

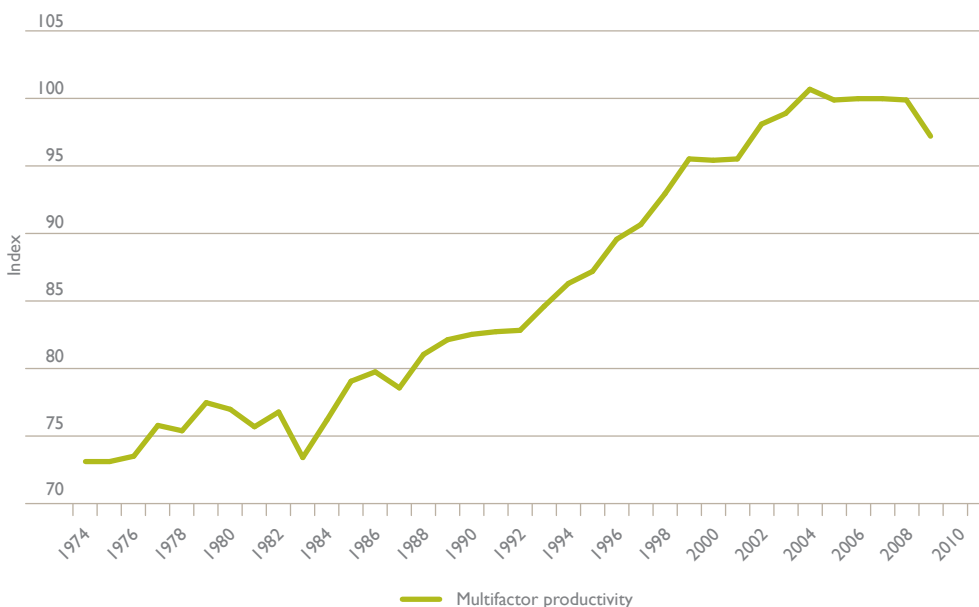
# Productivity

## Chapter 3

Structural drivers of economic growth include the 3Ps – population, participation and productivity (Treasury 2010) which form part of the 'supply side' of real GDP and real GDP per capita (Henry 2004). As noted in the *2010 Intergenerational Report* and described in the previous chapter the first P, working age population, is slowing and as such productivity and participation will be vital to Australia's future economic growth.

There are many ways to measure productivity but the most comprehensive method is multifactor productivity which refers to the combined contribution to productivity of both labour and capital. As illustrated in Figure 3.1, multi-factor productivity has levelled off then declined slightly in Australia since 2004 (ABS 2010).

**Figure 3.1** Australia's multifactor productivity, 1974 to 2009



Source: ABS 2010

As noted in *State of Australian Cities 2010*, since major cities account for four-fifths of the nation's economic activity, their productivity is pivotal to Australia's continuing economic progress.

The productivity section examines the tension between agglomeration (the concentration of certain activities within a certain area) driving productivity in major cities and the transaction costs pulling it backwards. Since transport is one of the major transaction costs of modern cities, an examination of how the largest Australian cities are arranging themselves to reduce this cost is the centrepiece of the chapter.

Participation in the labour force is the subject of the second section of the chapter which looks beyond national aggregate figures by examining participation rates between major cities.

The third section of this chapter looks at the interface of productivity and participation: industry structure. This provides an explanation of some of the major economic forces operating in major cities. The chapter closes by looking briefly at infrastructure investment.

## Summary indicators

Dimension	Indicators
Productivity	Australia's multifactor productivity Selected city labour productivity
Transaction costs - transport	Vehicle kilometres travelled Proportion of jobs with access to public transport Median peak travel time for commuters Amount of freight transported per person Cost of transporting freight
Participation	Labour force participation rates Unemployment rates
Industry structure	Proportion of employed persons by industry
Infrastructure provision	Value of transport infrastructure work

## Key findings

- Productivity growth has slowed and then declined since 1998. The major cities account for 80 per cent of the nation's economic activity.
- Agglomeration (the concentration of certain activities within one area) is a key driver of productivity in the larger capital cities and is strongly associated with employment density.
- While there has been an increased concentration of jobs in urban cores, a trend to a polycentric structure is also evident with a large proportion (50 to 70 per cent) of new jobs located in the outer suburbs in Sydney, Melbourne and Perth.
- Employed residents of Sydney took 35 minutes on average for the journey to work in 2006, which was longer than the average time taken by Melbourne residents (31 minutes) or Perth residents (26 minutes). Commuting times have changed little for a decade.
- Public transport trips in the eight capital cities have increased by 14.7 per cent from 2004 to 2008 and the public transport mode share increased from 9.3 per cent to 10.6 per cent over the same period, well above the population growth rate and higher than many comparable cities internationally.
- In depth analysis of 2001 and 2006 Census journey to work data for Sydney, Melbourne and Perth shows that urban commuting patterns became increasingly complex, with strong growth in outward and cross-suburban commutes. Commuters mainly used public transport to reach inner city jobs. Around 60 per cent of commuter travel by public transport in each city was to a workplace located in the central local government area, whereas public transport mode share to outer suburban jobs was five per cent or less. During the same period commuters' active travel (walking and cycling) mode share rose in all three cities.
- Australia's labour force participation rate is relatively high by international standards and has been mainly driven by increased participation of women in paid employment. Rates are significantly higher in capital than non-capital cities.
- Unemployment levels varied across major cities from a low of two per cent to a high of nine per cent.
- Industry structure in cities is highly variable suggesting that each city plays a unique role in the nation's economic system.
- The finance and insurance sector is continuing to grow in its dominant position in terms of Gross Domestic Product (GDP) and gross value added.
- Traditional industries such as manufacturing have declined as a proportion of GDP. Despite this decline, these industries are still major employers in cities and continue to make up a significant proportion of the gross value added of Australia's economy.
- Mining has now overtaken manufacturing as the industry contributing the second highest proportion of gross value added due to a significant recent increase in the terms of trade.
- There has been a significant increase in Australia's investment in infrastructure in the past decade.

## The concepts of agglomeration benefit and transaction costs

Late in the 19th century, the economist Alfred Marshall asked why firms found it advantageous to locate in cities (Marshall 1920). He suggested three reasons: to be near customers, to access a large pool of labour and to benefit from technological spillovers that occur when firms co-locate. A century of research has largely confirmed Marshall's views. Some firms benefit more than others from this process of agglomeration which is why banking, finance, law, advertising and government services are concentrated in the centre of major cities.

There are two components to this effect. The first is urbanisation: the larger the city, the higher the labour productivity. The second is localisation, which is related to the actual spatial organisation within a city and affects the ease with which firms can interact with each other (Rawnsley and Szafreñic, 2010).

Opposing agglomeration benefits are transaction costs. This concept of transaction costs is associated with the Nobel Laureate, Ronald Coase (Coase 1960) and John Commons. Transaction costs are the costs incurred in participating in the market. For example, the sticker price of a toothbrush might be \$7.00 but other (transaction) costs include search time, travel time and paying for the toothbrush. Therefore the real cost is the combination of \$7.00 plus transaction costs. If labour is exchanged for money, then travel is often a major transaction cost. Employees have an incentive to maximise salary and minimise transaction costs such as travel and parking. Commuting patterns in cities will reflect this tension.

## Agglomeration

Over the past 25 years, microeconomic reform and macroeconomic policy settings in Australia have lifted the productive capacity of the major cities. However, concerns that those reforms and policy instruments may not be able to deliver the same results into the future has led to attention being focused on increasing the level of agglomeration via improved transport linkages, increasing employment densities within existing employment clusters or expanding the areas of employment.

Assessing the possible benefits of increasing urban agglomeration has been problematic because Australian statistical and local government boundaries within and between cities vary so much in area and population (Trubka 2009). A recent study has built a picture of labour productivity for Australia's largest cities and the impact of the relative size of each major capital city on labour productivity. The data (Figure 3.2) shows that there is higher productivity in Melbourne and Sydney (Rawnsley and Szafraneic 2010). It also suggests that population is not the only factor that influences productivity, as seen in the case of Perth which has higher labour productivity relative to its population. The industry mix within each city also influences the outcome. That is, more productive industries tend to locate in particular cities.

**Figure 3.2** Selected capital cities labour productivity, 2008



Source: Rawnsley & Szafraneic 2010

The study also measured labour productivity data against 'effective job density' (the level of employment relative to the time taken to gain access to that employment and the transport mode split that is currently experienced by those employees) of various areas within Melbourne to determine the benefits of agglomeration for different industries. The results showed that agglomeration improves productivity for industries such as finance and insurance, property and business services, tertiary education, health and community services, and cultural and recreational services over others such as manufacturing and wholesale trade which are generally more attracted by the availability of large (relatively inexpensive) sites to locate their operations.

There are many impediments to maximising agglomeration including community opposition to proposed developments, higher transaction costs, rising land costs and congestion. However, with an ageing population and relative decline in labour force participation, increases in GDP will have to be achieved, in most part, through increased per capita productivity. How policy makers respond to the challenge of spatially organising our cities to increase productivity in the future will have an increasingly important impact on Australia's future economic growth.

## Transaction costs: An overview of urban transport

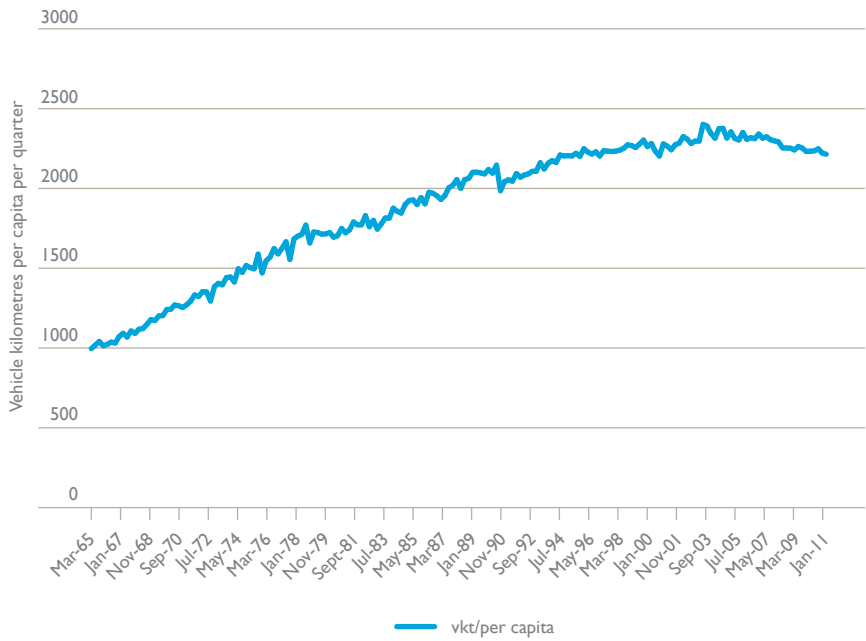
Transport costs are just one of the transaction costs incurred in urban markets but it is one of the most important and has a profound effect on the productivity of cities. An overview of urban transport at the beginning of this section gives context to detailed examination by BITRE of how the spatial structure of cities is expressed through commuting patterns of Perth, Melbourne and Sydney.

*State of Australian Cities 2010* noted that Australia's urban passenger transport task has been dominated by car travel since the 1950s. This has been made possible by a rapid improvement and spread of the road system and an even more rapid expansion in car ownership.

From 2000–01 to 2008–09, the total passenger vehicle kilometres travelled in the eight capital cities increased by 16 per cent (24 billion kilometres). Of the 173.5 billion passenger kilometres travelled within these metropolitan areas in 2008–09, more than 146.5 billion (84 per cent) were by passenger car. Note that the proportion of car use has declined slightly from 85.8 per cent in 2000–01 (BITRE, 2011a).

Total passenger kilometres travelled were originally projected to rise to 225 billion by 2020, with car travel accounting for nearly 190 billion passenger kilometres (BITRE, 2007). More recent research by BITRE (2011a) has shown a flattening of the trend (Figure 3.3) suggesting that there may be a limit to growth in per capita travel. These trends are replicated in many advanced economies (BITRE, 2011e).

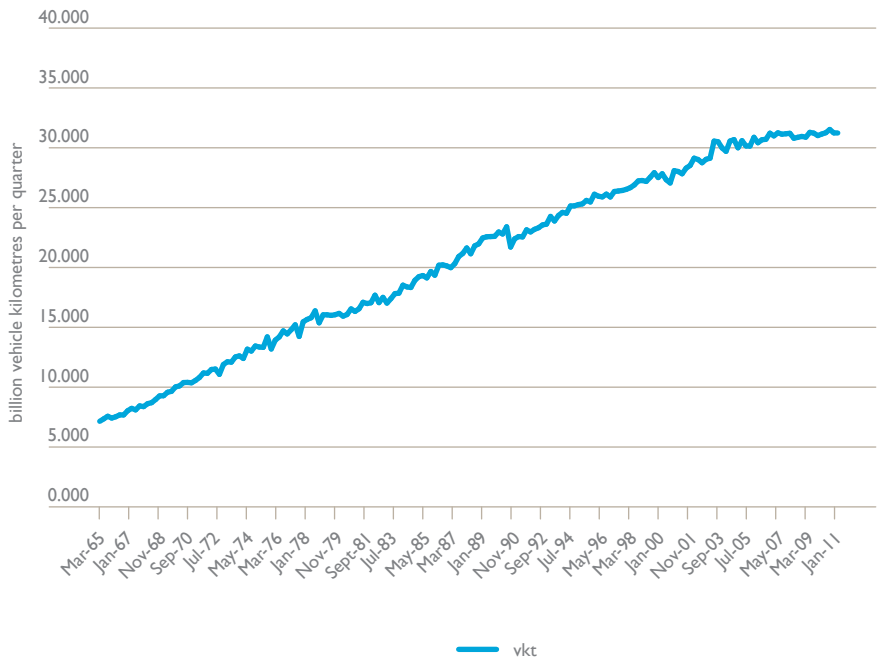
Figure 3.3      Vehicle kilometres travelled (vkt) per capita 1965 to 2011



Source: Derived from BITRE 2011e

Despite slowing of growth in per capita travel the total number of kilometres travelled has continued to increase. This is related to population growth and to a lesser extent the increased travel for freight in metropolitan centres, as shown in Figure 3.4.

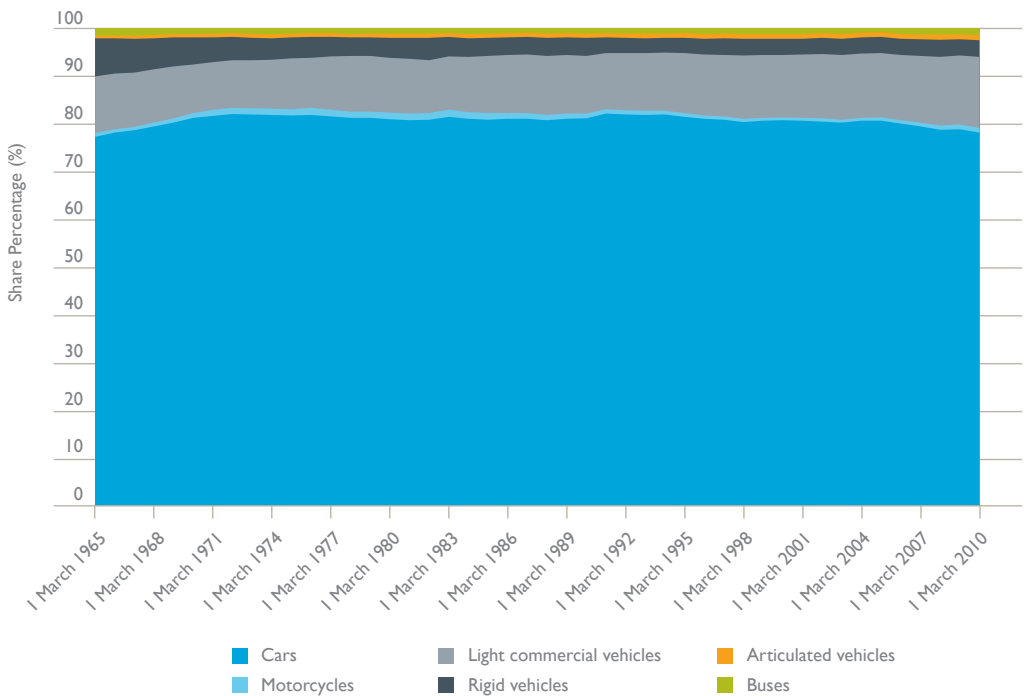
**Figure 3.4** Aggregate and predicted vehicle kilometres travelled (vkt) capital cities, 1965 to 2011



Source: Derived from BITRE (2011e)

Although the proportion of total vehicle kilometres travelled (vkt) attributable to car travel has decreased slightly over the past decade, this has been offset by an increase in the proportion of travel by light commercial vehicles and motor cycles (Figure 3.5) resulting a net increase in aggregate vehicle kilometres travelled.

**Figure 3.5** Share in capital city transport task (vkt) by vehicle types, March 1965 to March 2010

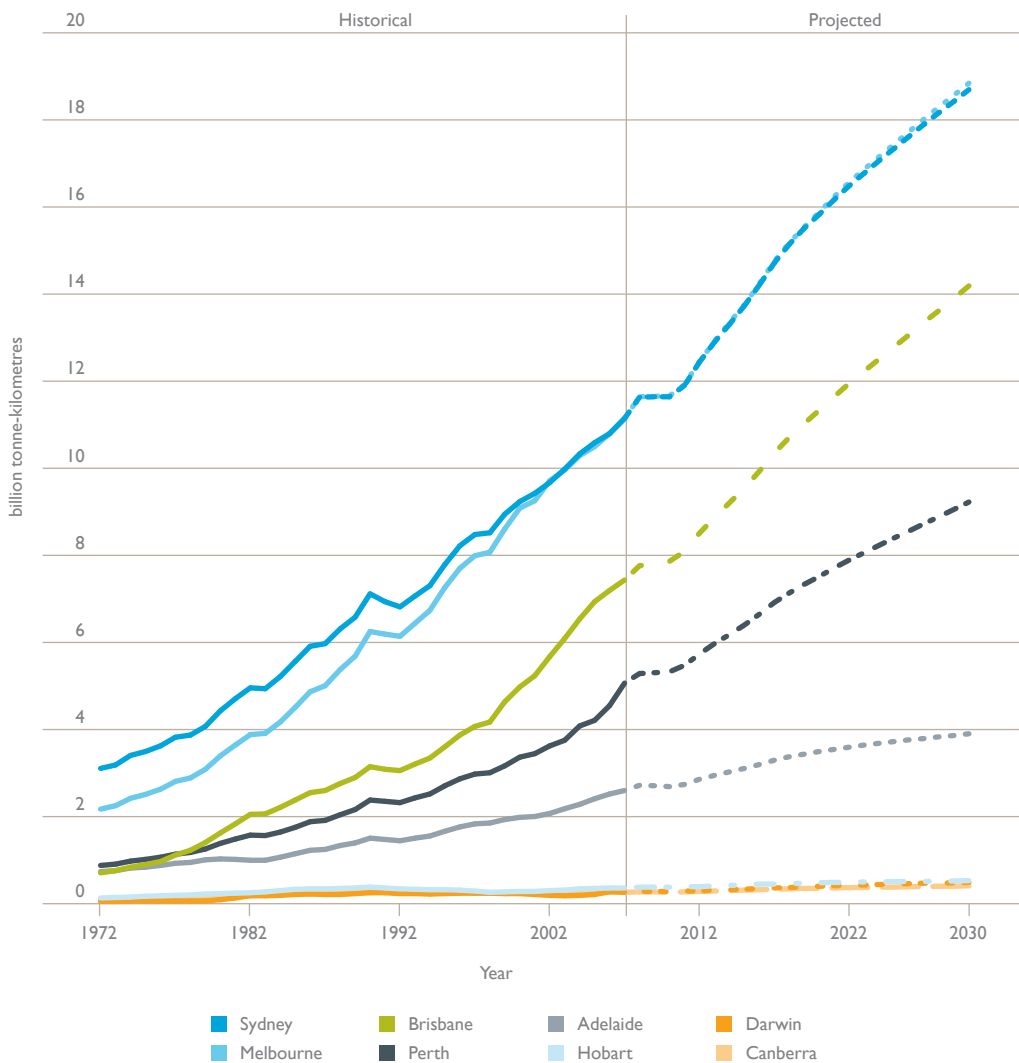


Source: BITRE 2011a

## Freight

Even though personal passenger travel exhibits a saturating trend over time there is, as yet, no sign of approaching saturation in per capita freight movement in Australia. Part of the reason for this is that freight rates (cost of transporting goods) are falling. Real freight rates fell approximately 45 per cent from 1965 to 1990, and then a further three per cent in the 1990s (BITRE 2008a). Projections by BTRE (after 2008, known as BITRE) suggest that the commercial freight task will grow 3.5 per cent a year between 2000 and 2030 compared with passenger car travel which is projected to grow by only 1.7 per cent a year (BTRE 2007). This growth in the freight task for capital cities is represented in Figure 3.6 in terms of how many more billion tonne-kilometres will be travelled by 2030.

Figure 3.6 Historical and projected freight travel in capital cities 1972 to 2030



Source: BTRE 2007

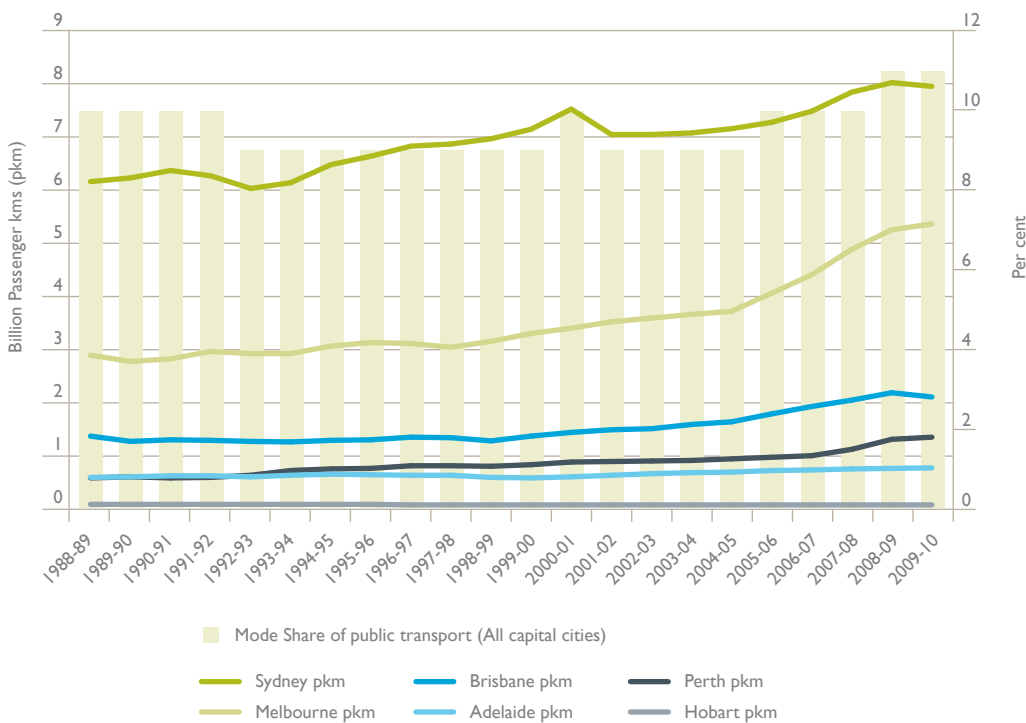
Despite the growth in freight's share of the transport task, the share of car travel as a percentage of the total will remain very high.

### Public transport

Past BTRE estimates (2007), assuming that the public transport mode share remained stable, concluded that the costs of congestion could rise from \$9.5 billion in 2005 to \$20.4 billion in 2020 (the business-as-usual scenario). However, in an alternative scenario whereby public transport, walking and cycling were to double their mode share, BITRE estimates that the avoidable congestion cost in 2020 could be reduced to about \$14 billion.

Public transport use has been rising significantly in most capital cities since 1991 (Figure 3.7). For example, Sydney's Cityrail experienced 5.7 per cent growth in 2008 and Sydney buses 3.2 per cent. Melbourne rail trips grew by 38 per cent over the three years to September 2008. Melbourne bus patronage grew 7.4 per cent and tram patronage 5.3 per cent in one year to 2007, and Melbourne's public transport mode share has increased from nine per cent in 1999 to 13 per cent in 2008. Public transport trips in the Translink area of South East Queensland (Brisbane/Gold Coast/ Sunshine Coast) increased from 100.8 million trips in 1998–99 to more than 171 million trips in 2007–08. Over the past 10 years, public transport use in Perth has increased by 67 per cent, three times the rate of population growth over the same period.

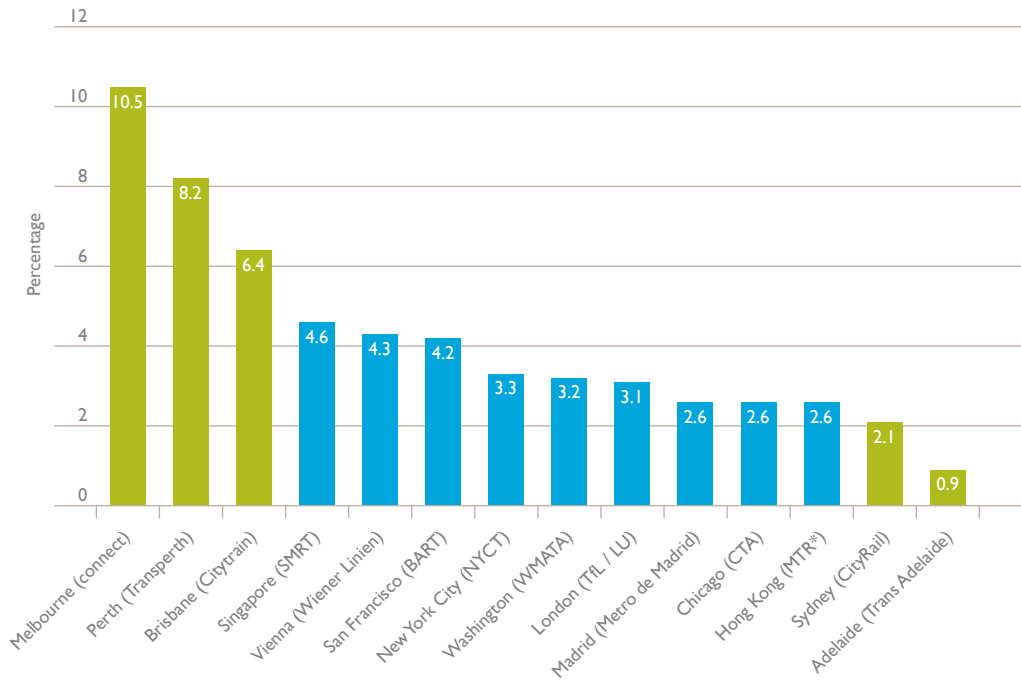
Figure 3.7 Public transport use in capital cities, 1988-99 to 2009-10



Source: BITRE 2009a

In total, public transport trips in the eight capital cities increased by 14.7 per cent from 2004 to 2008, and the public transport mode share increased from 9.3 per cent to 10.6 per cent. This growth rate is well above population growth and higher than many comparable international cities, albeit off a low base. For example, growth in passenger rail transport patronage in Australian cities has been higher than major international centres (Figure 3.8).

**Figure 3.8** Rail patronage growth per annum in major international cities,



Source: Stanley and Barrett 2010

Whether the above trend growth of the past few years will continue into the long term, leading to a sustained increase in the public transport mode share, is uncertain. However, the growth in the population of Australian cities alone is expected to contribute to continued strength in public transport use.

This level of growth has not occurred without presenting new challenges. Increased congestion on public transport in Australia's cities has reduced reliability. There is a call for more services in major centres to reduce persistent crowding during peak periods. Overcrowding, particularly on trains, has been regularly reported in Melbourne (Lucas 2011), Sydney (Simmonds 2011), Brisbane (Hurst 2011) and Perth (Acott 2011) over the past year, as transport authorities have grappled with increased patronage. Convenience is cited as a main reason for using public transport, but lack of reliability, personal comfort and privacy could quickly erode patronage.

# Minimising transaction costs through city structure: a detailed study of Sydney, Melbourne and Perth

This section looks in detail at how cities are structuring themselves to reduce the travel costs of economic activity. It does this by looking at commuting patterns in Perth, Melbourne and Sydney.

Commuting patterns are shaped by the spatial distribution of population and jobs in our cities. This section compares journey to work flows in three cities—Sydney, Melbourne and Perth—drawing on the findings of an ongoing BITRE study of spatial patterns of population growth, jobs growth and commuting (BITRE 2010, 2011d, 2011e). The section highlights some key features of urban commuting flows, discussing patterns of change since 2001 and the implications for transport use and infrastructure.

Commuter travel is a significant component of urban passenger transport demand, particularly during peak periods. Table 3.1 summarises the transport modes used for the journey to work in 2006, and the changes that have occurred since 2001. The private vehicle mode share is highest in Perth (81 per cent), while the public transport and active travel mode shares are both at their highest in Sydney (at 21 per cent and five per cent respectively).

Commuters mainly use the public transport system to reach inner city jobs. While roughly 20 per cent of jobs are located in the central local government area (LGA) of each city, about 60 per cent of commuter public transport use involves travel to a workplace in the central LGA. The public transport mode share is typically very low for outer suburban jobs, two to three per cent for Perth and Melbourne and five per cent in Sydney.

**Table 3.1** Transport mode use by commuters in Sydney, Melbourne and Perth, 2001 and 2006

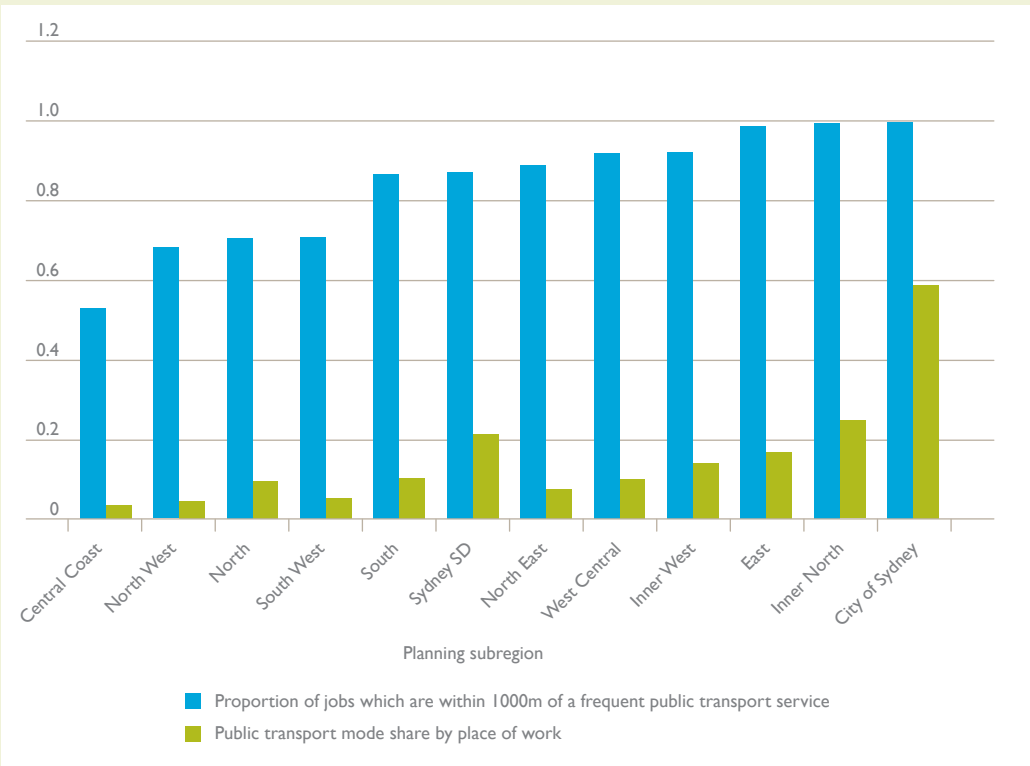
Indicator	Sydney	Melbourne	Perth
<b>Mode share of commuting trips, 2006 (%)</b>			
Private vehicles	68.6	76.4	80.5
Public transport	20.7	13.6	10.2
Active travel (cycling and walking)	5.3	4.7	3.7
Other*	5.4	5.3	5.6
<b>Percentage point change in mode share of commuting trips, 2001 to 2006</b>			
Private vehicles	+1.1	-1.7	-0.5
Public transport	-1.1	+0.8	+1.1
Active travel (cycling and walking)	+0.5	+1.0	+0.3
Other*	-0.5	-0.2	-0.9

Note: \*Includes work from home and other transport mode. Did not go to work and mode unstated were excluded from mode share calculations.

Source: BITRE analysis of ABS Census of Population and Housing 2006 and 2001

Looking at these patterns in more detail in Sydney (Figure 3.9), whether jobs are located within one kilometre of public transport has a measurable but limited influence on public transport use, suggesting that journey origin and length may play a key role in modal choice.

**Figure 3.9** Public transport access and use by subregion of work, Sydney, 2006



Note: A frequent public transport service is defined to be one which departs at least eight times during the morning peak (7am to 9am).

Source: New South Wales Bureau of Transport Statistics (2011 data request)

Table 3.1 shows that from 2001 to 2006, commuters' active travel mode share rose in all three cities with the most pronounced increase occurring in Melbourne. Perth and Melbourne both experienced a shift away from private vehicles towards public transport patronage for the journey to work. In contrast, Sydney's commuters were more car dependent in 2006 than in 2001 although recent data indicates that this mode shift has since reversed (TDC 2010).

Changes in commuting patterns have implications for the use of different transport modes and for investment in transport infrastructure. For example, the Victorian Government's spatial projections of population and employment growth through to 2026 imply substantial growth in commuter travel for the origin-destination pairs listed in Table 3.2 which would create increased demand for public transport and road infrastructure to facilitate these commutes. Some implications of this growth have been recognised in the Victorian Government's infrastructure planning (e.g. Outer Suburban Arterial Roads program, Regional Rail Link project). While rail infrastructure is likely to play an important role in accommodating increased commuting to the CBD, the expanding volume of shorter distance commuting flows within the Outer Southern, Outer Western and Outer Northern subregions of Melbourne is likely to require investment in road infrastructure and expanded bus services.

**Table 3.2**                      **Principal expected contributors to growth in commuting flows, Melbourne, 2006 to 2026**

Sub region of residence	Sub region of work	Estimated share of total change in commuters
Outer Southern	Outer Southern	18%
Inner	Inner	9%
Outer Western	Outer Western	8%
Outer Northern	Outer Northern	7%
Outer Western	Middle West	5%
Outer Western	Inner	4%

Note: Table represents results of scenario modelling of State government population and employment projections, using BITRE gravity model regression parameters for Melbourne.

Source: BITRE 2011b

Transport infrastructure also plays an important role in shaping urban commuting patterns. The existing rail and freeway network, built over many decades, plays a significant role in explaining current urban commuting flows. Large scale expansions of this infrastructure can fundamentally reshape commuting flows (BITRE 2011b).

## *Commuting flows*

BITRE conducted a study to explore contributing factors to commuting flows and how commuting behaviour has responded to recent changes in population and employment.

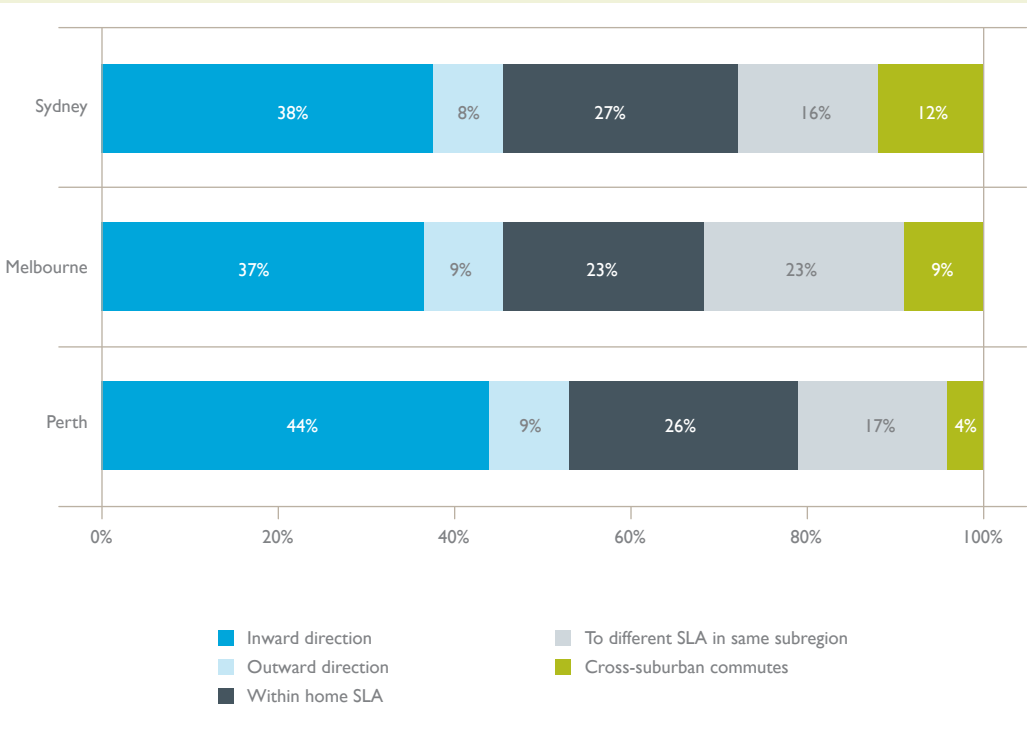
The main influences on urban commuting flows identified were:

- The spatial distribution of the residential population and jobs (including skills and industries)
- Travel costs, particularly the time spent commuting
- Transport infrastructure, such as rail and freeway networks (BITRE 2010, 2011a and 2011b).

Two fundamental drivers of change in urban commuting flows are changes to the spatial distribution of the residential population and of jobs. Since industries have different preferences as to where they locate, the industry mix of jobs growth in each city has implications for the spatial distribution of employment, and in turn, for commuting patterns.

People's journeys to work can be described spatially by their place of residence (origin) and their place of work (destination). Figure 3.10 presents a snapshot of these origin-to-destination commuter flows in 2006. About one quarter of commutes involve a place of work located within the person's home statistical local area (SLA), while 42 to 46 per cent of commutes involve a place of work in the home sub-region. The other prominent category of commuter flow is inward flows, which represent 37 to 44 per cent of commutes in each city.

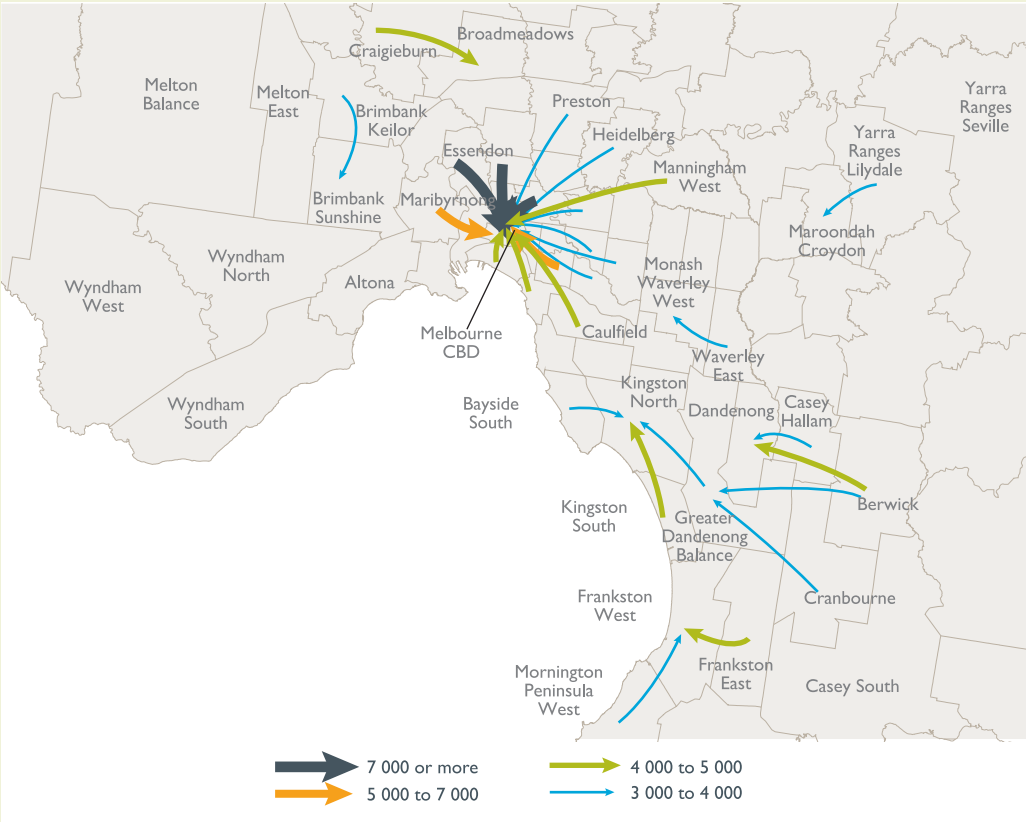
**Figure 3.10** Mix of different types of commuter flow within Sydney, Melbourne and Perth, 2006



Source: BITRE analysis of ABS Census of Population and Housing 2006.

Because the central LGA accounts for about 20 per cent of jobs, inward commutes to a workplace in the central LGA are very prominent, as can be seen for Melbourne in Figure 3.11.

**Figure 3.11**      **Commuting flows in Melbourne that involve 3000 or more persons, 2006**

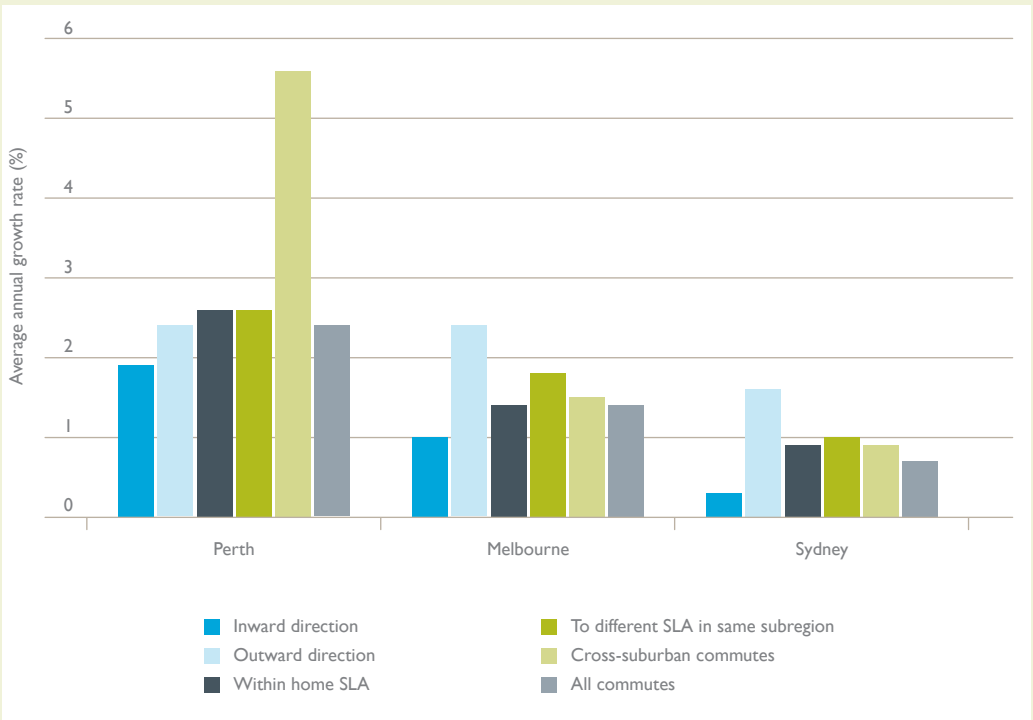


Note: For clarity of presentation, the three City of Melbourne SLAs have been aggregated to a single entity. Excludes commutes with n SLA of residence.

Source: BITRE analysis of ABS Census of Population and Housing 2006

Figure 3.12 shows how growth rates varied for the different types of commuting flows. Urban commuting patterns became increasingly complex between 2001 and 2006, with inward commutes becoming a little less dominant and strong growth in outward commutes and cross-suburban commutes. Inward flows experienced the slowest rate of growth in all three cities, while Melbourne and Sydney recorded strong growth in outward commuting. There was rapid growth in cross-suburban commutes in Perth's outer suburbs. Commutes within the home sub-region (including the home SLA) grew at a rate similar to the city-wide average and as a result, the proportion of people who worked in their home subregion remained unchanged for all three cities.

**Figure 3.12**      **Growth by type of commuter flow for Sydney, Melbourne and Perth, 2001 to 2006**



Notes: Further information on flow type definitions provided in Table 3 footnote and BITRE (2010).

Source: BITRE analysis of ABS Census of Population and Housing 2006 and 2001.

The time people spend commuting to and from work is an important element of quality of life in urban areas affecting the relationships people have with their families, communities and workplaces as well as emotional and physical wellbeing (Flood and Barbato 2005). Table 3.3 shows that employed residents of Sydney took 35 minutes on average for the journey to work in 2006, which was longer than the average time taken by Melbourne residents (31 minutes) or Perth residents (26 minutes). These between-city differences in travel time reflect differences in distances travelled and traffic congestion.

**Table 3.3** Indicators of commuting distance, time delay for Sydney, Melbourne and Perth

Indicator	Sydney	Melbourne	Perth
Average straight line commuting distance, 2006 (km) <sup>(1)</sup>	11.3	11.1	10.5
Average commuting time, 2006 (minutes) <sup>(2)</sup>	35	31	26

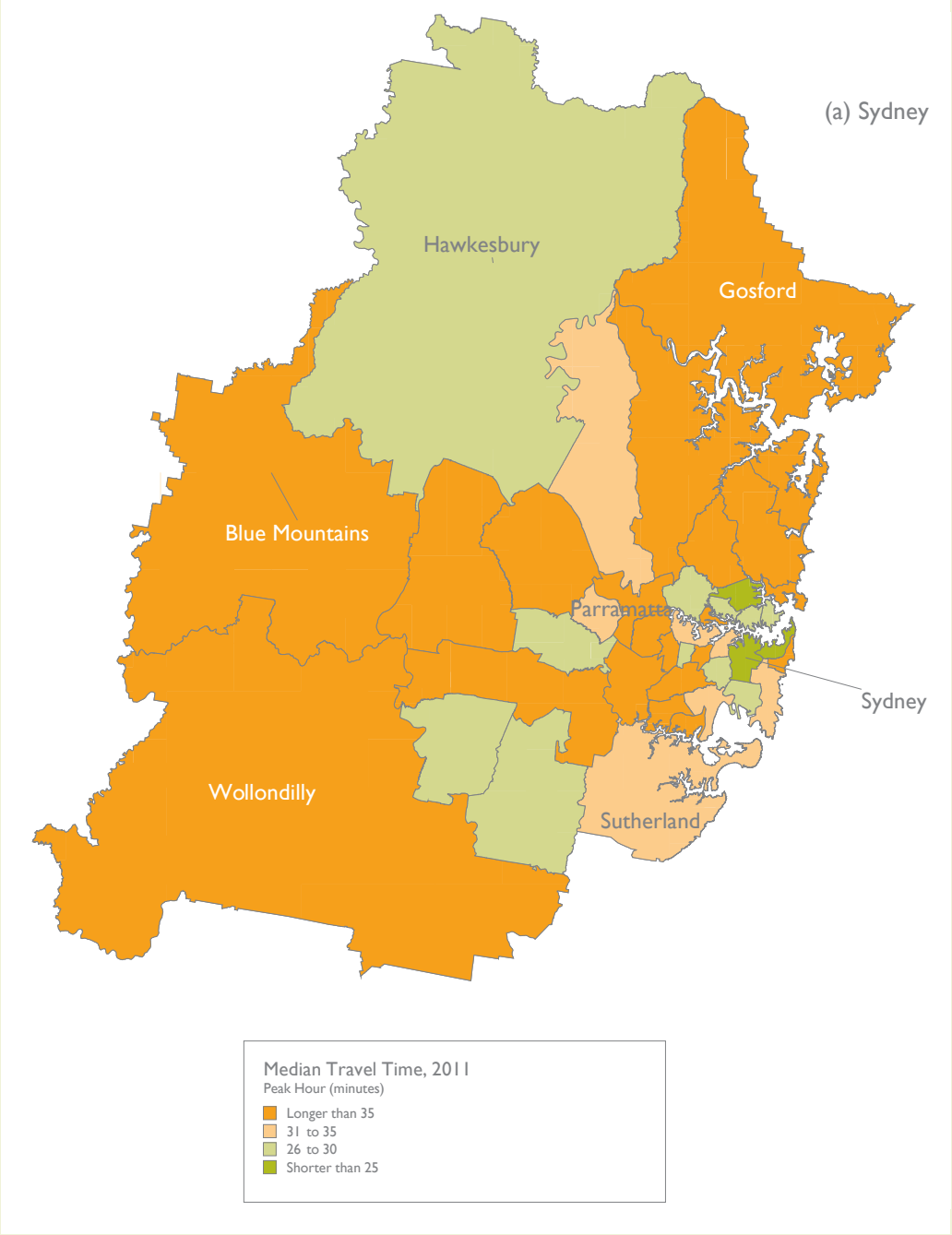
Note: BITRE estimates of the average road distance are 14.8km for Melbourne and 14.6km for Sydney

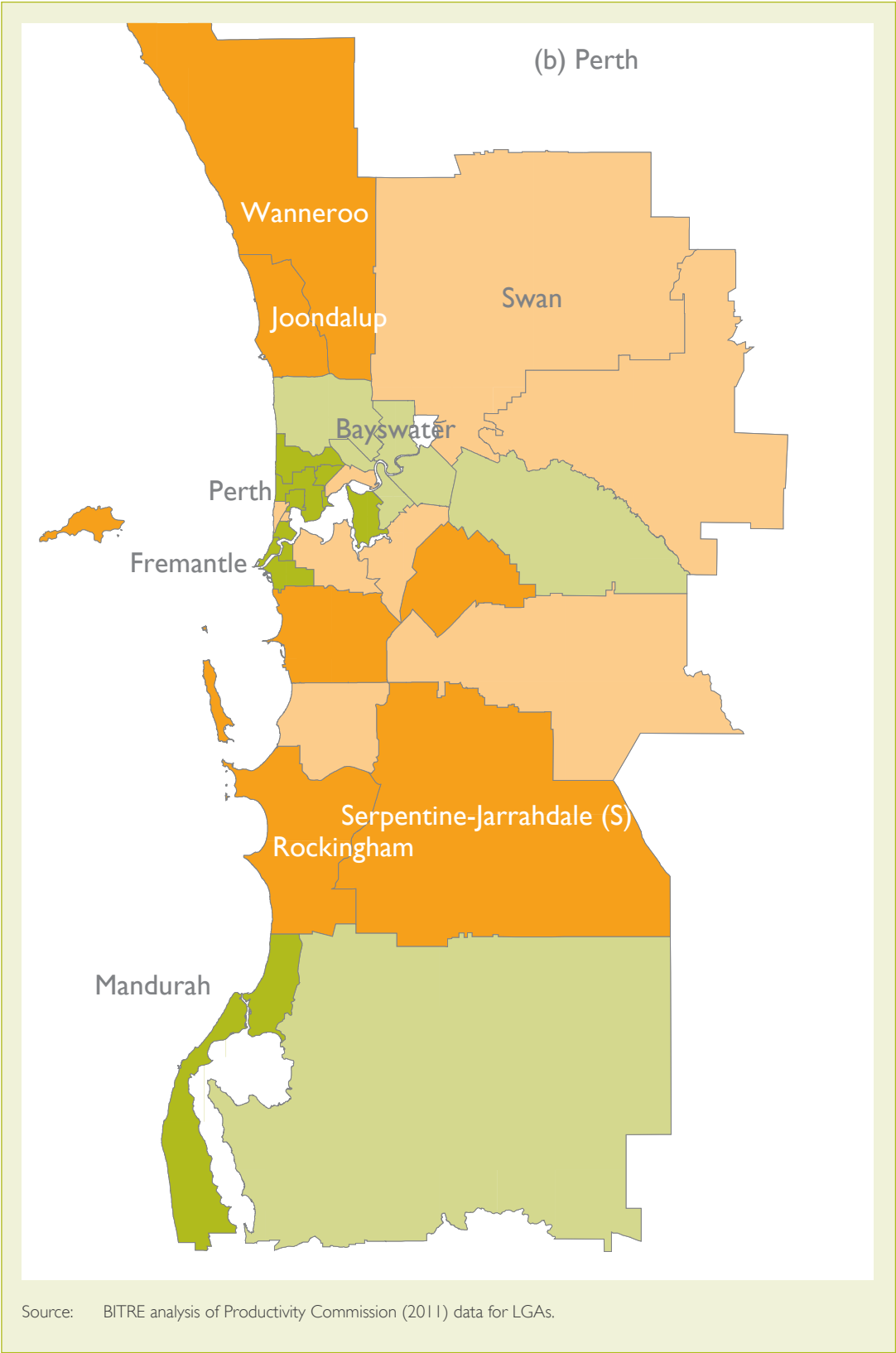
Sources: BITRE 2011 analysis of (1) ABS Census of Population and Housing 2006, (2) Melbourne Institute 2009

Outer suburban residents typically have longer distance journeys to work than middle suburban residents, who in turn travel further than inner suburban residents. Average commuting times display a similar but less systematic pattern of spatial variation (see Figure 3.13). State government travel surveys indicate the gap in one-way average commuting time between inner and outer suburban residents was six minutes for Melbourne in 2007–08 and seven minutes for Sydney in 2005–06. Within the outer suburbs, commuting times are greatest for residents of the most distant locations, such as Gosford, Penrith, Cardinia and Rockingham.

Other things being equal, increases in the amount of time spent travelling to work in our cities are detrimental to urban wellbeing as this takes away from time that could otherwise be spent with family and friends or in economically productive activities. Average commuting times per one-way trip rose by 2.4 minutes for Sydney full-time workers from 2002 to 2006, and there was a minimal increase for Melbourne and Perth (Melbourne Institute 2009). Recent State government travel surveys identify a further one minute increase in average commuting times for Sydney between 2006–07 and 2008–09, but no change occurred in Melbourne between 2007–08 and 2009–10.

Figure 3.13 Median peak travel time for commuters in (a) Sydney and (b) Perth, 2010





In the 2006 Census the number of cycling trips had increased from 2001. More recent evidence presented in Chapter 5 suggests that cycling's share of the total transport task may again be increasing.

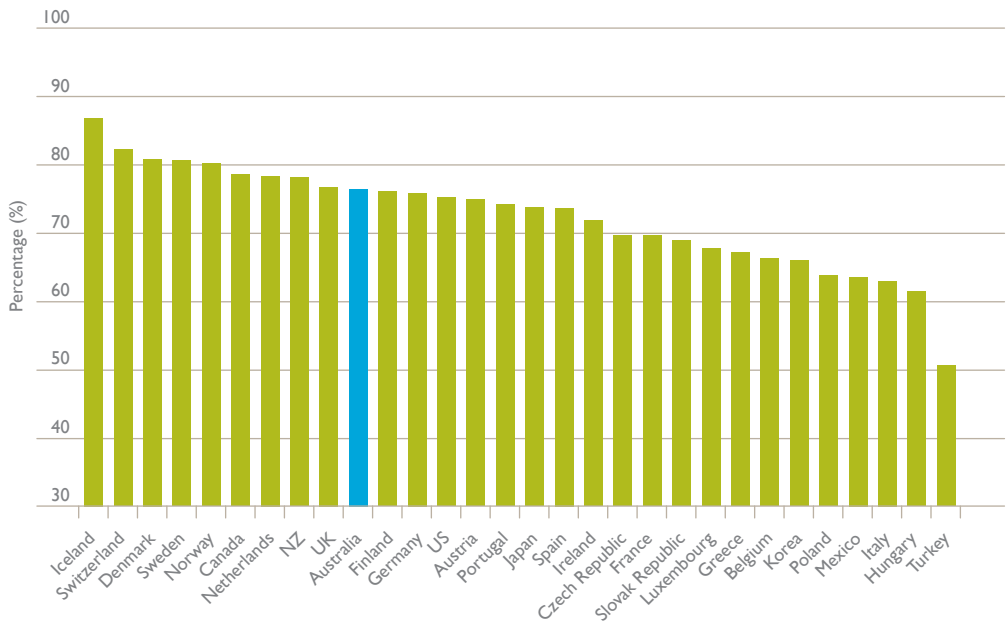
This section has discussed some of the key findings that emerge from BITRE's current research into spatial patterns of population growth, jobs growth and commuting in Sydney, Melbourne and Perth. Much greater detail is available from the individual reports (BITRE 2010, 2011a, 2011b), which consider recent trends in the context of the relevant metropolitan planning goals for each city. Future research will include:

- a study of spatial patterns of population growth, jobs growth and commuting in South East Queensland
- a comparative report, bringing together results for the four largest Australian cities, highlighting common themes and differences and drawing out the implications of the research.

## Workforce Participation

While there are some concerns about the validity of international comparisons of labour force participation (Abhayaratna and Lattimore 2006), recent estimates indicate that Australia's participation rate of 76.5 per cent for people aged from 25 to 64 years in 2008 was the tenth highest in the OECD (Figure 3.14) (OECD Statistics Database 2010).

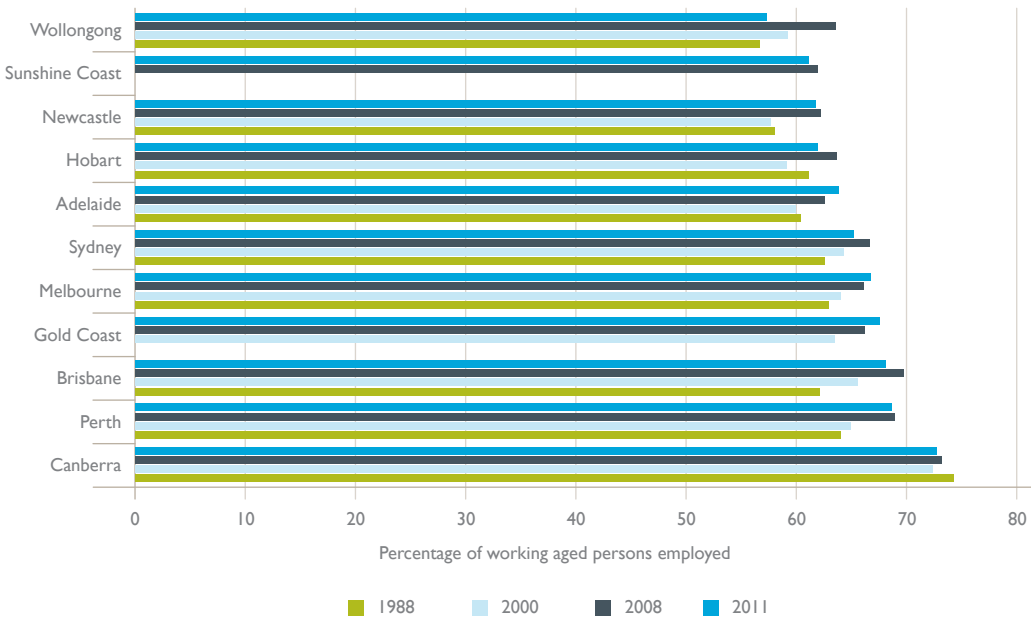
**Figure 3.14** Workforce participation rates, selected OECD countries 2010



Source: OECD Statistics Database 2010

The participation rates for all major cities was not available because the city areas used in this report are not always the same as the boundaries used to collect labour market statistics. Those cities where data was available are shown in Figure 3.15.

**Figure 3.15** Labour force participation rates in selected major cities



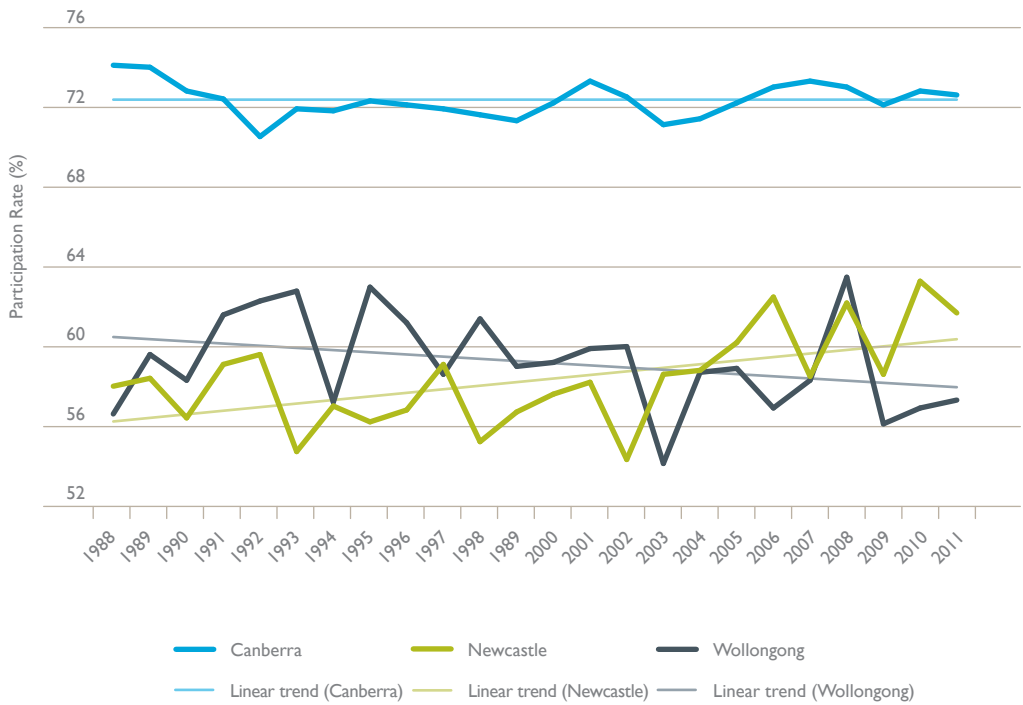
Note: Data not available for Sunshine Coast 1988, 2000; Gold Coast 1988.

Source: Derived from ABS 2011b

Figure 3.15 shows growing labour force participation rates for the 15-64 year age group have been a feature of the larger capital cities since 1988. Of note are the different experiences of each city: Brisbane's and Perth's participation rates have been consistently the highest and this has long pre dated the mining boom. In 2000, Adelaide staged a strong recovery after a long period of decline and since then its increase in participation rates has been statistically the strongest of any city. The two largest centres of the Australian economy, Sydney and Melbourne, showed more modest but consistent improvements.

Figure 3.16 shows the labour force participation rates in a selection of smaller cities since 1988. Here the trend seems to be variability rather than growth. Canberra's participation rates are the highest of any city in Australia and its experience over the past quarter of a century is one of considerable stability. Wollongong and Newcastle have had lower rates of participation but there has been a rising participation rate in Newcastle while Wollongong's has declined.

Figure 3.16 Labour force participation rates selected smaller cities



Source: Derived from ABS 2011b



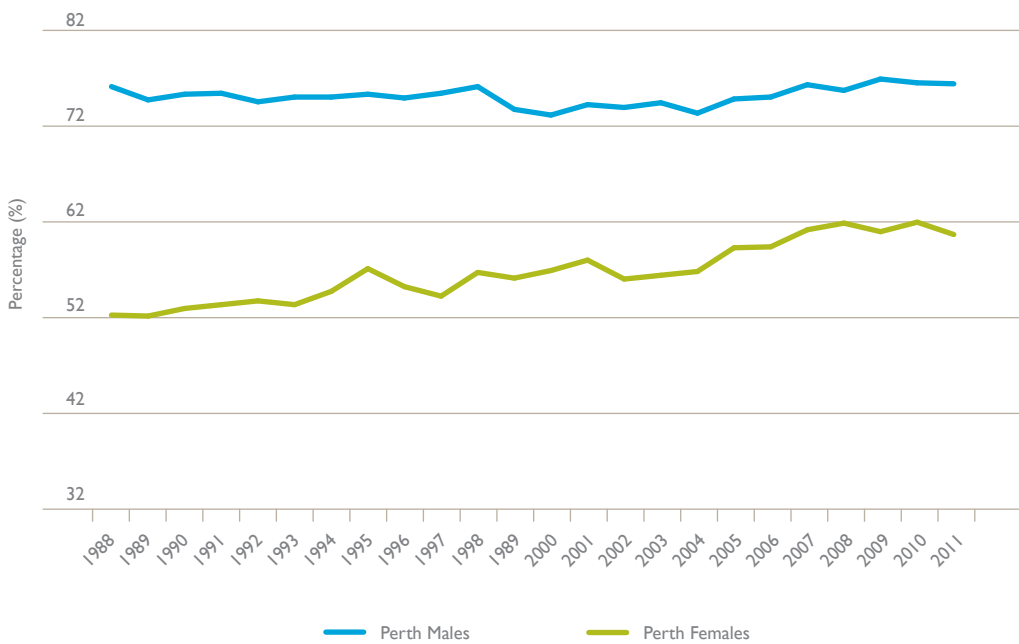
Newcastle, New South Wales

## Labour force participation by gender

Participation rates can be further explored by looking at gender. Male participation rates in Australia are about 2.2 per cent below the OECD average while female participation rates are four per cent higher than the OECD average, mainly due to the higher proportion of older women in paid employment (The Treasury 2010).

Gender participation rates vary considerably across major cities. Figure 3.17 shows the data for Perth which has one of the highest rates in Australia. The male participation rate seems near or at its practical ceiling, so the increase in participation rates for this city has been driven almost entirely by females entering the paid labour force.

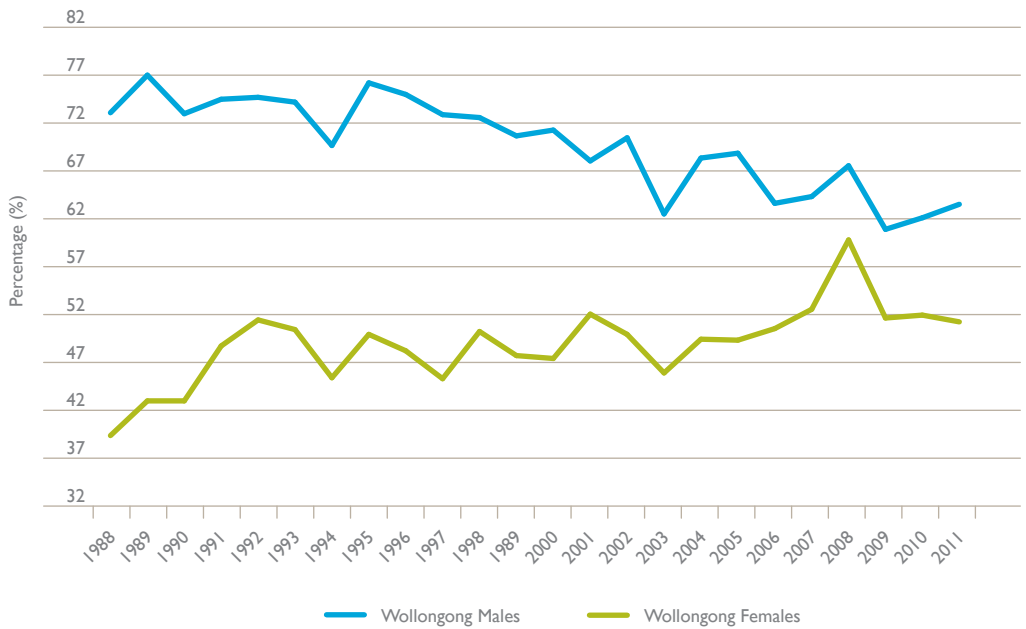
**Figure 3.17** Labour force participation rates in Perth, 1988 to 2011



Source: Derived from ABS 2011b

Wollongong's experience has been quite different. Figure 3.18 shows that an increase in females entering paid employment has been more than offset by a steep fall in male participation rates. This pattern is relatively common across many of the smaller non capital cities.

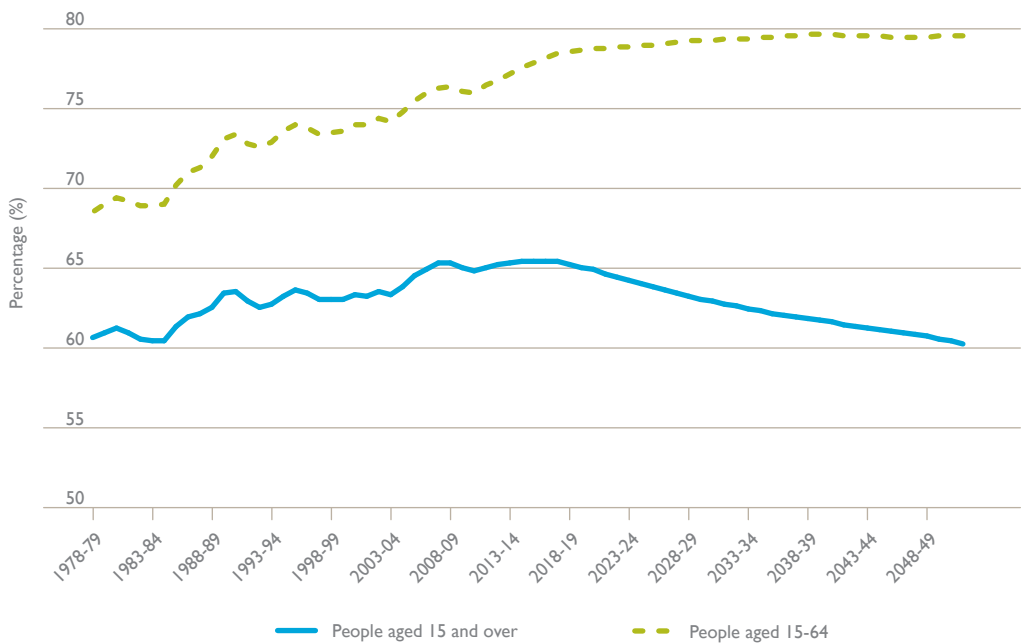
**Figure 3.18** Labour force participation rates in Wollongong 1988 to 2011



Source: Derived from ABS 2011b

Treasury figures suggest (Figure 3.19) that participation rates will fall over the course of the next few decades, due mainly due to the ageing population structure (The Treasury 2010).

**Figure 3.19** Actual and projected participation rates 1978-79 to 2048-49



Source: The Treasury 2010

# Employment

Employment and unemployment is an important aspect of participation rates because they show both labour utilisation and potential supply. Australia's unemployment, represented in Figure 3.20, has steadily decreased since 1990 to a low of 4.2 per cent in 2007. The Global Financial Crisis in late 2008 resulted in a spike in the national unemployment rate to 5.7 per cent in 2009. The annualised unemployment rate then continued to fall and was at 5.3 per cent at August 2011 seasonally adjusted (ABS 2011a).

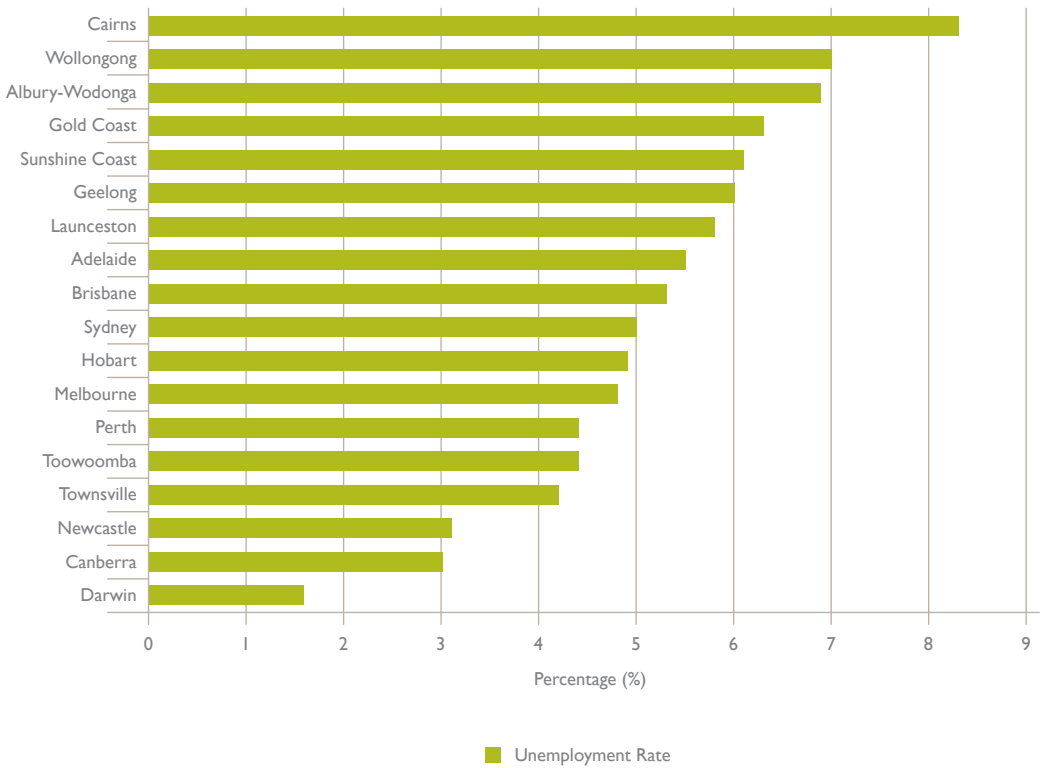
**Figure 3.20      Australia's unemployment rate 1990 to 2011**



Source:      ABS 2011b

There are significant differences in unemployment rates between Australia's major cities (Figure 3.21). As at the June quarter 2011, Darwin had the lowest unemployment rate at 1.6 per cent while Cairns (8.5 per cent) and Wollongong (7.2 per cent) had the highest. It is noteworthy that Newcastle had the second lowest unemployment rate of all major cities, despite significant changes in its industrial structure in the 1990s associated with the loss of steelmaking and related manufacturing jobs.

Figure 3.21      Unemployment rate in major cities, June quarter 2011



Source: DEEWR 2011 June quarter 2011

## Industry structure

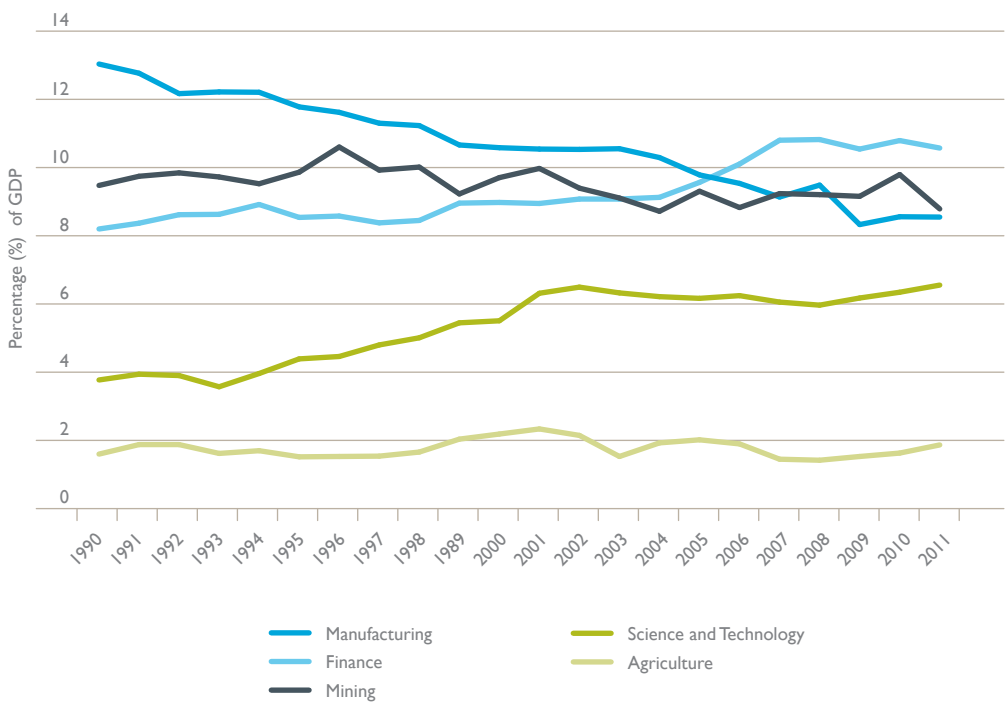
This section looks at industry structure, the factor that binds both productivity and participation. It begins with an overview of the major industrial changes in Australia in the last quarter of a century as context for the recent experiences of industry change in the major cities.

Australia is often described as an advanced or deindustrialised economy. The underlying paradigm for these terms is that as a nation's economy progresses, it will move from a reliance on agriculture to manufacturing and then onto a service economy.

There are three ways of measuring how or whether Australia fits into this broad context. The first and most common is to measure the contributions of particular industry types to the national GDP.

In Figure 3.22 below five industry divisions are shown that have experienced the most significant change in their contribution to GDP. The other 14 divisions have been relatively stable. Manufacturing experienced the most significant change with its share of GDP nearly halving in a 19 year period. At some point in 2007, financial services overtook it as Australia's largest economic sector. Agriculture also nearly halved its proportion of GDP. Favourable seasonal conditions and a spike in the terms of trade are evident in the 2000 and 2002 periods as is the long drought and poor terms of trade in more recent years. The graph illustrates the continuing growth in the dominance of the finance and insurance sector. It also shows the significant recent growth in the mining industry albeit with the volatility that has long characterised the industry. Noteworthy too is the increasing contribution to GDP of the so-called knowledge intensive industries in the science and technical category. Indeed, their rate of growth is not far behind the mining industry and are demonstrating less volatility.

Figure 3.22 Selected industries' contribution to GDP

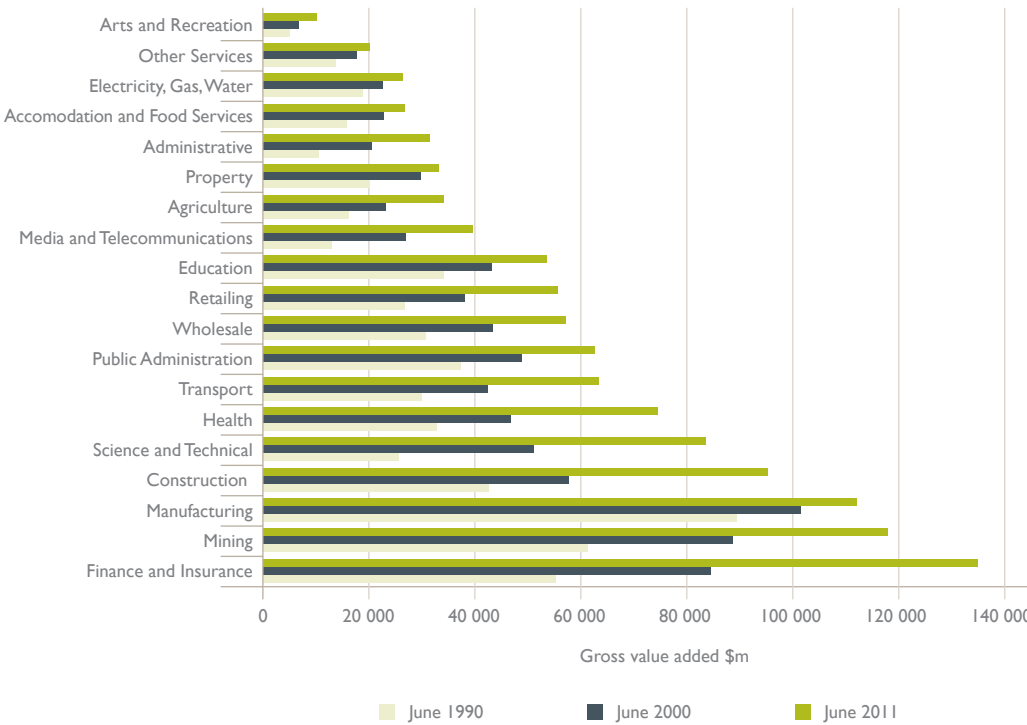


Source: Derived from ABS 2011a

A second method of comparing industry contribution is Gross Value Added (GVA), shown in Figure 3.23. When the changes in industry GVA are plotted, a different picture emerges. The finance and insurance sector is continuing to grow in its dominant position in terms of GDP and GVA.

The GVA data shows that the finance and insurance sector is increasing in its dominance and mining has now overtaken manufacturing as the industry contributing the second highest proportion of gross value added.

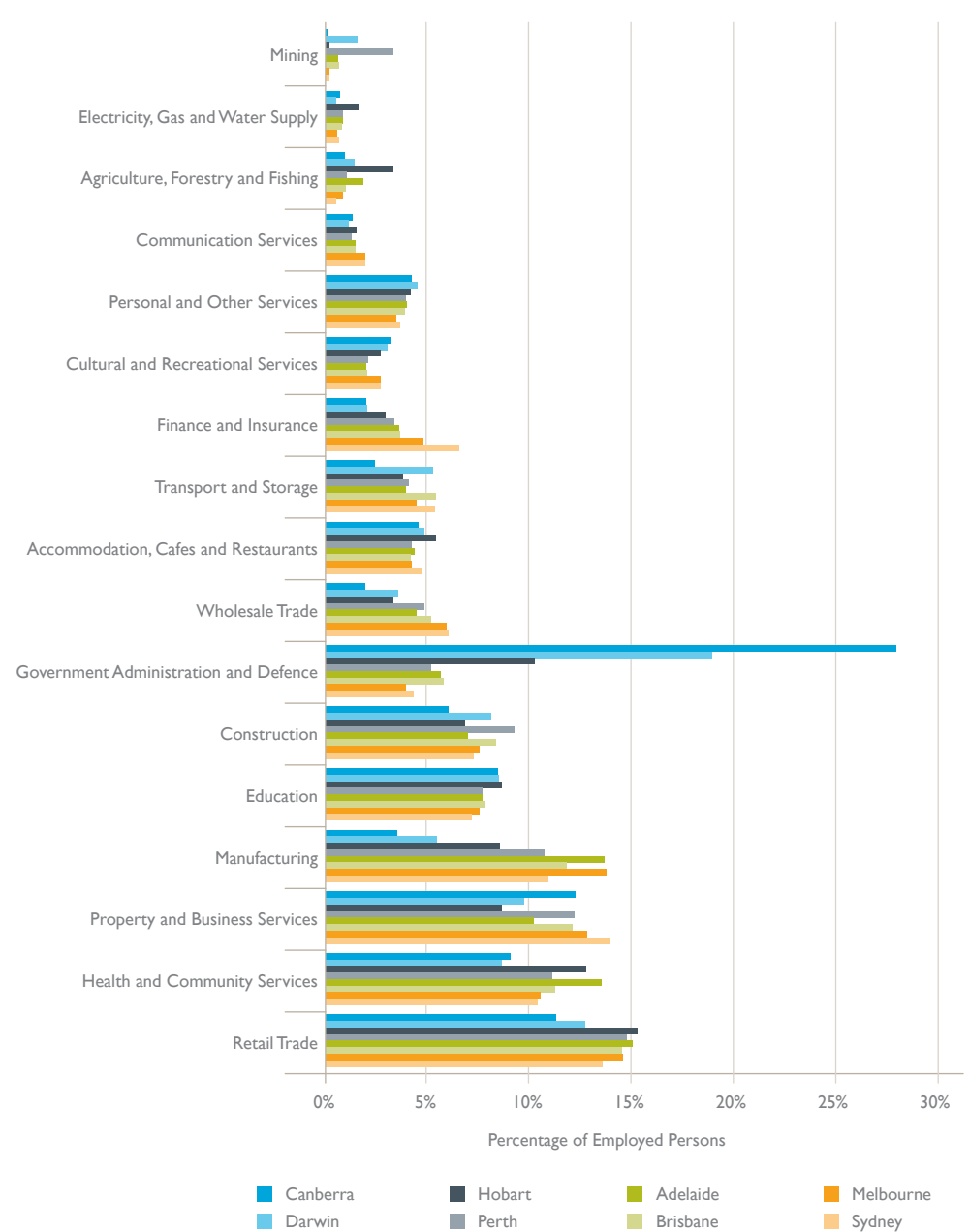
**Figure 3.23** Gross value added across industry sectors, 1990 to 2009



Source: Derived from ABS 2011a

A third measure of examining industry structure is the number of persons employed by industry sector. Examining industry structure in capital cities (Figure 3.24) shows Canberra's and Darwin's unique government-service focus. It also shows that in cities, the majority of people are employed in manufacturing, property and business services, health and community services, and retail trade.

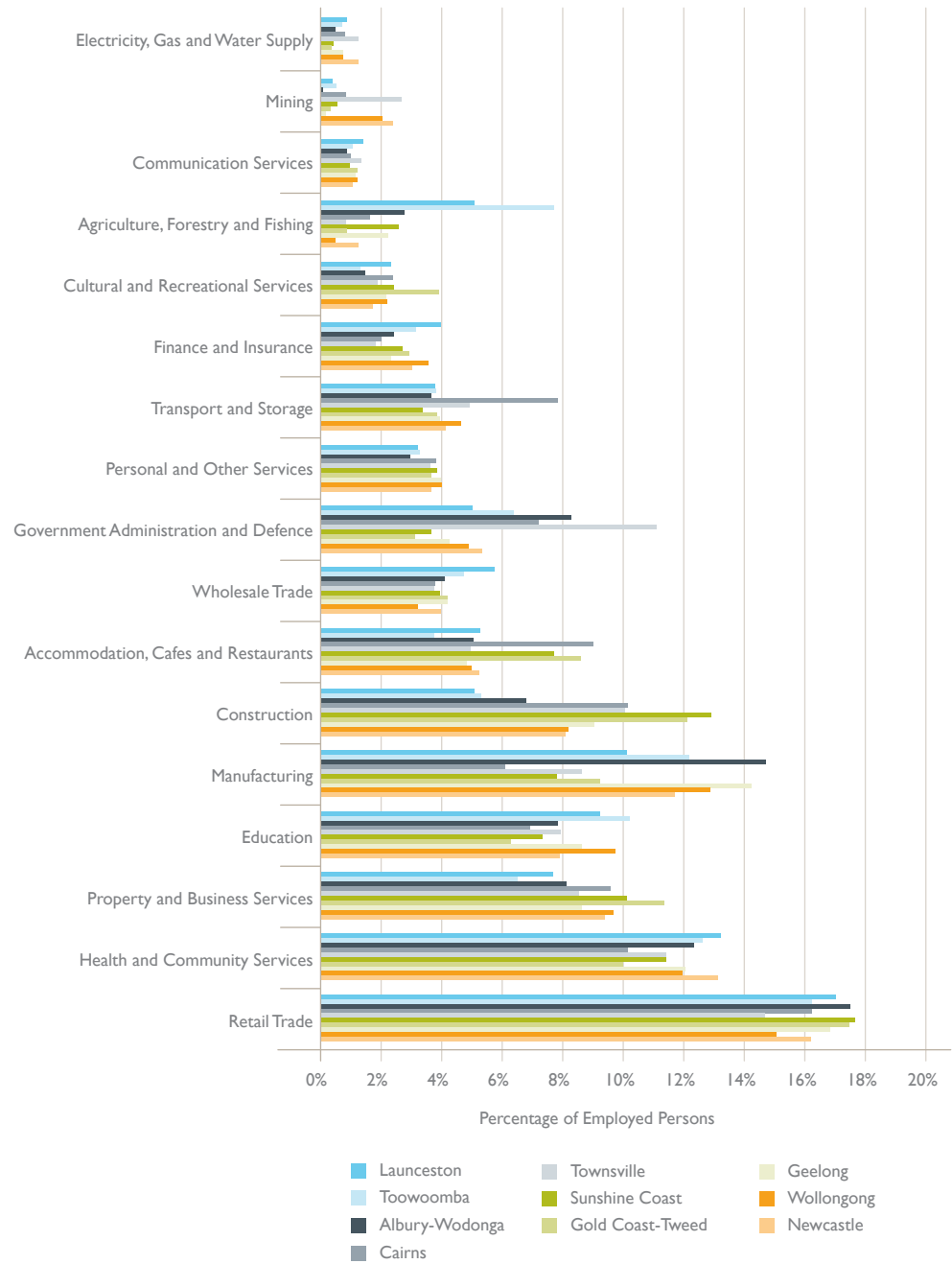
Figure 3.24 Proportion of employed persons by industry division in capital cities



Source: Derived from BITRE 2009b

Figure 3.25 shows that non-capital cities exhibit more variability. Noteworthy is the difference between capitals and non capitals in the finance, property and business and cultural sectors. These sectors generate a significant proportion of the nation's GVA and indicate an economic concentration in the capitals.

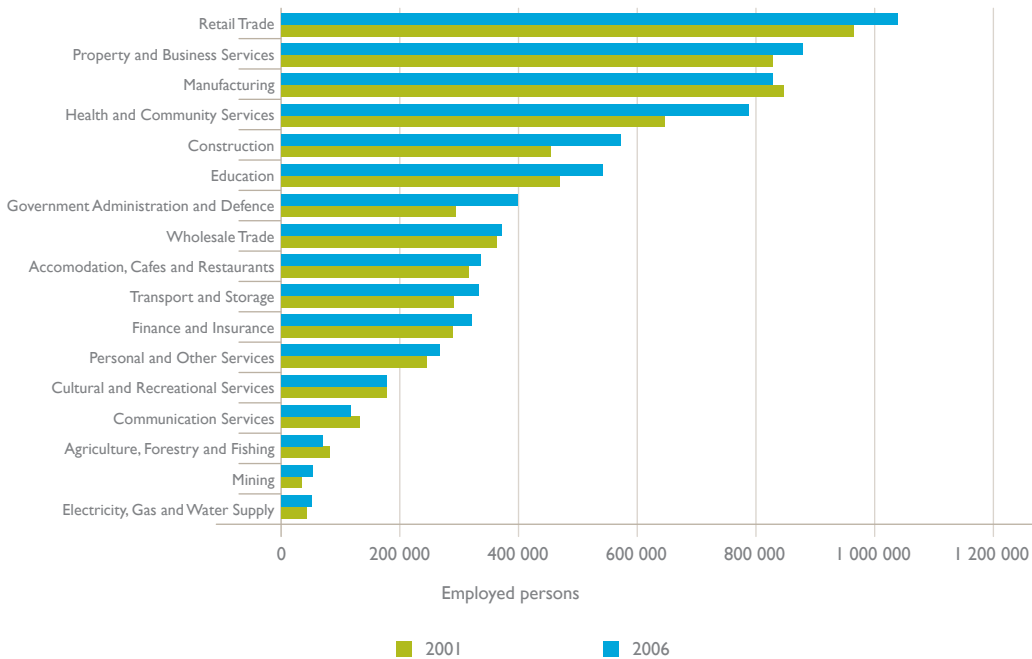
Figure 3.25 Proportion of employed persons by industry division in non capital cities



Source: Derived from BITRE 2009b

Examining changes in industry structure between 2001 and 2006 using persons employed measure (Figure 3.26) the growth in the services sector of major cities' economies becomes apparent.

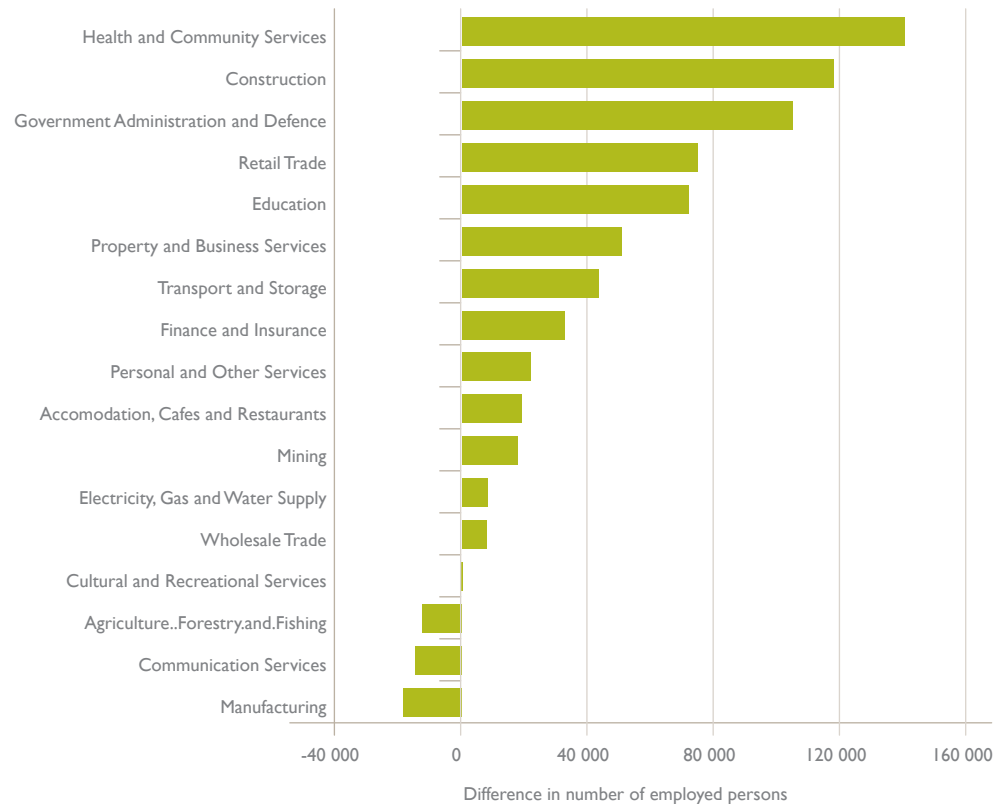
**Figure 3.26** Major cities' employment by industry sector 2001 and 2006



Source: Derived from BITRE 2009b

If the data in Figure 3.26 is expressed as growth and contraction (Figure 3.27) then small losses in employment in the communication (-2.3 per cent), manufacturing (-0.4 per cent) sectors is shown. Agricultural employment in major cities declined by 3.2 per cent mainly due to the contraction of agriculture in western Sydney (Malcolm and Fahd 2009). Manufacturing employment in the rest of Australia grew by 1.6 per cent, however this was not enough to offset a small overall national fall in this key sector of 0.1 per cent. These falls in employment were more than counterbalanced by strong gains in the services sectors (health, education, retail and government services) and the construction sector. It is important to note that change in employment is not the same as changes in GVA. Changes in employment in the property and business sector, for example, are likely to be far more significant in terms of the effect on the overall economy than changes to retail employment.

**Figure 3.27**      **Relative change in major cities' employment (employed persons) by industry sector 2001 and 2006**



Source:      Derived from BITRE 2009b

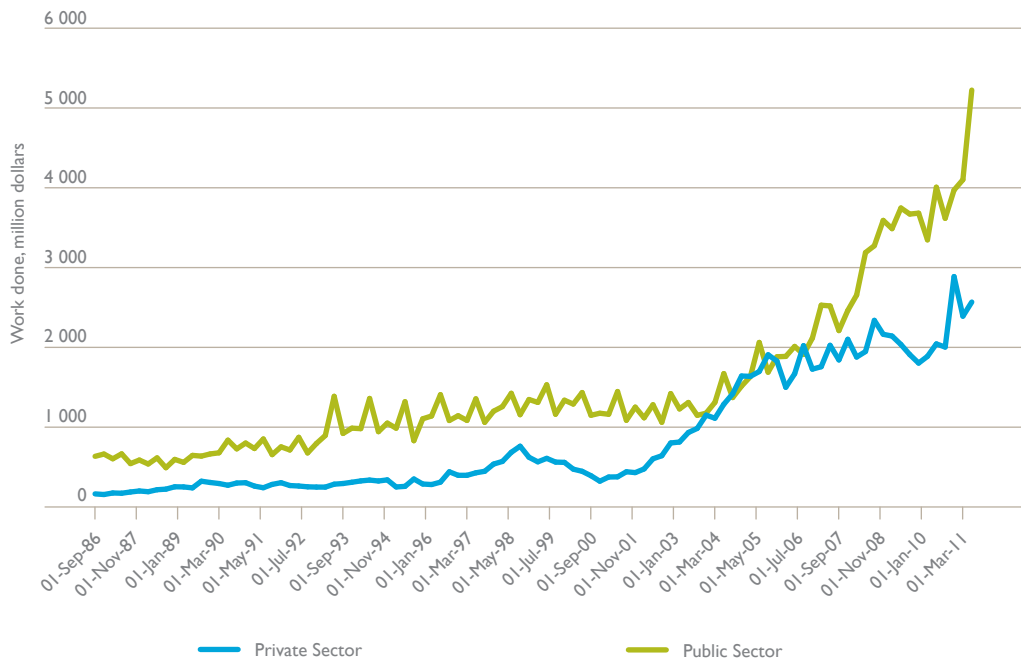
## Infrastructure

Infrastructure is a major component of productivity but a complete understanding of the area is not well developed in Australia due mainly to disparate data sources of variable quality. As such, only summary data is presented here. Investment is undergoing fundamental change in Australia where average annual infrastructure construction between 2007-08 and 2009-10 was almost double the average over the previous eleven years in real terms (from \$28 billion per year to \$54 billion per year).

Much of this was private capital investment driven largely by the mineral extraction boom. In the period from March quarter 2005 to September quarter 2010 new private capital expenditure increased by 73.0 per cent (or \$12.14 billion) to \$28.76 billion (ABS 2010). The mining industry accounted for 66.2 per cent (or \$8.034 billion) of this increase, and this spending has been largely driven by the need to develop mine sites and construct infrastructure to service the increasing demand for natural resources by emerging economies in Asia, particularly China.

Investment in transport infrastructure (Figure 3.28) however, was dominated by a sharp rise in public sector spending, particularly since 2007.

Figure 3.28 Value of transport engineering work by sector of project owner, 1986 to 2011



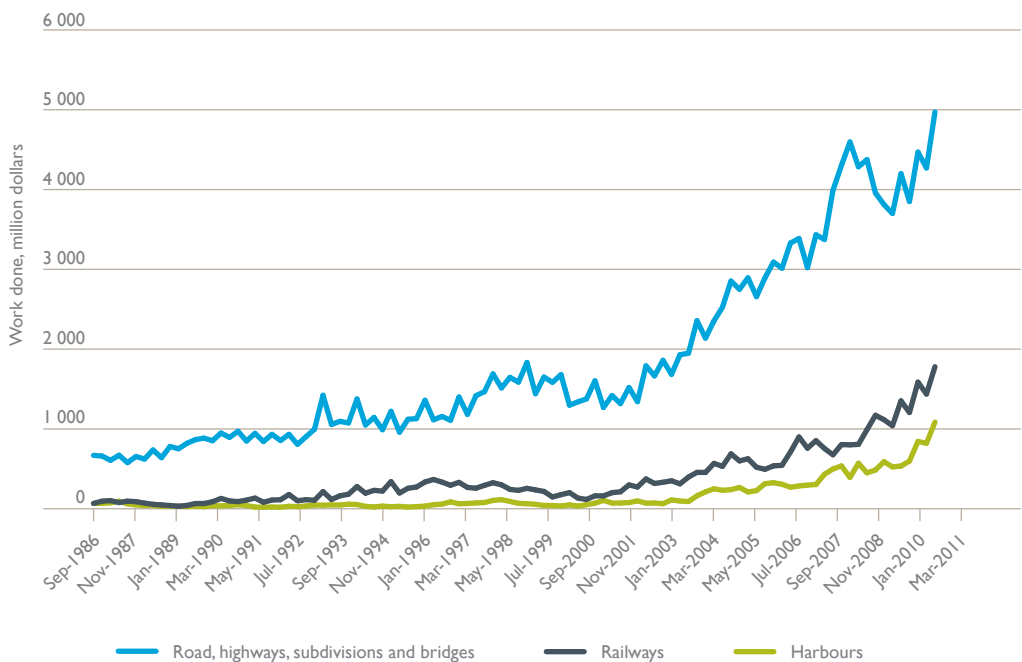
Source: ABS 2011b

When the transport infrastructure is broken down by mode (Figure 3.29), investment increased across all sectors with the stimulus spending in road construction at the end of 2008 clearly visible.



Sydney Harbour Bridge, New South Wales

**Figure 3.29** Value of transport engineering work by mode of transport, 1986 to 2011



Source: ABS 2011b

## Conclusion

It seems clear from the current studies that increasing agglomeration (measured by job density) results in a significant productivity boost to Australian cities and by implication maintaining or increasing job density is important to improving productivity. The BITRE work on commuting patterns suggest that cities are already doing this by increasing core density while at the same time moving to a polycentric arrangement outside the core as cities strive to reduce their major transaction cost: transport.

There has been concern that there may be limited scope to further increase productivity by increasing labour force participation, given the ageing population. While this may be broadly true at the national level, the variation in participation rates between cities would suggest that there is still scope to improve rates by better aligning labour demand with this underutilised human capital.

The discussion on industry structure shows that specificity is required in how it is being measured. Assessing an industry by proportion of GDP or even employment can be misleading. Manufacturing is a case in point. While it has declined as a proportion of the national economy and employs slightly fewer people than it did a decade ago, manufacturing is still producing significant value add to the economy.

## Chapter 3 References

Abhayaratna, J & Lattimore, R 2006, *Workforce Participation Rates – How Does Australia Compare?* Productivity Commission, Melbourne <http://www.pc.gov.au/research/staffworkingpaper/workforceparticipation> [Accessed 27/09/11].

Acott, K 2011, 'Crowded buses add to train woes', *The West Australian* 6 April <http://au.news.yahoo.com/thewest/a/-/wa/9141547/crowded-buses-add-to-transport-woes/> [Accessed 22.08.2011].

Australian Bureau of Statistics (ABS) 2006, *Census of Population and Housing 2006*, Canberra.

ABS 2010, *Experimental Estimates of Industry Multifactor Productivity, 2008-09*, cat. no. 5260.0.55.002, Canberra.

ABS 2011a, *Australian National Accounts: National Income, Expenditure and Product, Jun 2011*, cat. no. 5206.0, Canberra.

ABS 2011b, *Labour Force, Australia, Detailed – Electronic Delivery, Aug 2011*, cat. no. 6291.0.55.001, Canberra.

Bureau of Transport and Regional Economics (BTRE) 2007, *Estimating urban traffic and congestion cost trends for Australian cities*, Working Paper 71, Canberra.

Bureau of Infrastructure, Transport and Regional Economics (BITRE) 2008a, *Freight rates in Australia 1964–65 to 2007–08*, Information Sheet 28, Canberra.

BITRE 2008b, *A regional economy: A case study of Tasmania*, Report 116, Canberra.

BITRE 2009a, *Australian transport statistics Yearbook 2009*, Canberra.

BITRE 2009b, *Changes in Australia's industry structure: main cities 2001-2006*, Information sheet 32, Canberra.

BITRE 2010, *Population growth, jobs growth and commuting flows in Perth*, Research Report 119, Canberra.

BITRE 2011a, *Road vehicle-kilometres travelled: estimation from State and Territory fuel sales*, Report 124, Canberra.

BITRE 2011b, *Population growth, jobs growth and commuting flows in Melbourne*, Research Report 125, Canberra.

BITRE 2011c, *Australian Infrastructure Statistics Yearbook 2011*, Canberra.

BITRE 2011d, *Population growth, jobs growth and commuting flows in Sydney*, Canberra.

BITRE 2011e, *Traffic Growth: Modelling a Global Phenomenon*, Canberra.

Coase, R 1960, 'The Problem of Social Cost', *Journal of Law and Economics*, 3 1-44.

Department of Education, Employment and Workplace Relations (DEEWR) 2011, *Employment Service Area estimates for March 2011*, Canberra.

Department of Transport (Western Australia) 2011, *Public Transport for Perth in 2031*, Perth.

Flood, M & Barbato, C 2005, *Off to work: Commuting in Australia*, Discussion Paper No. 78, Australia Institute, Canberra.

Gaymer, S 2010, *Quantifying the impact of attitudes on shift towards sustainable modes*, paper presented to Australasian Transport Research Forum, 29 September–1 October 2010, Canberra.

Henry K 2004, *The Fiscal and Economic Outlook Address to the Australian Business Economists*, Australian Government, The Treasury, Sydney, <<http://www.treasury.gov.au/documents/830/HTML/docshell.asp?URL=abe.asp>>[Accessed 07.10.2011]

Hurst, D 2011, 'Bus overcrowding worse than ever', *Brisbane Times* 20 May [<http://www.brisbanetimes.com.au/queensland/bus-overcrowding-worse-than-ever-20110519-1eupf.html>] [Accessed 22.08.2011]

Infrastructure Australia 2010, *State of Australian Cities 2010*, Infrastructure Australia, Canberra.

Lampard, M, Copeland, A & Commodity Analysts 2010, *Minerals and energy, major development projects – October 2010 listing*, ABARE–BRS, Canberra.

Lucas, C 2011, 'Peak hour trains still a horror trip', *The Age* 17 May <http://www.theage.com.au/victoria/peakhour-trains-still-a-horror-trip-20110516-1epv3.html> [Accessed 22.08.2011]

Malcolm, P & Fahd, R 2009, *Ground Truthing of the Sydney Vegetable Industry in 2008*, New South Wales Department of Primary Industries, Sydney.

Marshall, A 1920, *Principles of Economics*, MacMillan, London.

Melbourne Institute 2009, 'Time spent travelling to and from work', in *Families, income and jobs, volume 4: A statistical report on waves 1–6 of the HILDA survey*, Melbourne Institute, pp. 202–204.

Productivity Commission 2011, *Performance benchmarking of Australian business regulation: planning, zoning and development assessments*, Productivity Commission Research Report, Canberra.

Rawnsley, T & Szafraneic, J 2010, *Agglomeration and Labour Productivity in Australian Cities*, SGS Economics and Planning, Melbourne <http://www.sgsep.com.au/agglomeration-and-labour-productivity-australian-cities> [Accessed 21.09.2011]

Senate Committee for Rural and Regional Affairs and Transport 2009, *Inquiry into Investment of Commonwealth and State funds in public passenger transport infrastructure and services*, 2.18.

Simmonds, K 2011, 'Buses, trains still crowded: commuters', *ABC Online* 31 December <http://www.abc.net.au/news/2010-12-31/buses-trains-still-crowded-commuters/1890790> [Accessed 22.08.2011]

Stanley, J & Barrett, S 2010, Moving people: solutions for a growing Australia, paper prepared on behalf of Australasian Railway Association, Bus Industry Confederation and International Association of Public Transport–UITP, <http://apo.org.au/research/moving-people-solutions-growing-australia> [Accessed 19.09.2011]

Transport Data Centre 2010, *2008/09 Household Travel Survey Summary Report* (2010 release), New South Wales Transport Data Centre, Sydney.

The Treasury 2010, *The 2010 Intergenerational Report*, The Treasury, Canberra. <http://www.treasury.gov.au/igr/igr2010/> [Accessed 27.09.2011]

Trubka, R 2009, *Productivity and the density of economic activity: preliminary estimates of agglomeration benefits in Australian cities*. Curtin University Sustainability Policy Institute, Perth.