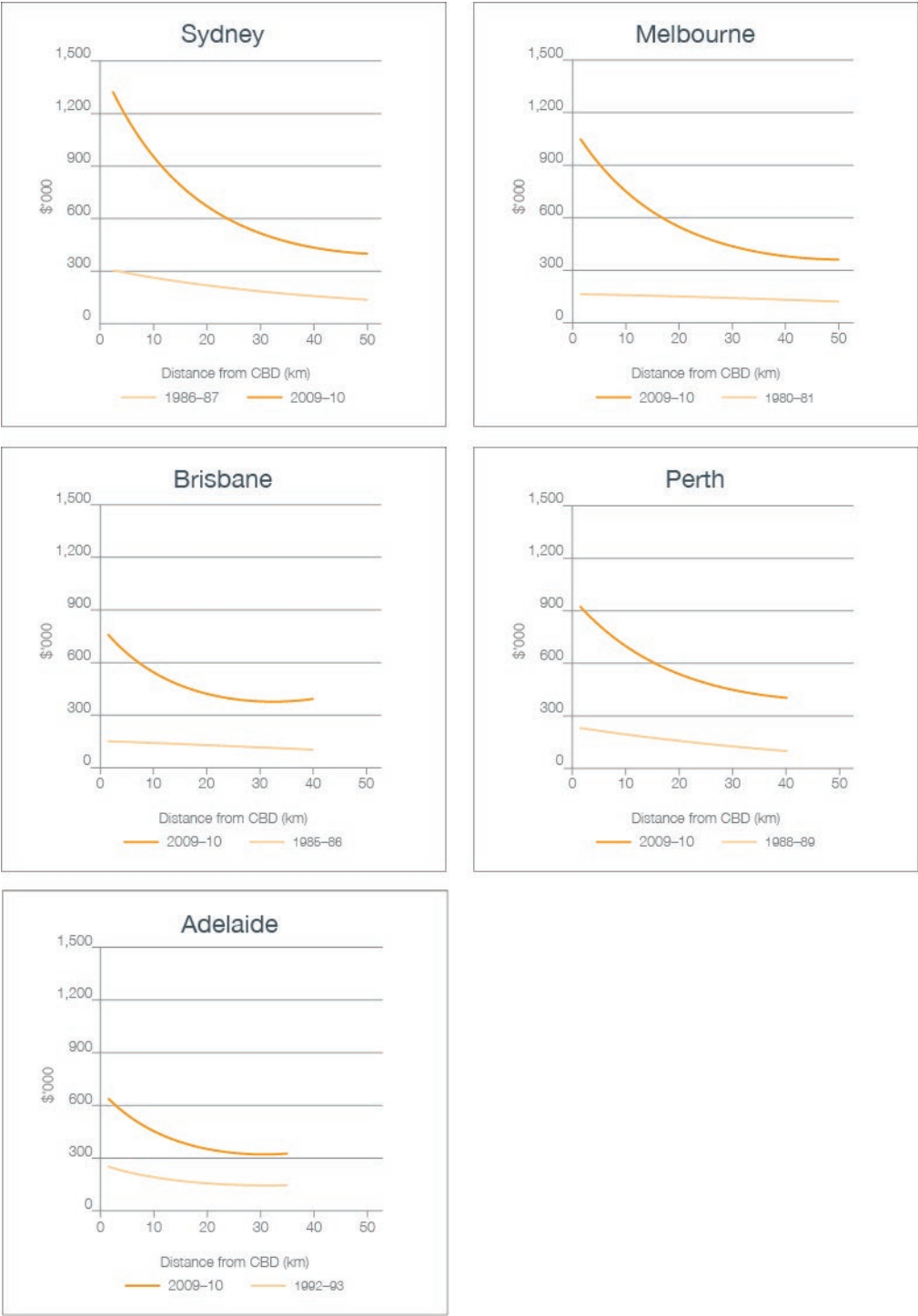
### The impact on access to job opportunities

Australia's major cities once relied upon our spreading suburb to boost productivity and enrich human capital. After World War II jobs growth moved from the inner city colonial cores to outer suburban growth areas where the population was also growing. Manufacturing, which once drove jobs growth in the middle and outer suburbs, is now employing proportionally fewer Australians while new knowledge-intensive industries are driving jobs growth in the inner suburbs. At the same time, population growth continues to be absorbed and planned for at the metropolitan fringe (Spiller 2012).

The outward spread of major cities, structural economic change and the substantial difference in house prices between inner and outer areas have separated middle and outer suburban communities from the job-rich opportunities in our CBDs. Labour markets are relatively weak in many parts of Australia's major cities, particularly in outer suburbs. Recent research has found that many residents of Australia's largest cities can reach fewer than 10 per cent of all metropolitan jobs within a reasonable commuting time (Kelly et al. 2013). Moreover, the jobs they can reach are less likely to be the higher paying, knowledge-intensive jobs that are clustered in central locations.

The difference in house prices between the inner and outer areas of Australia's capital cities is large and continuing to grow, as reported in *State of Australian Cities 2012*, see Figure 3-1. Because of a lack of affordable housing in the inner and middle suburbs of Australia's major cities, many people do not have equal access to the highly paid and growing job markets in the inner suburbs. This can create spatial polarisation and pockets of social disadvantage.

Figure 3-1 Real house prices by distance from CBD in Australia's largest cities, in 2009–10 dollars



Source: Richards 2011, reworking data from Kulish, Richards and Gillitzer 2011, published in Yates 2011 and SOAC 2012

Increasing housing prices generate greater wealth for city homeowners and landlords. But they also exacerbate inequities within cities. Moretti (2012) notes that homeowners in areas with strengthening labour markets, such as the inner suburbs of Australia's capital cities, gain from not only access to jobs with higher wages but also increases in property prices.

## Spatial disadvantage in the Western Sydney region

*Contributed by Professor Phillip O'Neill*

The Western Sydney region covers 8,817.3 square kilometres of greater metropolitan Sydney. It comprises 14 local government areas including Auburn, Bankstown, Baulkham Hills, Blacktown, Penrith, Blue Mountains, Hawkesbury, Holroyd, Fairfield, Liverpool, Campbelltown, Camden and Wollondilly.

Western Sydney has long been a major growth area of Sydney. Its population grew from 1.5 million or 31.7 per cent of Sydney's metropolitan population in 1996 to over 2.0 million or 47.0 per cent of Sydney's population in 2011. In 2010–11, the Western Sydney economy had a Gross Regional Product (GRP) of approximately \$95.6 billion, equivalent to nearly one-third of Sydney's Metropolitan GRP (NSW Premier and Cabinet 2013).

### Western Sydney's jobs deficit

The Western Sydney region for a long time has had fewer jobs in the region than workers. Approximately 33 per cent of workers living in Western Sydney commute outside Western Sydney to get to work. South-west Sydney in particular has the lowest access to jobs. The New South Wales Government has set employment targets for the region in successive Sydney metropolitan strategies between 2006 and 2011, but there has been little net employment growth in the region over this period.

Western Sydney is Australia's largest manufacturing region and manufacturing represents a substantial amount of Western Sydney's economy. Manufacturing contributed 16 per cent or approximately \$13.4 billion of total Western Sydney industry GVA in 2010–11.

However, the decline in manufacturing coupled with the increasing concentration of high-value employment opportunities in Sydney's CBD exacerbated Western Sydney's jobs deficit. In 1996, the number of manufacturing jobs in the region was growing, even coming out of the early 1990s recession (NSW Government 1998). Since then, however, the number of jobs in manufacturing in Western Sydney has fallen, following trends elsewhere in Australia. Between 2006 and 2011, the Western Sydney region experienced a net loss of 6,842 manufacturing jobs.

There has also been a net job loss in the wholesale trade sector in Western Sydney between 2006 and 2011. There has also been limited growth in the number of construction jobs in Western Sydney, linked to the slowing of growth in outer suburban development. Growth in retail trade and private sector transaction industry jobs, including in finance, has also been limited.

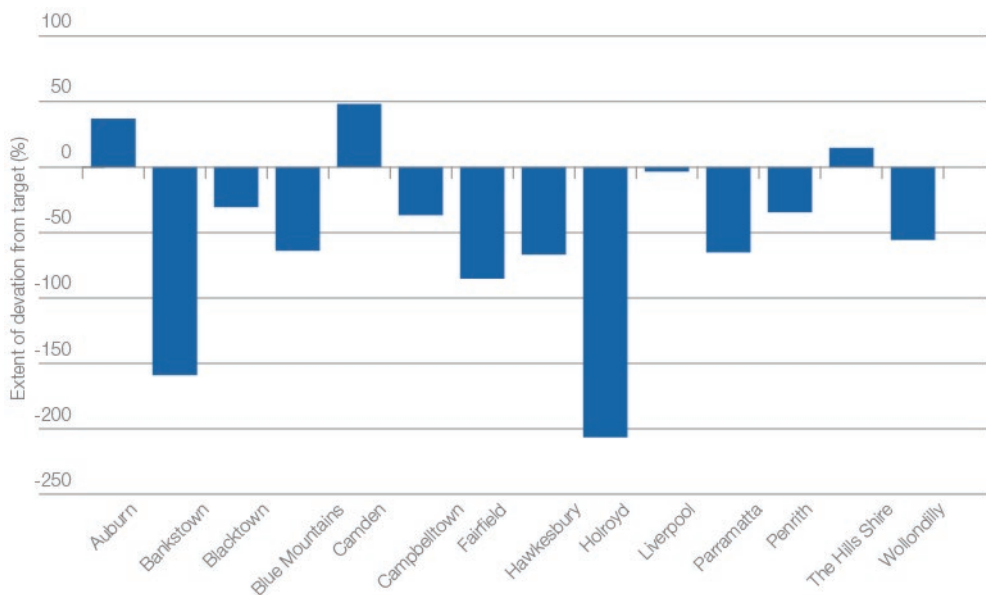
Three public sector industries have experienced growth in Western Sydney between 2006 and 2011: health care and social assistance; education and training; and public



administration and safety. Without these sectors there would have been no growth in net additional jobs in Western Sydney between 2006 and 2011. However, productivity growth in these three industry sectors tends to be low and this may have implications for the economic growth prospects for the region.

Figure 3-2 displays the difference between the jobs targets and the net jobs growth/loss between 2006 and 2011 for the 14 local government areas (LGAs) in Western Sydney. It shows that jobs targets have not been met in most of Western Sydney's LGAs, with two notable exceptions: Auburn LGA and the Hills Shire LGA. Auburn's jobs growth probably reflects the fact that the region includes the Sydney Olympic Park precinct and the Parramatta Road corridor. The jobs growth in the Hills Shire extends from the already successful M2 corridor growth.

**Figure 3-2** Western Sydney LGAs' deviation from the NSW Government's jobs growth targets, 2006–11



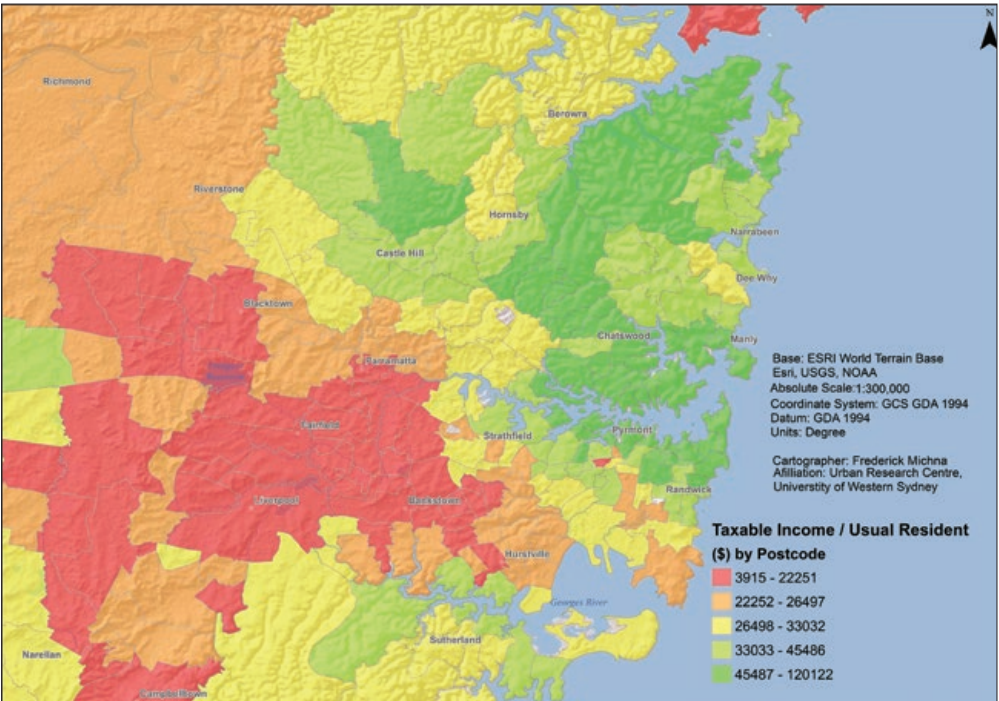
Note: Parramatta reflects the wider Parramatta LGA, not only the relatively more successful Parramatta business centre. The jobs growth shown for Camden LGA is from a limited number of existing jobs so it did not result in the generation of a substantial number of new jobs.

Source: O'Neill 2013 derived from ABS Census data 2006 and 2011

### Sydney's income inequality

Map 3-3 below displays average income per capita by postcode in Sydney. It shows that the lowest income receivers in Sydney, with an average income of less than \$22,252 per person per annum, are concentrated largely in Western Sydney. The highest income receivers, with average incomes of between \$45,488 to \$120,122 per capita per annum, are concentrated in Sydney's eastern suburbs, the inner harboursides and the North Shore.

**Map 3-3**      **Distribution of average taxable income per capita by postcode in Sydney, 2011**



**Note:** The taxable income per usual resident is calculated by aggregating every taxable income according to its postcode of origin and dividing the result by the population living in that postcode. Taxable income includes income from all sources.

**Source:** O'Neill 2013 derived from data from Australian Taxation Office and ABS 2012a

The lower average per capita incomes evident in Western Sydney reflect two issues. Firstly, work in Western Sydney is harder to come by. As a consequence, participation rates among young people and women in the region are lower than in other areas of the city, so income is distributed among more people in each area. Secondly, a greater proportion of Western Sydney workers are in jobs in industries that pay less or are not relative to their qualifications.

## Opinion piece on the challenges facing fast-growing municipalities in the outer suburbs of capital cities

*Contributed by the National Growth Areas Alliance*

The NGAA is an organisation which advocates for the interests of communities in outer urban growth area and this article highlights their position in the debate. This article refers to the 25 fast-growing municipalities on the outskirts of the capital cities that are the members of the National Growth Areas Alliance (NGAA). A list of members can be found on NGAA's website at [www.ngaa.org.au](http://www.ngaa.org.au).

The fast-growing areas on the outskirts of Australia's capital cities face a significant challenge in creating sustainable communities. If current population growth rates are maintained, these areas will double in size over the next 25 years and accommodate almost one in five Australians. Yet fewer than one in 10 jobs are currently located there and each day approximately half a million people commute out of the area for work. NGAA areas also typically have unemployment rates above their state averages. It can be estimated that in total, the areas represented by the NGAA have an additional 20,000 unemployed persons living within them (based on the difference between unemployment rates in NGAA areas when compared with their relevant state average unemployment rates). These factors have considerable social, environmental and economic impacts.

Essential Economics and Geografia (2012) found that the need for large-scale out-commuting and the persistent 'excess' unemployment are a consequence of shortfalls in jobs and/or local skills programs and they result in a significant drain on the national economy. The problems form a complex interaction of cause and effect. For example, according to the experience of local employment coordinators (Essential Economics and Geografia 2012), a shortage of local jobs also reduces the number of workforce entry points for school leavers and that also contributes to local unemployment levels.

An analysis of the flow-on effects of this situation has pointed to the need to:

- create a local system of skilled employment and supporting infrastructure to attract private business investment
- secure a stream of State and Commonwealth funding for community, transport and other major infrastructure to attract private sector investment
- stimulate private sector investment to create more job diversity
- recognise the importance of liveability features in attracting skilled workers and private investment
- improve employment self-sufficiency rates to avoid long-term unemployment growth and deskilling
- raise the local skill base to attract investment.

## The current picture

### *Labour force participation*

NGAA municipalities have a low crude labour force participation rate. Table 3-1 shows that just 48.8 per cent of the total population is either in a job or looking for work compared to 54.0 per cent across Australia.

**Table 3-1** NGAA municipalities' labour force, March 2012

	Employed	Unemployed	Size of labour force	Unemployment rate (%)	Crude labour force participation rate (%)
NGAA municipalities	1,644,620	108,880	1,753,500	6.2	48.8
Australia	11,442,800	620,500	12,063,300	5.1	54.0

Note: Figures rounded.

Source: DEEWR 2012, ABS 2012a

### *Employment self-sufficiency*

In 2011, based on ABS journey to work data, there were approximately 930,000 jobs in NGAA municipalities and a working population of approximately 1.6 million (2011). This represents just 0.58 jobs per working resident, compared with a ratio of approximately 1:1 for Australia's metropolitan areas in total. The 0.58:1 ratio represents an employment deficit of approximately 660,000 jobs. As Table 3-2 shows, in 2006 there were 0.62 jobs per working resident in NGAA municipalities and the deficit was 500,000 jobs, so there has been a decrease in employment self-sufficiency between 2006 and 2011.

**Table 3-2** Employment self-sufficiency in NGAA municipalities, 2006 and 2011

	Jobs provided within municipalities	Employed residents of municipalities	Employment self-sufficiency ratio	Jobs deficit/surplus
2006	797,860	1,295,450	0.62	-497,590
2011	927,537	1,589,339	0.58	-661,802

Note: Figures rounded.

Source: ABS 2012a, Essential Economics and Geografia

### *Industry sectors*

Compared to national averages, there are significantly higher proportions of manufacturing, retail trade, education and training and transport, postal and warehousing jobs within NGAA municipalities, as can be seen in Table 3-2. Over the period 2006 to 2011, there has been little change in the types of jobs in NGAA municipalities, as illustrated by Table 3-3 and Table 3-4. However, the proportion of manufacturing jobs has declined at a greater rate than the national trend in NGAA municipalities and the number of professional, scientific and technical jobs has increased, although they are still well below national proportions.

**Table 3-3** Percentage of jobs per industry sector, NGAA municipalities and Australia (main sectors in NGAA municipalities), 2006

Sector	NGAA (%)	Australia (%)	Difference in percentage points (%)
Manufacturing	17.0	10.5	6.6
Construction	7.6	7.8	-0.2
Wholesale trade	5.1	4.4	0.8
Retail trade	13.7	11.3	2.3
Accommodation and food services	5.7	6.3	-0.7
Transport, postal and warehousing	6.5	4.7	1.8
Other services	3.9	3.7	0.2
Public administration and safety	6.0	6.7	-0.7
Education and training	9.6	7.7	2.0
Health care and social assistance	10.1	10.5	-0.4
Professional, scientific and technical services	3.2	6.6	-3.4

Note: Figures rounded.

Source: ABS 2007, Essential Economics

**Table 3-4** Percentage of jobs per industry sector, NGAA municipalities and Australia (main sectors in NGAA municipalities), 2011

Sector	NGAA (%)	Australia (%)	Difference in percentage points (%)
Manufacturing	14.4	9.0	5.4
Construction	8.4	8.2	0.1
Wholesale trade	5.0	4.0	1.0
Retail trade	13.4	10.5	2.9
Accommodation and food services	6.1	6.5	-0.4
Transport, postal and warehousing	6.4	4.8	1.6
Other services	4.0	3.8	0.3
Public administration and safety	5.9	6.9	-1.0
Education and training	9.9	8.0	1.9
Health care and social assistance	11.3	11.6	-0.3
Professional, scientific and technical services	3.6	7.3	-3.6

Note: Figures rounded.

Source: ABS 2012a, Essential Economics and Geografia 2012

Table 3-5 shows the main industries that NGAA residents work in. It can be seen that industries in NGAA municipalities are in traditional sectors like manufacturing, construction, transport, postal and warehousing, and wholesaling activities.

**Table 3-5**      **NGAA industry structure (top 10 industries that NGAA residents work in), 2011**

Sector	Number of people employed	NGAA (%)	Australia (%)	Difference in percentage points (%)
Manufacturing	201,222	12.7	9.0	+3.7
Construction	156,963	9.9	8.2	1.6
Retail trade	179,123	11.3	10.5	+0.8
Wholesale trade	78,368	4.9	4.0	+0.9
Accommodation and food services	84,904	5.3	6.5	-1.1
Transport, postal and warehousing	108,829	6.8	4.8	+2.1
Professional, scientific and technical services	79,157	5.0	7.3	-2.3
Public administration and safety	100,131	6.3	6.9	-0.6
Education and training	101,816	6.4	8.0	-1.6
Health care and social assistance	169,431	10.7	11.6	-0.9

Note:      Figures rounded. Refers to jobs located in NGAA municipalities.

Source:    ABS 2012a

## Skills

### *Level of educational attainment*

Table 3-6 shows that residents in NGAA municipalities have significantly lower levels of diploma and degree qualifications compared with the national average. In 2011, 20.1 per cent of NGAA residents held such qualifications compared to 27.2 per cent nationally. A relatively high proportion of NGAA residents hold vocational qualifications, but the NGAA municipalities have a significantly higher proportion of residents with no post-school qualifications when compared with the national average. These figures reveal a contrast between skill and attainment levels in outer metropolitan growth areas compared with the Australian average.



**Table 3-6** Post-school qualifications for NGAA municipality residents aged 15 years and above, 2011

Qualification	Number of residents	NGAA (%)	Australia (%)	Difference in percentage points (%)
Bachelor or higher degree	326,540	12.4	19.1	-6.7
Advanced diploma or diploma	202,157	7.7	8.1	-0.4
Diploma and above	528,697	20.1	27.2	-7.1
Vocational	549,227	20.9	18.3	2.6
No qualifications	1,309,259	49.8	44.7	5.1
Not stated	240,834	9.2	9.7	-0.5
Total	2,628,017	100.0	100.0	0.0

Note: Figures rounded.

Source: ABS 2012a

### Occupational status

Table 3-7 shows the occupational status of NGAA municipalities' residents compared with the Australian average. It can be seen that in NGAA municipalities the proportion of professionals and managers is lower and the proportion of technical and clerical workers is higher.

**Table 3-7** Resident occupational status, NGAA municipalities and Australia, 2011

Occupational Group	Number	NGAA (%)	Australia (%)	Difference in percentage points (%)
Professionals and managers	388,688	24.5	34.2	-9.7
Technicians and trades workers	264,219	16.6	14.2	+2.5
Clerical and administrative workers	262,790	16.5	14.7	+1.8
Machinery operators and drivers	154,618	9.7	6.6	+3.2
Labourers	174,397	11.0	9.4	+1.6

Note: Figures rounded.

Source: ABS 2012a

### Skills and jobs mismatch

Essential Economics and Geografia (2012) used composite indices to develop a more location-specific approach to discovering where municipalities fall along a spectrum of areas in which the skills profile is the dominant concern to areas in which the availability of jobs is the dominant concern.

At one end of the spectrum, in some regions there are a reasonable number of jobs attracting in-commuters. Yet these areas have higher unemployment (than NGAA averages), lower educational attainment and slower growth (relative to other areas). Population growth compounds these issues by expanding the pool of working-age residents without increasing the stock of jobs. Also, the growth does not address the mismatch between local skill sets and available jobs or ensure that local residents are

able to take advantage of local job opportunities. Such locations include traditional manufacturing areas.

At the other end of the spectrum, there are NGAA municipalities with lower unemployment rates, relatively skilled and educated resident labour forces and often faster population growth but with a chronic (and growing) undersupply of local jobs. There is a large amount of out-commuting in these largely residential areas and they often lack the infrastructure to attract new business investment or even community infrastructure to support the expanding population. In most cases, because of an undersupply of local employment opportunities in more skilled work, a large proportion of skilled residents must out-commute and this diminishes the local benefits of having a skilled resident workforce. A strategy to generate greater employment diversity in these areas and to increase the amount of skilled employment opportunities will reduce the need for out-commuting, bringing about a substantial productivity gain to the economy.

Without intervention, these NGAA typologies may converge over time. Some municipalities already show the signs of this. Firstly, the traditional manufacturing areas (with a relatively healthy supply of local jobs but a low skills base) are likely to experience population growth. This would cut into the job surplus and exacerbate the high unemployment rates that are already being generated by the downsizing and up-skilling of manufacturing. Secondly, there may be an increase in unemployment in the greenfield municipalities (which have more skills but fewer local employment opportunities) as the lack of local jobs affects new generations of residents looking for local, career entry opportunities. Moreover, given the current scale of existing skills and jobs deficits, even without further population growth pressure the NGAA municipalities already face long-term challenges.

Much emphasis has been placed on the concentration of high-growth industries in CBDs and major centres and the need to transport people more efficiently to these locations. However, there must be a commensurate emphasis on addressing skills and employment gaps in outer metropolitan growth areas. This includes the development of centres within outer metropolitan growth areas that draw on local strengths and relationships and address skills and/or employment deficits. Infrastructure provision, including transport and community facility infrastructure, are key components of this.

### The potential

The NGAA municipalities have a number of strengths. These include available land; a strong vocational education skills base; ability to build on the existing manufacturing base to create advanced manufacturing opportunities, especially if there is a focus on skill development; existing food production which could be retained and further developed; and a high proportion of small to medium enterprises, including home-based businesses, that could benefit from access to high-speed broadband and business support.

The following activities are those expected to generate employment in the outer metropolitan growth areas:

- high-value manufacturing
- construction
- freight, transport and logistics
- wholesaling
- service sector
- community services.

Proposed actions focus on:

- creating job clusters through catalytic investment
- skilling the local workforce
- enabling employment diversity and growth by investing in and maintaining infrastructure
- ensuring intraregional and interagency coordination of efforts to tackle employment and skills issues.

### Expected benefits

Modelling of hypothetical interventions by Essential Economics and Geografia (2012), which used five representative municipalities, highlighted the potential for significant returns to government and communities from well-targeted projects and programs in NGAA municipalities. Potential economic and social benefits identified from the projects included:

- increased direct and indirect employment
- increased GRP
- improved tax receipts to all levels of government
- reduction in unemployment rates
- reduction in government welfare payments
- improved local job sustainability
- reduction in congestion costs.

A summary of the aggregate results from the hypothetical interventions in the five municipalities is provided in Table 3-8.

**Table 3-8** Hypothetical project impacts in five representative NGAA municipalities over a 20-year period

Impact	Mean estimate
<b>Economic impacts</b>	
Total cost	\$5.2 billion
Total output	\$8.8 billion
Gross regional product	\$3.4 billion
Total full-time equivalent jobs	
Construction	2,290 FTE jobs
Operational	3,560 FTE jobs
Government revenue	\$897 million
Net present value (NPV)	\$7.46 billion
<b>Social impacts</b>	
Impact on unemployment rate	7.7% to 7.1%
Impact on local job self-sufficiency (local jobs provided per resident labour force participant)	0.75 to 0.77
Total welfare benefit savings (NPV)	\$228 million
Total congestion cost savings (NPV)	\$37 million

Source: Geografia and Essential Economics 2012

## Improving the connection between work and home

In Australia's major cities, an increasing number of people are living further away from city centres. At the same time, many jobs – in particular, higher-skill, higher-paying jobs – are recentralising. In Australia's major cities this is leading to an increased distance between where people work and where they live and a growing need to effectively connect homes and workplaces.

There are many economic and social benefits to be derived from improving connections between where people live and where they work. There are three ways that this can be achieved: firstly, by bringing workplaces closer to homes; secondly, by increasing the number of dwellings in areas with good access to jobs so that people can live closer to work; and thirdly, by improving transport links between work and home. These three approaches are explored in the Grattan Institute report *Productive Cities* (Kelly et al. 2013).

### Bringing work closer to home

One way to better connect people and jobs in major cities is to create more jobs in middle ring suburbs and outer suburban areas. This could be done by offering incentives for businesses to relocate there or by building new employment clusters in these areas. However, there is currently little evidence to show that these methods are cost-effective, that they will generate significant numbers of long-term jobs or that they will increase the productivity of businesses (Ahrend 2013, Kelly et al. 2013). A number of industry sectors, such as the finance and insurance sector, experience significant agglomeration benefits by being located in the inner suburbs. If these sectors relocated to the outer suburbs, they would lose these benefits, resulting in a decrease in productivity.

Jobs could be created in middle and outer suburban areas by building on existing agglomerations in those areas – for example, universities, hospitals and activity centres. This method is likely to be more effective than trying to build new employment clusters from scratch. However, it is unlikely to provide the number of jobs needed in middle and outer urban areas.

### Enabling people to live closer to work

Another way to improve the connection between work and home in major cities would be to increase the number of dwellings in areas with good access to jobs – for example, areas where there are extensive job markets or that have good transport connections to job markets – thereby allowing more people to live closer to those jobs.

As discussed earlier in this chapter, in Australian cities there is a large difference in house prices between inner and outer urban areas. Because of high house prices in the inner and middle suburbs, many households in outer areas are unable to move into these areas, which have better access to jobs. It has also meant that wealthier households tend to predominate in areas where there are both better jobs and public transport.

A variety of factors exacerbate this situation. Resistance to change and restrictive planning practices mean that there are too few new and affordable types of dwellings being built in the inner and middle ring suburbs that could allow more residents to live closer to good jobs. Developers and builders face strong disincentives to address housing shortages in these locations (Kelly et al. 2013, Fensham 2013).

## Improving transport links between work and home

A third way to improve the link between work and home in major cities is to improve the transport system to connect people, particularly those living in the outer suburbs, to more centralised jobs. This would involve improving roads and public transport networks, which would be expensive. However, there are ways to improve the use of existing transport links. Demand measures could be used to spread the demand for travel in morning and afternoon peak travel times and therefore reduce congestion and overcrowding.

As a result of an ageing population, Australia will increasingly face significant budgetary pressures at Commonwealth and State levels. Today one in seven Australians are aged over 65. By 2030, this proportion will be one in five. Tax revenue bases will decline as the proportion of the population in the workforce declines. The GDP spend on health and age-related pensions will increase substantially making it even harder to fund significant capacity increases in urban networks, particularly mass transit systems.

There are also physical constraints when considering building new transport infrastructure. Most cities have very few corridors preserved to accommodate new transport infrastructure links. Some also have geographical limitations that would make new transport links difficult and costly to build.

The three ways of connecting work and homes described above could all be used to exploit local and geographic circumstances to improve the productivity and liveability of major cities. Improving these connections between work and home will be critical if we are to build the productivity, sustainability and liveability of Australia's major cities.

## Transport mode choice and transport accessibility

### *Trends in transport mode share*

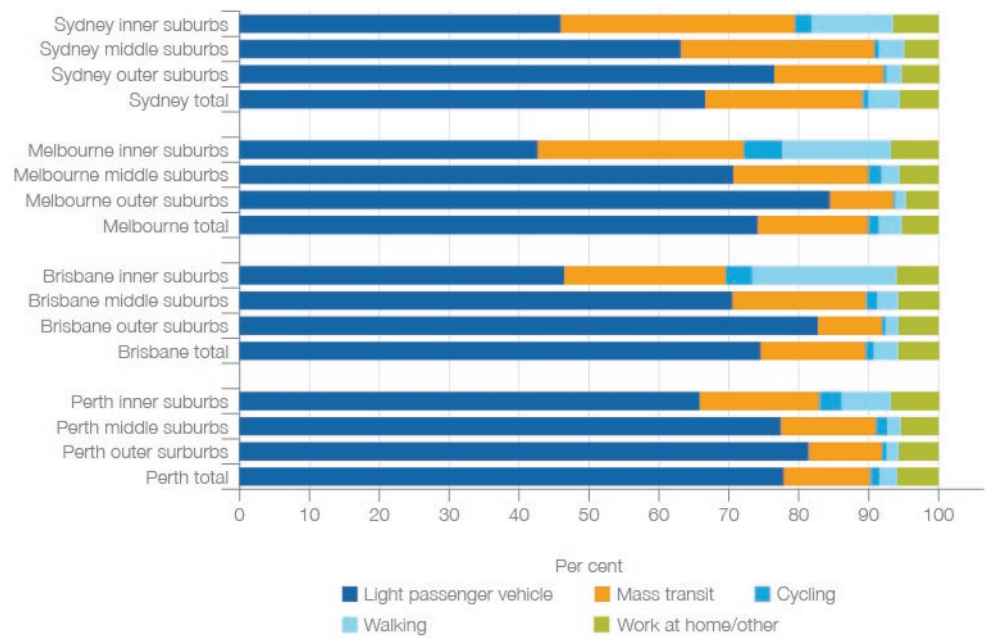
'Passenger transport mode share' refers to the proportion of travellers that use each type of transport – for example, the number that use light passenger vehicles (LPVs – private cars but also motorcycles and scooters) as opposed to mass transit. Passenger mode share is not the same across Australia's major cities or within them. Different parts of major cities often have different mode share breakdowns.

Australia's cities tend to have higher LPV use and lower mass transit use than cities overseas (Curtis and Scheurer 2012). LPVs are the most popular choice for all journeys in Australia's major cities although their popularity varies depending on the destination and purpose of the journey (BTS 2012a, Corpuz 2007).

Figure 3-3 shows the mode share for travel to work in 2011 for Australia's four largest cities and for the inner, middle and outer suburbs of these cities. LPV was the main mode of travel to work in all four cities and their inner, middle and outer suburbs. Melbourne's inner suburbs had the highest LPV use of any area of the four cities (84.4 per cent), while its outer suburbs had the lowest LPV use of any area (42.6 per cent). Sydney's inner suburbs had the highest mass transit usage (33.5 per cent) and Melbourne's outer suburbs had the lowest (9.2 per cent).

Approximately 16 per cent of all journeys in Australia's capital cities are for the purpose of travel to work, so these figures do not necessarily apply over all of the journeys made in major cities (BTS 2012b, SOAC 2012).

Figure 3-3      Mode of travel to work for commuters in Australia’s four largest cities, 2011

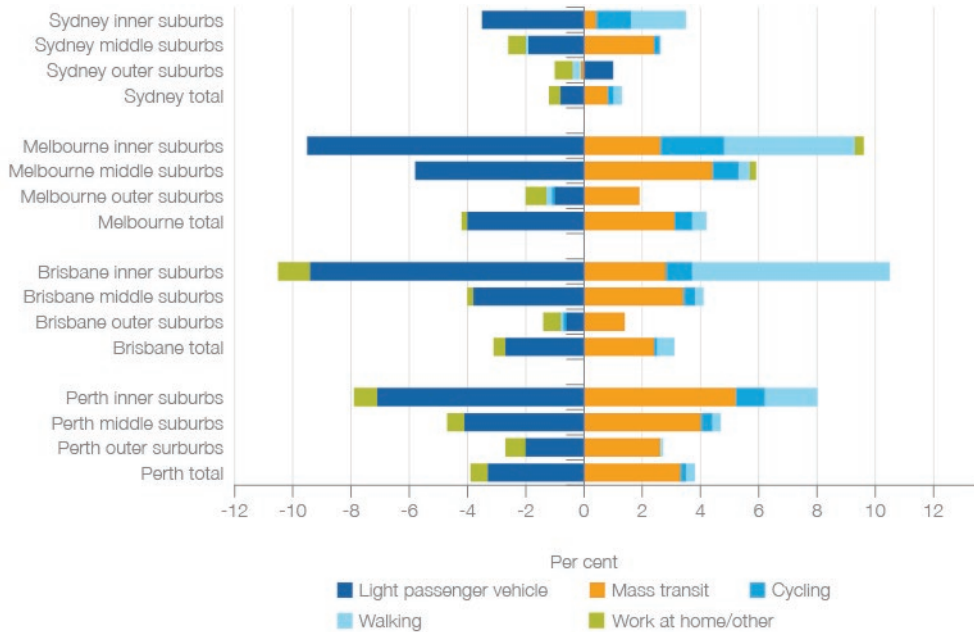


Source: BITRE 2013 derived from ABS 2011

Although LPVs are the most popular mode of transport in Australia’s major cities, overall vehicle kilometres travelled per person peaked in Australia in 2004 (Cosgrove 2011). There was a decrease in the proportion of trips to work using LPVs in Australia’s four largest cities in the decade to 2011, as can be seen in Figure 3-4. There was an increase in use of mass transit, walking and cycling to get to work in all four cities, particularly in inner urban areas. The only area of the four largest cities to experience an increase in LPV usage in the decade to 2011 was Sydney’s outer suburbs. The majority of people who travel to work by LPV are the sole occupants of the vehicle. The proportion of people travelling to work as a passenger in a car has been declining in recent years (BITRE 2013).



**Figure 3-4** Change in mode of travel to work for commuters in Australia's four largest cities, 2001–11



Source: BITRE 2013 derived from ABS 2011

Census data shows that in the capital cities, at least for travel to work, the vast majority of trips by LPV are made by a single person – 53.7 per cent of all journeys to work in Sydney and up to 64 per cent of all journeys to work in Adelaide (ABS 2012a). Between 2006 and 2011 there was an increase in the proportion of people travelling to work by LPV as a driver in almost all capital cities, the exceptions being Melbourne and Perth. In all of the capital cities, there has been a decrease in the number of people travelling to work by LPV as passengers since 2006. This is particularly evident in Sydney, where there has been a decrease of approximately 15 per cent, and Melbourne where there has been a decrease of approximately 8.5 per cent (ABS 2012a).

### Factors that influence the choice of transport mode

The decision a person makes about transport mode is influenced by a complex interaction of factors including price, reliability, accessibility, affordability, personal income, travel time and the level of comfort (or discomfort) of the mode. The decision is also influenced by the nature of a trip (for instance, commuting to work or visiting family) and the destination.

#### Pricing

Pricing can be used to influence the choices people make about transport mode. A recent Australian survey indicated that peak hour road pricing could encourage a shift of around 13 per cent in peak period from LPV to mass transit. In addition, it could encourage around 22 per cent more commuters to drive to work during an off-peak period instead of during a peak period (Institute of Transport and Logistics Studies 2013).

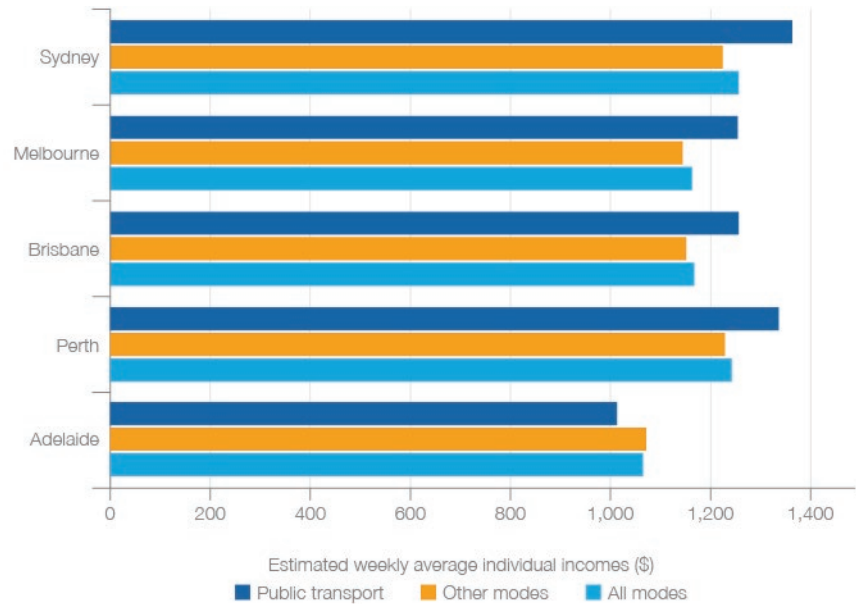
In Australia’s major cities, mass transit services to low-density suburban communities have low levels of cost recovery and require high levels of public subsidies, as reported in *State of Australian Cities 2012*. Fare recovery and other revenue sources for mass transit systems in Australia, particularly rail, are low by international standards.

Cost recovery rates for mass transit systems are not uniform across Australia’s major cities. For example, Sydney’s metropolitan buses in 2011–12 had an overall cost recovery rate of 30 per cent, while its outer metropolitan buses have a cost recovery rate of 10 per cent (SOAC 2012). In south-east Queensland in 2011–12, five per cent of bus routes fully recovered running costs, 30 per cent had a cost recovery rate of 30 per cent and 14 per cent had a cost recovery rate of less than 10 per cent.

Income distribution and mass transit use

Average incomes appear to influence the type of mode of transport used for journeys to work. Those who use public transport for their journey to work tend to have higher average weekly individual incomes than those who use other transport modes (see Figure 3-5). Average incomes are about 10 per cent higher for public transport users in Sydney, Melbourne, Brisbane and Perth, but Adelaide public transport users have somewhat lower incomes (on average) than users of other transport modes.

Figure 3-5      Estimated weekly average individual income for users of selected transport modes for the journey to work in selected capital cities, 2011



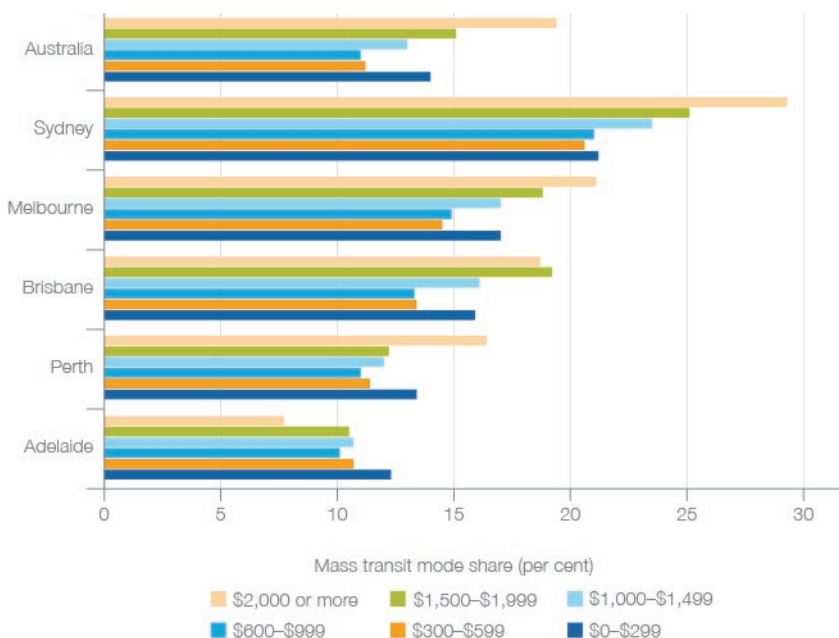
Note: Average income was estimated using the midpoint income of each Census income range, with ‘negative’ and ‘not stated’ income responses excluded from the calculation and the ‘2000 or more’ category assigned a conservative average value of \$3,000 (based on evidence from the ABS Survey of Income and Housing 2009–10 and ABS special tabulations of average Census incomes). The ‘Other modes’ category includes all modes except mass transit.

Source: BITRE analysis of ABS Census of Population and Housing 2011 place of work data

Figure 3-6 shows the proportion of people in each personal income category who use mass transit for the journey to work. In Australia, the highest income bracket (annual income of \$104,000 or more) had the highest mass transit mode share of 19 per cent, while the mass transit mode share was lowest for those earning between \$15,600 and \$51,999 per annum (at 11 per cent).

The individual capital cities showed mixed patterns. For example, in Sydney, Melbourne and Perth, the mass transit mode share was highest in the top income group, while in Adelaide the top income group had the lowest mass transit mode share and the lowest income group (\$0 to \$15,599) had a comparatively high rate of mass transit use.

**Figure 3-6** Users of mass transit for journey to work by weekly personal income category in selected capital cities, 2011



Note: Data for 'unknown' income category, which includes 'negative income' or 'not stated', are not shown. Annual incomes shown in brackets.

Source: BITRE analysis of ABS Census of Population and Housing 2011 place of work data

The relationship between income and mass transit use also differs across transport modes. Based on 2010–11 data from the Sydney Household Travel Survey, Bureau of Transport Statistics (2013) found that bus use was particularly common among those in the lowest personal income bracket (\$25,000 or less), while a relatively high proportion of ferry and taxi users belonged to the highest income bracket (annual income of over \$100,000).

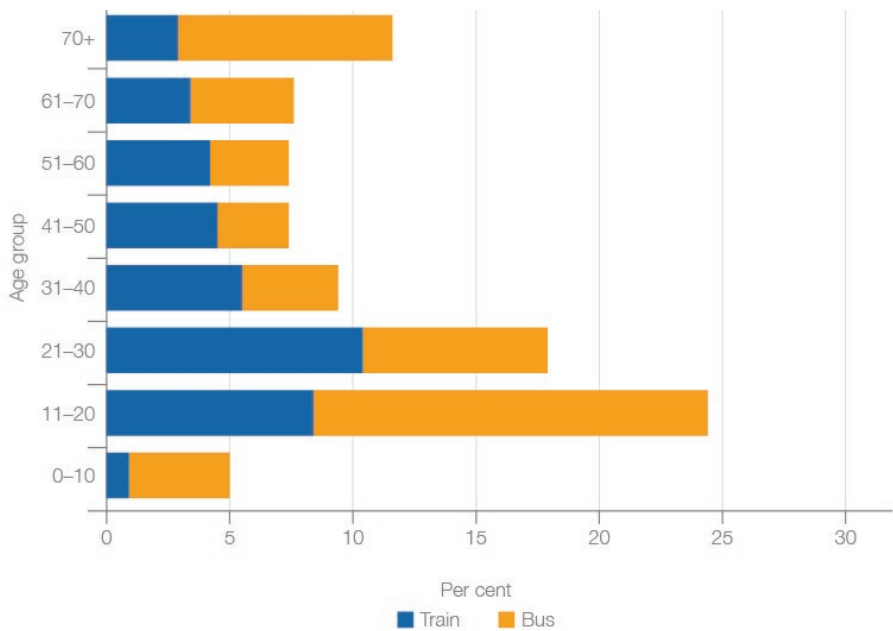
A large proportion of high income users use mass transit, although they do not account for the majority of mass transit users. Instead, most of the mass transit users belong to the middle two income categories. Nationally in 2011 about one-quarter of those who commuted to work by mass transit earned between \$31,200 and \$51,999 per annum and a further one-quarter earned between \$52,000 and \$77,999 per year.

Travel by mass transit

Mass transit serves different travel needs for different groups of people in Australia’s major cities. One in six people in the capital cities uses mass transit for daily commuting (Mees and Groenhart 2012), while many rely on mass transit for things like shopping, social and recreational activities and personal business. Children frequently use mass transit, including dedicated school bus services, to travel to and from school and older Australians may rely on mass transit to reach health and other social services and activities.

The NSW Government’s Household Travel Survey for Sydney reveals that, of all age groups, young people are most reliant on mass transit (Figure 3-7). On an average weekday, mass transit accounts for nearly one-quarter of all trips made by 11- to 20-year-olds and one in five trips by 21- to 30-year-olds but less than 10 per cent of trips for Sydney residents between the ages of 31 and 70 (BTS 2012b).

Figure 3-7      Mass transit mode share for all trips on an average weekday in Sydney, by age of travellers, 2010–11



Source:    BTS 2012b

Young people and mass transit

Young people have the highest dependence on mass transit. A recent Translink review of bus services in south-east Queensland showed that nearly half of all bus passengers are school students (12 per cent of all passengers) or university students (30 per cent) (Translink 2013).

Mass transit can also play an important role in alleviating the risk of social exclusion for some groups. A study on the social inclusion benefits of bus services in Melbourne has found that, while the benefits of mass transit services for relieving traffic congestion are substantial, the social benefits they produce are even more substantial (Stanley 2010).

### People with drivers licences

Given that young people have the highest dependence on mass transit for everyday trips, they are particularly disadvantaged if there are few or no mass transit services. The importance of good mass transit provision is underlined by recent trends that have seen younger adults in Australia becoming less likely to hold a drivers licence (Raimond and Milthorpe 2010).

Between 1998 and 2009, people aged under 35 years in Sydney have become less likely to hold a drivers licence. Similar results have been found in both Melbourne and Brisbane (Raimond and Milthorpe 2010).

A Graduated Licensing Scheme was introduced in New South Wales in 2000 to reduce over-representation of drivers under 25 years of age among road fatalities. This scheme has delayed the minimum age at which an unrestricted licence can be obtained from 17.5 years to 20, mandated minimum supervised driving requirements and introduced additional driver testing at additional cost. While these changes have contributed to the decline in the number of young adults in New South Wales holding a licence, the trend predates the introduction of the scheme (Raimond and Milthorpe 2010), suggesting other factors are influencing young people's decisions about obtaining a drivers licence.

### Crowding on mass transit

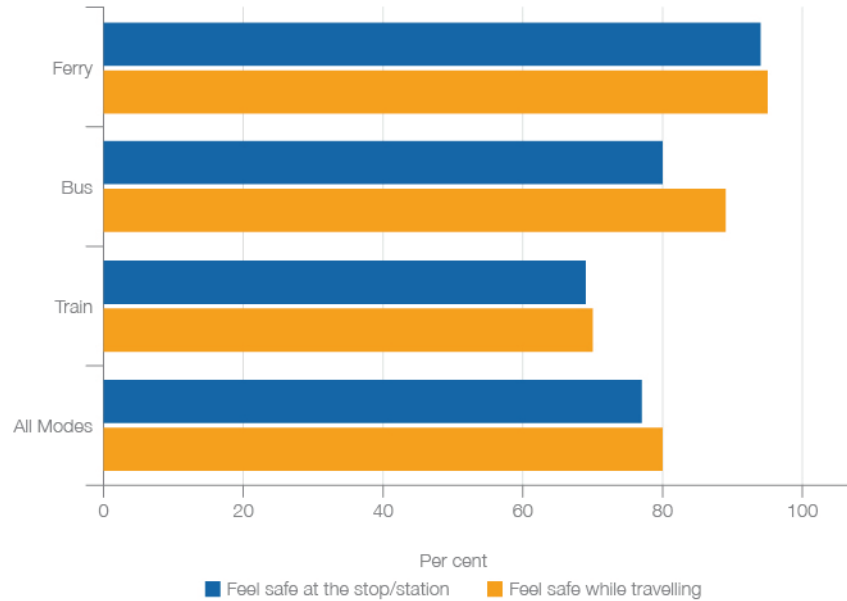
Crowding has been described as endemic on urban rail systems in Australia's major cities, particularly during morning and afternoon weekday peak periods. It is affecting the comfort of passengers and shows that some services are reaching capacity. In Australia's capital cities, around 40 per cent of urban heavy rail users stand for 60 to 100 per cent of their journey in peak periods, although this proportion does vary between cities (Institute of Transport and Logistic Studies 2013). Notably, each metropolitan railway system has its own definitions of 'crowding' (Currie 2012).

### Passenger perceptions of mass transit

There is growing literature on user and non-user perceptions of mass transit that affect decisions to use mass transit. A Monash University study found high rates of discomfort, self-reported anxiety and physiological stress amongst mass transit users (Currie 2012). It also demonstrated that 'transfers' between modes of transport are perceived as a major deterrent to mass transit travel.

Among users of the CityRail, bus and ferry networks in Sydney, feelings of safety are generally highest on ferries and lowest on trains (Figure 3-8). Passengers feel marginally safer while travelling on services than waiting on platforms or jetties (BTS 2011).

Figure 3-8      Feelings of safety on Sydney mass transit by mode, 2011



Source: NSW BTS 2011

Sitting beside a stranger on a bus or train is ranked alongside crowded elevators as worst in terms of social discomfort (Thomas 2009). The fact that mass transit is referred to as an ‘alternative’ mode of transport reinforces the concept that it is ‘alternative’ behaviour, as opposed to the private car. The car represents convenience whereas alternative modes are more commonly linked with less important predictors of use, such as environmental factors (Thomas 2009).

Fear of crime is recognised internationally as a barrier to mass transit use and crime on mass transit often receives political commentary and media coverage. Research by Currie et al. (2010) with young people in Melbourne found that their feeling unsafe was highest at night using mass transit (43 per cent), followed by waiting at train stops (32 per cent). Very few young people surveyed had ever experienced a direct attack (four per cent of the sample), but one-quarter had been directly threatened at some point, while 30 per cent had seen someone attacked and 60 per cent had seen someone threatened. Moreover, 73 per cent had *felt* threatened at some point (Currie et al. 2010).

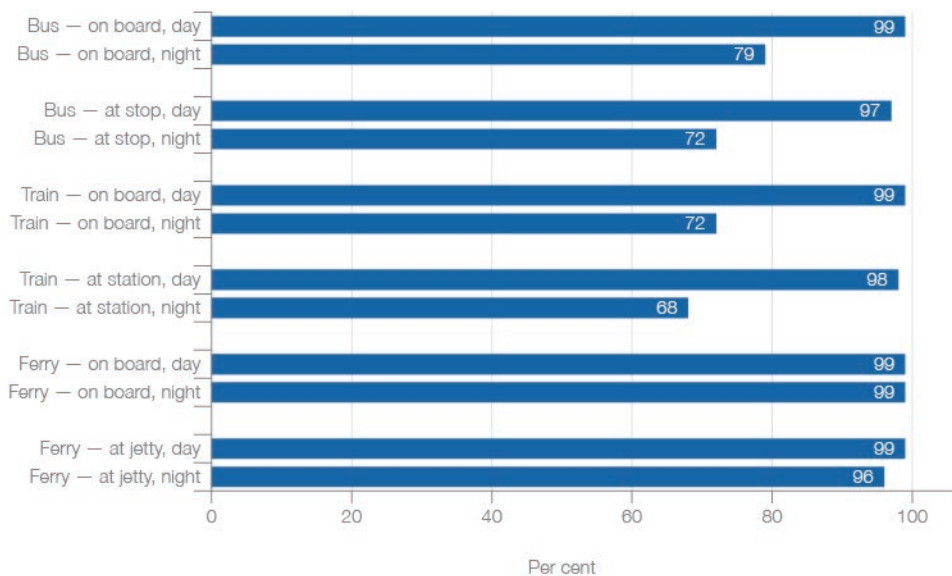
Currie et al. (2010) suggest that feelings of anxiety and discomfort associated with travelling in a relatively confined space with strangers is the most influential factor driving negative feelings of personal safety on mass transit. The frequency with which mass transit was used had no link to safety perceptions and country of birth had no influence. Actual experience of attacks or threats had some influence, but the most commonly cited source of information about safety incidents was media reports.



Negative journey to work responses about urban mass transit include indirect services, having to transfer between modes, travel time, and the timetable or services not being available at the origin or destination. It is difficult to know whether the reasons people choose instead to drive are based simply on negative perceptions and/or lack of knowledge of mass transit or whether it is based on the facts about different travel modes. Journey to work data shows that many commuting trips made by private cars are from locations that are well serviced by mass transit services (Hay and Shaz 2012).

In Perth, ferries receive the highest passenger satisfaction ratings for feelings of safety (Figure 3-9). As in Sydney, passengers felt safer on services than at stations or interchanges, where fear of crime is greatly increased at night. Train passengers felt less safe than bus passengers at night, particularly at stations or interchanges (32 per cent). Train passengers felt marginally safer during the day (WA Public Transport Authority 2012).

**Figure 3-9** Feelings of safety on Perth mass transit, by mode and time of day, 2012

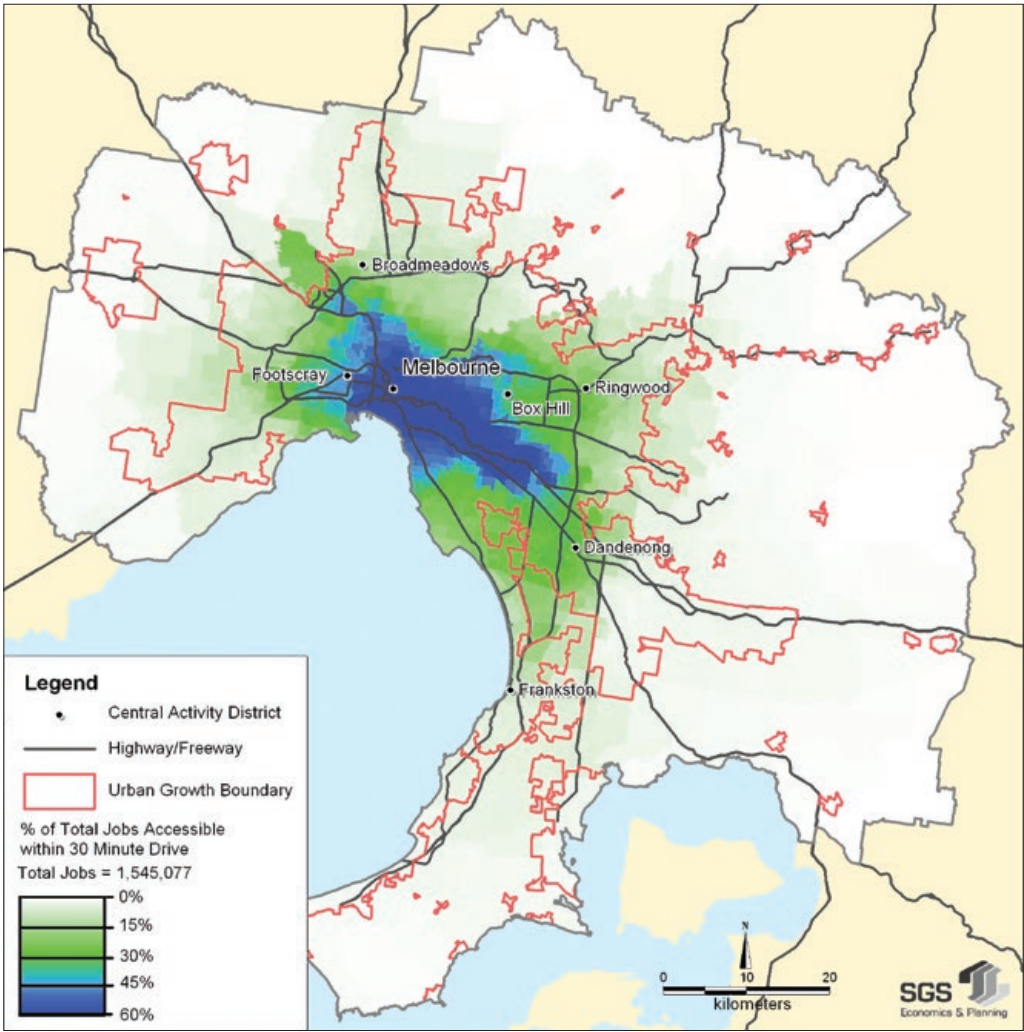


Source: Western Australian Public Transit Authority 2012

Accessibility

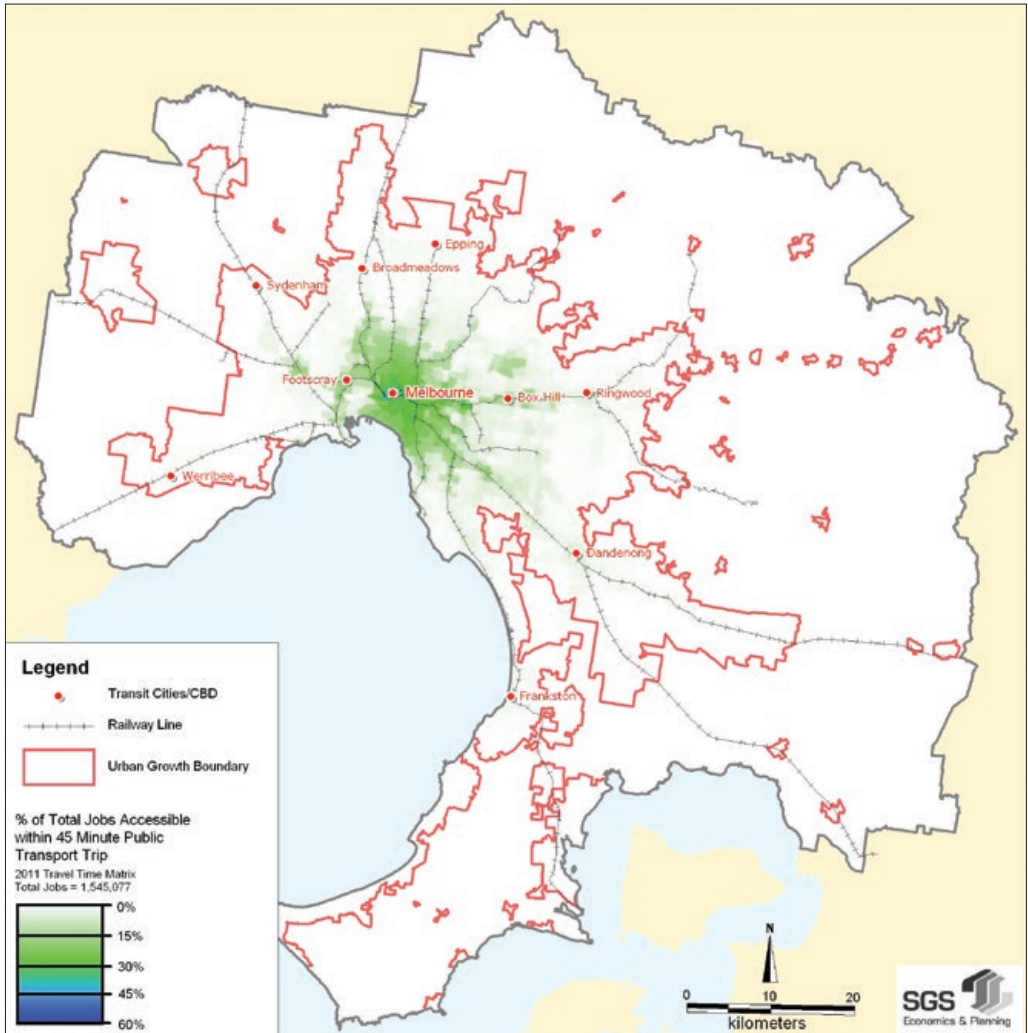
More jobs are easily accessible by private vehicles in Australia’s major cities than by mass transit. Map 3-4 shows the proportion of jobs accessible within a 30-minute drive in Melbourne in 2011 and Map 3-5 shows the proportion of jobs accessible within a 45-minute mass transit trip. Only Melbourne’s CBD and inner suburban areas can be reached within a 45-minute mass transit trip. The areas with the greatest mass transit accessibility in Melbourne tend to be those areas with higher average incomes, higher house prices, a greater proportion of residents with tertiary qualifications and higher EJD, as illustrated in Map 3-2.

Map 3-4            Accessibility of jobs within a 30-minute drive in Melbourne, 2011



Source: SGS Economics and Planning 2013

Map 3-5 Accessibility of jobs within a 45-minute mass transit trip in Melbourne, 2011



Source: SGS Economics and Planning 2013

## Congestion

Congestion is a growing issue in Australia's largest cities and is predicted to cost Australians \$20.4 billion per year by 2020 (BITRE 2007, Garnaut 2012). A 2013 study of six major cities showed that traffic congestion has been increasing in Perth, Melbourne and Sydney and has decreased in Brisbane and Canberra (Tom Tom International 2013) – see Table 3-9. A concurrent wider study of 123 world cities (including cities in Australia, New Zealand, Europe, Russia, North America and South Africa) rated Sydney as the seventh most congested city (Levy 2013). Averaged over the whole day, road congestion results in a time penalty over free-flowing roads of between 18 per cent (in Canberra) and 33 per cent (in Sydney). During peak periods congestion rises significantly, more than doubling in Sydney (Tom Tom International 2013).

Table 3-9 Congestion in selected capital cities, 2013

City	Congestion	Morning peak	Evening peak	Delay per hour driven peak period	Congestion change 2011 to 2012
Sydney	33%	70%	67%	40 mins	Increase of 1%
Perth	30%	55%	55%	33 mins	Increase of 4%
Melbourne	28%	56%	54%	33 mins	Increase of 1%
Adelaide	28%	50%	45%	28 mins	Decrease of -1%
Brisbane	25%	45%	50%	28 mins	Decrease of -1%
Canberra	18%	41%	34%	22 mins	Decrease of -1%

Note: Percentages refer to the Increase in overall travel times when compared to a free-flow situation. For example, a congestion level of 12 per cent corresponds to 12 per cent longer travel times compared to a free-flow situation. Delay in minutes per hour driven during morning and evening peak times is as compared to free-flow situations. For example, 22 minutes delay per hour at peak times indicates that a one-hour journey driven at free-flow times will take an additional 22 minutes at peak times.

Source: Derived from Tom Tom International 2013

Although travel during peak periods might be considered inevitable by some, research conducted by the Institute of Transport and Logistic Studies (2013) has indicated that at least one in four drivers in Sydney and one in three drivers in most other major cities during peak periods do not need to make their trip at that time. The study also looked at the impacts of pricing major roads, finding that peak hour road pricing could encourage approximately 13 per cent of commuters to switch to mass transit modes and a further 22 per cent of commuters would change their travel time to drive during off-peak periods (Institute of Transport and Logistic Studies 2013). Proposals to use time and distance based pricing to ease congestion were considered by a review of mechanisms to fund and maintain transport infrastructure conducted by Australian governments (Infrastructure Finance Working Group 2012).

## Density

Density refers to the intensity of land use. Higher densities are thought to make mass transit services more viable. The more residences and destinations there are within mass transit catchments, the more people there are that might use mass transit.

Professor Mees (2009a, 2009b) recently argued that, while density does have an impact on mass transit usage, this can be outweighed by other factors unless the differences in density are large. He suggests that making cities more compact and lifting their densities is unlikely to produce substantial shifts away from the LPV. His research found that the relative attractiveness of competing urban transport modes influences mode choice much more than differences in density. Mees argues that this is important because improving the relative attractiveness of a mode is easier and more cost-effective than changing the urban densities of large cities, which could be slow and controversial. Nonetheless, Australian cities are some of the least dense in the world and increasing densities would be likely to encourage a mode shift towards mass transit use.

### Car parking cost and availability

Parking availability and cost greatly influence mode choice. Results of annual household travel surveys have consistently shown that parking availability and cost is the main reason for the decision to travel to work by mass transit (Hay and Shaz 2012 using BTS 2012b, TDC various years).

CBD car parking is becoming scarcer per capita in Australia's major cities and it is getting more expensive. By monthly parking rate, Sydney, Melbourne and Brisbane have been ranked the ninth, 11th and 14th most expensive CBDs to park in (in the world). By daily parking rate, Melbourne has been ranked the third most expensive and Sydney the fourth most expensive (Colliers International 2012a). Extending parking restrictions to streets in an around CBDs is not believed to reduce traffic volumes, because they create more capacity for through traffic (Willett 2006).



*Brisbane.*

Image courtesy of Brisbane Marketing



# Industry structure

## The national context

Industry structure is the only measure for which data is available at major city level in Australia, so it is explored in more detail in this section. So that comparisons can be easily made across the major cities, the industry sectors have been grouped into five categories: producer services, trade, other services, transaction services and cultural services. The makeup of these groupings is detailed in Table 3-10.

Table 3-10      Industry sector descriptions and groupings

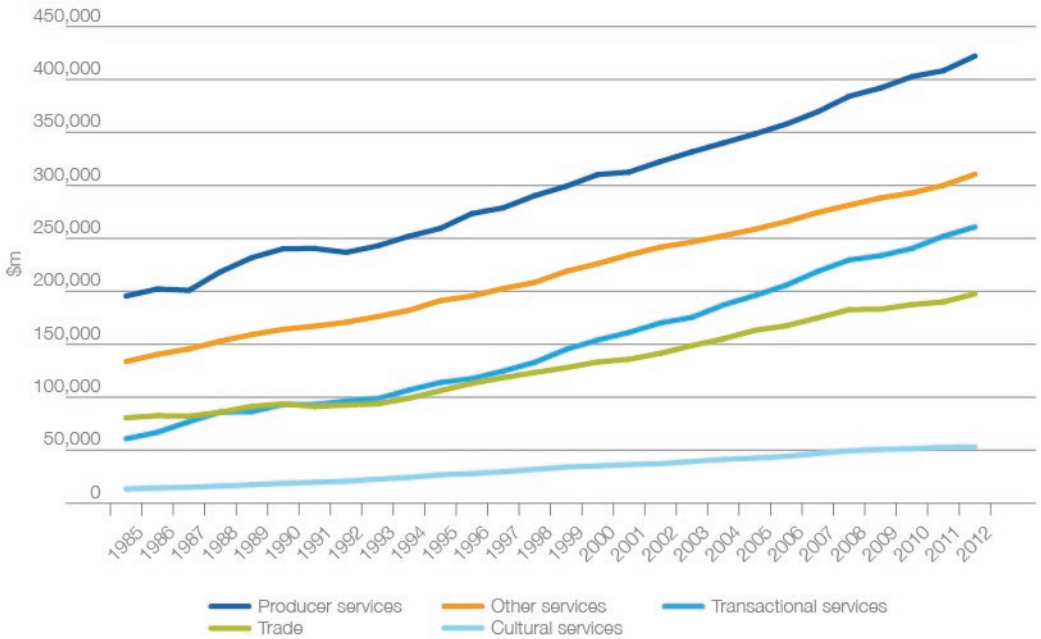
<b>Producer services</b> Manufacturing Construction Agriculture, forestry and fishing Mining Electricity, gas, water and waste services (Electricity, gas and water supply in 2001)
<b>Trade</b> Retail trade Wholesale trade Transport, postal and warehousing (Transport and storage in 2001)
<b>Other services</b> Health care and social assistance (Health and community services in 2001) Education and training (Education in 2001) Public administration and safety (Government administration and defence in 2001) Accommodation and food services (Accommodation, cafes and restaurants in 2001) Administrative and support services; and other services (Personal and other services in 2001) – abbreviated in figures as administrative and other services
<b>Transaction services</b> Professional, scientific and technical services; and rental, hiring and real estate services (Property and business services in 2001) – abbreviated in figures as professional and real estate services Financial and insurance services Rental, hiring and real estate services
<b>Cultural services</b> Information media and telecommunications (Communication services in 2001) Arts and recreation services (Cultural and recreational services in 2001)

Source:    Derived from ABS 2012a and ABS 2002



Figure 3-10 illustrates the contribution to GDP of these industry groups between 1985 and 2012. Producer services was the group that made the largest contribution. The transactional services group has shown the greatest increase in value during the period and has overtaken the trade group in its contribution to GDP.

Figure 3-10 National Gross Value Added (GVA) by industry group, 1985–2012

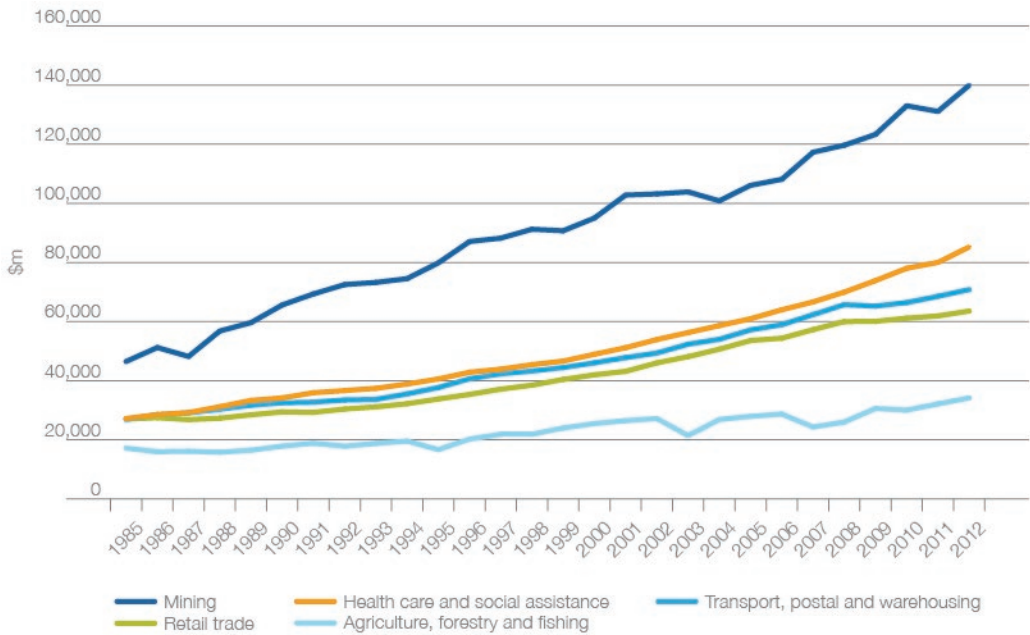


Note: See Table 3-10 for the breakdown of the industry groups by industry sector.

Source: Derived from ABS 2012a and ABS 2012b

Figure 3-11 illustrates the contribution of the highest earning industry sectors to national gross value added (GVA). Mining is by far the largest contributor and its earnings have increased significantly since 1985. The health care and social assistance sector is the second highest contributor and its contribution has been increasing in recent years.

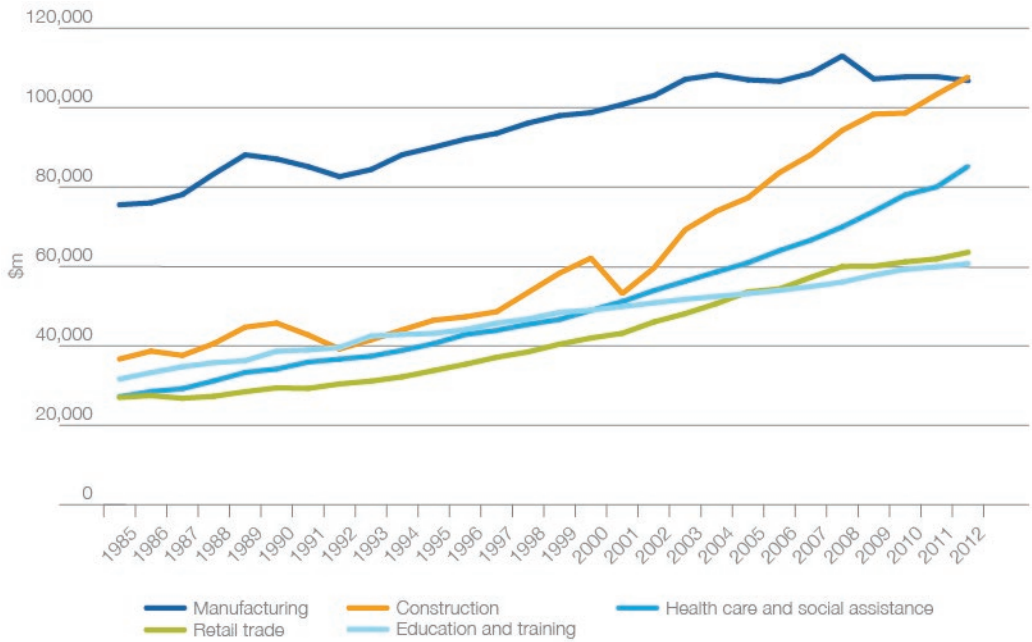
**Figure 3-11** Contribution of highest earning industry sectors to national Gross Value Added, 1985–2012



Source: Derived from ABS 2012a and ABS 2012b

Figure 3-12 shows the contribution of the highest employing industry sectors to GDP. Of these sectors, construction contributes the most to GDP. Its contribution has increased significantly since 2001 and it has recently overtaken the contribution of manufacturing.

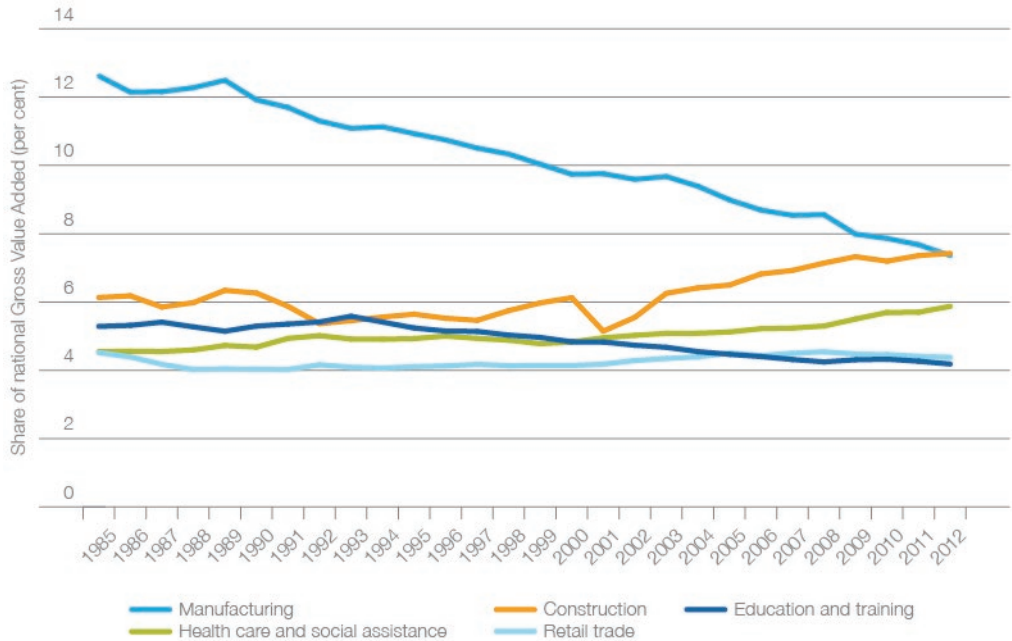
**Figure 3-12** Contribution of highest employing industry sectors to national Gross Value Added, 1985–2012



Source: Derived from ABS 2012a and ABS 2012b

Figure 3-13 illustrates the highest employing industry sectors' share of national GVA. The contribution of manufacturing has declined notably since 1989, while the contributions of construction and health care and social assistance have increased since 2005.

**Figure 3-13** Highest employing industry sectors' shares of national Gross Value Added, 1985–2012

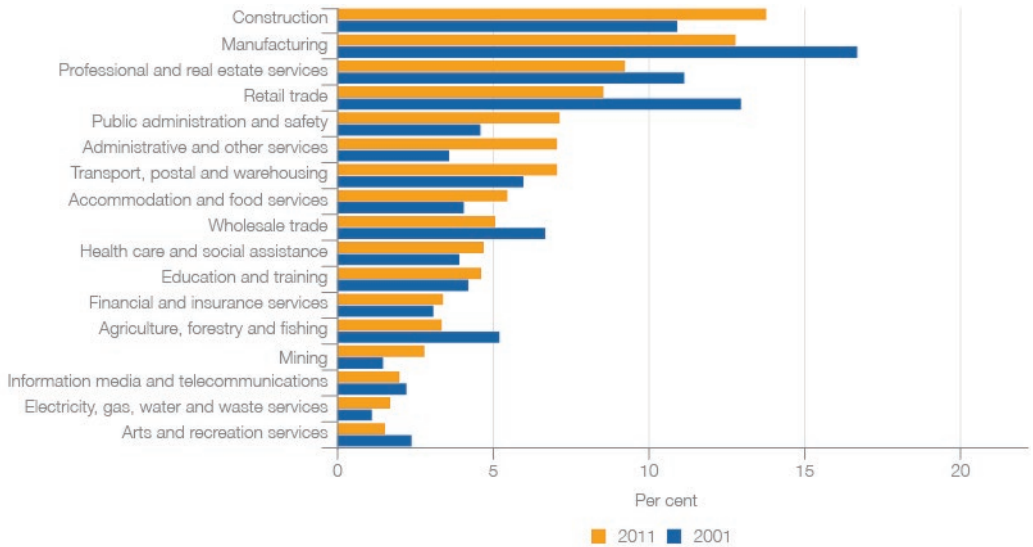


Source: Derived from ABS 2012a and ABS 2012b

### Employment by industry for males and females

This section looks at the proportion of males and females employed by industry, nationally and at major city level. Figure 3-14 and Figure 3-15 show the proportion of males and females employed by industry sector nationwide. The health care and social assistance sector employed more Australians than any other industry sector in 2011 (11.6 per cent). This sector was the largest employer of women in 2011, employing one in five working women.

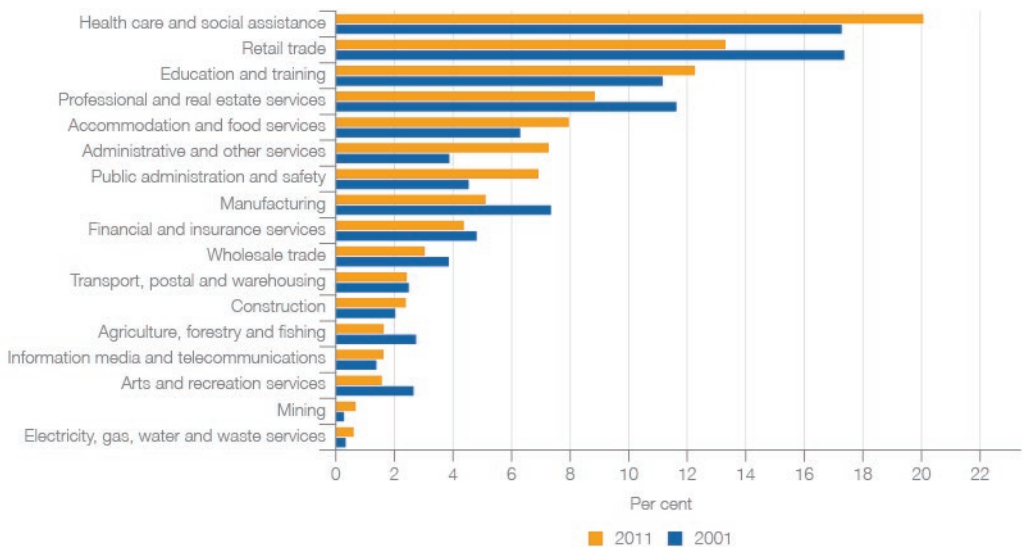
Figure 3-14 Industry sector of employment for males in Australia, 2001 and 2011



Note: Some industry sector categories have changed slightly since 2001, which may have a minor effect on the percentage of change in some industries. The changes are detailed in Table 3.1. Data where industry of employment was not stated or inadequately described have been excluded.

Source: Derived from ABS 2012a and ABS 2002

Figure 3-15 Industry sector of employment for females in Australia, 2001 and 2011

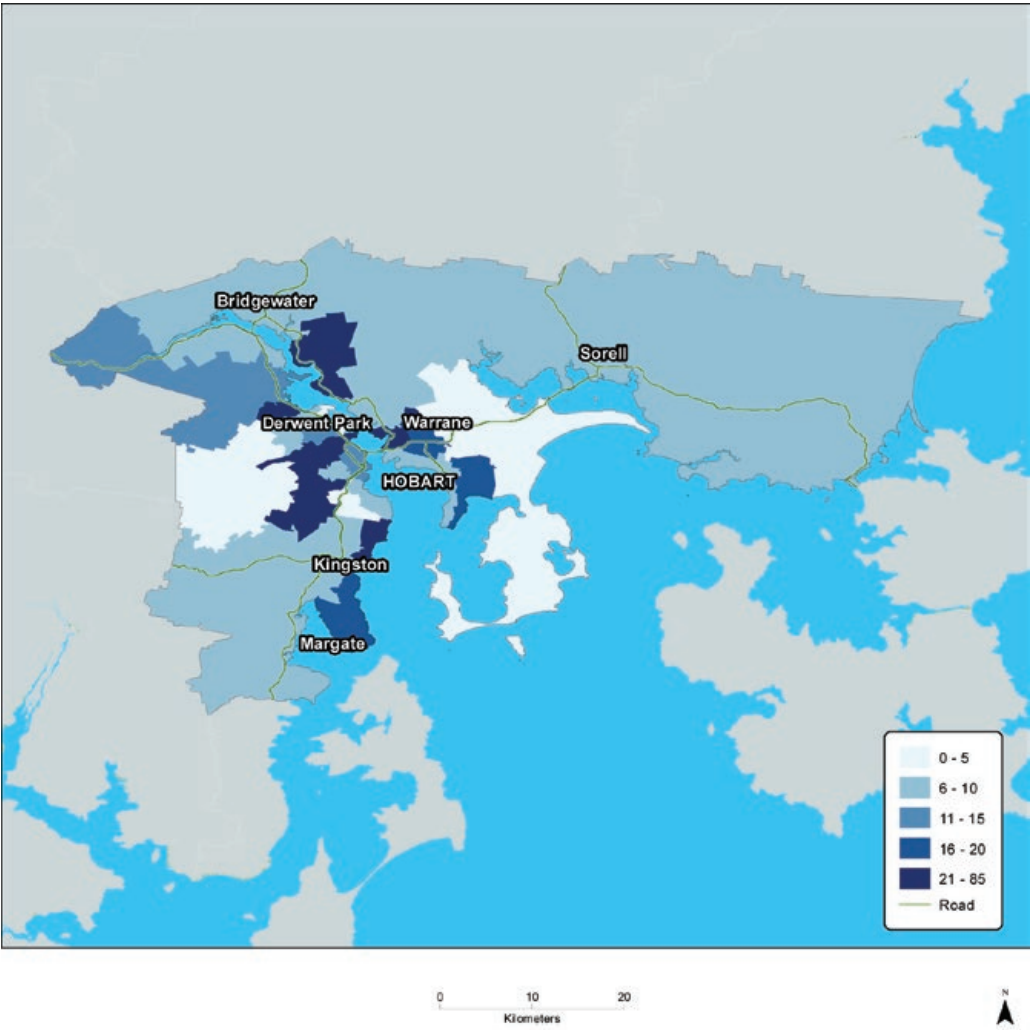


Note: Some industry sector categories have changed slightly since 2001, which may have a minor effect on the percentage of change in some industries. The changes are detailed in Table 3.1. Data where industry of employment was not stated or inadequately described have been excluded.

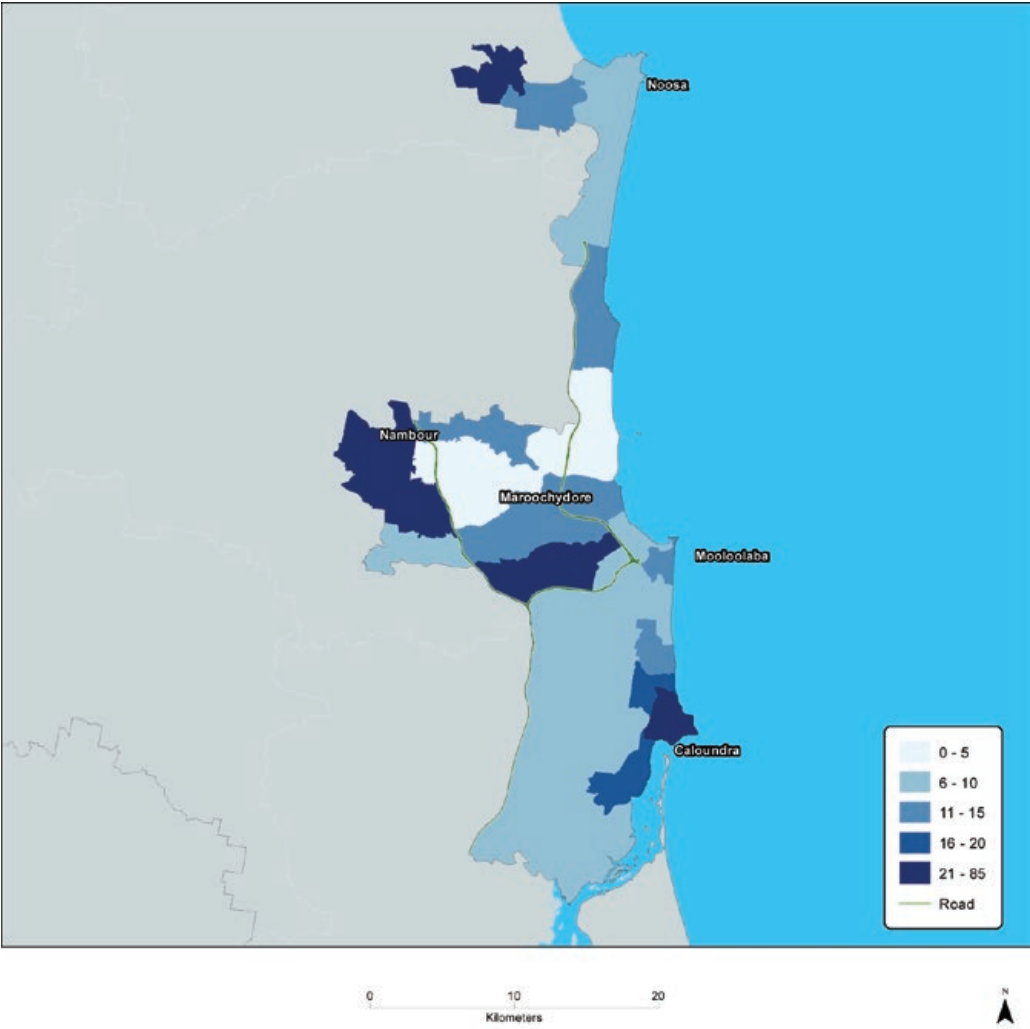
Source: Derived from ABS 2012a and ABS 2002

Areas with higher proportions of employed people working in the health care and social assistance sector tend to be clustered around secondary employment hubs, such as hospitals, rather than CBDs. This is illustrated by Map 3-6 and Map 3-7, which show the proportion of employed people working in health care and social assistance in Hobart and the Sunshine Coast by place of work.

Map 3-6 Proportion of employed persons working in the health care and social assistance sector by place of work in Hobart, 2011



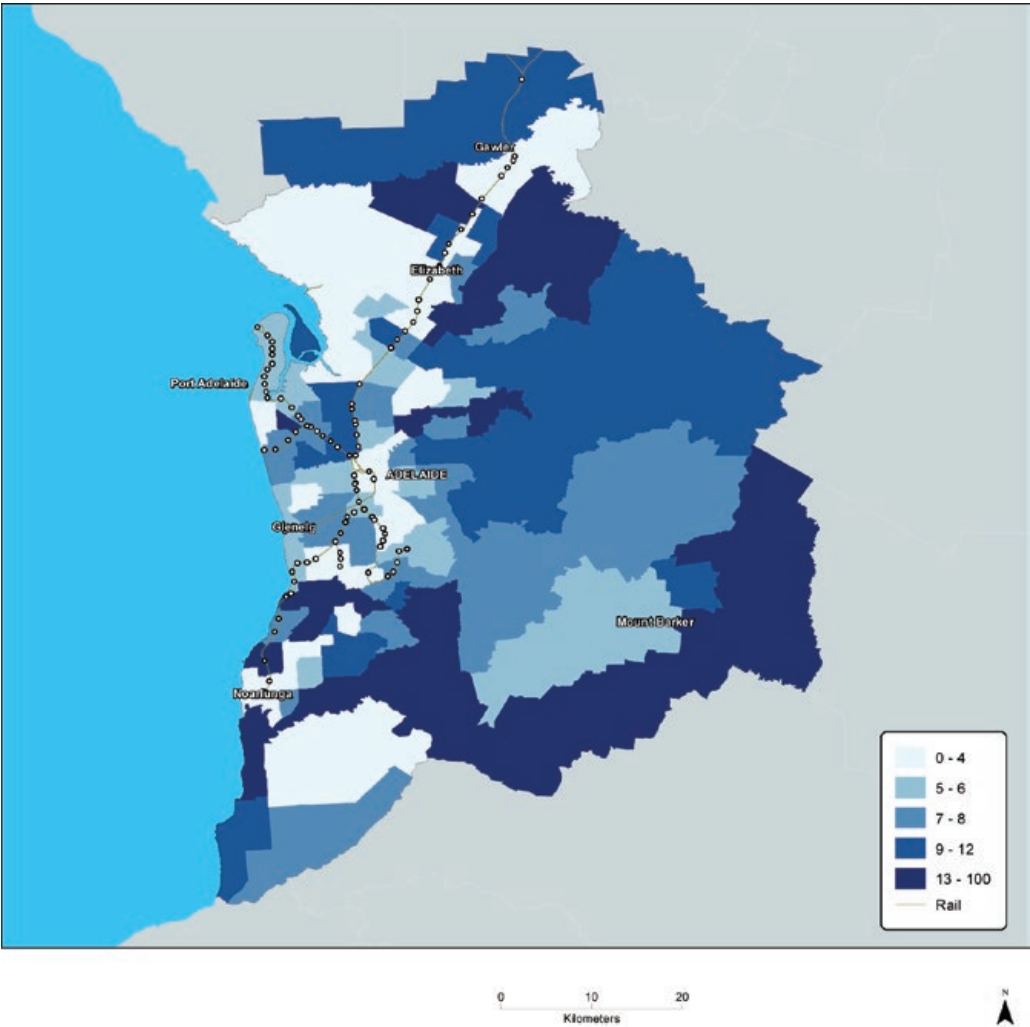
Map 3-7      Proportion of employed persons working in the health care and social assistance sector by place of work in Sunshine Coast, 2011





The construction sector was the biggest employer of Australian males in 2011, employing 13.8 per cent of working males, up from 10.9 per cent in 2001. Employment in this sector tends to be concentrated in the outer suburbs of major cities, where the most residential construction occurs. Map 3-8 and Map 3-9 illustrate this phenomenon in Adelaide and Wollongong. Map 3-8 shows that in Adelaide's outer suburbs a higher proportion of employed people work in the construction sector than anywhere else in the city.

Map 3-8      Proportion of employed persons working in the construction sector by place of work in Adelaide, 2011



Map 3-9 shows that in Wollongong the areas that have the highest proportion of workers employed in construction tend to be the areas with the most greenfield residential development.

Map 3-9 Proportion of employed persons working in the construction sector by place of work in Wollongong, 2011

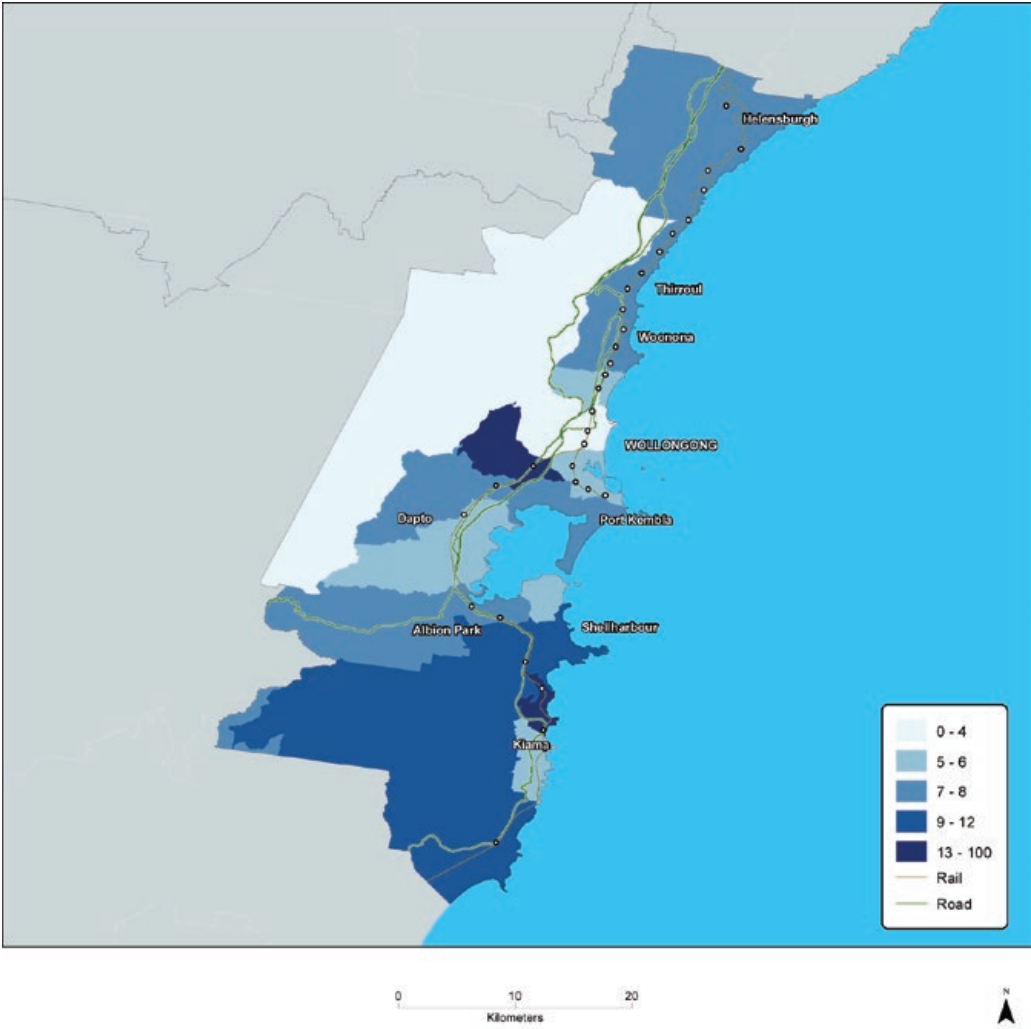


Table 3-11 shows average weekly earnings in industry sectors in November 2012. The average wage for the accommodation and food services sector in 2012 was less than half the average wage for all industries, while the average wage for mining was more than double the average of all industries.

**Table 3-11      Average weekly earnings nationally by industry sector,  
November 2012**

Industry Sector	Average weekly earnings (persons 2012)
Accommodation and food services	\$530.30
Retail trade	\$647.10
Arts and recreation services	\$745.30
Other services	\$878.10
Administrative and support services	\$890.00
Health care and social assistance	\$903.00
Education and training	\$1,045.90
Rental, hiring and real estate services	\$1,074.60
Manufacturing	\$1,157.50
Wholesale trade	\$1,299.20
Transport, postal and warehousing	\$1,317.50
Public administration and safety	\$1,333.10
Construction	\$1,377.90
Professional, scientific and technical services	\$1,392.70
Financial and insurance services	\$1,423.90
Information media and telecommunications	\$1,434.90
Electricity, gas, water and waste services	\$1,665.10
Mining	\$2,381.20
Average of all industries	\$1,081.30

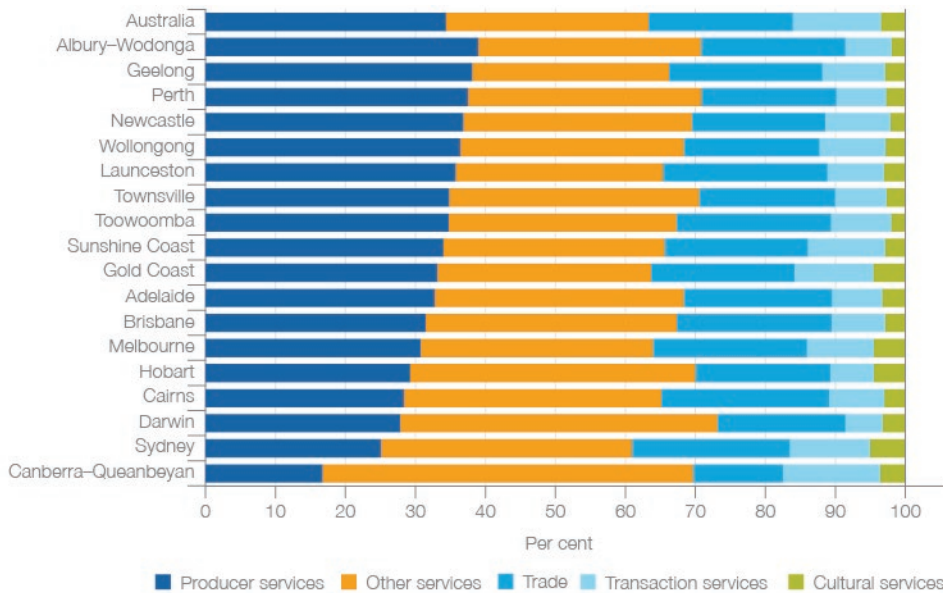
Source: Derived from ABS 2012a

Higher paying industries tend to employ more males than females. For example, the high paying mining sector employed four times as many males as females in 2011, while the lower paying health care and social assistance sector employed four times as many females as males (ABS 2012c). The persistent difference in proportion of males and females in industries of employment is likely to be contributing to the gap between the average full-time Australian male wage and the average full-time Australian female wage, which has remained at approximately 17.6 per cent over the past 30 years (ABS 2012c).

There is a significant difference in the amount that men and women are likely to earn over their lifetime. A 2009 report by AMP and the National Centre for Social and Economic Modelling found that a 25-year-old man in 2009 was likely to earn \$2.4 million over his working life, whereas his female counterpart was likely to earn \$1.5 million (Summers 2013). Again, one of the factors that may be contributing to this is the difference in proportion of males and females in various industries of employment.

Figure 3-16 and Figure 3-17 show the proportion of males and females employed by industry group categories in major cities in 2011. The producer services group was the largest employer of males Australia-wide and in most of the major cities in 2011. The next highest proportion of males nationwide was employed in the other services group. A higher proportion of males worked in this category in major cities than the nationwide average, which may reflect the fact that cities are hubs and service centres.

**Figure 3-16** Proportion of males employed by industry group, 2011



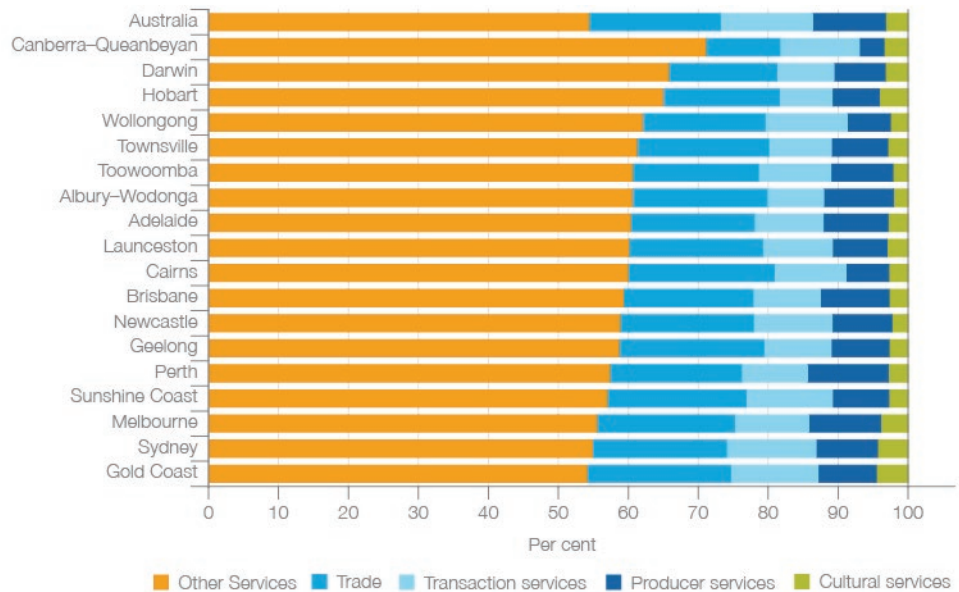
**Note:** See Table 3-10 for the breakdown of the industry groups by industry sector. Data where industry of employment was not stated or was inadequately described have been excluded.

**Source:** Derived from ABS 2012a

Figure 3-17 shows that the ‘other services’ group is by far the largest category of employment for females Australia-wide and in the major cities. A higher proportion of women worked in this group in the major cities than nationwide in 2011, with the exception of the Gold Coast–Tweed. Compared with men, a significantly lower proportion of women are employed in the producer services group (34.3 per cent for males versus 10.4 per cent for females nationwide).

The producer services group has perhaps the most potential for labour productivity growth which often leads to a boost in employee wages. There is more opportunity for additional capital to be used in these sectors to enhance labour productivity (Moretti 2012). As more males are employed in these sectors than females, there is potential to further exacerbate or prolong the wage gap between males and females.

Figure 3-17 Proportion of females employed by industry group, 2011



Note: See Table 3-10 for the breakdown of the industry groups by industry sector. Data where industry of employment was not stated or was inadequately described have been excluded.

Source: Derived from ABS 2012a

Between 2001 and 2011, all major cities experienced a significant increase in the proportion of males employed in the other services group, as can be seen in Figure 3-18. There was an increase in the proportion of males employed in the producer services group in 11 major cities, although this was significantly lower than the increase for the other services group. The other cities experienced a decline in the proportion employed in the producer services group. All major cities experienced a decline in the proportion of males employed in the trade, transactional services and cultural services groups.

**Figure 3-18** Change in the proportion of males employed by industry group, 2001–11

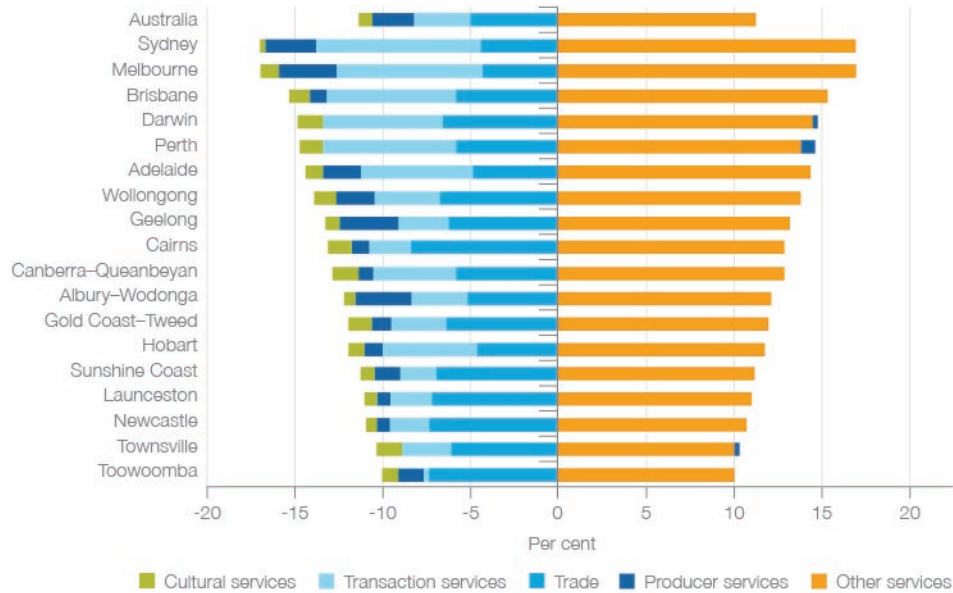


**Note:** See Table 3-10 for the breakdown of the industry groups by industry sector. Data where industry of employment was not stated or was inadequately described have been excluded.

**Source:** Derived from ABS 2012a and ABS 2002

In all major cities there was a significant increase in the proportion of females employed in the other services group, as shown in Figure 3-19. There were declines in the proportion of females employed in the trade, transaction services and cultural services categories in all major cities.

Figure 3-19      Change in the proportion of females employed by industry group, 2001–11



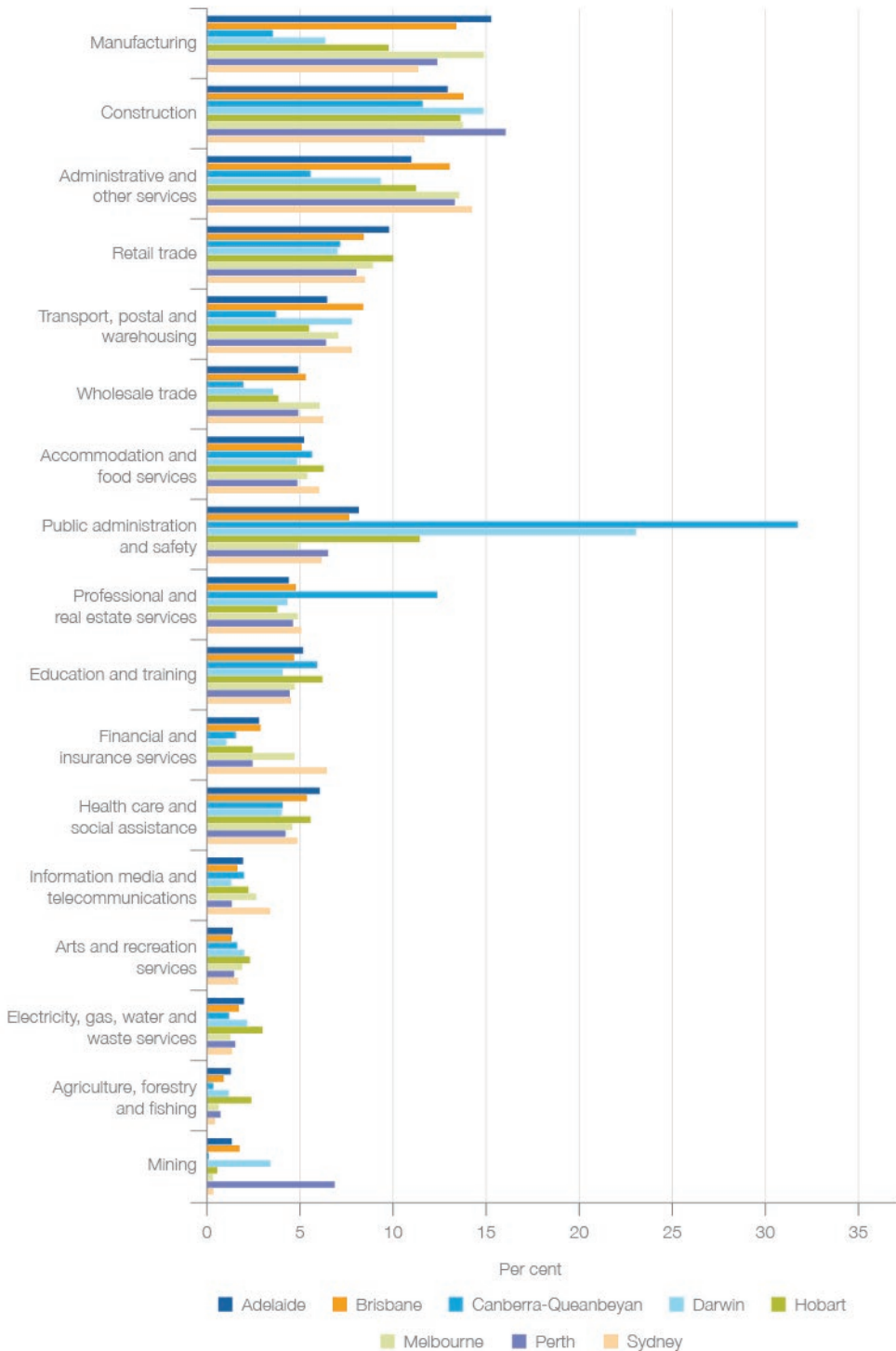
Note: See Table 3-10 for the breakdown of the industry groups by industry sector. Data where industry of employment was not stated or was inadequately described have been excluded.

Source: Derived from ABS 2012a

Figure 3-20 to Figure 3-23 illustrate the share of employment by industry structure for both males and females in 2011 in major cities. They show that industry structure in cities is highly variable, indicating that each city plays a unique role in the nation's economic system. They also show a significant difference in the top employing industries for males and the top employing industries for females.



Figure 3-20 Proportion of males employed by industry sector in capital cities, 2011

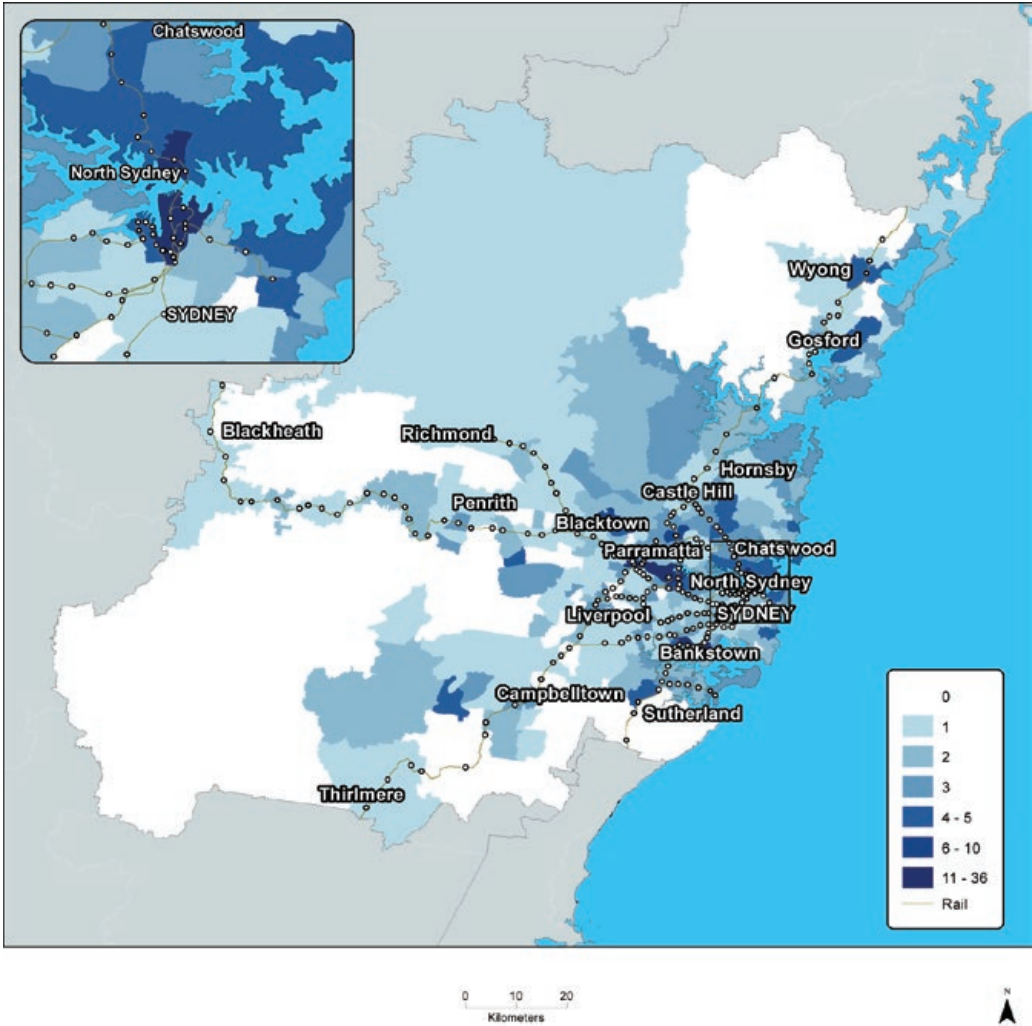


Source: Derived from ABS 2012a

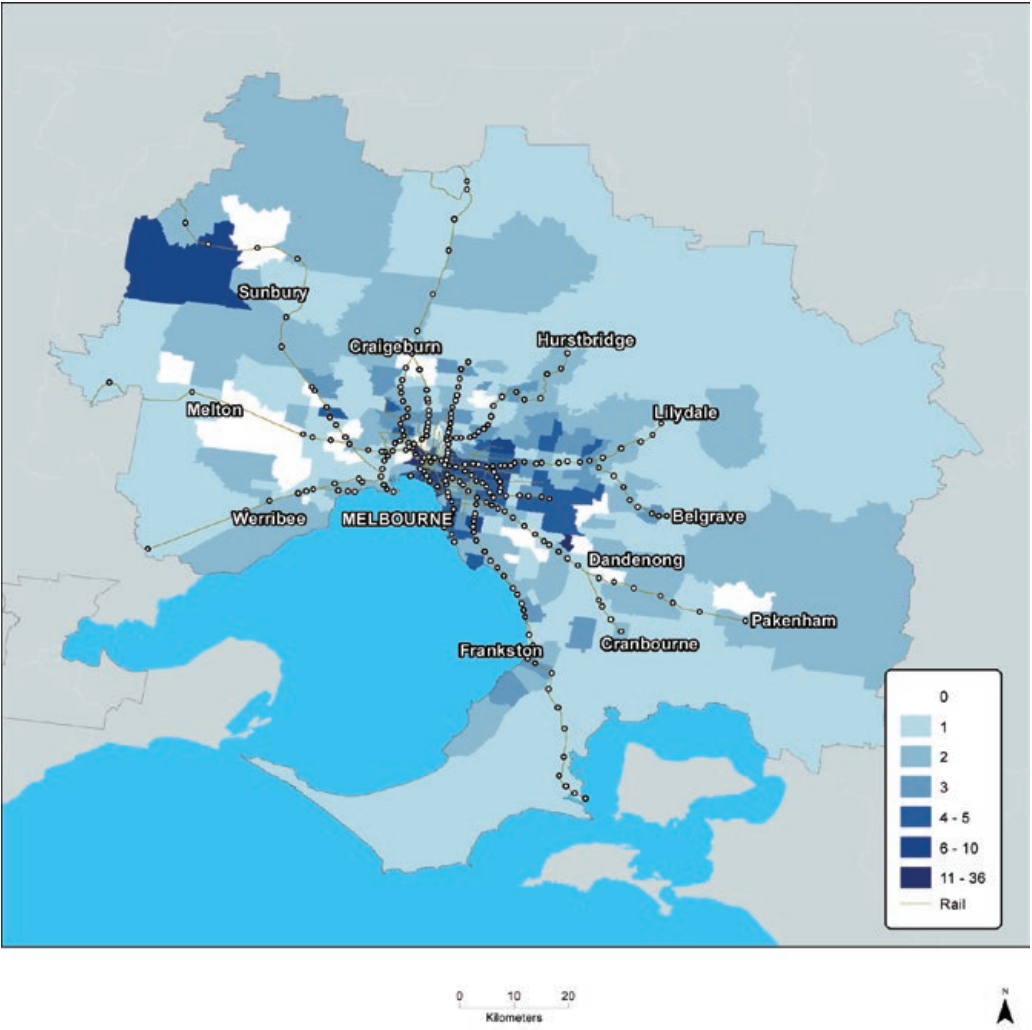
Canberra and Darwin have a unique government service focus. Both cities have also seen a significant increase in reliance on the public sector for employment between 2001 and 2011. The large capital cities have a focus on financial, insurance, professional, scientific and technical services. Sydney and Melbourne have by far the highest share of employment in the finance and insurance sectors. This is likely to be a reflection of agglomeration, the large population bases in these cities and their global focus. Sydney and Melbourne are Australia’s national business and finance centres and connect Australia with the global market (BITRE 2009).

Sydney’s and Melbourne’s employment in these sectors tend to be clustered in central locations rather than spread across the larger metropolis. Map 3-10, Map 3-11, Map 3-12 and Map 3-13 show the geography of the proportion of employed people working in the finance and insurance and in professional, scientific and technical services by place of work. They reveal that jobs in these sectors tend to be clustered in central areas.

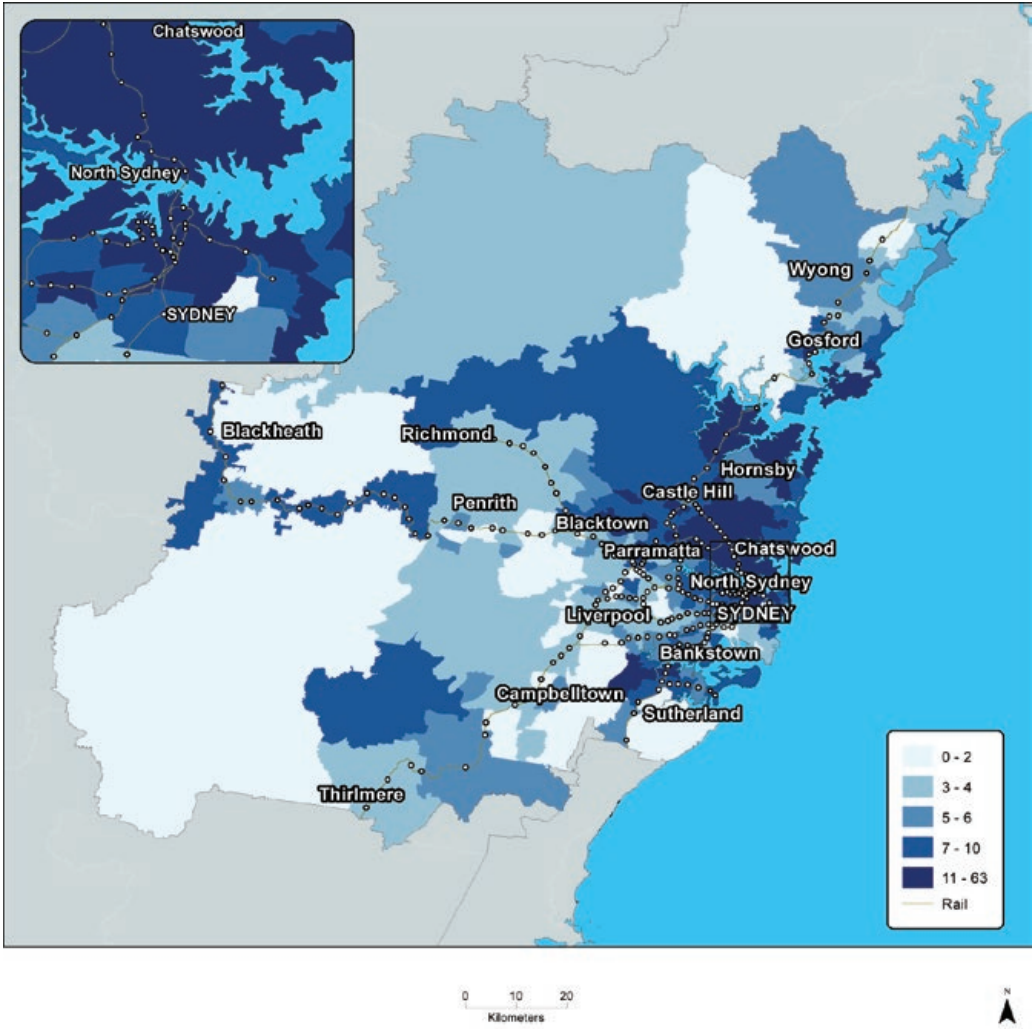
Map 3-10 Proportion of employed persons working in the financial and insurance sector by place of work in Sydney, 2011



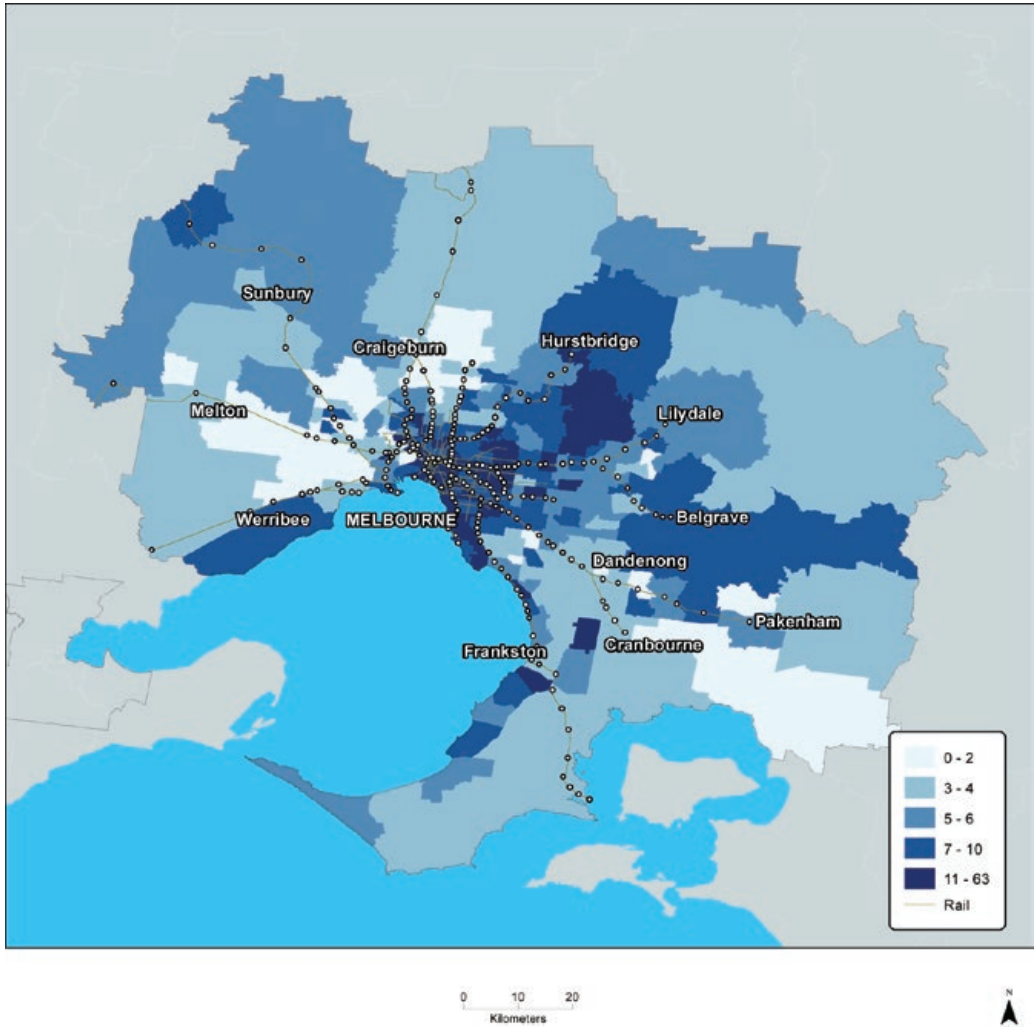
Map 3-11      Proportion of employed persons working in the financial and insurance sector by place of work in Melbourne, 2011



Map 3-12 Proportion of employed persons working in the professional, scientific and technical services sector by place of work in Sydney, 2011

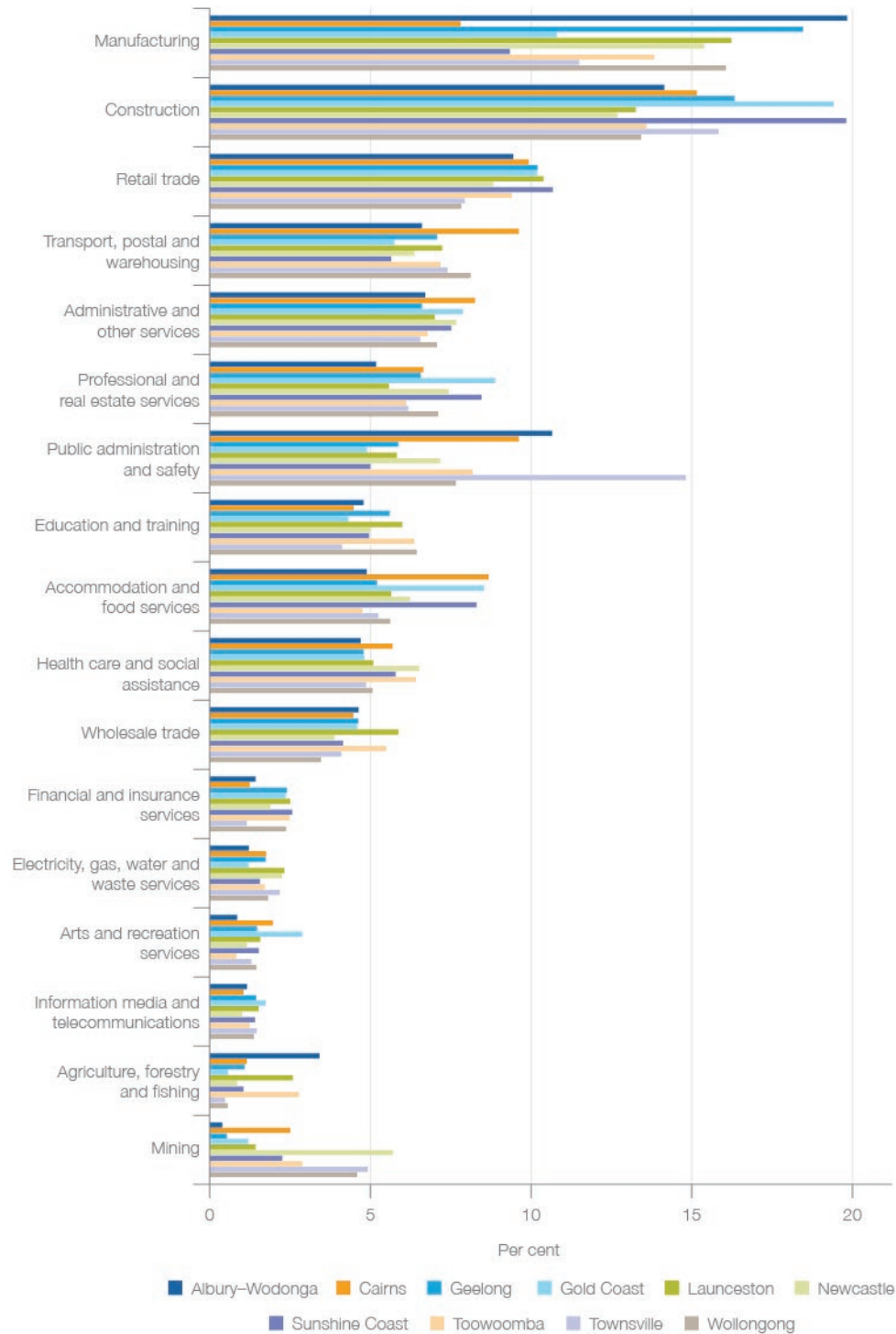


**Map 3-13** Proportion of employed persons working in the professional, scientific and technical services sector by place of work in Melbourne, 2011



Non-capital cities show more variability, reflecting their more unique and specialised industry focuses (see Figure 3-21 and Figure 3-23). Albury-Wodonga and Geelong both specialise in manufacturing, while Cairns, the Sunshine Coast and the Gold Coast have the highest proportion of workers employed in the accommodation, cafes and restaurants sector than the other major cities, a reflection of their tourism focus. While regional cities tend to have specialised industry focuses, the industry structure of male employment in the non-capital cities tends to show greater variation between cities than the structure of female employment.

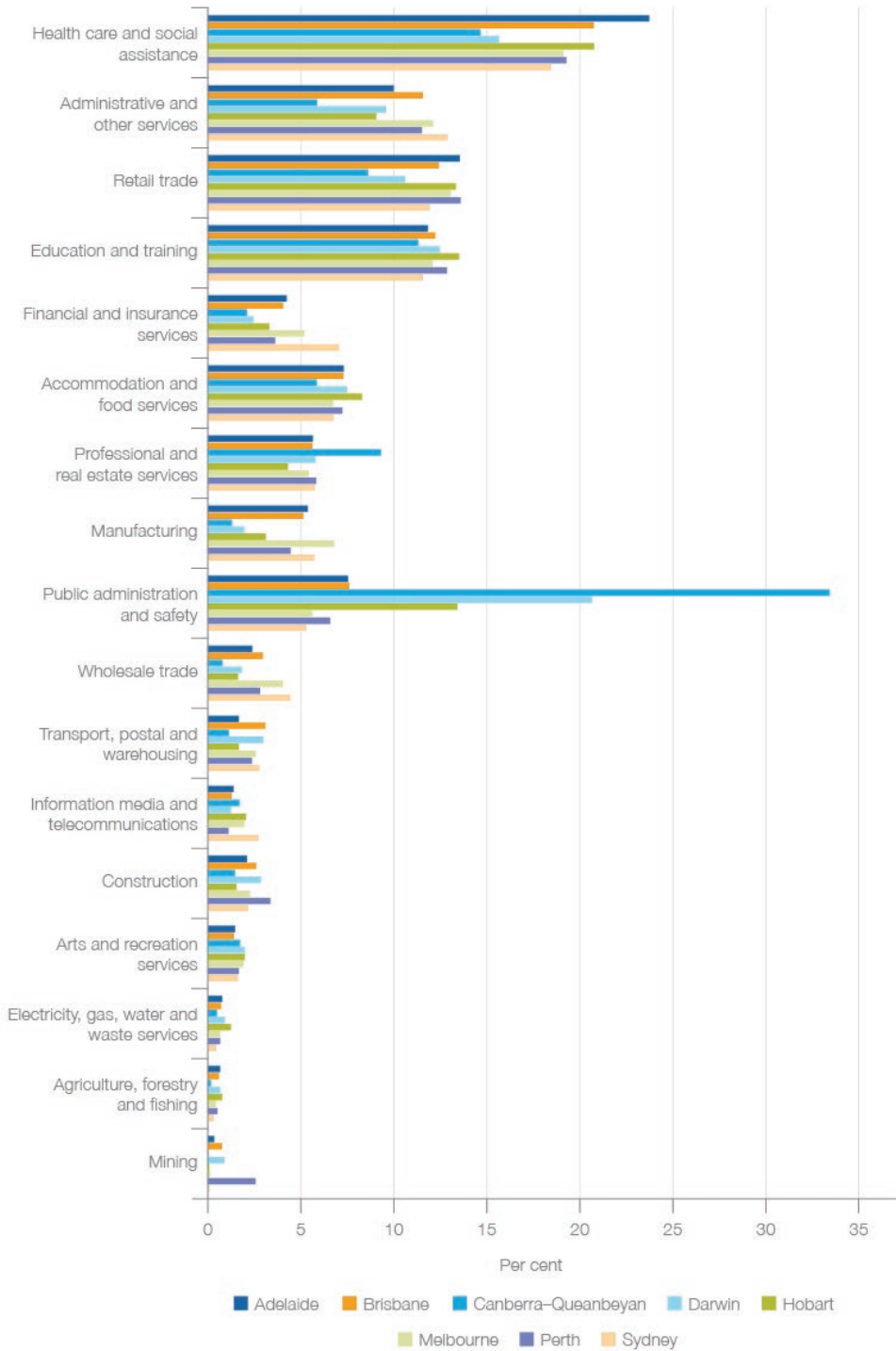
Figure 3-21 Proportion of males employed by industry sector in non-capital major cities, 2011



Source: Derived from ABS 2012a



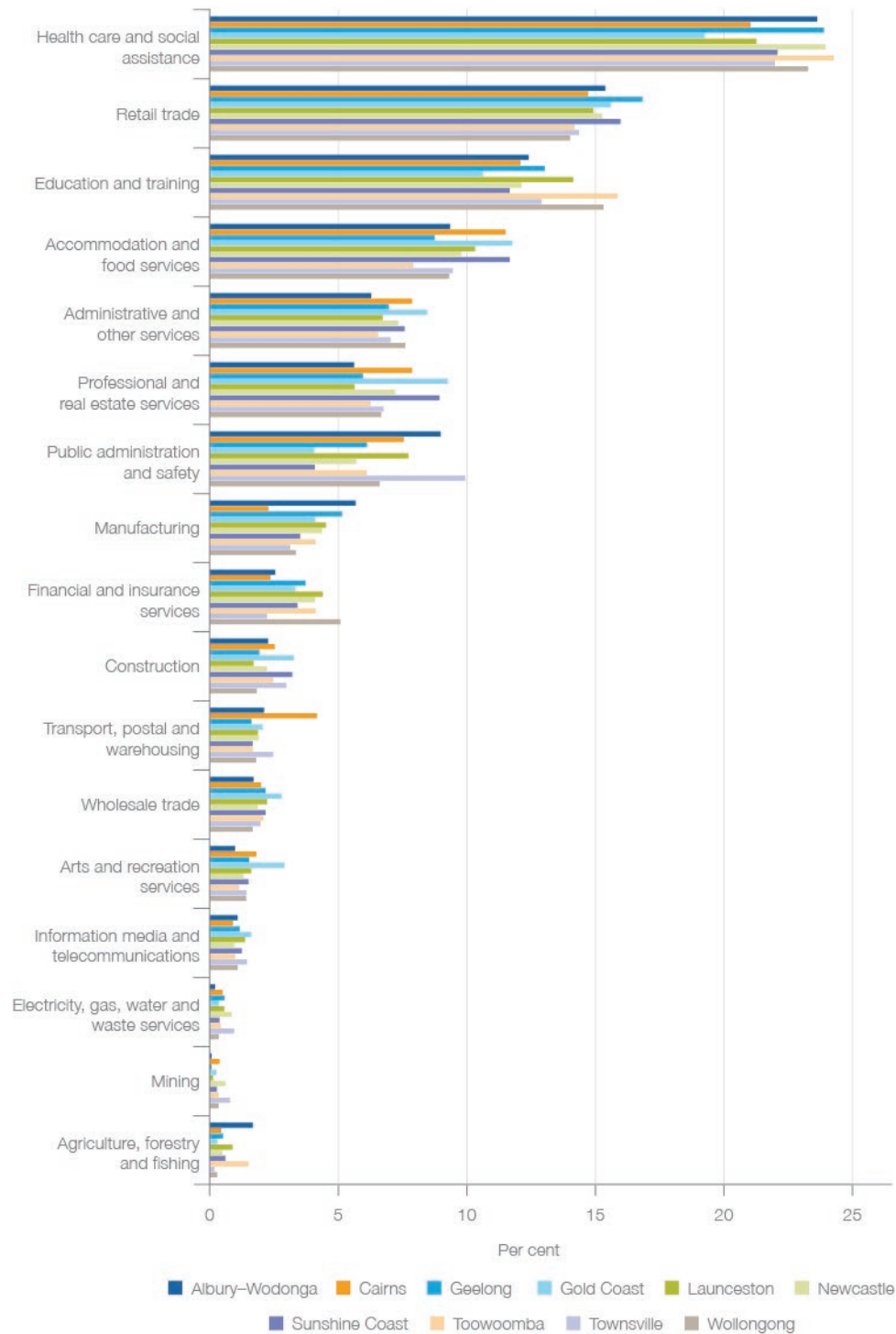
Figure 3-22 Proportion of females employed by industry sector in capital cities, 2011



Source: Derived from ABS 2012a



Figure 3-23 Proportion of females employed by industry sector in non-capital major cities, 2011



Source: Derived from ABS 2012a

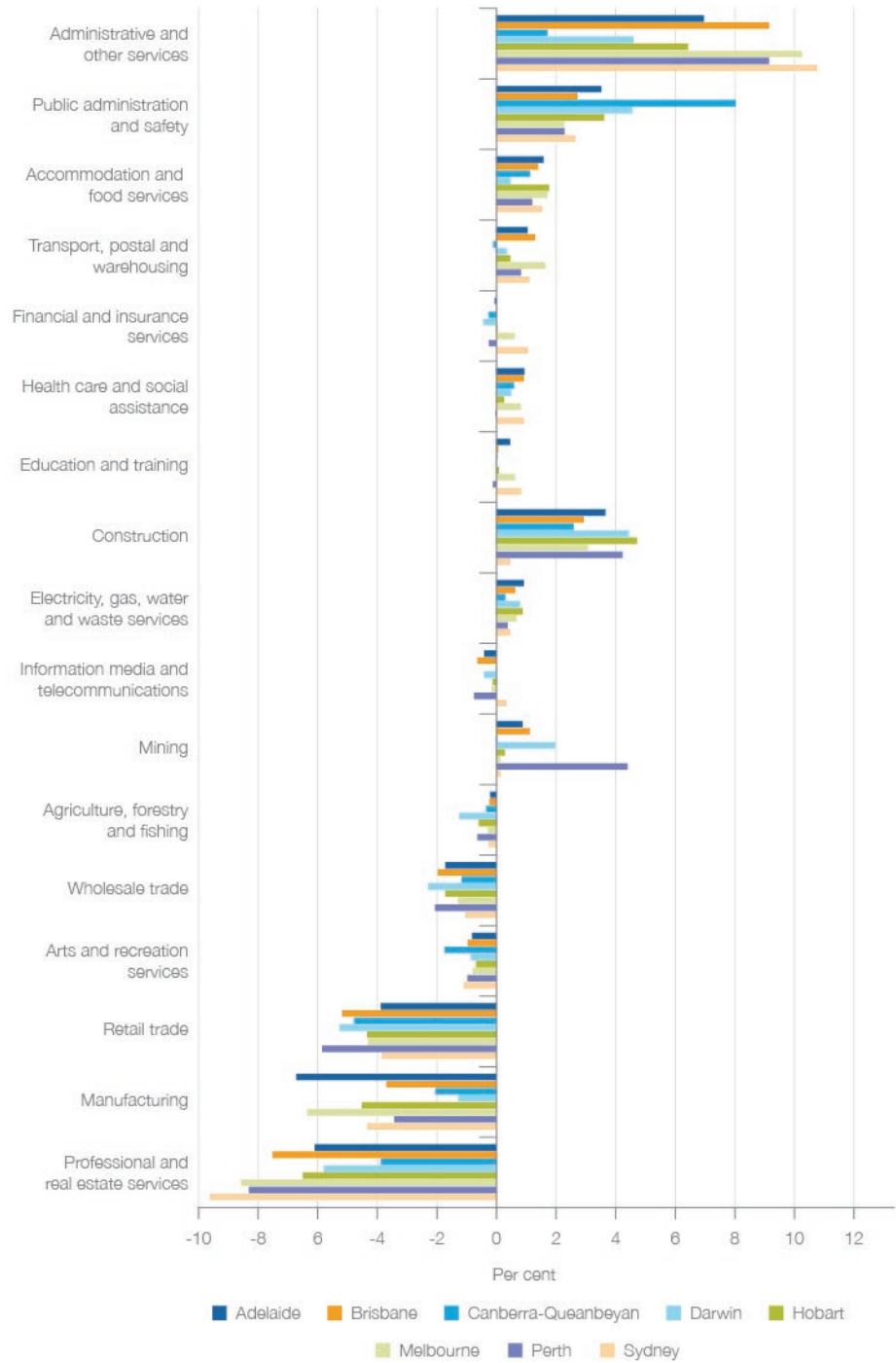
Figure 3-24 to Figure 3-27 show that employment by industry has changed noticeably in Australia's major cities between 2001 and 2011. There were notable declines in the proportion of people employed in retail trade and manufacturing in all major cities between 2001 and 2011. There were increases in the proportion of people employed in the public administration and safety sector and the accommodation and food services sector in most cities. There were significant increases in the proportion of males employed in construction in all major cities and most females were employed in health care and social assistance. All non-capital cities experienced increases in the proportion of males employed in mining.



*Ship berthed at Kwinana.*

Image courtesy of Ceri Breheny

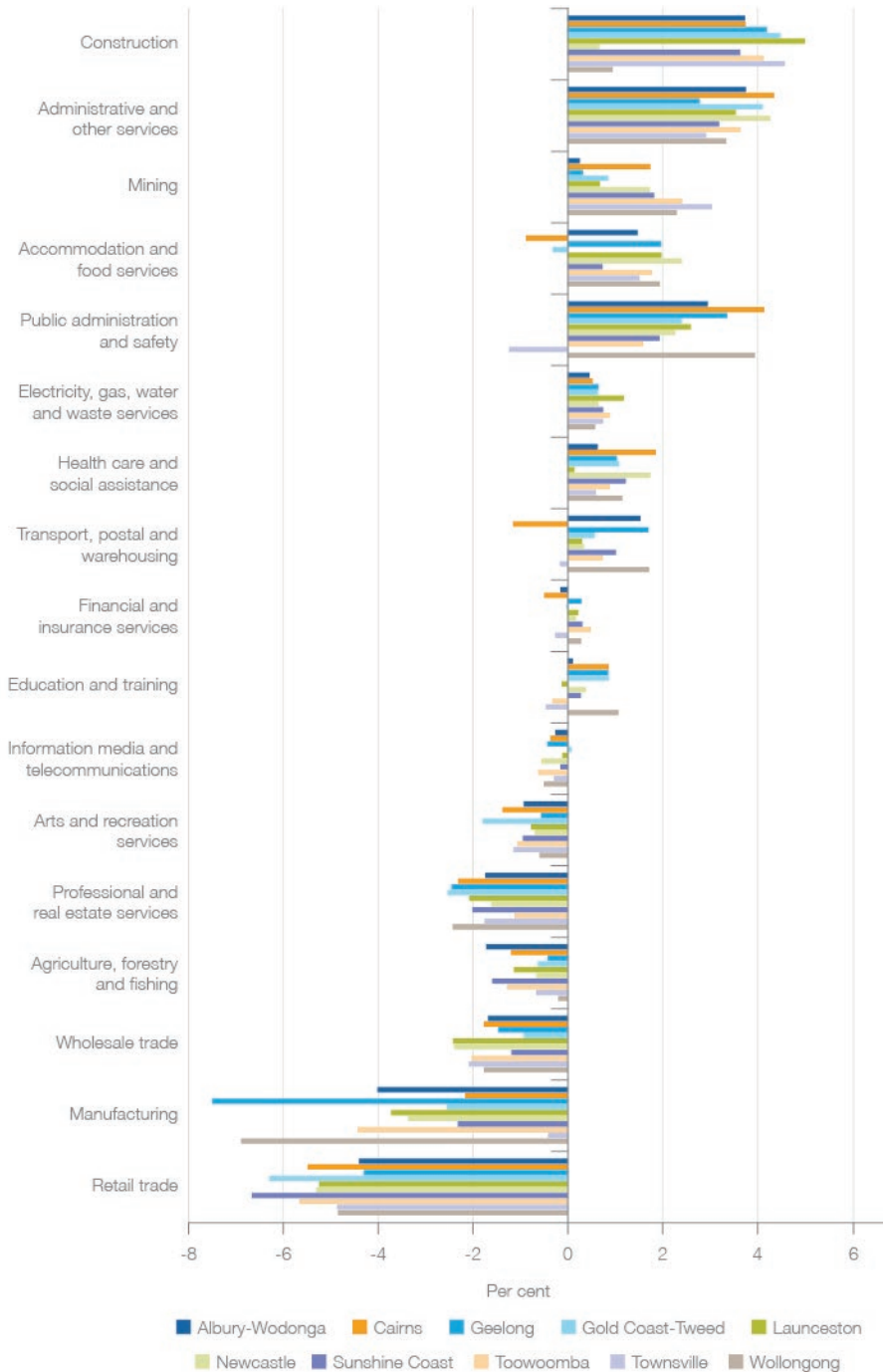
Figure 3-24      Change in the proportion of males employed by industry sector in capital cities, 2001–11



Note: Some industry sector categories have changed slightly since 2001, which may have a minor effect on the percentage of change in some industries, particularly professional and real estate services and administrative and other services.

Source: Derived from ABS 2012a

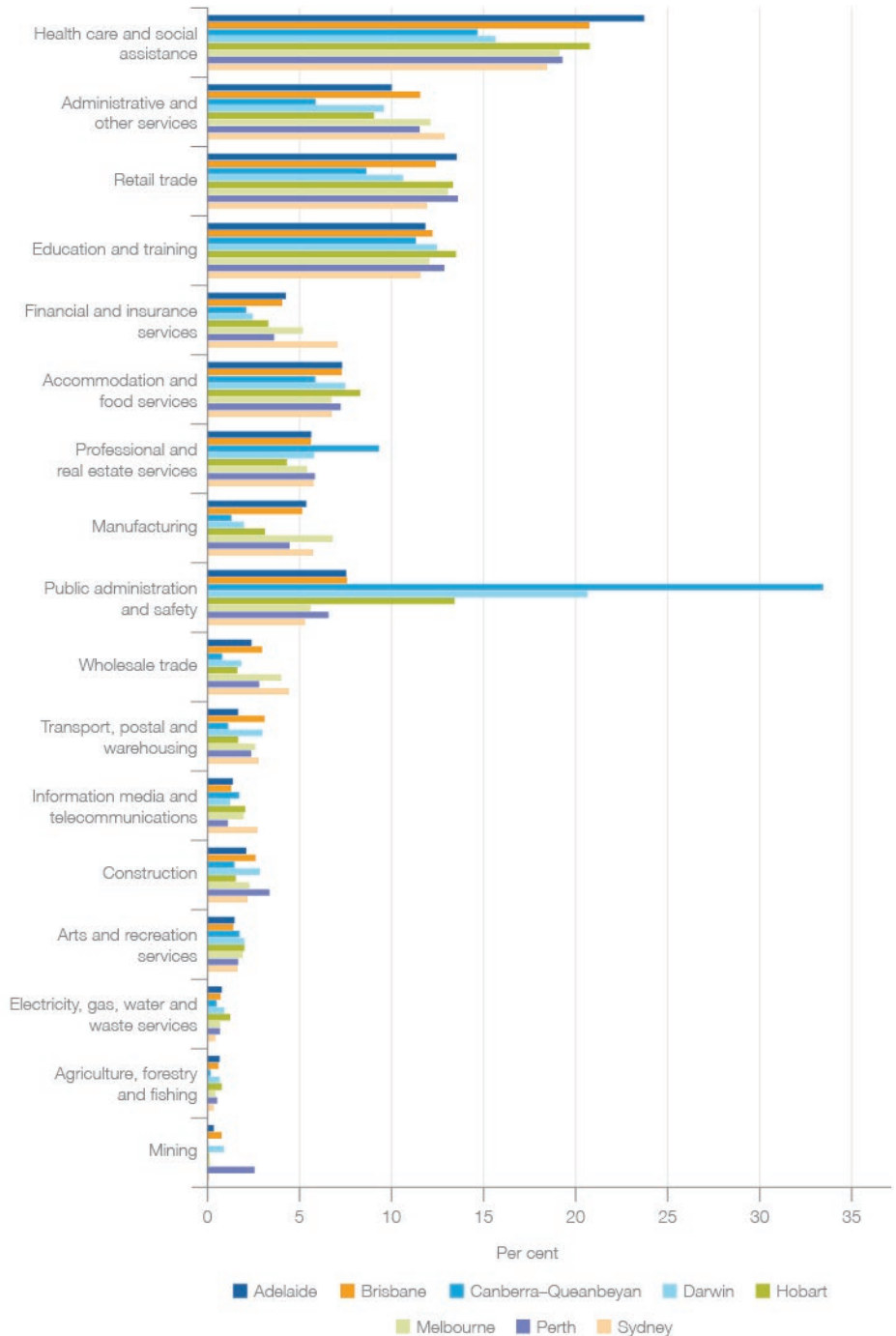
**Figure 3-25** Change in the proportion of males employed by industry sector in non-capital major cities, 2001–11



**Note:** Some industry sector categories have changed slightly since 2001, which may have a minor effect on the percentage of change in some industries, particularly professional and real estate services and administrative and other services.

**Source:** Derived from ABS 2012a

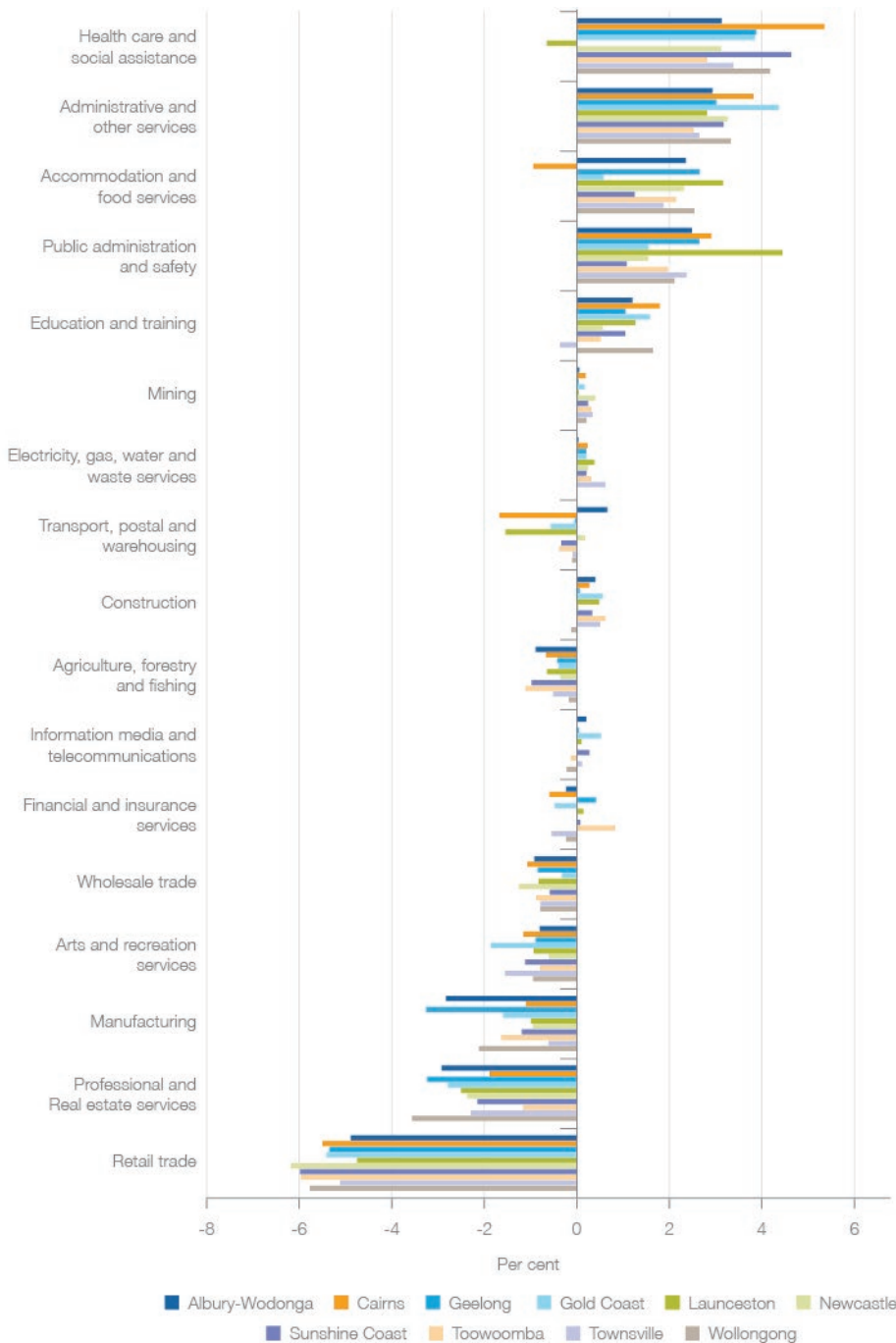
Figure 3-26 Change in the proportion of females employed by industry sector in capital cities, 2001–11



Note: Some industry sector categories have changed slightly since 2001, which may have a minor effect on the percentage of change in some industries, particularly professional and real estate services and administrative and other services.

Source: Derived from ABS 2012a

**Figure 3-27** Change in the proportion of females employed by industry sector in non-capital major cities, 2001–11



Note: Some industry sector categories have changed slightly since 2001, which may have a minor effect on the percentage of change in some industries, particularly professional and real estate services and administrative and other services.

Source: Derived from ABS 2012a

## Manufacturing

Manufacturing is one of Australia's most productive and largest employing sectors (Australian Business Chamber 2011). In 2011–12, manufacturing was the third largest contributing sector to Gross value added (GVA) in Australia, contributing 10.1 per cent to total GVA or \$102.1 billion (ABS 2013a). Manufacturing has a multiplier effect on the economy and drives jobs, investment and sales in other sectors (Prime Minister's Manufacturing Taskforce 2012).

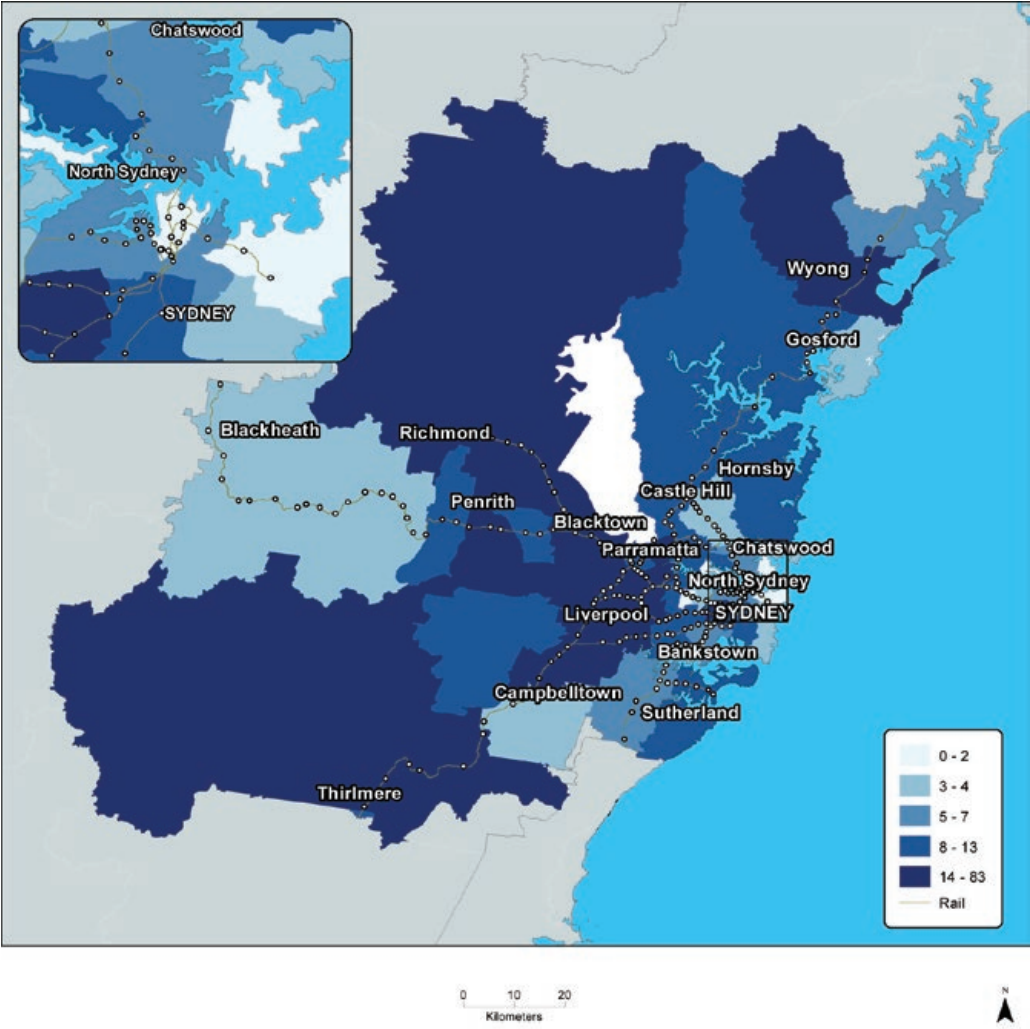
The rise in the productivity of workers in the manufacturing sector was a major driver of the great leap in living standards in most developed nations during the last century (Australian Business Chamber 2011, Moretti 2012). More recently, manufacturing jobs have been doing the same for living standards in India and China (Moretti 2012).

Manufacturing is a very important economic contributor to Australia's major cities and regions within them. In Western Sydney, for example, the manufacturing sector drives approximately 16 per cent of its estimated \$100 billion gross regional product (Morton and Bennet 2013, derived from ABS 2013). The manufacturing sector is an important employer because, like retail trade, it is accessible to a wide range of labour force entrants, particularly young workers (BITRE 2009). In addition, it is a relatively well paid sector. In 2012 on average it paid above the average for all industries (see Table 3-11).

Map 3-14 shows that in Sydney a high proportion of workers are employed in the manufacturing sector in pockets of the city, particularly in the outer suburbs. Similar maps for other major cities can be viewed using the [supplementary online map application](#).

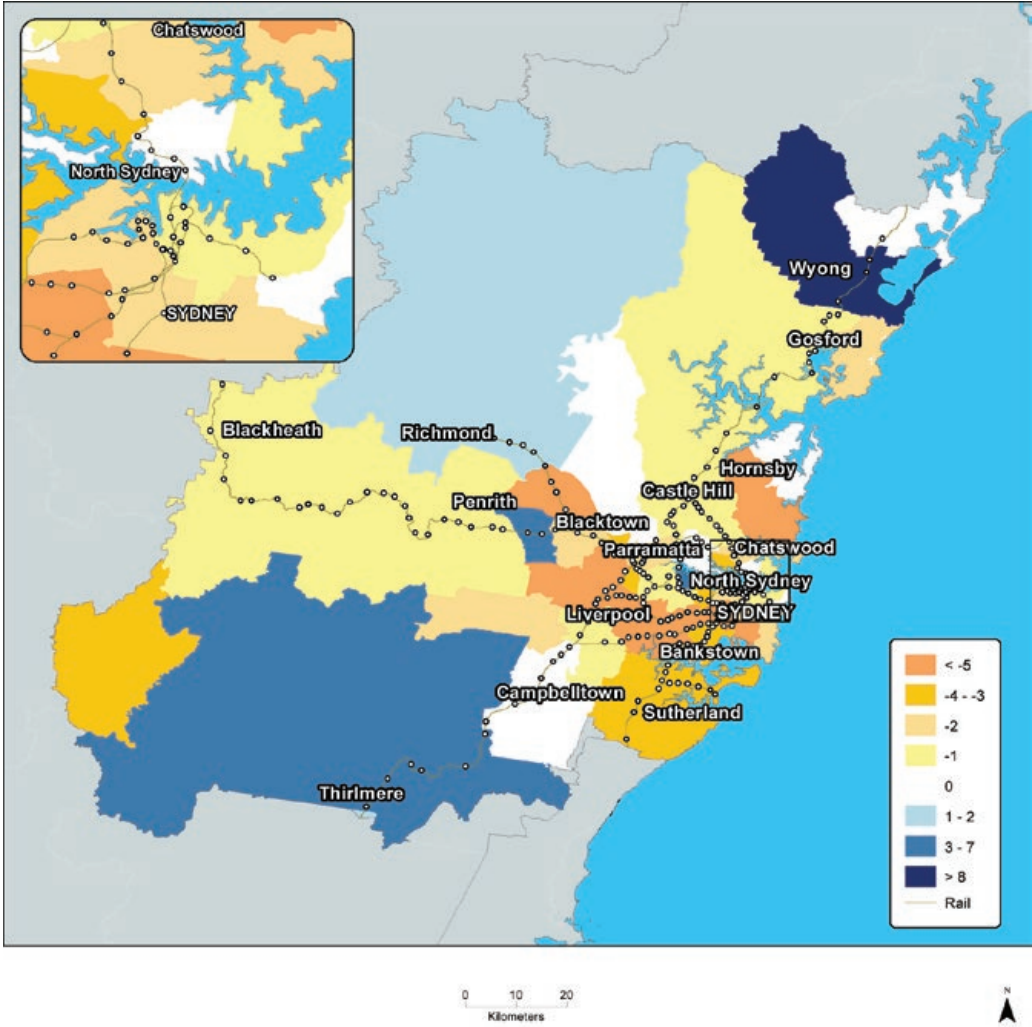


Map 3-14      Proportion of workers employed in the manufacturing sector by place of work in Sydney, 2011



Map 3-15 shows which areas gained jobs in the manufacturing sector and which areas lost jobs in the decade to 2011. Almost all inner and middle areas lost manufacturing jobs over the period, while selected areas in the outer suburbs gained some jobs.

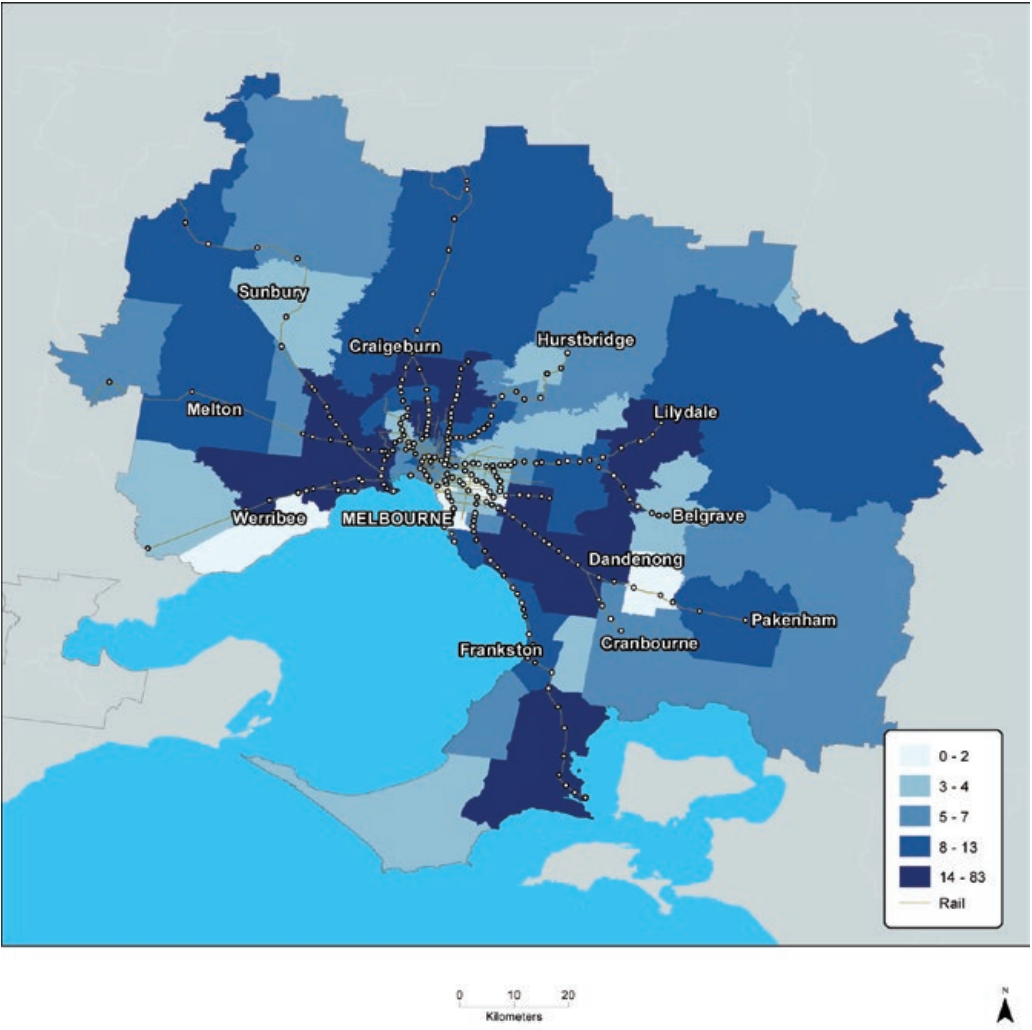
Map 3-15      Change in the proportion of workers employed in the manufacturing sector by place of work in Sydney, 2001–11



Note: To avoid reporting changes caused by SLA redefinitions or coding changes between 2001 and 2011, some SLAs have been grouped together prior to calculating the change.

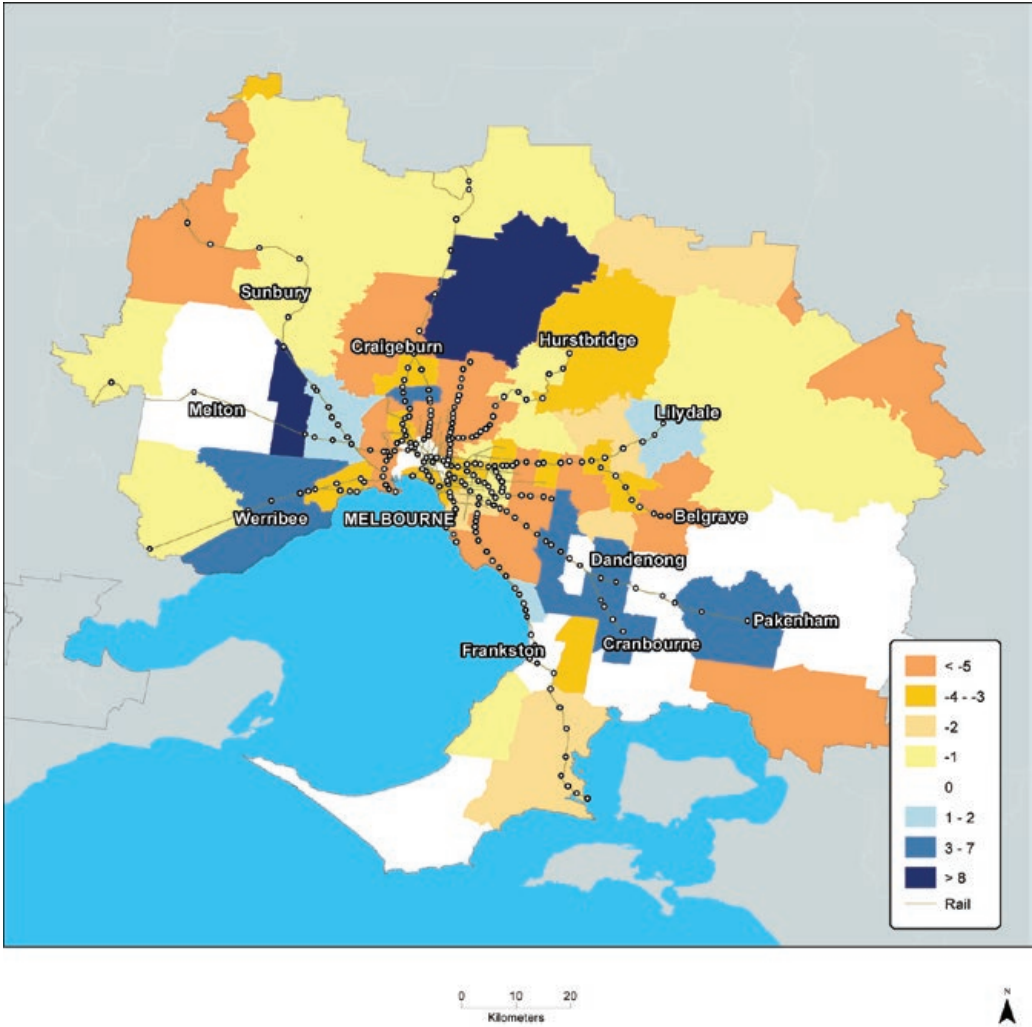
Map 3-16 shows that in Melbourne a high proportion of workers are employed in the manufacturing sector in certain parts of the city, particularly in certain areas of the middle suburbs.

Map 3-16      Proportion of employed persons working in the manufacturing sector by place of work in Melbourne, 2011



Map 3-17 reveals that between 2001 and 2011 Melbourne's inner and middle areas also lost manufacturing jobs, similar to the trend experienced in Sydney. Some pockets of the outer suburbs gained some manufacturing jobs.

Map 3-17      Change in the number of workers employed in the manufacturing sector by place of work in Melbourne, 2001–11



Note: To avoid reporting changes caused by SLA redefinitions or coding changes between 2001 and 2011, some SLAs have been grouped together prior to calculating the change.

Despite the recent reduction in the proportion of people employed in manufacturing in Australia's major cities, the sector is not in decline; rather, it is undergoing transformation. There are two aspects driving this transformation:

- the growing interdependence between manufacturing and other sectors of the economy, particularly services
- the rise of the knowledge economy and high-skilled, high-value jobs emerging as a driver of business innovation and productivity (Australian Business Chamber 2011).

It is becoming increasingly important for the manufacturing productivity to create increased value for customers and capture part of this value. Australian manufacturing firms are becoming more innovative and knowledge-intensive, creating customised business offerings by joining products and services together in diverse ways to meet customer needs (Australian Business Chamber 2011). This may have implications for the location and nature of manufacturing jobs in major cities into the future.



*Toowoomba.*

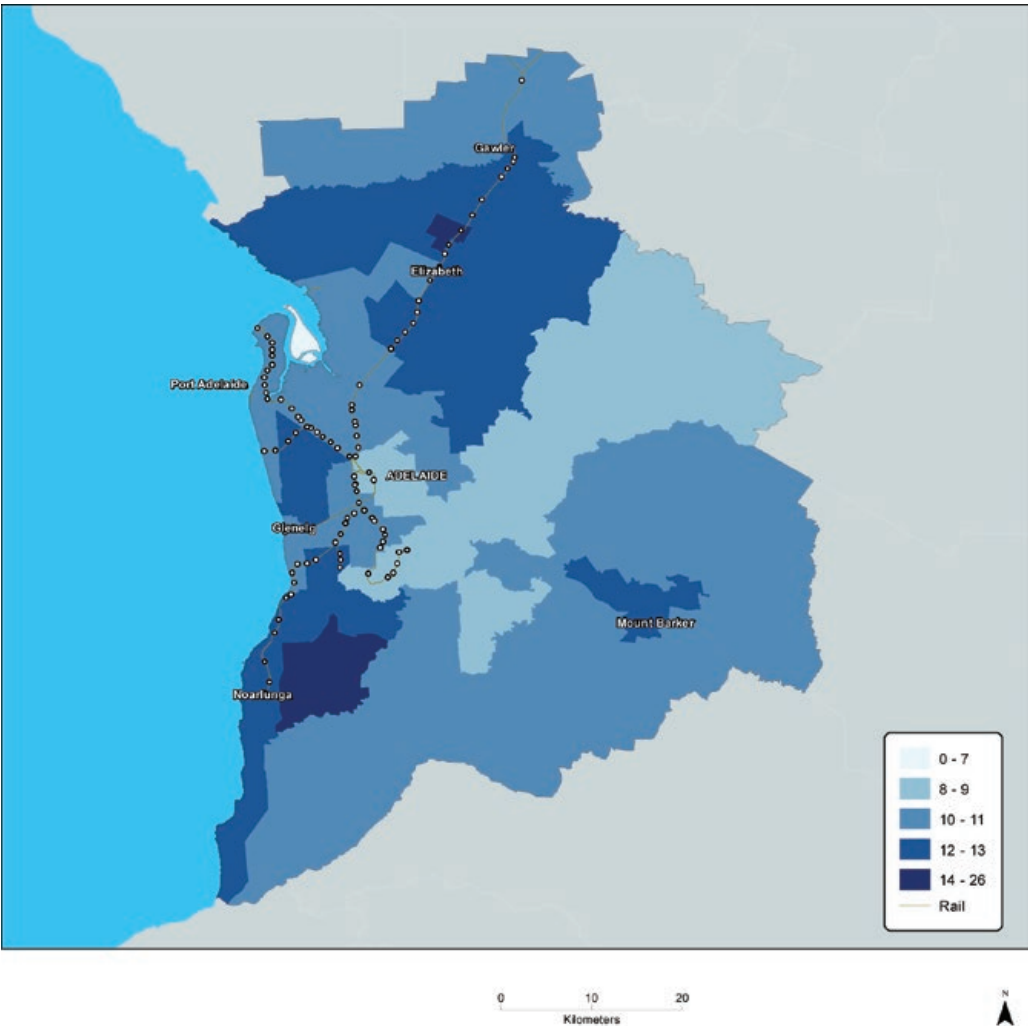
Toowoomba Regional Council



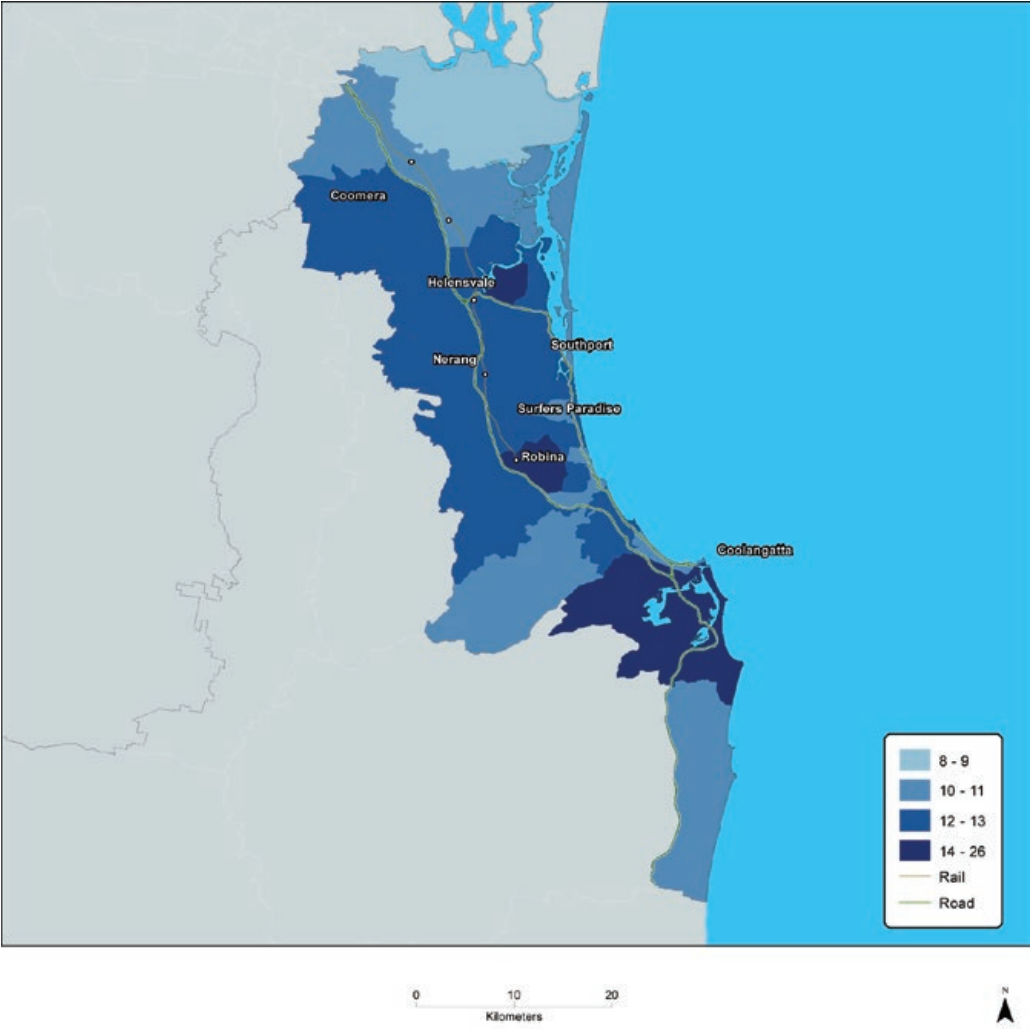
## Retail trade

Retail trade is another one of Australia’s largest employing sectors. As is the case with manufacturing, the number of people employed in the sector has declined from 14.9 per cent of Australians in 2001 to 10.5 per cent in 2011 (ABS 2012b). This reduction may have been partly due to a change in the savings behaviour of households following the Global Financial Crisis. The retail trade industry is affected by the economic cycle so interest rates, disposable incomes, consumer confidence and technological change all affect performance (DEEWR 2008a in BITRE 2009). Employment in retail trade in major cities tends to be spread across cities and concentrated around secondary employment hubs such as activity centres, rather than in CBDs. Map 3-18 and Map 3-19 show the proportion of workers employed in retail trade by place of work in Adelaide and Gold Coast – Tweed in 2011.

**Map 3-18** Proportion of employed persons working in the retail trade sector by place of work in Adelaide, 2011



Map 3-19      Proportion of employed persons working in the retail trade sector by place work in Gold Coast – Tweed, 2011



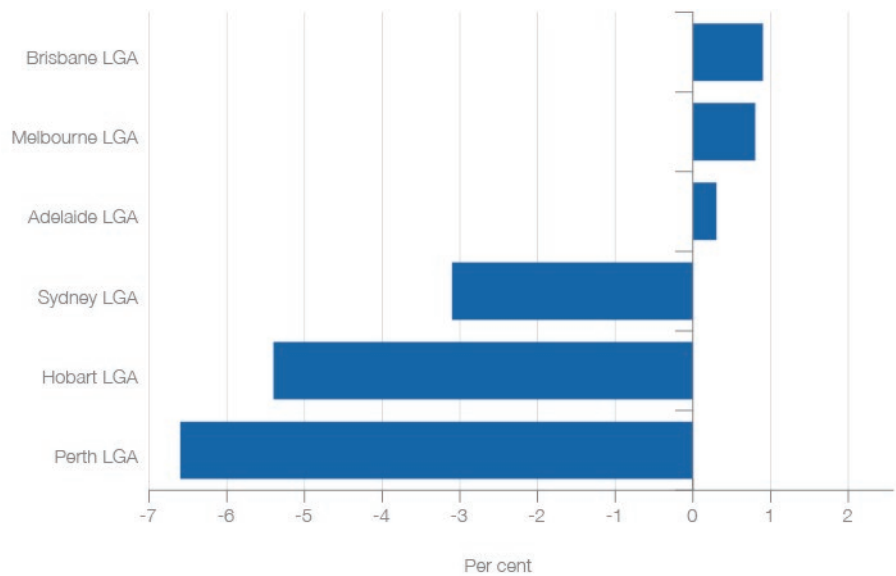


### The night-time economy

‘Night-time economy’ (NTE) refers to night-time leisure or work that generates economic activity. Hospitality is a main driver of night-time activity, but other examples include evening sports, nightclubs, hospitals and convenience stores. A recent report (TBR Economic Research & Business Intelligence 2013) valued the Australian NTE at \$92 billion and estimated that its value increased by 8.2 per cent between 2009 and 2011. The report estimated that the NTE employed 8.4 per cent of all Australian employees in 2011 – an increase of 6.9 per cent since 2009.

Comparing the outputs of LGAs is difficult because of differences in population growth, wealth, age and size. However, changes in the size of the night time economies of our major city centres can be compared. Figure 3-28 shows changes in the size of night time economies between 2009 and 2011. The central city LGAs of selected major cities are compared, as they are the only areas for which substantial data is available.

**Figure 3-28**      **Change in the size of the night-time economy in selected major city central LGAs, 2009–11**



Note: These are the only major city central LGAs for which data is available.

Source: TBR Economic Research & Business Intelligence 2013

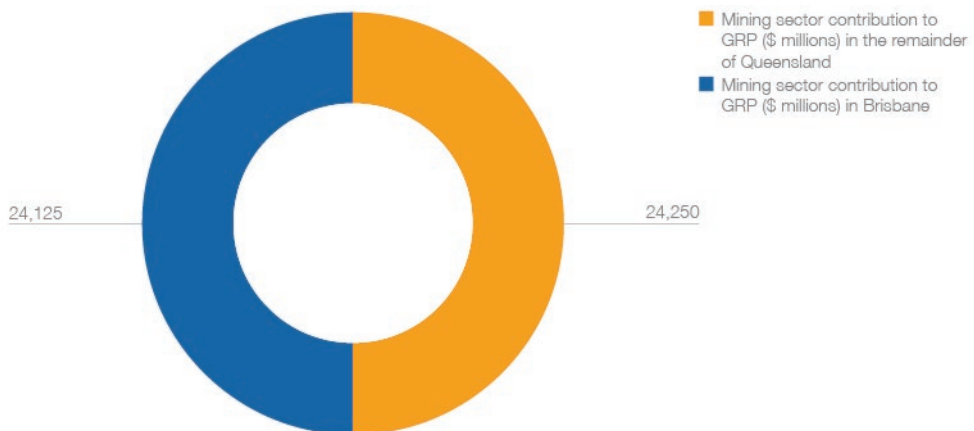
Increasingly, cities are competing to attract skilled workers. The liveability of a city and its vibrancy, particularly at night, influence a city’s attractiveness. The NTE is important for attracting visitors to cities.

Many night-time activities rely on late-night transport. Public transport services often finish or significantly reduce in frequency in the late evening, limiting the options available for night-time workers and visitors to move across the city and return home safely.

## The impact of the mining sector and associated fly in, fly out and drive in, drive out practices on Australia's major cities

One might assume that the mining boom is something that is confined to regional and remote areas. However, in reality it is as much an urban industry as a regional and remote industry. Figure 3-29 shows the mining sector's contribution to Gross Regional Product in Brisbane compared with its contribution to the rest of Queensland.

**Figure 3-29** Mining sector contribution to Gross Regional Product in Brisbane and the remainder of Queensland, 2012

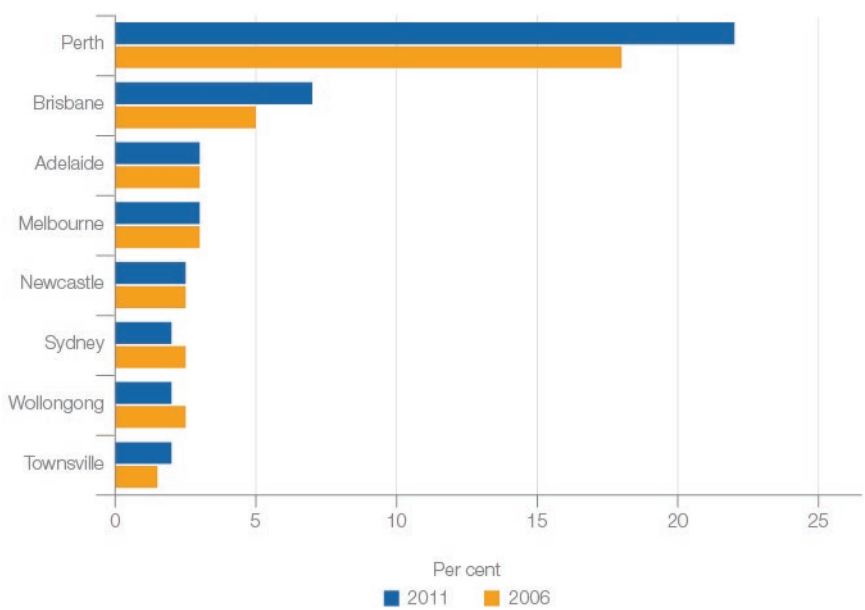


Source: SGS Economics and Planning 2012

The mining sector currently employs approximately 276,300 Australians (ABS 2013a). It employed 1.8 per cent of working Australians in 2011, up from 1.2 per cent in 2006 (ABS 2012c). The sector has the highest average weekly wage for any sector – \$2,381.20 in November 2012, more than double the average for all industries (\$1,081.30). Its workforce is predominantly male and has a slightly higher than average median workforce age – 40 compared with the national average of 37.

Figure 3-30 shows the large proportion of mining sector employees that resided in Australia's major cities in 2011. More mining sector employees resided in Perth – 40,919 or approximately 22 per cent of Australia's mining sector employees – than in any other city or town in Australia in 2011 (ABS 2012a). In 2011, 12,822 Greater Perth residents worked in the mining sector and reported a place of work outside of Perth. Many of these residents are likely to be engaged in fly in, fly out (FIFO) or drive in, drive out (DIDO) practices (ABS 2013b).

**Figure 3-30** Proportion of Australia's mining sector employees that resided in selected major cities, 2006 and 2011



Source: ABS 2013b

Brisbane had the fifth largest number of people who work in the mining sector in 2011 (10,229) of any Australian town or city. Approximately seven per cent of Australia's mining sector employees live in Brisbane (ABS 2013b). For every mining sector job in Brisbane, it is estimated that up to 19 more ancillary support jobs are created in mining support jobs, supplying industries and flow-on jobs from increased expenditure (Brisbane City Council 2012). The mining sector directly and indirectly contributed to approximately 124,000 full-time jobs in Brisbane in 2012 (SGS Economics and Planning 2012). Additionally, Brisbane receives the largest proportion of the mining sector's gross regional product in Queensland (approximately 21 per cent) (SGS Economics and Planning 2013). The Brisbane City LGA alone received approximately 22 per cent of its gross regional product from the mining sector in 2011, approximately \$25 billion (Brisbane City Council 2012).



*Port Hedland, Western Australia.*

Image courtesy of Charlene Liau

### The mining sector's influence on office space demand in major cities

The mining sector significantly influences demand for office space in several major cities, particularly Perth and Brisbane (CBRE 2012). During the first half of 2012, approximately three-quarters of Australia's net CBD office absorption (the total amount of office space leased minus the total amount of office space vacated over a period) occurred in Perth and Brisbane (PropertyOz 2012b). Demand for this space was largely driven by the mining sector.

Australia's four largest mining companies directly accounted for the occupation of approximately 20 per cent of Perth CBD office space in 2011 (Property Observer 2011). Approximately half of total occupied office space in Perth is taken up by mining and associated sectors which largely service the mining sector (PropertyOz 2013).

Perth's office space rental growth increased faster than all other Australian capital cities in the quarter to 30 September 2012, largely driven by the mining sector. Perth was the second largest growth market for A-grade office space in the Asia Pacific region in this quarter behind Beijing. Perth is now one of the top 10 most expensive office markets in the world (PropertyOz 2012a).

In the inner Brisbane office market between 2008 and 2011, 21 per cent of the lease transactions were linked to the mining sector and a further 22 per cent were in related sectors that largely service the mining sector (Colliers 2012). The mining sector and related sectors are thought to have accounted for approximately half of the large leasing transactions (more than 1,000 square metres) in the inner Brisbane office market in recent years (Colliers International 2012b).



*Perth.*

Image courtesy of Jacqueline McKinnon

## Long-distance commuting

Although commuting is traditionally thought of as intra-urban trips, the long-distance commutes made by workers from their homes to workplaces in remote mining regions are also commuter journeys – popularly referred to as FIFO and DIDO. The key differences between FIFO and DIDO commutes and traditional intra-urban commutes are that FIFO and DIDO workers spend more time at their worksites – often several days or weeks at a time – and travel much further to reach them, often over 1,000 kilometres.

FIFO and DIDO practices are not new. They have been used in Australia at least since the 1980s. However, they have increased in prevalence in recent years, mainly due to the difficulty in attracting workers to live and work in remote locations, lower costs of air transport and the high cost of housing in remote and regional mining site areas (Australian Government 2013). In Port Hedland, for example, median weekly rents are approximately \$2,650 per week and the median house price is \$980,000 (Australian Financial Review 2012).

Analysis of 2011 Census estimates of long-distance commuting (over 400 kilometres between LGA of residence and LGA of workplace was used as an assumed threshold between FIFO and DIDO) by mining industry employees shows that six of the 25 most popular residence/workplace LGA pairs had Perth as the place of residence and the Pilbara or northern Western Australia as the place of work. Indeed, the three most popular commuting pairs in Australia are between Perth and the Pilbara (Newman, Paraburdoo and Karratha), representing 44 per cent of all commuters between the 25 most popular LGA pairs (BITRE 2013a).

### Population and commuter flows

Chapter 2 of this report (Population and Settlement) discussed both permanent and temporary migration flows within and between Australian cities. It also introduced the concept of domestic movers as distinct from domestic migrants. Domestic mover arrangements are more fluid and temporary in nature. FIFO and DIDO commuters are essentially domestic movers who straddle the city and regional divide. In most cases, the city is ‘home’ and FIFO and DIDO workers are ‘temporary residents’ at a worksite, often residing in staff quarters or other temporary accommodation. A typical characteristic of an area with large temporary population movements (and long-distance commuters) is the large number of people who reported that they were staying in staff quarters. For example, the Pilbara had the highest proportion of people staying in staff quarters on Census night than anywhere else in Australia (34 per cent compared to the Australian average of 0.4 per cent) (ABS 2012d).

Western Australia and Queensland are the States with the most mining sector employees, many of whom reside in the major cities located in these States. In Queensland, approximately 40 per cent of mining employees are long-distance commuters (BITRE 2013a). In Western Australia, approximately 50 per cent of mining employees are long-distance commuters (Morris 2012, BITRE 2013a, Australian Government 2013). This figure is expected to rise to 57 per cent by 2015 (BITRE 2013a).

Some major cities are encouraging FIFO and DIDO workers to base themselves in that city so that the city secures some of the economic benefits. For example, to attract domestic migrants, Townsville, Cairns and the Gold Coast are promoting their quality of life, amenity, educational opportunities and connectivity to mining centres (Australian Government 2013). Cairns has a FIFO Coordinator Project that aims to identify opportunities for employment in the mining and resource sector in the Cairns region (Cairns Regional Council 2011). It also has a website promoting its attributes as a base city for new residents working on FIFO rosters, including the city’s comparatively lower house prices, its major airport and its relatively close proximity to mining centres such as Moranbah and Kununurra (FIFO Cairns 2013).

### The impact of FIFO on aviation

The increasing use of FIFO practices has triggered significant growth in the aviation sector and has added pressure on airports in some major cities, particularly Perth. Approximately 30 per cent of total domestic passenger movements at Perth Airport between 2011 and 2012 were directly related to FIFO practices (Perth Airport 2013). Approximately 75 per cent of all Perth Airport’s intrastate passenger movements are now related to the mining sector (Perth Airport 2013). It has been reported that FIFO traffic out of Perth Airport has increased by 58 per cent over the past five years (Australian Financial Review 2013).

Perth Airport has experienced bottlenecks in peak times, particularly between 5.30am and 8.30am, when returning intrastate aircraft largely servicing FIFO commuters overlap with interstate and international aircraft arrivals (Perth Airport 2012). Domestic air passenger movements at Perth Airport increased by an average of 10.2 per cent per year over the 10 year period to 2012 – the largest increase of any capital city airport.



Although the majority of FIFO commuters use regular scheduled flights, many charter flights are also scheduled to mining regions to service FIFO commuters. It is estimated that more than one-third of Australia's fixed-wing charter passengers pass through Perth Airport (BITRE 2013a) and almost all are likely to be related to the mining industry.

Perth to Karratha was the 19th busiest Australian air route in 2012 (27th busiest in 2002) and Perth to Port Hedland was the 26th busiest (45th busiest in 2002). In 2012, passenger numbers on the Perth–Karratha route were more than five times those experienced in 2002 and for the Perth–Port Hedland route the passenger numbers were more than seven times the 2002 passenger levels. In contrast, the total number of passengers carried on Australian domestic airlines doubled between 2002 and 2012 (BITRE 2013b).

In 2012 the greatest percentage increase in passenger numbers, compared to the year ending December 2011, was on the Newman Perth route (up 48.9 per cent). There were also large increases on the air routes of Perth – Port Hedland (up 33.6 per cent) and Karratha–Perth (up 12.3 per cent) (BITRE 2013b). Such increases demonstrate the impact of FIFO workers on the aviation sector (SOAC 2012).

Other major city airports have also experienced significant growth in FIFO passenger numbers. It has been estimated, for example, that 5,000 FIFO workers pass through Townsville Airport each week. Approximately 22 per cent of passengers passing through Townsville Airport in the first quarter of 2012 were mining industry employees, up to 15 per cent of them FIFO workers (Galloway 2012).



*Cairns, Queensland.*

Image courtesy of Chay Garde



### Implications of FIFO and DIDO practices

FIFO and DIDO practices allow workers to live in towns or cities with access to urban services while commuting to worksites in remote locations on a roster system. However, there are some personal and social disadvantages associated with these practices on workers, their families and regional and remote communities. They can also have social impacts on the remote communities where the mines are located (Australian Government 2013; Australian Financial Review 2012). A recent inquiry identified an emerging trend of an ‘us versus them’ mentality in some remote mining regions and in certain cases an ‘anti-FIFO worker’ mentality (Australian Government 2013).

A common criticism of FIFO is that the remote region where the mining occurs does not receive the economic benefits of mining. This is known as the ‘fly-over’ effect and it can create tensions between cities and remote mining areas (Haslam et al. 2009). A recent Queensland study, however, concluded that, whilst 59 per cent of the direct effects of the mining sector flow to the Brisbane region, a significant proportion still goes to Queensland’s remote mining regions (Rolfe et al. 2011).

### The increasing use of automation by the mining sector

There is evidence that the FIFO and DIDO phenomena may be finite given the increasing use of automation by the sector – fewer mining sector workers will need to be physically located at mine sites in coming years. Larger mining companies are moving towards automation of mine sites, aiming to largely run them remotely from city offices (Garvey 2013).

BHP already has a remote operating centre in Perth employing 340 people. Rio Tinto has one located near Perth airport in which 450 employees remotely control driverless trucks at its Pilbara mining site. There are also plans for driverless trains at Rio Tinto’s Pilbara mining site, which would also be controlled remotely from Perth (Chambers 2012).

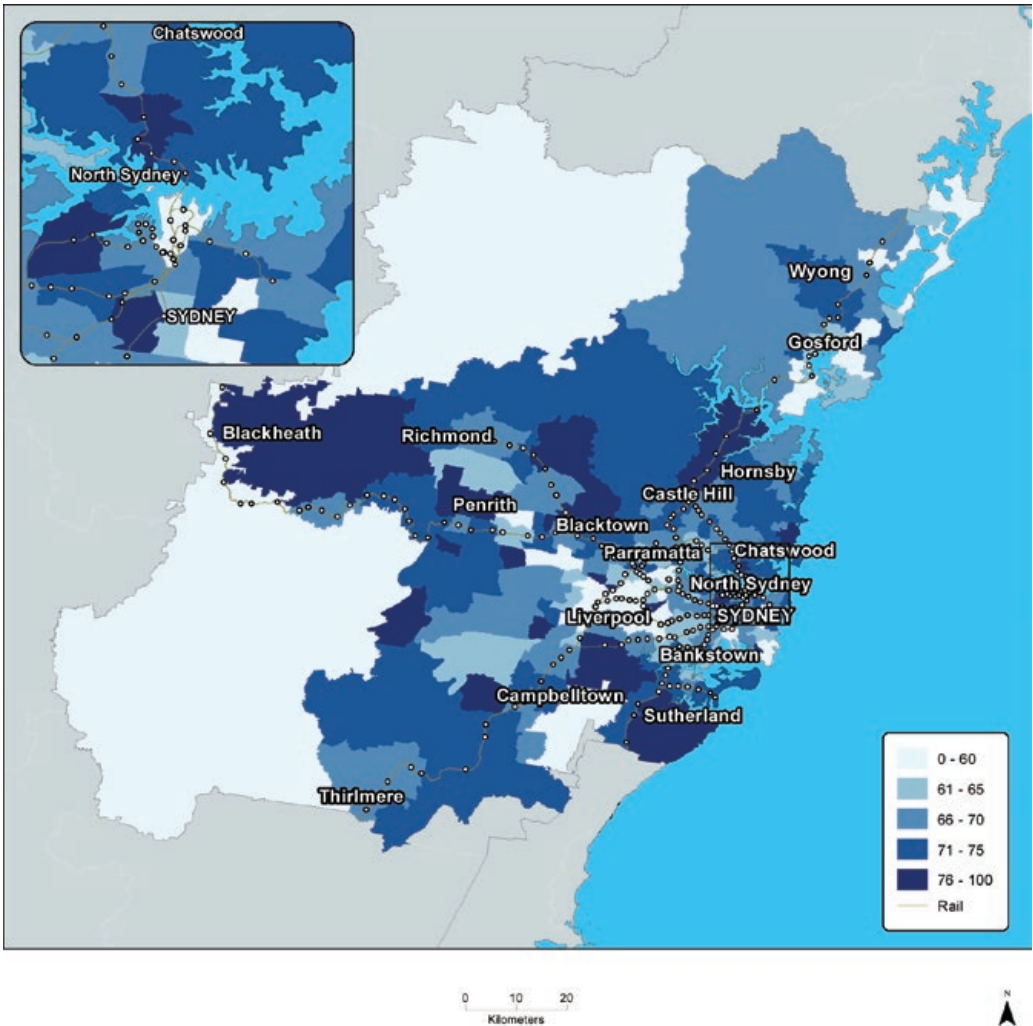
# Human capital

## Labour force participation

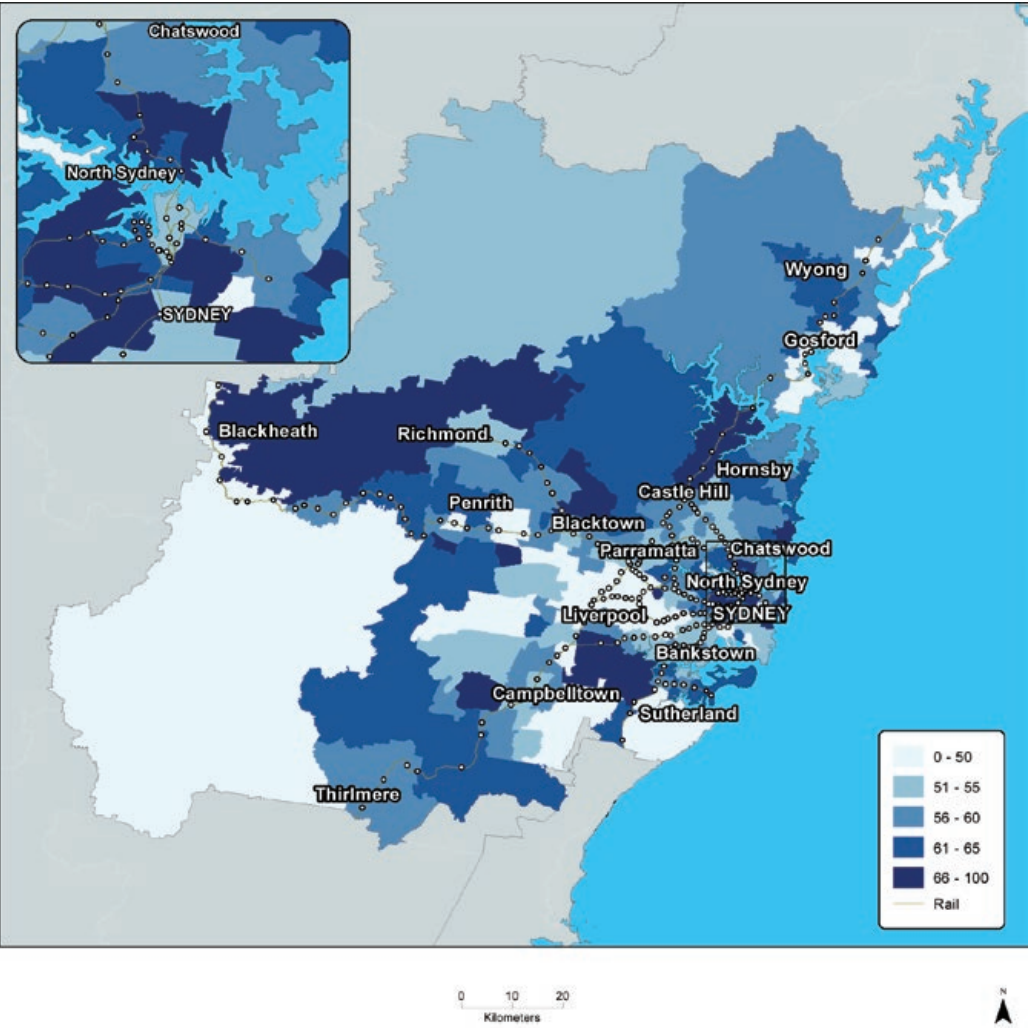
The proportion of people in the labour force in a city influences its productivity. A larger proportion of people in the labour force leads to greater capacity for higher productivity levels. *State of Australian Cities 2012* looked at workforce participation rates by age and gender. This section looks at the geography of labour force participation within cities.

Labour force participation rates are not the same across Australia's major cities and they are also different for males and females. Map 3-20 and Map 3-21 illustrate this using Sydney as an example. Maps of the other major cities can be viewed using the [supplementary online map application](#). The maps highlight the areas in Sydney which may have underutilised labour potential that could be tapped into to raise participation rates. Areas where there is a large difference between male and female participation also indicate there may be underutilised labour potential.

Map 3-20      Male workforce participation in Sydney, 2011

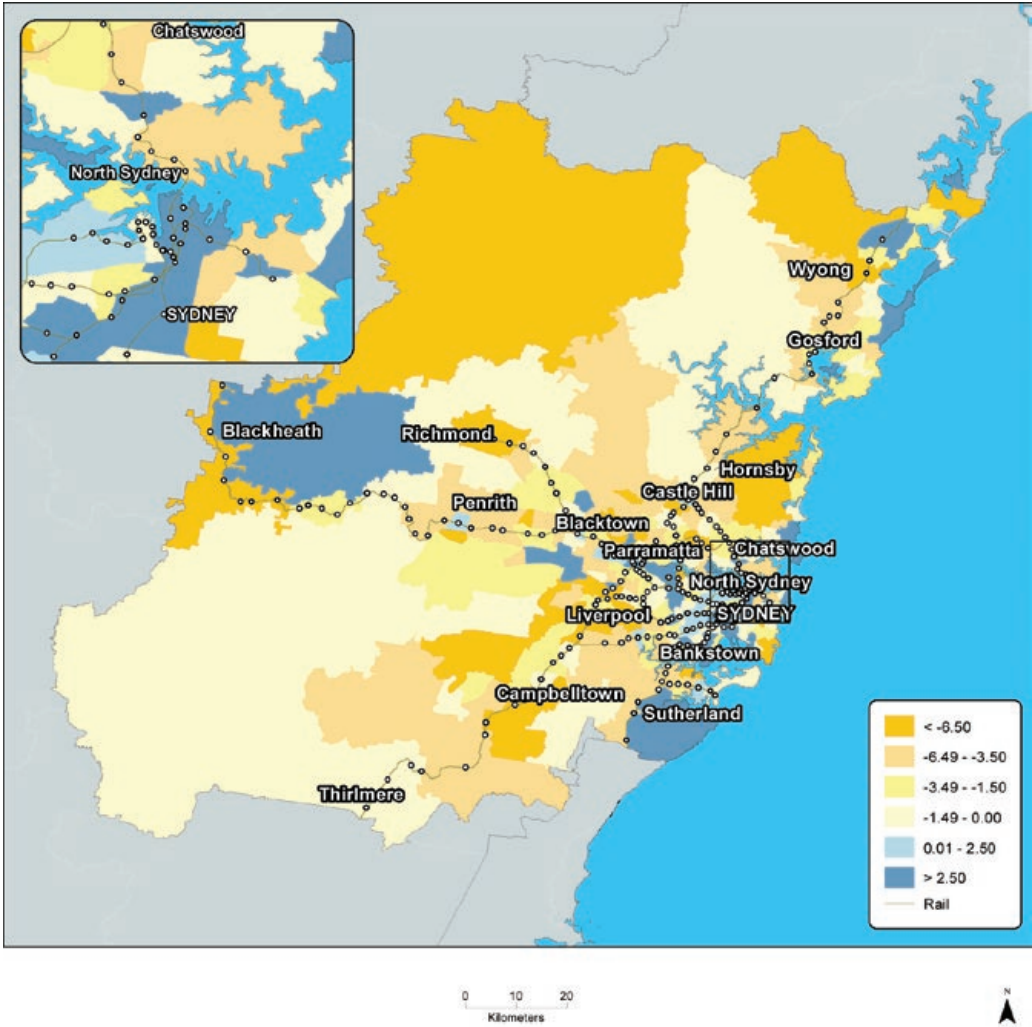


Map 3-21 Female workforce participation in Sydney, 2011

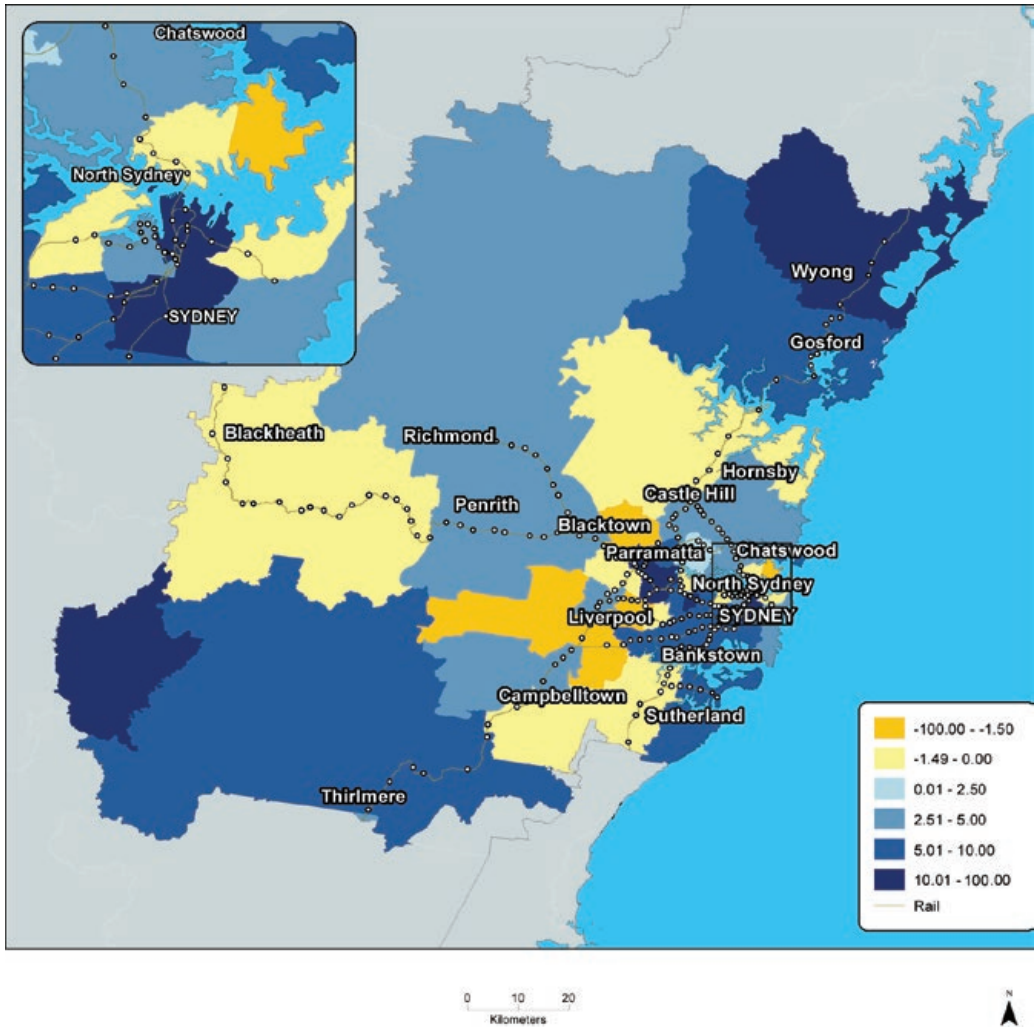


Map 3-22 and Map 3-23 show areas that have experienced the largest change in workforce participation between 2001 and 2011 in Sydney. Male participation has declined across most of Sydney, while female participation has increased in most areas. This trend is occurring in many major cities. The key exceptions are Canberra, Cairns and Darwin, where female participation declined in many areas, and Perth and the Sunshine Coast, where male participation increased across most of the city.

Map 3-22 Proportion change in male workforce participation in Sydney, 2001–11



Map 3-23 Proportion change in female workforce participation in Sydney, 2001–11



Commuting distances have a large effect on people's capacity to undertake certain jobs. In particular, this can affect women who often have primary responsibility for the care of young children and/or aged relatives and need to be fairly close to home. They may need to be able to tend to them quickly in the event of an illness or other needs. More women than men may therefore be unable or unwilling to take up jobs that require a longer commute. Pocock, Skiller and Williams have described this as a 'spatial leash' (2012). They described this phenomenon as follows (2012, p. 90):

*'The result for families is reinforcement of a traditional division of labour, with many highly educated and skilled women forced to abandon careers and take lower skilled jobs close to home in order to be available to their children ... On the other hand, many men are forced to trade time with their children for long commutes and long working hours. This is particularly evident in new suburbs that are not well integrated with industry, employment or educational opportunities.'*



If women have less access to job opportunities or their choice is limited by the time and constraints due to their caring responsibilities, they are more likely not to work or to choose a job that does not optimally match their skills and experience. Many areas of major cities have a lack of readily accessible jobs, particularly high-skilled and professional jobs. As a result, women in these areas, in an effort to spend more time with and be available to their children and/or aged relatives, may trade full-time city jobs for part-time jobs closer to home.

Today, it is more common for couples in Australia to have two careers than it was in the past. This is changing not only how people live but also where they live. An indication of how many couples have two careers is the proportion of mothers working full-time. While it is most common for mothers to work part-time in Australia (36 per cent of mothers did this in 2011), approximately 25 per cent of mothers worked full-time in 2011, up from 23 per cent in 2001 (Baxter 2013 derived from ABS 2001 and 2011). In situations where couples or families have two careers, they may face location challenges. Labour markets that have sufficient professional matches for both partners are the best way to meet this challenge. These tend to be in the inner suburbs of cities. A recent study found that more than half of increased agglomeration in the inner suburbs of United States cities is due to so-called 'power couples' relocating to areas with the best access to a range of high-skilled, high-paying jobs (Moretti 2012). Similar trends are evident in Australia.

## Full-time and part-time workers

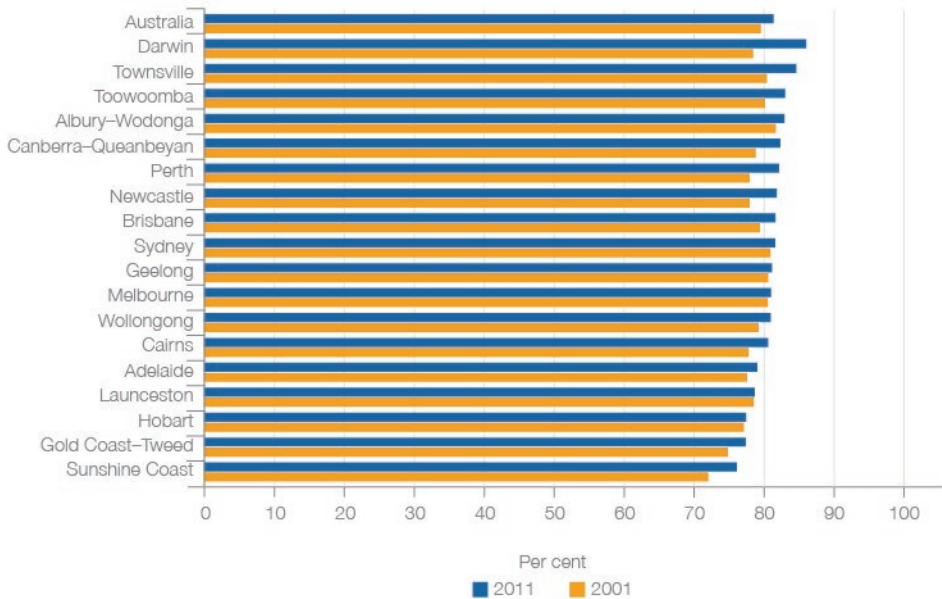
This section uses the latest Census data to look at the proportion of employed males and females aged 15 to 64 that were employed full-time versus part-time in Australia's major cities. 'Full-time' in this section refers to employees who worked 35 hours or more in the week before the 2011 Census night and 'part-time' refers to employees who worked at least one hour but less than 35 hours in the week before the 2011 Census night.

In the week before the 2011 Census night, 10.7 million Australians reported being in the workforce. Of these, 59.7 per cent were employed full-time and 28.7 per cent were employed part-time. An additional 5.9 per cent were employed but away from work in the week before the Census night and 5.6 per cent were unemployed (ABS 2013c).

Across Australia, 81.7 per cent of employed males aged 15 to 64 worked full-time in the week before the 2011 Census night. For females, the proportion was 53.0 per cent. The proportion of males in major cities working full-time was slightly lower than the national average at 81.4 per cent. However, the proportion of females in major cities working full-time was one percentage point higher than the national average (54.0 per cent versus 53.0 per cent).

Most major cities were roughly on par with the 2011 national average for the proportion of employed males aged 15 to 64 working full-time (81.7 per cent), as can be seen in Figure 3-31. Of the major cities, Darwin and Townsville had the highest proportion of males working full-time in 2011 (86.4 per cent and 84.9 per cent). There were increases in the proportion of employed males aged 15 to 64 working full-time between 2001 and 2011 in all major cities, although some were only slight increases. The largest increases in the proportion of employed males working full-time between 2001 and 2011 were in Darwin, Townsville and Perth.

**Figure 3-31** Proportion of employed males aged 15 to 64 working full-time, 2001 and 2011



**Note:** Full-time work is defined as working 35 hours or more in the week before Census night and part-time work is classified as working one to 34 hours in the week before Census night. Data for people who were employed but away from work in the week before the Census have been excluded. Data where employment status was not stated have been excluded.

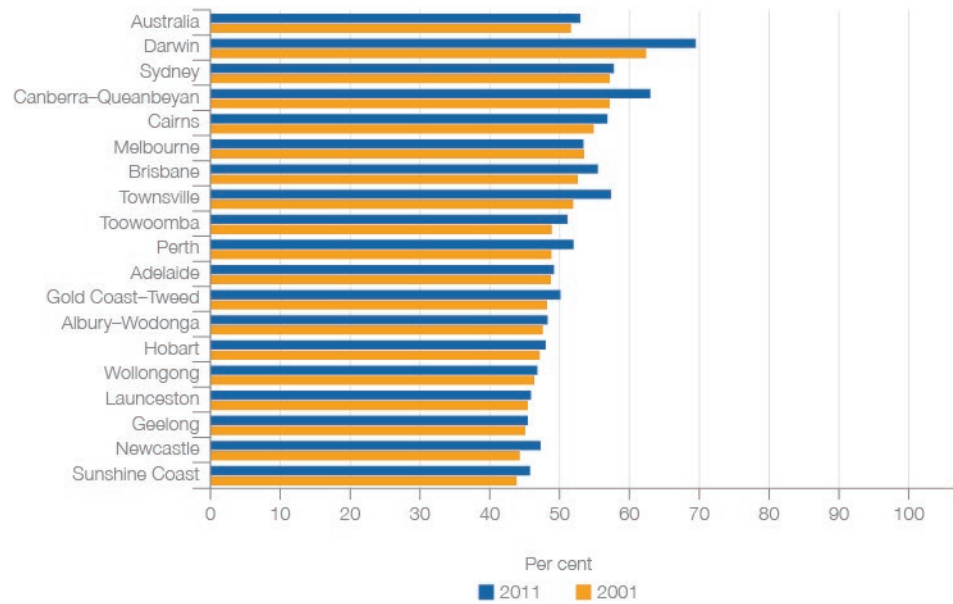
**Source:** Derived from ABS 2012a and ABS 2002

The proportion of employed females aged 15 to 64 working full-time nationwide is significantly lower than the proportion of males working full-time. This is reflected across the major cities. Despite significant changes in gender relationships over the past couple of decades, research shows women still do the majority of care work in Australian households, such as looking after children and older family members. This is one of the reasons that they are more likely to reduce their work hours from full-time to part-time (Ibid, p. 76 in Kelly et al. 2013, p. 31).

Darwin and Canberra-Queanbeyan had the highest proportion of employed females aged 15 to 64 working full-time in 2011 (69.5 per cent and 63.0 per cent) while Geelong, the Sunshine Coast and Launceston had the lowest proportion (45.4 per cent, 45.8 per cent and 45.9 per cent). There was a slight decrease in the proportion of employed females aged 15 to 64 working full-time in Melbourne between 2001 and 2011. All other major cities experienced increases, although many were only slight increases.



Figure 3-32 Proportion of employed females aged 15 to 64 working full-time, 2001 and 2011

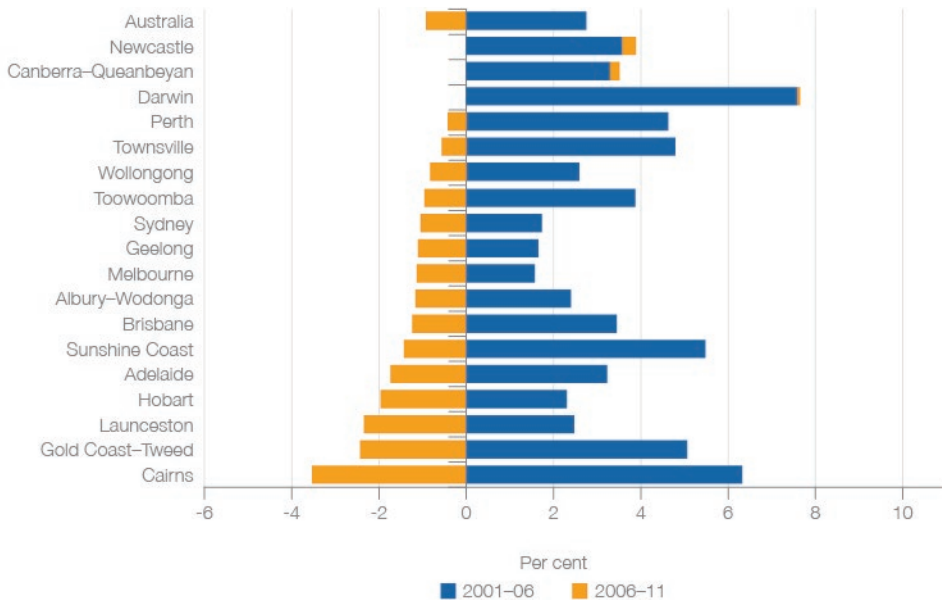


Note: Full-time work is defined as working 35 hours or more in the week before Census night and part-time work is classified as working one to 34 hours in the week before Census night. Data for people who were employed but away from work in the week before the Census have been excluded. Data where employment status was not stated have been excluded.

Source: Derived from ABS 2012a and ABS 2002

Figure 3-33 and Figure 3-34 show the change in the proportion of employed males and females aged 15 to 64 working full-time between 2001–06 and 2006–11. These figures show that most of the increases in the proportion of males and females working full-time in the major cities were between 2001 and 2006. Declines were most commonly experienced across the major cities between 2006 and 2011. This decrease is likely to be at least partly due to the Global Financial Crisis, which is believed to be linked to a reduction in the number of hours worked by Australians (ABS 2013d).

**Figure 3-33** Change in the proportion of employed males aged 15 to 64 working full-time, 2001–06 and 2006–11



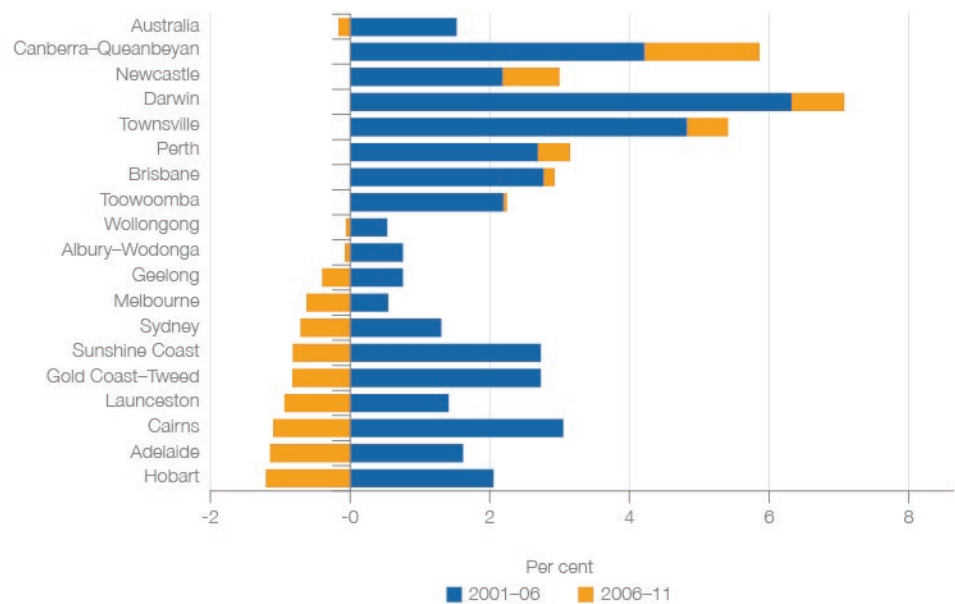
**Note:** Full-time work is defined as working 35 hours or more in the week before Census night and part-time work is classified as working one to 34 hours in the week before Census night. Data for people who were employed but away from work in the week before the Census have been excluded. Data where employment status was not stated have been excluded.

**Source:** Derived from ABS 2012a, ABS 2007 and ABS 2002

Between 2006 and 2011 there were declines in the proportion of employed males aged 15 to 64 working full-time in almost all major cities except Newcastle, Canberra–Queanbeyan and Darwin. However, the 2006–11 reductions were significantly less than the 2001–06 gains, meaning that all the major cities experienced increases in the proportion of employed males working full-time between 2001 and 2011.

The change in the proportion of employed females aged 15 to 64 working full-time between 2006 and 2011 was more varied. In just over one-third of the major cities there were increases between 2006 and 2011 and in the remaining cities there were declines. However, almost all declines between 2006 and 2011 were at least matched by increases between 2001 and 2006, the exception being Melbourne.

Figure 3-34      Change in the proportion of employed females aged 15 to 64 working full-time, 2001–06 and 2006–11

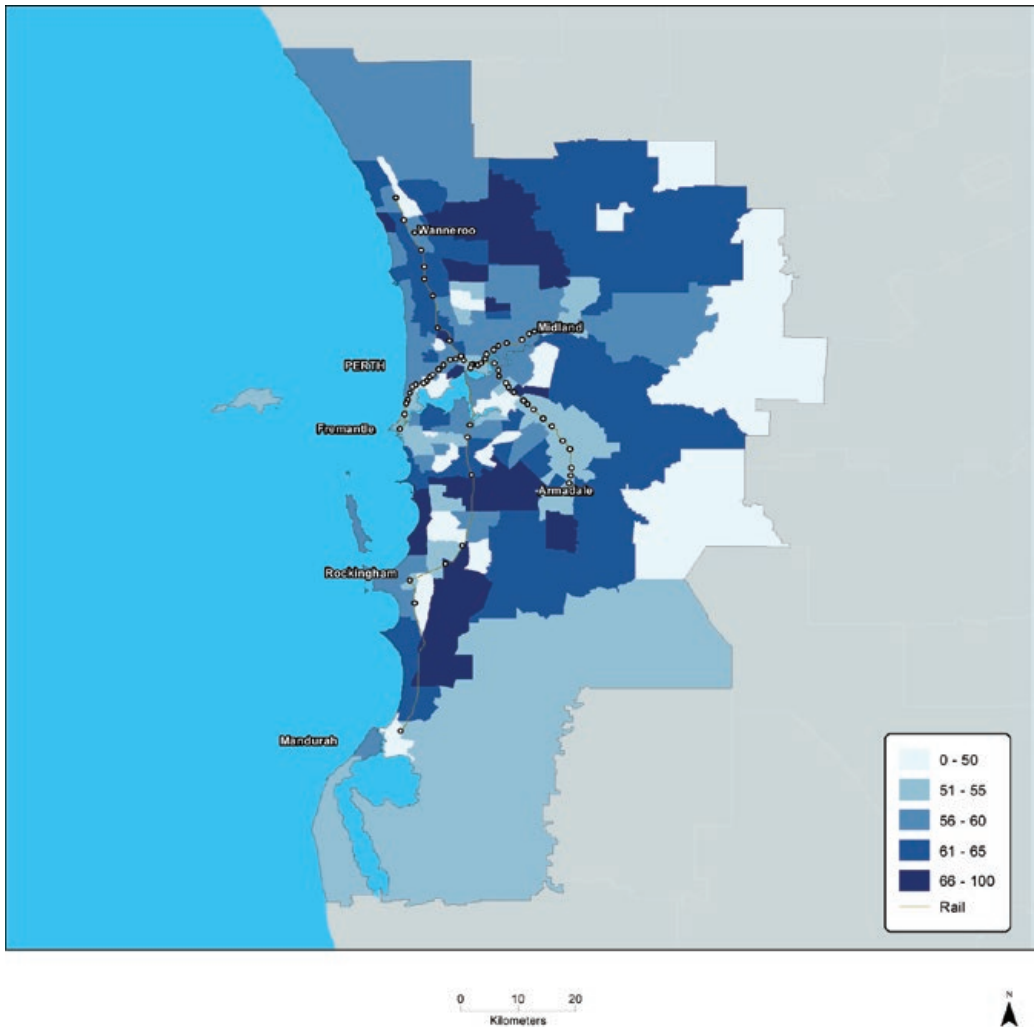


Note: Full-time work is defined as working 35 hours or more in the week before Census night and part-time work is classified as working one to 34 hours in the week before Census night. Data for people who were employed but away from work in the week before the Census have been excluded. Data where employment status was not stated have been excluded.

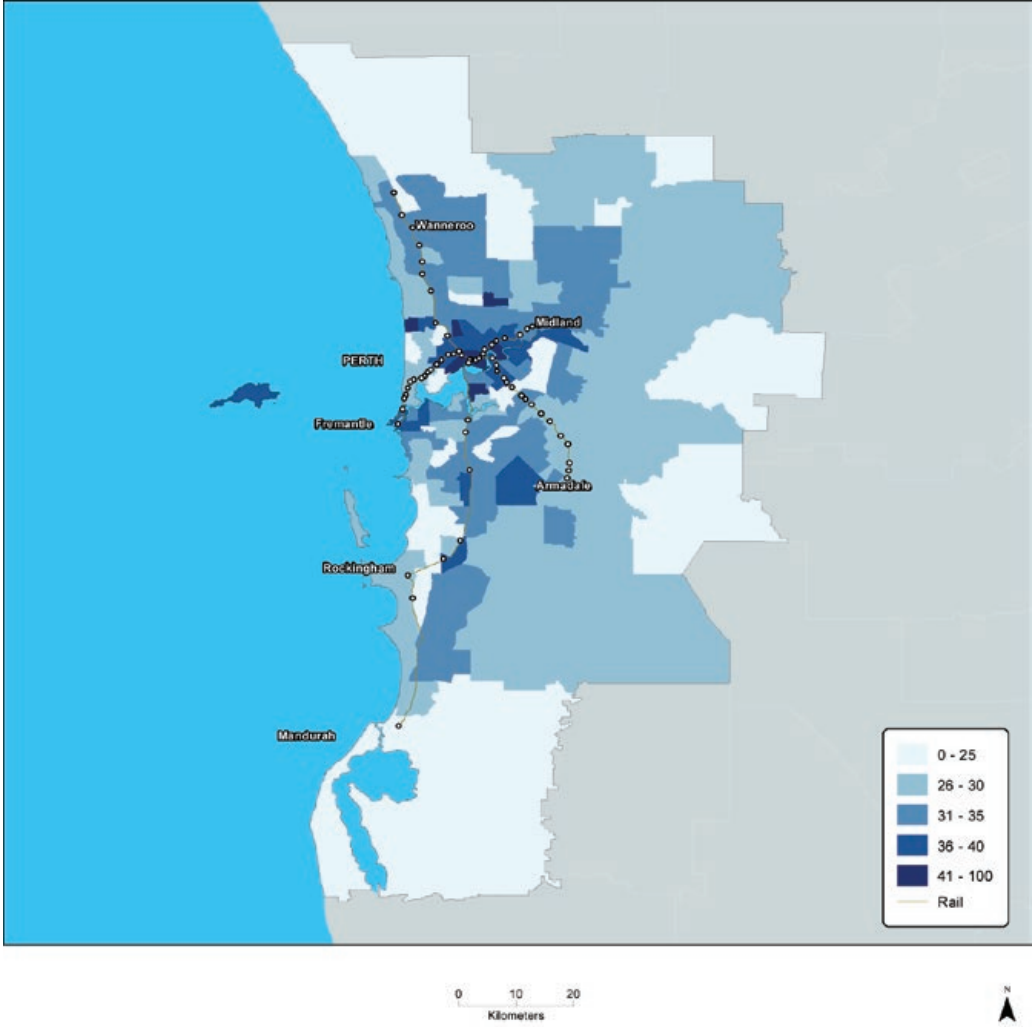
Source: Derived from ABS 2012a, ABS 2007 and ABS 2002

The proportion of males working full-time does not show the same pattern between or within the major cities and it is not the same as the pattern for females. This is illustrated in Map 3-24, Map 3-25, Map 3-26 and Map 3-27. Significantly more males than females work full-time in Perth, with the inner city having the highest proportion of females working full-time and the middle ring suburbs tending to have the highest proportion of employed males working full-time. More employed males tend to work part-time in Perth's inner suburbs, but this situation is not the same for females.

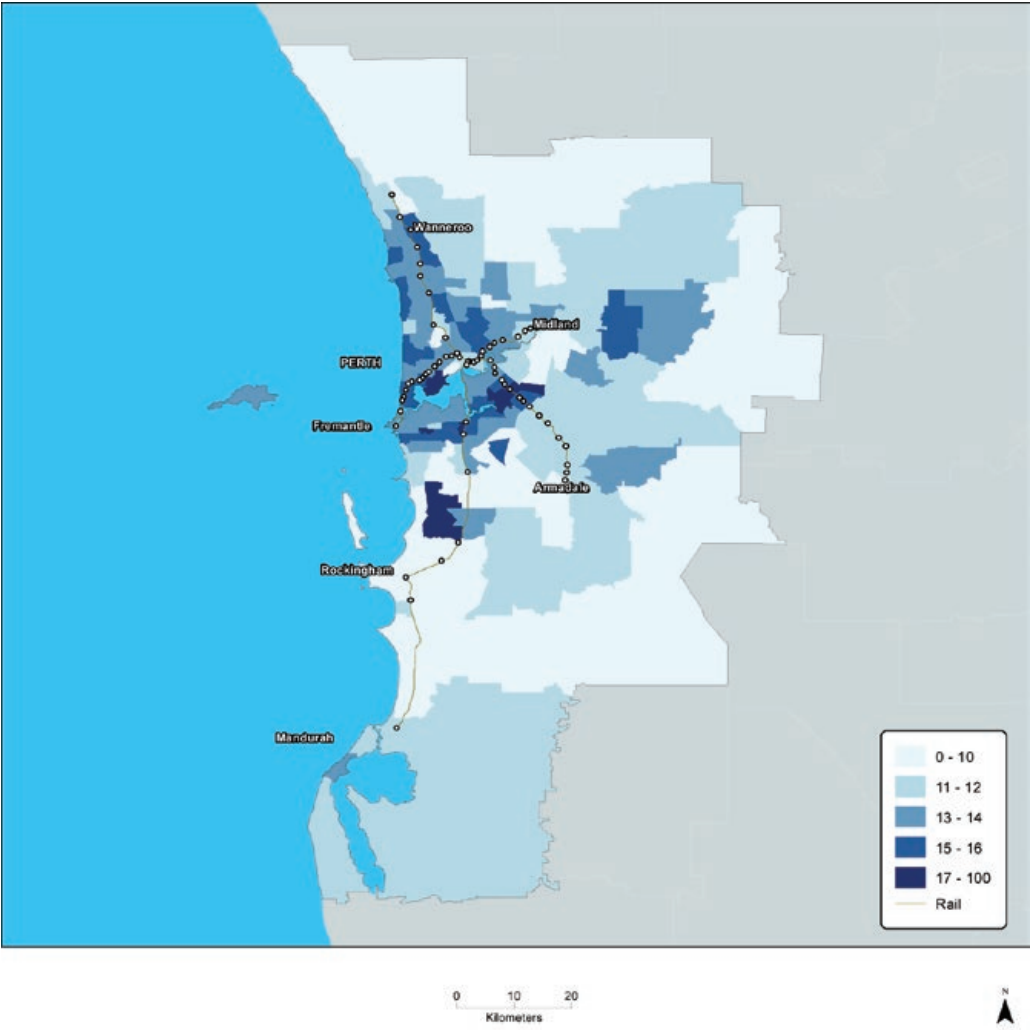
**Map 3-24** Proportion of employed males aged 15 to 64 working full-time in Perth, 2011



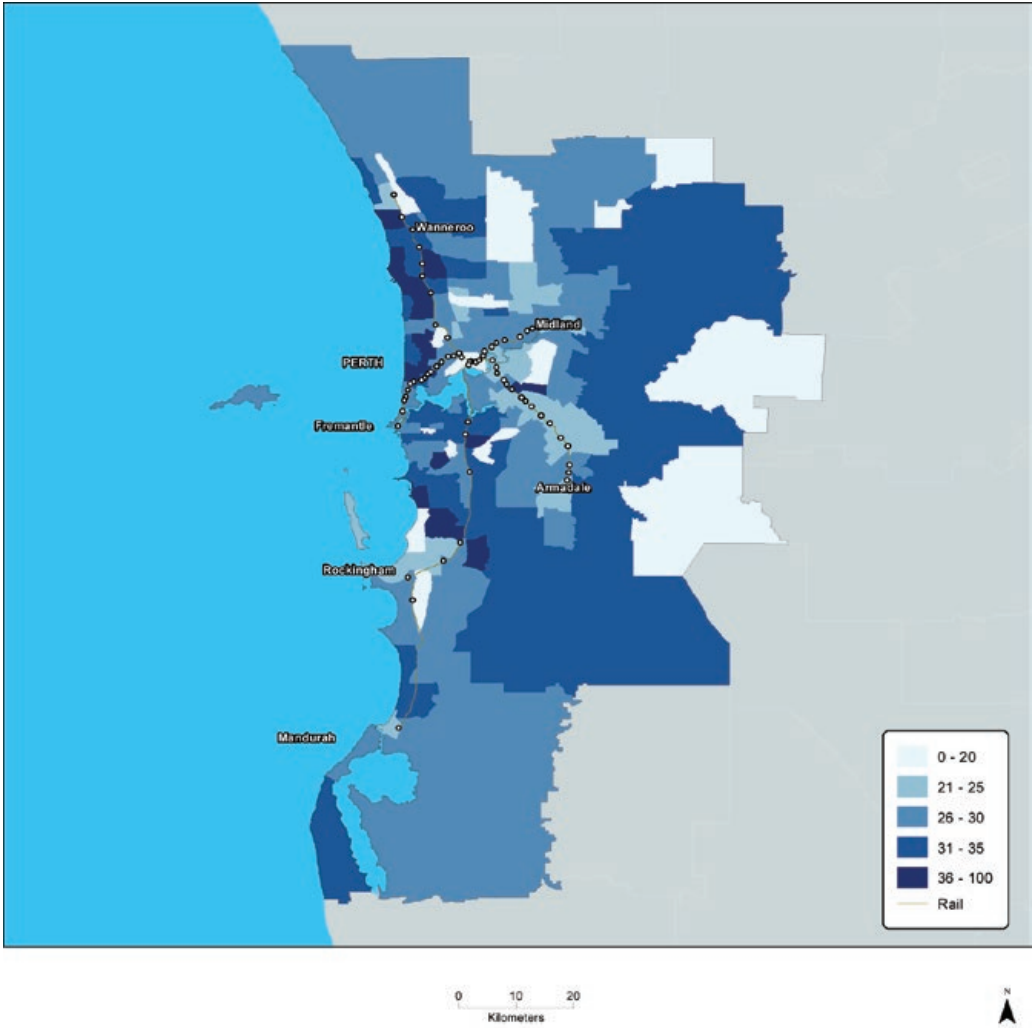
Map 3-25      Proportion of employed females aged 15 to 64 working full-time in  
Perth, 2011



Map 3-26      Proportion of employed males aged 15 to 64 working part-time in Perth, 2011



Map 3-27      Proportion of employed females aged 15 to 64 working part-time in Perth, 2011



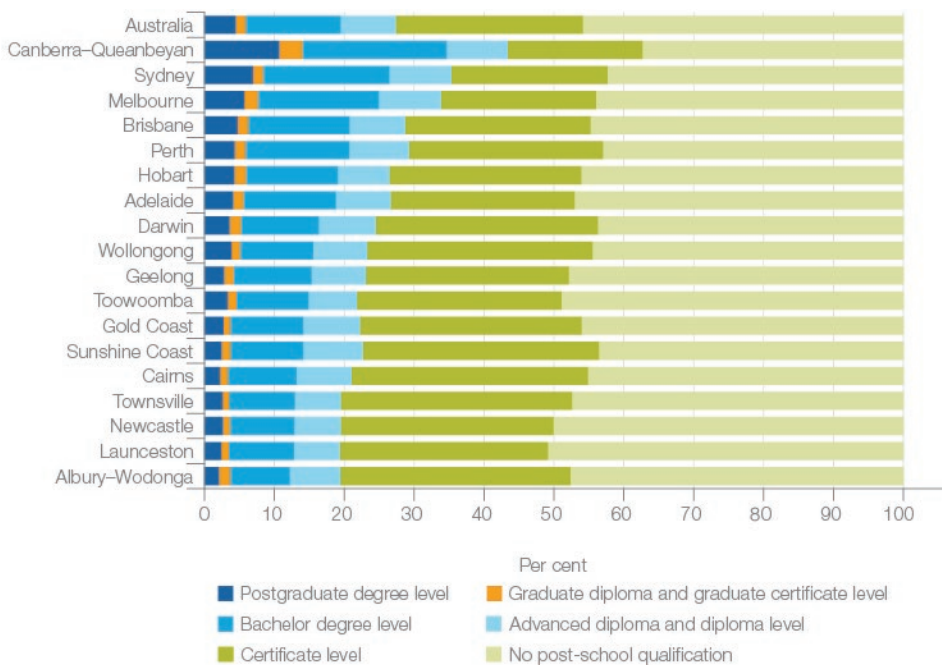


## Qualifications

Higher education qualifications play a key role in Australia's productivity. There is an increasing demand for higher skill levels in the Australian workforce. The OECD has found that post-school qualifications are becoming increasingly important in OECD countries, while the number of unskilled jobs is declining, leaving people without qualifications more vulnerable to unemployment (Coughlan 2013).

Figure 3-35 and Figure 3-36 show the proportion of males and females in Australia's major cities aged 15 and over with post-school qualifications in 2011. They allow a time series comparison to be made with 2001 data. By using data for those aged 15 and over rather than just that for core working age of 25 to 64 a different picture is revealed: 15 to 24 year olds are often still obtaining qualifications and people aged 65 and over are less likely to have post-school qualifications. The proportion of males of core working age with post-school qualifications was approximately 52 per cent in 2011 and for females it was approximately 43 per cent.

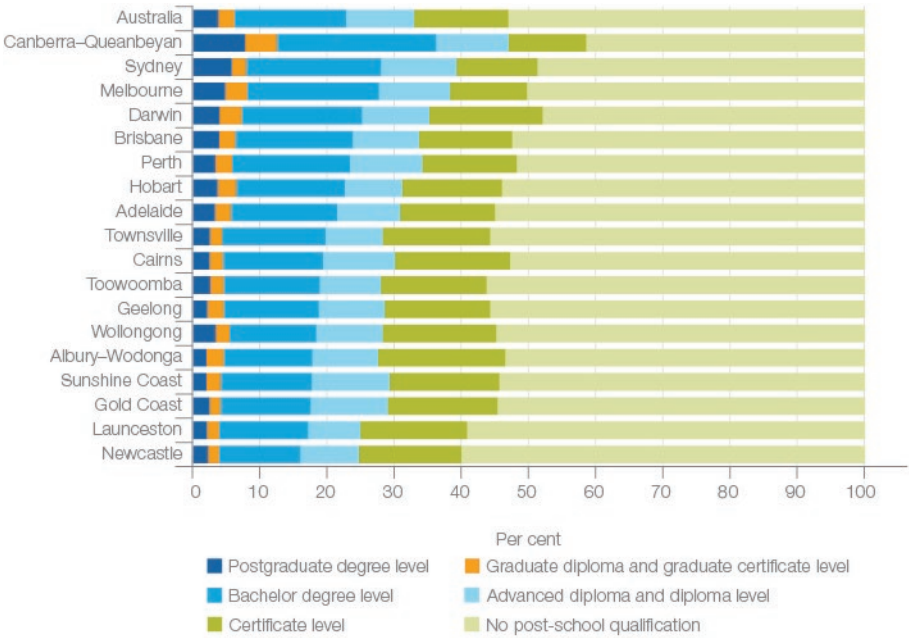
**Figure 3-35** Proportion of males aged 15 and over with certain post-school qualifications, 2011



Note: Data is for males aged 15 years or over. Data is based on highest qualification obtained. Data where industry of employment was not stated or inadequately described have been excluded. Data also excludes persons with a qualification out of the scope of the Australian Standard Classification of Education (ASCED).

Source: Derived from ABS 2012a and ABS 2002

Figure 3-36 Proportion of females aged 15 and over with post-school qualifications, 2011



Note: Data is for females aged 15 years or over. Data is based on highest qualification obtained. Data where industry of employment was not stated or inadequately described have been excluded. Data also excludes persons with a qualification out of the scope of the Australian Standard Classification of Education (ASCED).

Source: Derived from ABS 2012b and ABS 2002

Due to differences in the way that qualifications are classified internationally, it is not possible to compare the number of core working age people with post-school qualifications in Australia against the number in OECD countries. However, the proportion of 25- to 64-year-olds with a tertiary education can be compared: in 2007, 34 per cent of Australians aged 25 to 64 years had a tertiary education, ranking it six percentage points above the OECD average (28 per cent) and the seventh highest amongst the 30 OECD member countries (ABS 2010).

Despite the increasing number of women completing tertiary education, the proportion of females holding post-school qualifications was still significantly lower than for males in 2011 (46.9 per cent for females nationwide versus 54.1 per cent for males). Even when women hold the same qualifications as men, they are less likely to earn the same amount. A 2009 report by AMP and the National Centre for Social and Economic Modelling (NATSEM) found that an Australian man with a bachelor degree or higher qualifications and who had children was estimated to earn \$3.3 million over his working life, whereas a woman with the same qualifications who had children was estimated to earn \$1.8 million (Summers 2013).

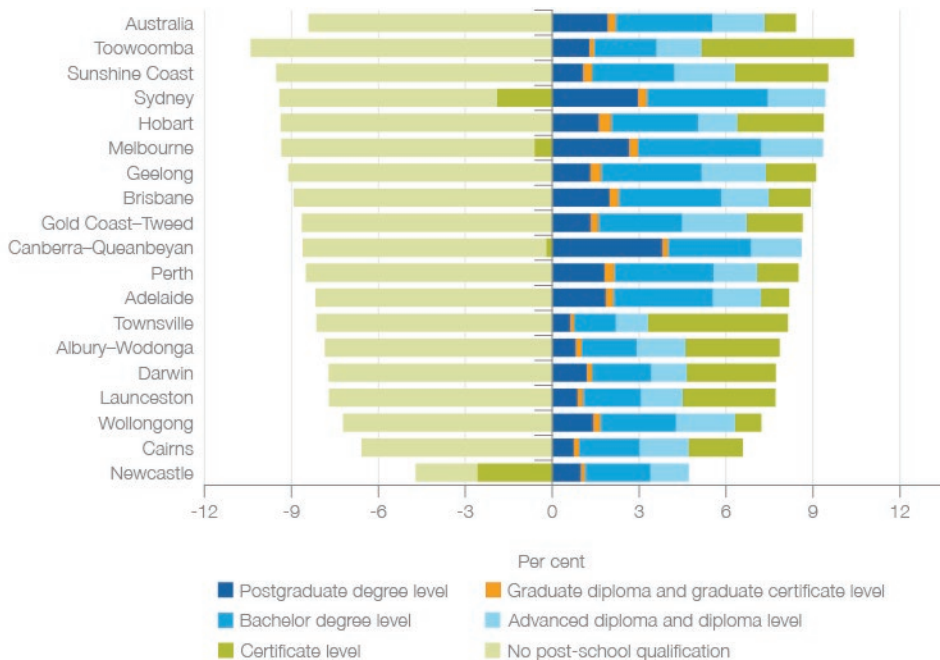
The post-school qualification category where the biggest difference can be seen between males and females is the certificate level qualification. The proportion of males with certificate qualifications is 26.8 per cent nationwide, compared with 14.0 per cent for females. One reason for this is that fewer females seek work in technical and trade occupations. Almost all women studying certificate qualifications between 1995 and 2010 were in the lower-paid trades of hairdressing and hospitality (NCVER 2011). International research has shown that it

is challenging not only to attract women to technical and trade occupations but also to retain women in them (NCVER 2011).

The figures also show that there is a higher proportion of males with certificate qualifications in non-capital cities, while there are higher proportions of males with bachelor degree level or higher qualifications in large capital cities. There are lower proportions of women with certificate qualifications than the national average in all major cities and there are higher proportions of females with bachelor degree level or higher qualifications in large capital cities.

Figure 3-37 and Figure 3-38 show that in most cities there were increases in the proportion of males and females with post-school qualifications between 2001 and 2011, except in Newcastle and Sydney, where there were slight declines in the proportion of males with certificate level as their highest post-school qualification. The proportion of females with post-school qualifications increased at a greater rate than for males in all major cities.

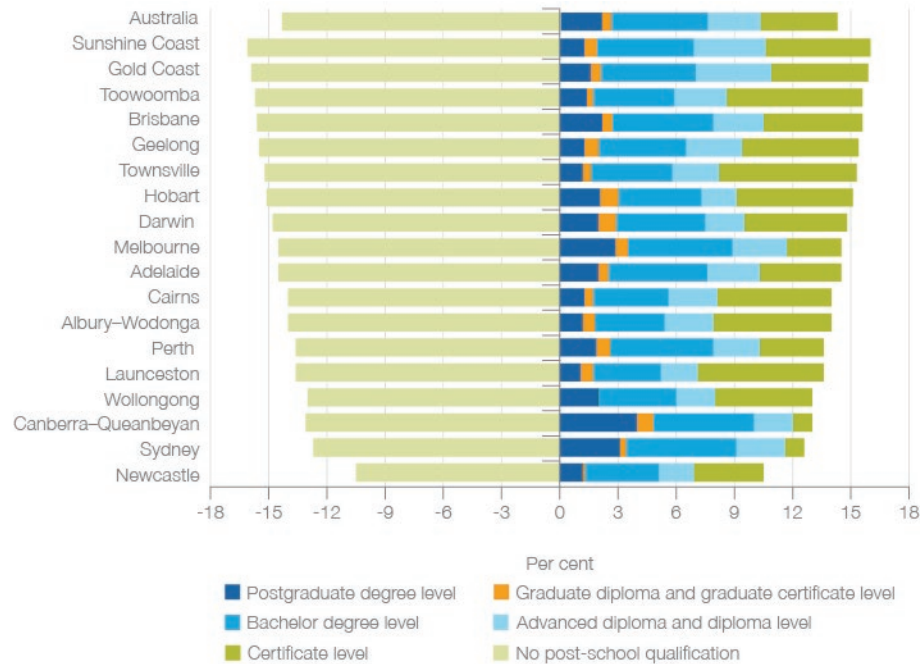
**Figure 3-37** Change in the proportion of males aged 15 and over with post-school qualifications, 2001–11



**Note:** Data is for males aged 15 years or over. Data is based on highest qualification obtained. Data where industry of employment was not stated or inadequately described have been excluded. Data also excludes persons with a qualification out of the scope of the Australian Standard Classification of Education (ASCED).

**Source:** Derived from ABS 2012b and ABS 2002

Figure 3-38 Change in the proportion of females aged 15 and over with post-school qualifications, 2001–11



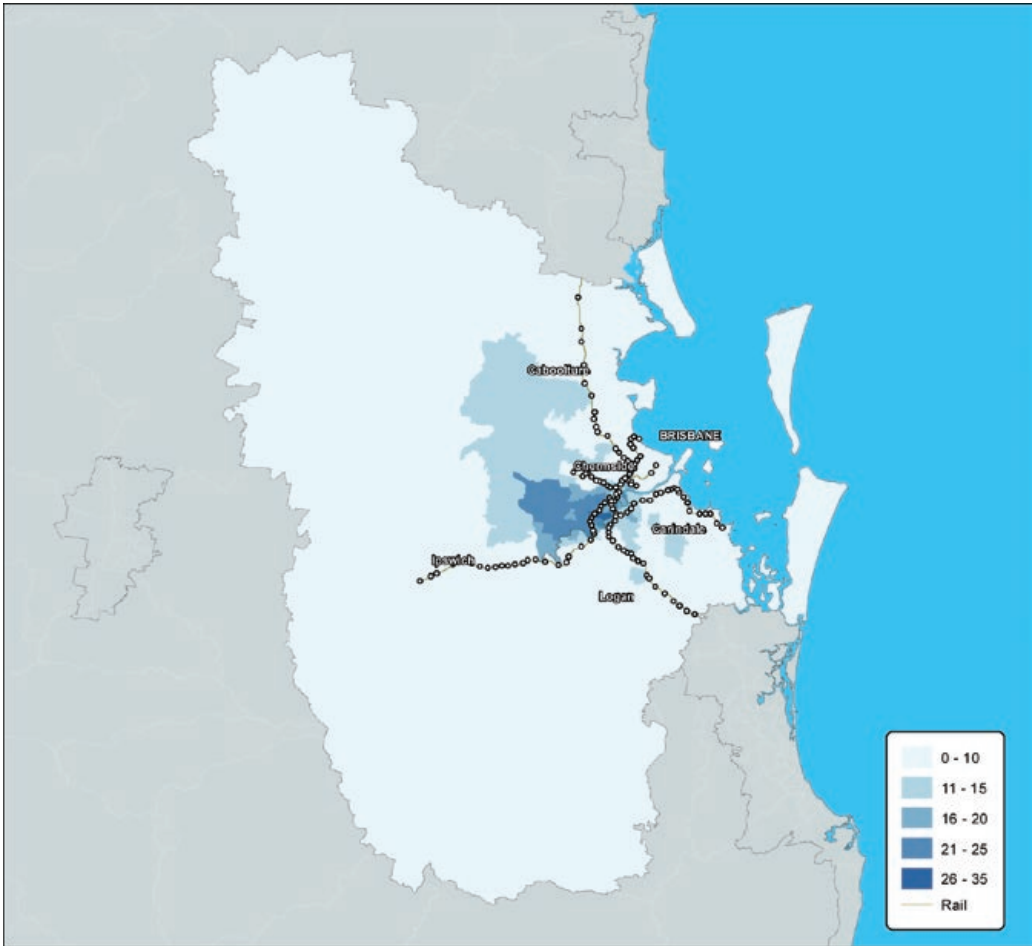
Note: Data is for females aged 15 years or over. Data is based on highest qualification obtained. Data where industry of employment was not stated or inadequately described have been excluded. Data also excludes persons with a qualification out of the scope of the Australian Standard Classification of Education (ASCED).

Source: Derived from ABS 2012b and ABS 2002

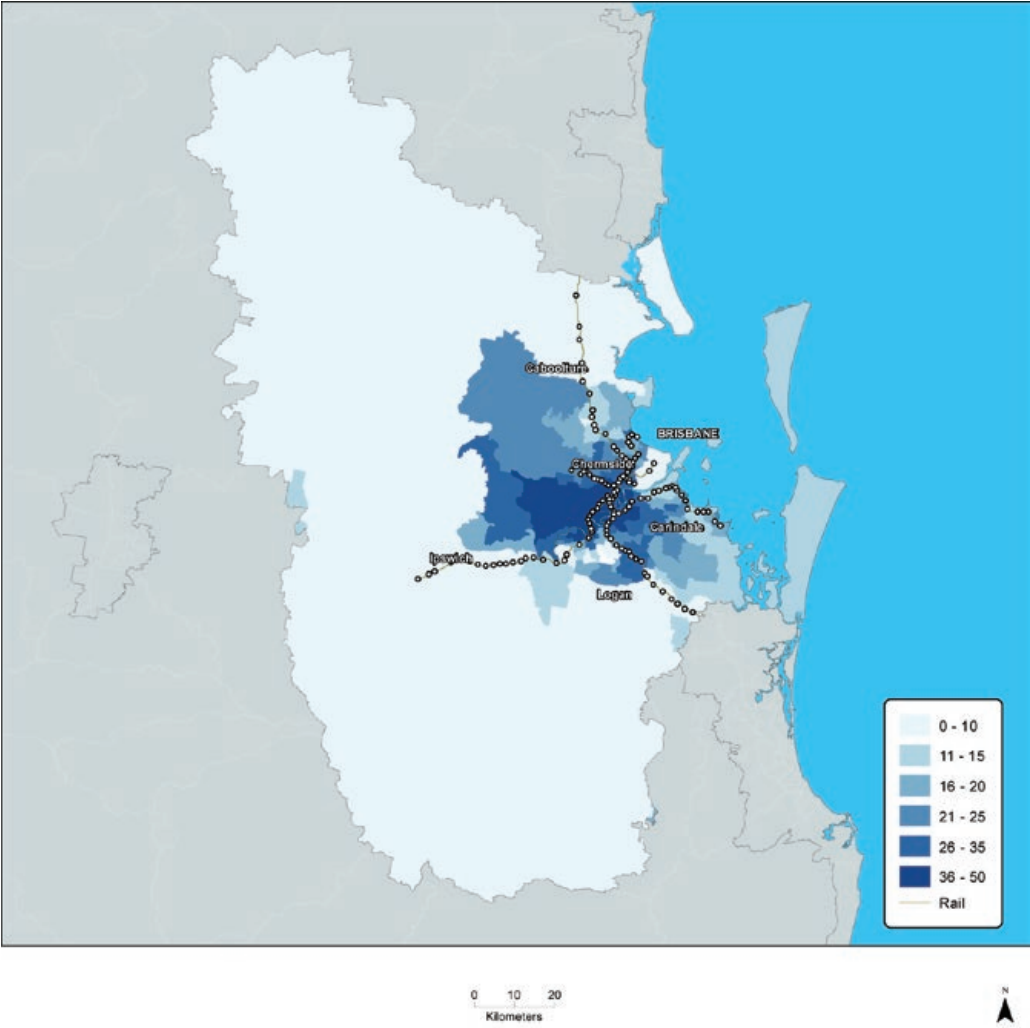
The proportion of people with certain qualification levels is not the same between and within major cities. A higher proportion of people with bachelor degree level qualifications or higher tend live in central areas of major cities, while a higher proportion of people with certificate level qualifications or no post-school qualifications live in outer areas.

Map 3-28 details the proportion of the population in Brisbane in 1996 aged between 15 and 74 with a bachelor degree or higher. It shows that people with this level of qualification were largely concentrated in the inner suburbs. Map 3-29 shows that in 2011 a much higher proportion of people living in Brisbane had this level of qualification and this group was concentrated in Brisbane's inner and middle ring suburbs. Maps for other cities can be viewed using the [supplementary online map application](#).

**Map 3-28** Proportion of the population aged 15 to 74 with a bachelor degree or higher in Brisbane, 1996

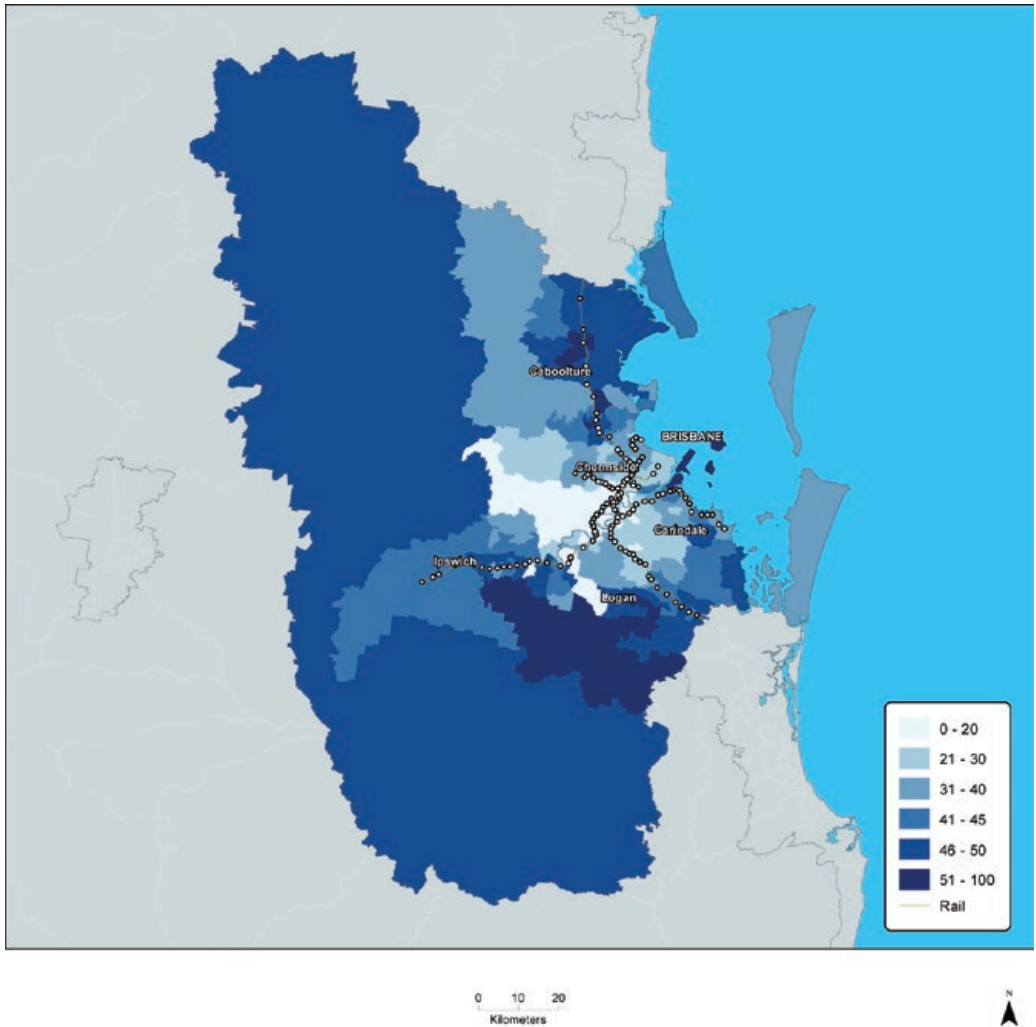


Map 3-29      Proportion of the population aged 15 to 74 with a bachelor degree or higher in Brisbane, 2011



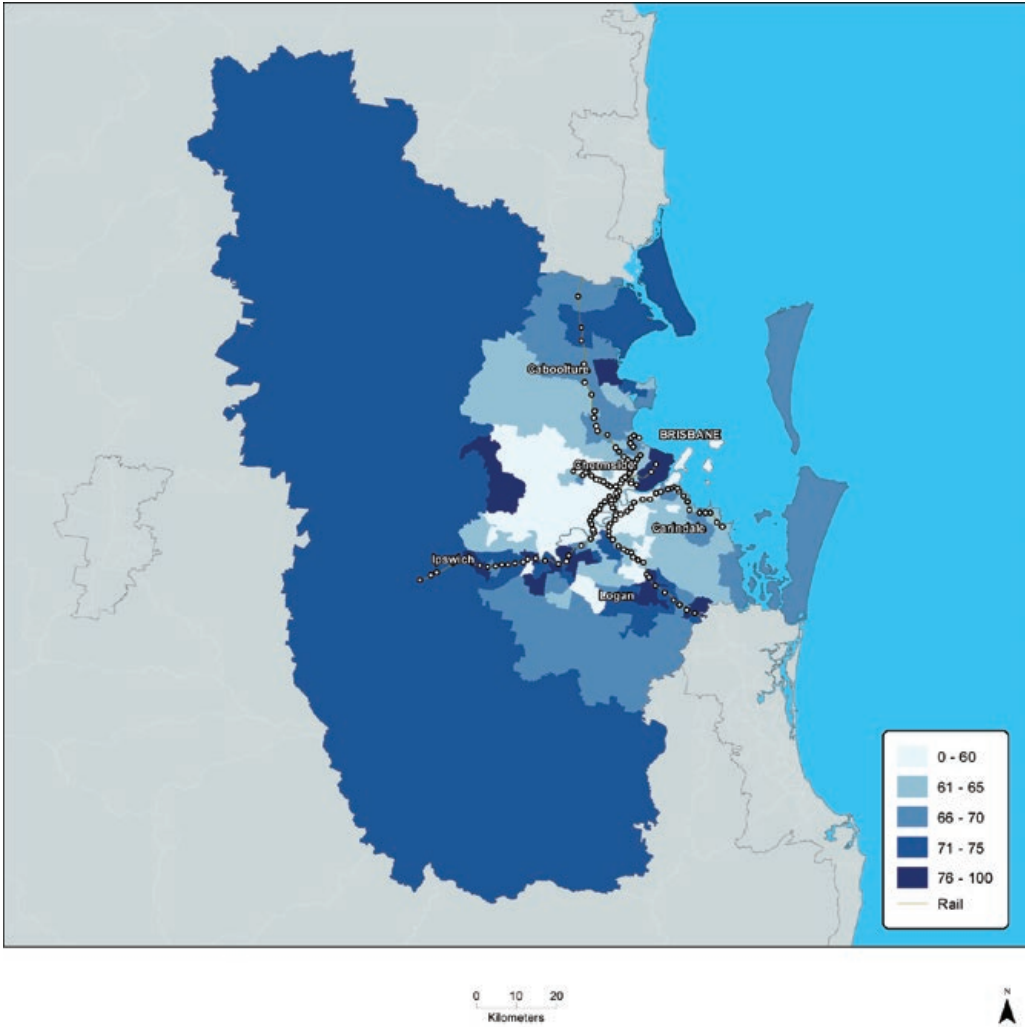
Map 3-30 shows the proportion of the population aged between 15 and 74 with certificate level qualifications in Brisbane in 2011. People with this level of qualification were more likely to live in the outer suburbs. Map 3-31 shows that the proportion of the population aged between 15 and 74 with no post-school qualifications in Brisbane in 2011 were also more likely to live in the outer suburbs.

**Map 3-30** Proportion of the population aged 15 to 74 with highest qualification being certificate level in Brisbane, 2011





Map 3-31 Proportion of the population aged 15 to 74 with no post-school qualification in Brisbane, 2011



## Conclusion

Australia's labour market is undergoing a fundamental shift. Some industries and occupations are under increasing pressure, others are growing stronger and other promising industries are emerging. This has implications for major cities because, while changes in the labour market are being experienced on a national and sometimes even global scale, their effects are very different in different cities and different regions within cities.

Knowledge-intensive jobs account for a small proportion of all jobs overall in Australia's major cities, but they are increasingly important for productivity and national prosperity. They trigger a large multiplier effect, increasing employment and salaries for people who work in the region, particularly in local services jobs that cannot be exported elsewhere. Knowledge-

intensive jobs benefit significantly from agglomeration and therefore tend to cluster in the inner suburbs of Australia's major cities. This is one of the reasons that major cities may be beginning to shrink in on themselves, reversing the dispersing forces that have been dominant since the end of World War II. Additionally, work opportunities in manufacturing and retail in the middle and outer suburbs have been decreasing. These changes to labour markets may be resulting in Australia's major cities becoming more divided, not just by socioeconomic status but also by geography.

Major cities are the economic powerhouses of the nation and will be relied upon to boost Australia's productivity growth during the Asian Century. Connections between the places that people live and where they work in major cities are important to their productivity and also to equality of opportunities. The better we understand productivity and where people live and work, the better placed we will be to boost productivity and liveability.

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