



Productivity

Chapter 3

Discussion about economic growth in Australia is usually framed in terms of the 'Three Ps': Population, Productivity and Participation. This framework is also used in the *State of Australian Cities* reports. The previous chapter discussed one of the Ps – Population. It focused on two critical factors: the rate of population increase and the age structure of the population which is associated with participation. In this chapter, Productivity and the other leg of the Three Ps – Participation – will be discussed.

The main theme of the Productivity section of this chapter is that the social and economic geography of Australia's major cities is undergoing some of the most fundamental changes since the end of World War II. The key driver of this is the concentration of high-growth industries in city centres. This is reversing the dispersal forces that drove the outward spread of cities for 60 years. Business growth in the largest cities in particular is increasingly being concentrated in CBDs and large centres. This is changing the transport task and the chapter outlines this in the context of a century of change in urban transport.

This year, the first feature article looks at the role of that often-forgotten transport mode, motorcycles and scooters. The second of the feature articles in the Productivity chapter looks at the basis on which most of the older major cities were founded: their ports. It shows how ports are adapting to the growth in freight and the challenges they face as space and transport constraints exert pressure. The third feature article looks at the importance of airports to cities and implications for future growth.

The workforce participation section develops some of the themes touched on in *State of Australian Cities 2011*. Women's participation in the workforce in major cities is examined in greater detail, as are the changing patterns of workforce participation through the age cohorts. The workforce participation pattern between cities is significant and raises issues not just with the amount of workforce participation but where it is occurring.

Summary indicators

Dimension	Indicators
Productivity	Australia's multifactor productivity growth 1974–2011 Australia's labour productivity growth 1974–2011
Transaction costs – transport	Australia's modal shares for urban passenger transport 1900–2011 Australia's total metropolitan passenger transport task across all modes 1900–2011 Australia's urban passenger transport consumption per capita (for Australian capital cities) 1965–2011 Median peak travel time for commuters Amount of freight transported per person 1945–2011
Participation	Labour force participation rates for major cities 1988–2012 Labour force participation rates by gender for major cities 2000–12 Labour force participation rates by age and gender for major cities 2000–12

Key findings

- Australian national productivity growth levels continue to be lower than previous years.
- Most of the industry sectors that are experiencing rapid growth as a proportion of the economy are located in city centres and rely on increasing job densities to drive their productivity.
- This suggests that, measured in terms of the value of economic activity, cities may be beginning to shrink in on themselves, reversing the dispersing forces that have been dominant since the end of World War II.
- After reaching a peak in 2005, per capita urban passenger transport (the number of kilometres travelled per person) has declined more steeply and for a longer period than since the Great Depression.
- The decline has been led by a reduction in car travel offset by some increase in heavy rail.
- In contrast, the per capita freight task is increasing substantially and is likely to become the major driver of the urban transport systems.
- Morning travel peak has increased and sharpened in the last 30 years, greatly increasing the pressure on transport networks. This appears to be driven in part by an increase in discretionary travel in the morning peak period.
- Fare recovery in Australian urban mass transit systems is already well below international best practice and continues to decline. This raises questions about the sustainability of their current financial structures and the scope for further investment in mass transport infrastructure and services.
- The sea ports of coastal major cities, particularly Sydney and Melbourne, are experiencing a significant increase in container volumes. More than 80 per cent of containers will be discharged and loaded within the urban boundary.
- There are significant differences in labour force participation between major cities. In Canberra 72 per cent of the working age population is in the workforce while in Wollongong 57 per cent is in the workforce.

- Female participation in the paid workforce has increased by nearly 10 per cent since 1988. The increase is across the age cohorts.
- Female human capital is increasing at a faster rate than that of males, indicating that not only are there more women in the workforce but their potential individual productivity is increasing.
- Australia is following the trends of other advanced economies in that a growing proportion of older people are working past the traditional retirement age.



Perth skyline twilight, City of Perth, 2012.

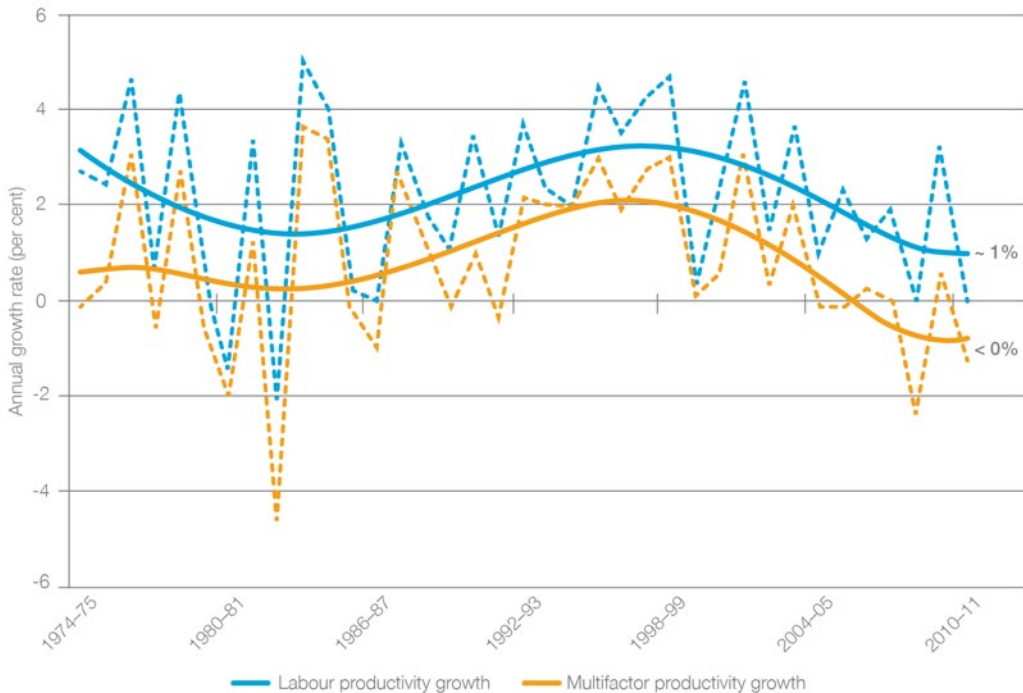
Introduction

This section begins with a discussion about the current period of falling or static productivity growth in Australia and outlines possible causes. We then look at what drives the productivity growth of cities. This discussion develops a theme from last year's report – the changing industrial structure of cities and in particular the growing concentration of jobs and economic value in the finance and transaction sectors which tend to be located in capital city centres. It then looks at the future transport needs of this changing industrial structure – in particular, the challenges of carrying large numbers of workers to a relatively small area within an acceptable total travel time. It concludes that high capacity mass transit will become critical to urban productivity growth. The 'productivity' section of this chapter finishes with a review of the financial structures of urban mass transit systems.

The national context

State of Australian Cities 2011 discussed the plateauing and fall in multi-factor productivity (the efficiency with which labour and capital are combined to produce goods and services). Figure 3-1 shows that this trend is continuing and Australia has entered into the longest period of static or falling productivity growth for more than 30 years. Since four-fifths of the economic growth occurs in major cities, they both affect and are affected by changes in productivity rates.

Figure 3-1 Multi-factor and labour productivity growth in Australia 1974–75 to 2010–11

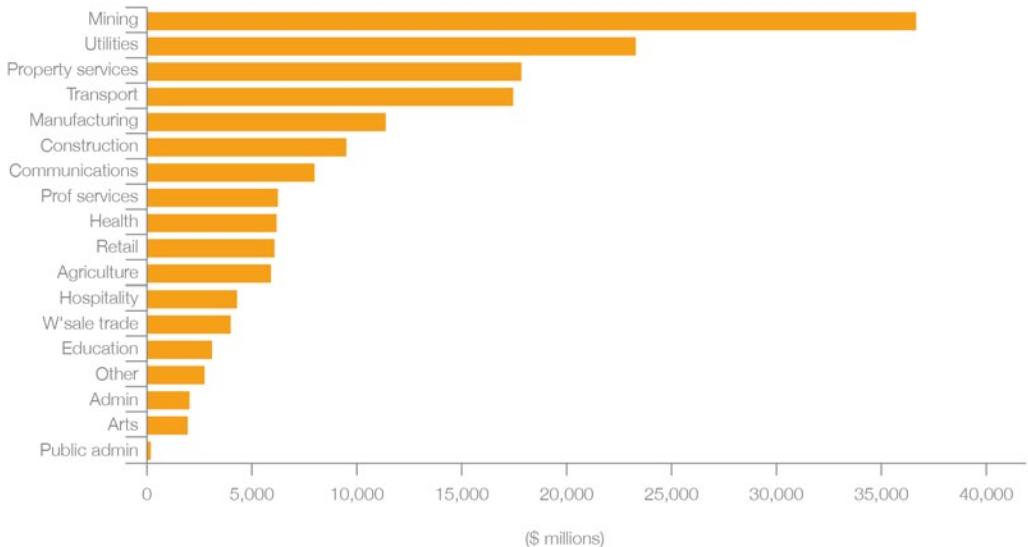


Source: From Lattimore 2012, reproduced with kind permission of the author

Attempting to summarise and explain Australian productivity is an exceptionally complex task. However, two themes are apparent.

The first is the seeming paradox of productivity – more investment can lead to falling levels of productivity in the short to medium term due to the time lag in reaping the productivity rewards flowing from that investment. Figure 3-2 shows that there are large differences between investment levels in Australian industry sectors.

Figure 3-2 Gross fixed private capital investment by industry division 2009–10



Source: ABS 2011a

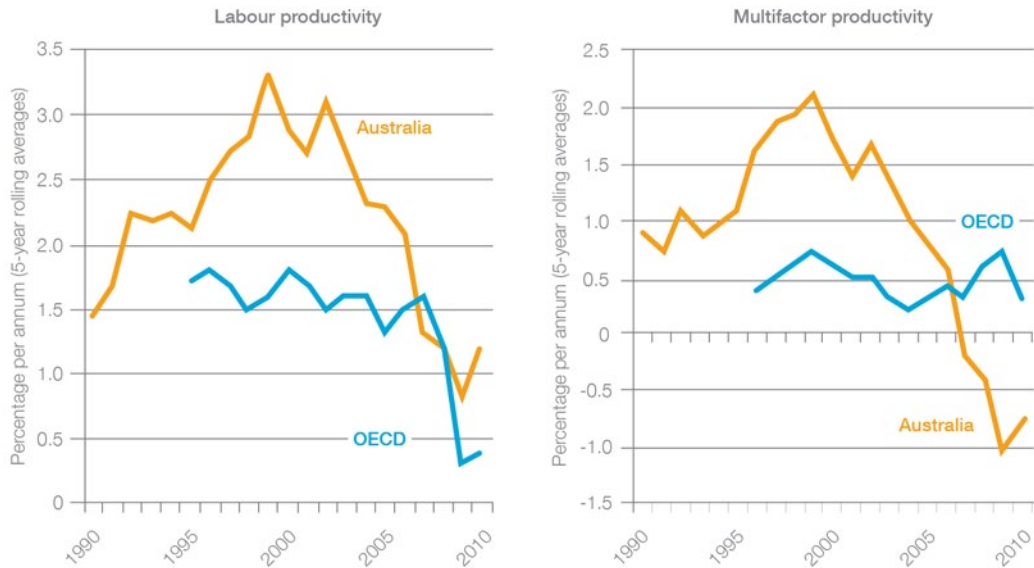
Viewed through this prism, a large part of the national productivity decline has been caused by high levels of investment in the mining and to a lesser extent the utilities sectors (Electricity, gas, water and waste services) causing a slump in the productivity of these industry groups (Productivity Commission 2010 Lowe 2012).

The second prevailing theme on the decline in Australia's productivity is whether the slowdown in productivity growth is largely due to the exhaustion of the micro-economic reforms in Australia in the 1980s and 1990s and the lack of productivity-enhancing reforms since then (Garnaut 2005).

In a comprehensive sectoral analysis, Eslake and Walsh (2011) conclude that the productivity decline in Australia is broad based, with only three industry sectors (Construction, Administration and Cultural Services) showing a consistent increase in productivity over the last decade.

They also compare Australia's labour productivity with that of the United States and find that after reaching 92 per cent in 1998 it has declined steadily to 84 per cent and is now at the lowest level since 1974. Eslake and Walsh also show that both labour and multi-factor productivity relative to the OECD average have fallen in the first decade of the century, although the recent improvements give some hope that this may have ceased (Figure 3-3).

Figure 3-3 Australian labour and multi-factor productivity relative to the OECD average



Source: Redrawn from Eslake and Walsh 2011 with kind permission from the Grattan Institute

The McKinsey Global Institute has analysed growth in the Australian economy since 1993 and reaches similar conclusions to Eslake and Walsh (Taylor et al. 2012). It found that growth in terms of trade (103 per cent), investment (85 per cent) and workforce expansion (two per cent) was being offset by declines in capital productivity (68 per cent) and labour productivity (40 per cent).

In a recent analysis by the Productivity Commission, Parnham (2012) concludes that inputs across many industries had risen faster than outputs and that manufacturing, agriculture (drought) and, to a lesser extent, transport and logistics are also significant contributors to national decline. Barnes (2011) argues for a more sectoral-specific understanding of productivity, believing that aggregated figures could disguise quite different forces acting on different industries.

A greater understanding of the productivity puzzle is hampered by the fact that it is difficult to look over time in any level of detail. This is largely due to the regular changes in the ABS's Australian New Zealand Standard Industrial Classification (ANZSIC) to accommodate new industries and the loss of old ones. There is also little published work on the relationship between industries, such as the relationship between the mining and construction industries. Nevertheless, there is general agreement that productivity in Australia has plateaued and declined. There is also a consensus that the decline is broad based, even if the reasons for this and the appropriate policy prescriptions are still disputed.

The next section examines how a better understanding of the economic geography of Australian cities might help us to increase their productivity.

The production geography of Australian cities

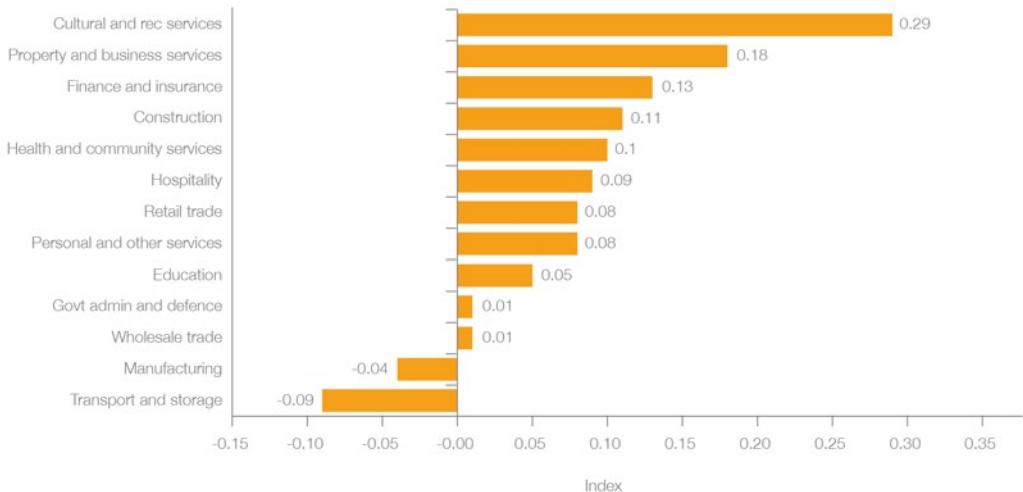
State of Australian Cities 2011 explored the concept of agglomeration as an economic driver. Agglomeration is the geographic concentration of industries in locations near their customers and a workforce that allows a greater division of labour. Cities by their nature provide the greatest agglomeration opportunities. A concentration of firms also encourages knowledge transfers and spillovers, helping businesses to be adaptive and innovative. Whilst agglomeration often refers to a concentration of labour in city centres, it is also evident in many regional centres such as Dubbo in NSW which draws industry and population from almost one third of the State.

The role of agglomeration in improving labour productivity is receiving increasing attention from urban researchers. Reports that have looked across capital cities include a major report to the COAG Reform Council by SGS Economic and Planning (COAG Reform Council 2012) and work by Trubka using small area units (2011). More city-specific studies include those by Hensher et al. 2012, Daniels and Mulley 2011 and Longworth 2008.

Initially, it was thought that population size was the main driver of agglomeration benefits. Now it is believed that it is employment concentration that drives increased labour productivity from agglomeration.

Studies show a remarkable consistency in estimates of agglomeration benefits in developed economies. Taken as a whole, for every doubling of job concentration there is a five to 13 per cent increase in labour productivity (Melo et al. 2009). Australian cities are generally at the midpoint in this range (Hensher et al. 2012, Rawnsley and Szafraneic 2010, Trubka 2011).

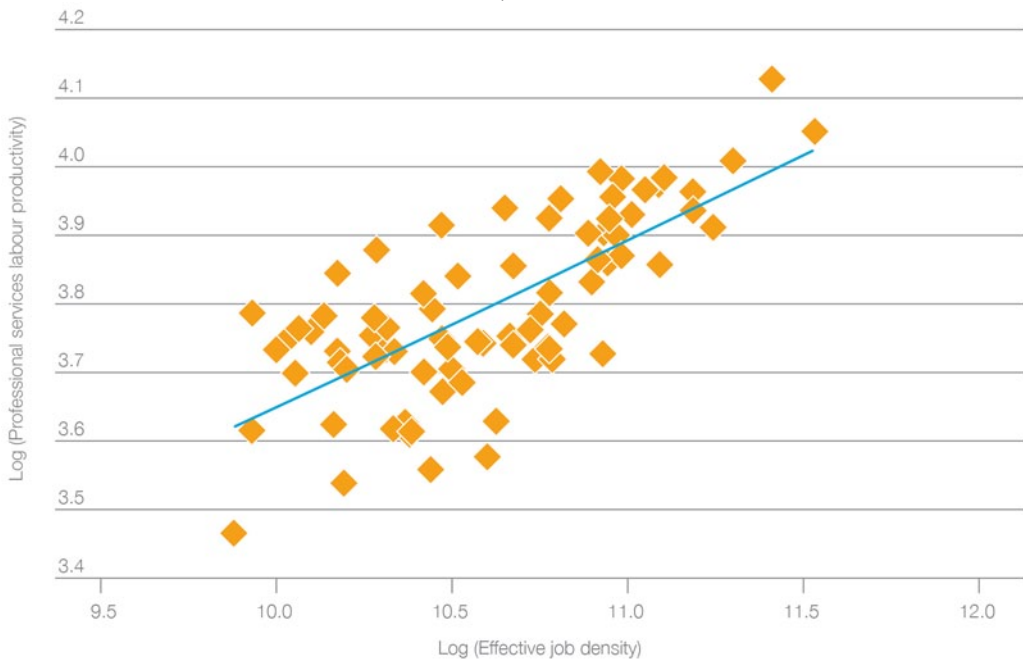
Figure 3-4 Agglomeration benefits by industry division for Melbourne 2007–08



Source: From Rawnsley and Szafraneic 2010

Not all industries benefit from agglomeration. Figure 3-4 shows the situation for Melbourne, and studies by Hensher et al. (2012) and Daniels and Mulley (2011) indicate a similar ranking for Sydney. The average manufacturing or transport firm derives little or no benefit from greater job density. Professional services such as finance, accounting and advertising gain significantly, while arts, media and entertainment benefit most of all. An analysis by the Australian Government Department of Infrastructure and Transport used a different statistical process (fuzzy clustering) that allowed it to look at the agglomeration process in much more detail. At this level, the basic structure shown in Figure 3-4 was confirmed but there were significant variations within Industry Divisions. For example, some types of manufacturing industries such as fine furniture benefit from agglomeration, while steel making does not. Within retailing generally, the higher the value of the good, the more firms benefit from agglomeration. This explains why car retailers cluster together in almost all cities. These examples show how complex the agglomeration process is.

Figure 3-5 Effect of job density on labour productivity of the property and business services sectors, Melbourne 2007–08

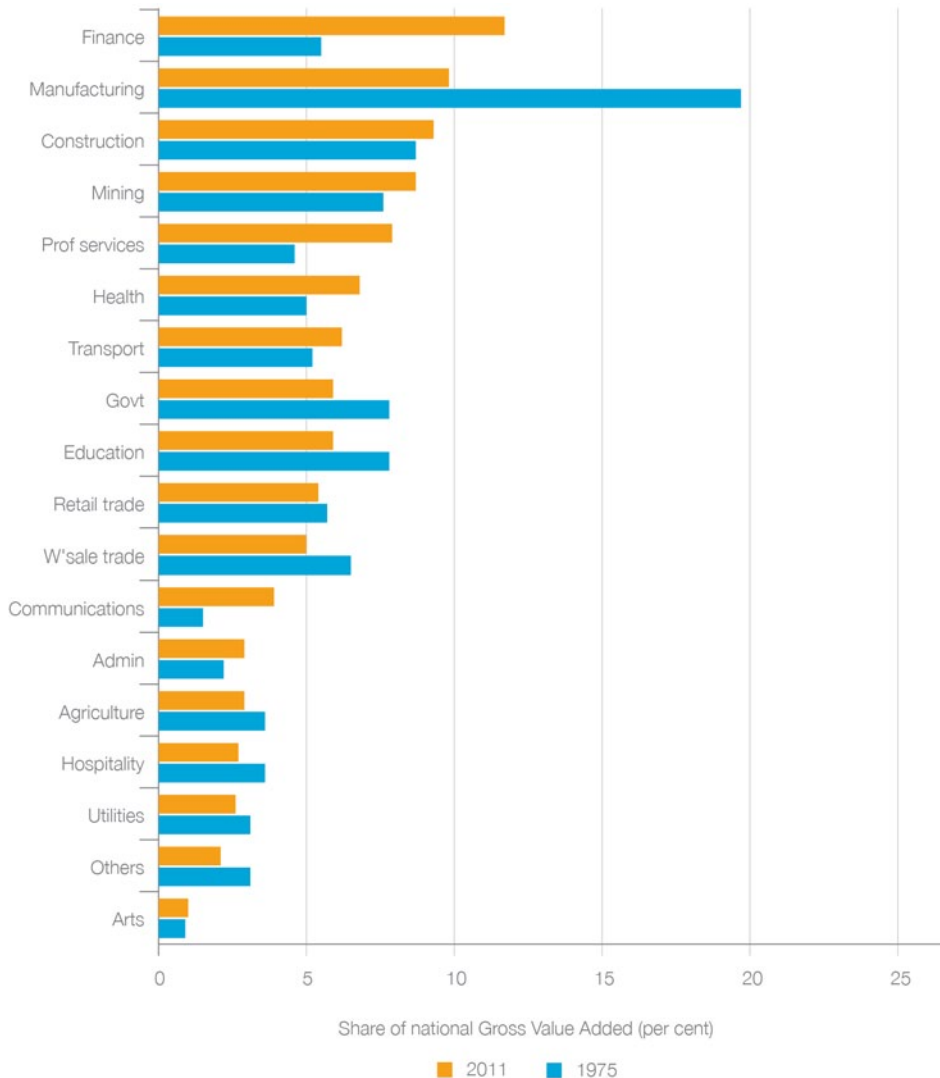


Source: From Rawnsley and Szafaneic 2010

Figure 3-4 showed the significant agglomeration benefits to the ‘transaction’ industries which refer to industries such as finance, insurance broking houses and law. This is further illustrated by the example of the property and business sectors in Figure 3-5. The concept of transaction industries is that as the economy improves its productivity by increasing the division of labour (labour specialisation) then the structure of the economy becomes more complex. Transaction industries help people navigate the complexity. For example, if a business owner was seeking to raise capital, they may find it more cost effective to use a merchant bank that has amalgamated capital from a variety of sources rather than going to each capital provider themselves, in the same way that a home buyer might use a mortgage broker. Thus, transaction industries help the whole economy to grow by allowing a further division of labour and providing the ‘oil’ to lower the internal friction in the economy.

A further discussion of the Australian context can be found in O'Malley (2007). When the ABS updated its 1993 Australian New Zealand Standard Industrial Classification in 2006, it expanded it by nearly 25 per cent. That is, the number of industries in Australia and New Zealand expanded by nearly one-quarter in 13 years. Most of this was in the transaction industry sector, indicating that this is where the greatest division of labour is taking place.

Figure 3-6 Industry Division shares of national Gross Value Added 1975 and 2011

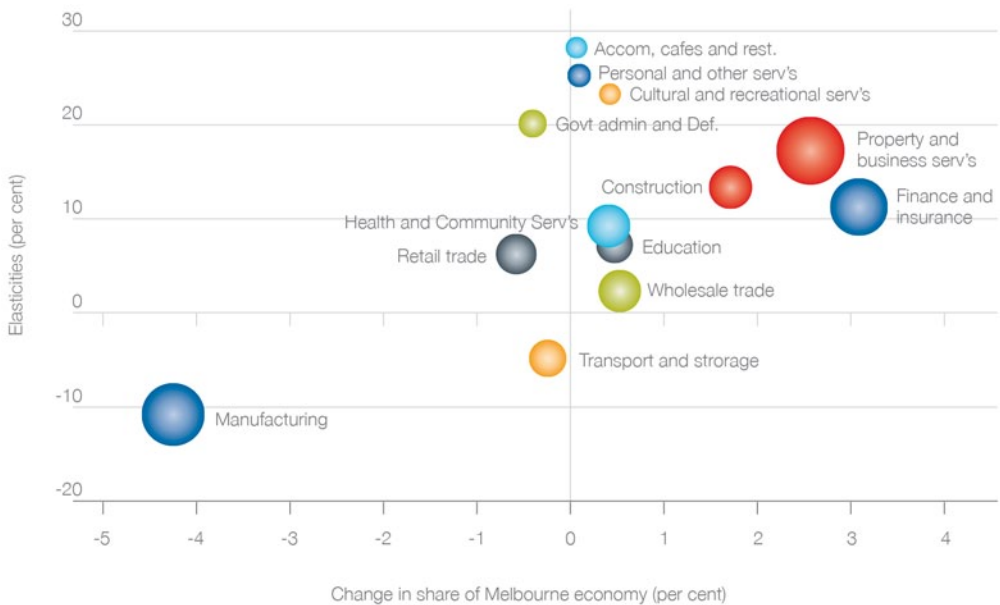


Note: Gross Value Added is the economic value of the good and services in an industry or area.

Source: ABS 2011b

Figure 3-6 shows that there have been major changes in industry mix in Australia over the last 37 years. Most noteworthy is a halving of manufacturing from 20 per cent to 10 per cent and the rise in transaction industries as a proportion of the Gross Value Added of the economy. This continues a trend that has been in place since 1960, when both agriculture and mining peaked at around 30 per cent of the economy while 'Finance, distribution and other services' were about 25 per cent (ABS 2005).

Figure 3-7 Agglomeration activities versus industry size and growth 2000–10



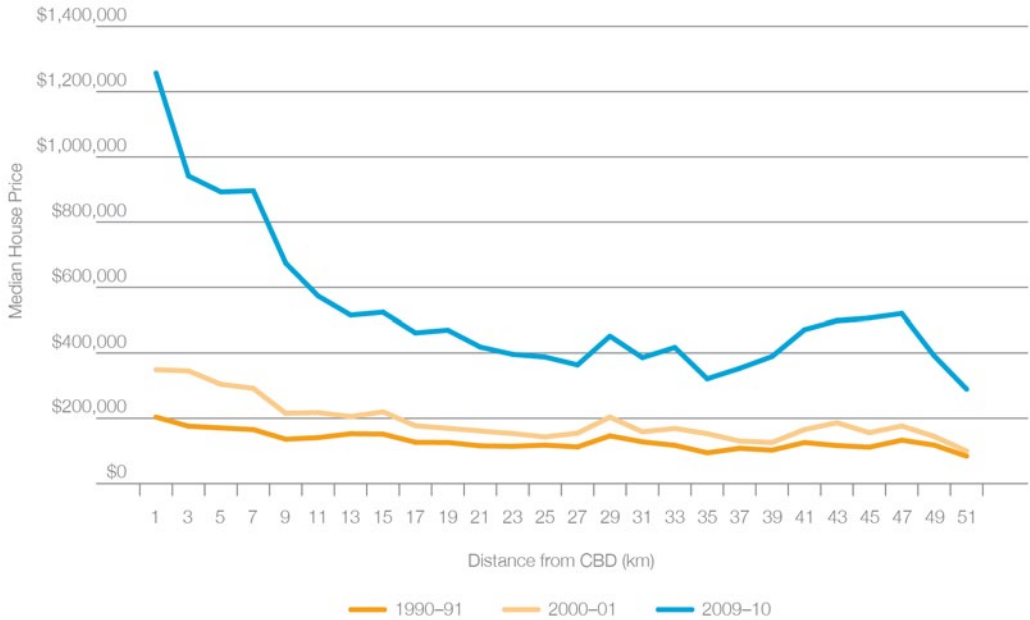
Source: Spiller 2012

SGS Economics and Planning has examined this process in Melbourne. Figure 3-7 shows the size of industries as represented by the size of the spheres. Those on the right of the plot are growing as a share of the economy while those to the left are declining. The higher an industry is on the plot, the more it gains from agglomeration. Those below the line are negatively affected by increasing job density. The plot shows that those industries that are growing as a proportion of the economy are also those that rely on higher job densities to increase their productivity. In other words the economic centre of gravity is moving to city centres where employment concentration is high.

Melbourne CBD construction.

Image courtesy of Chay Garde



Figure 3-8 House price gradients in Melbourne 1990–91 to 2009–10

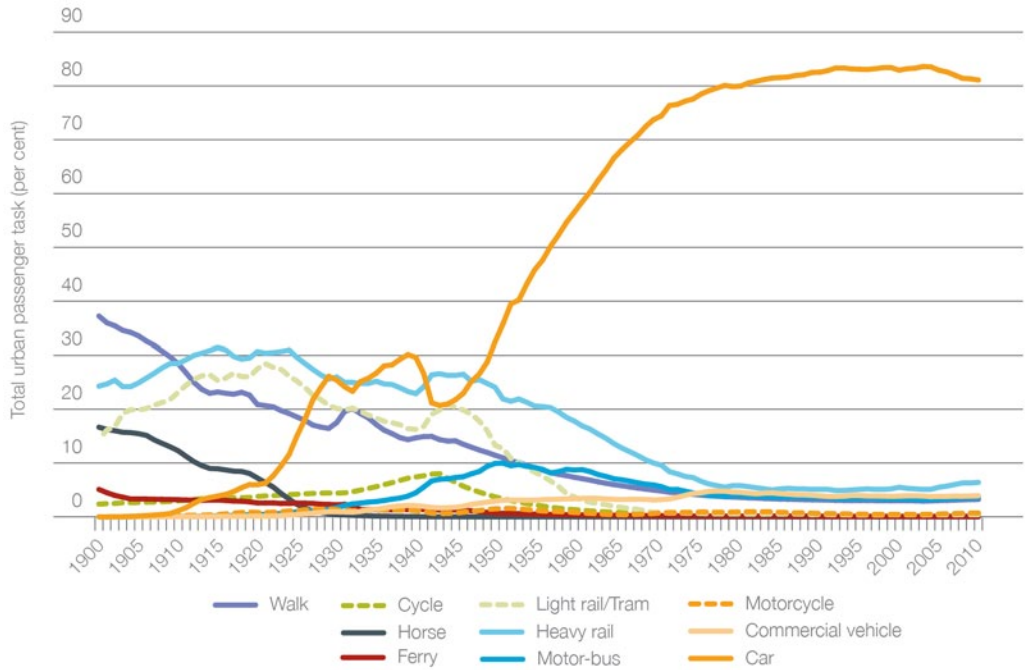
Source: From Rawnsley 2011

Analysis by the Australian Government Department of Infrastructure and Transport shows that the concentration of high Gross Value Added transaction industries in the centres of large cities has been the largest change in Australia's industrial geography in the last two decades. This finding is reinforced in Figure 3-8 which shows that in the last 20 years there has been a more than six-fold increase in the cost of dwellings near the CBD as compared to the outer suburbs where real prices have only doubled. As shown in Figure 2-41 in the previous chapter, this trend is common across the capital cities.

Transport

Urban transport in Australia 1900–2011

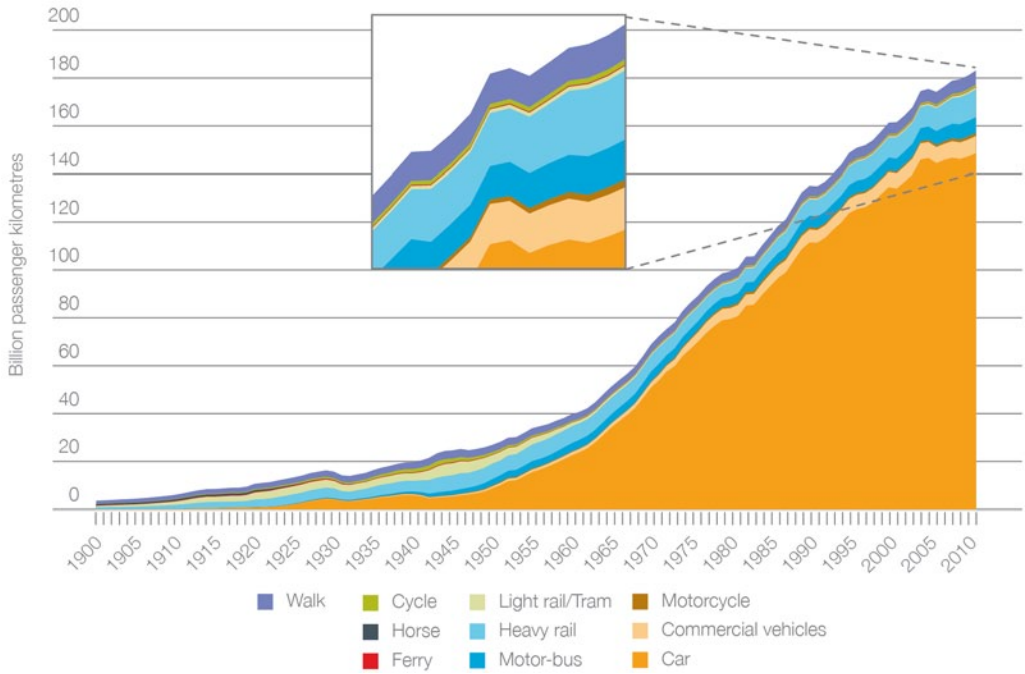
Figure 3-9 Modal shares for urban passenger transport 1900–2011



Source: Updated from Cosgrove 2011

The most obvious feature of Figure 3-9 is the very rapid increase in cars' share of the total transport task after World War II, peaking at almost 86 per cent in 2004 before declining to 81 per cent in 2011. Walking as a share of the transport task has declined at a consistent rate since Federation, although the temporary increase during the Depression is noteworthy. Light rail's (trams) peak was in the mid-1920s, with a relatively consistent decline since then only broken by wartime fuel rationing. Of interest is that the rise of buses and the decline of light rail are contemporaneous, suggesting that it was not only cars that were responsible for their decreasing patronage. Also contributing to the decline were government policies after World War II which favoured modern, clean and comfortable buses over what were then seen as rickety and dirty trams that often offered little weather protection to passengers, such as Sydney's infamous 'toast racks'. After peaking in the 1950s, bus's share of the transport task also declined before rising slightly in the last decade. Heavy rail's proportion of the urban transport task declined steeply after World War II before levelling off in the 1980s but is now growing again as the use of the car declines.

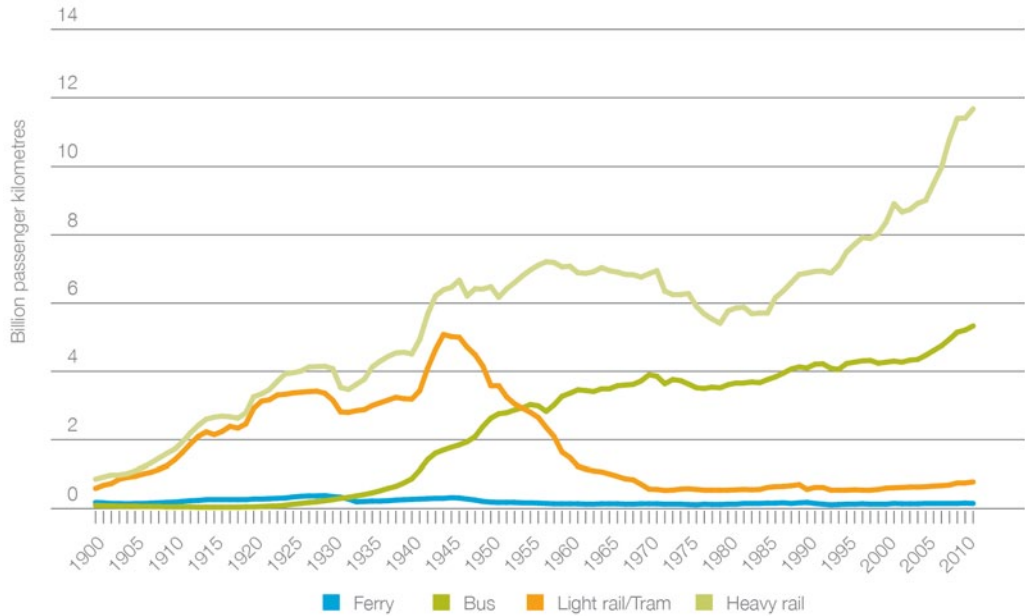
Figure 3-10 Total metropolitan passenger task across all modes 1900–2011



Source: Updated from Cosgrove 2011

When urban travel is expressed in billions of passenger kilometres (Figure 3-10), the sheer scale of the growth in the urban transport task is apparent. What is also clear is the dominance of the car over the second half of the 20th century. Also evident is the increase in light commercial vehicle use as the service economy expanded.

Figure 3-11 Total metropolitan passenger task performed by Australian mass transit modes 1900–2011



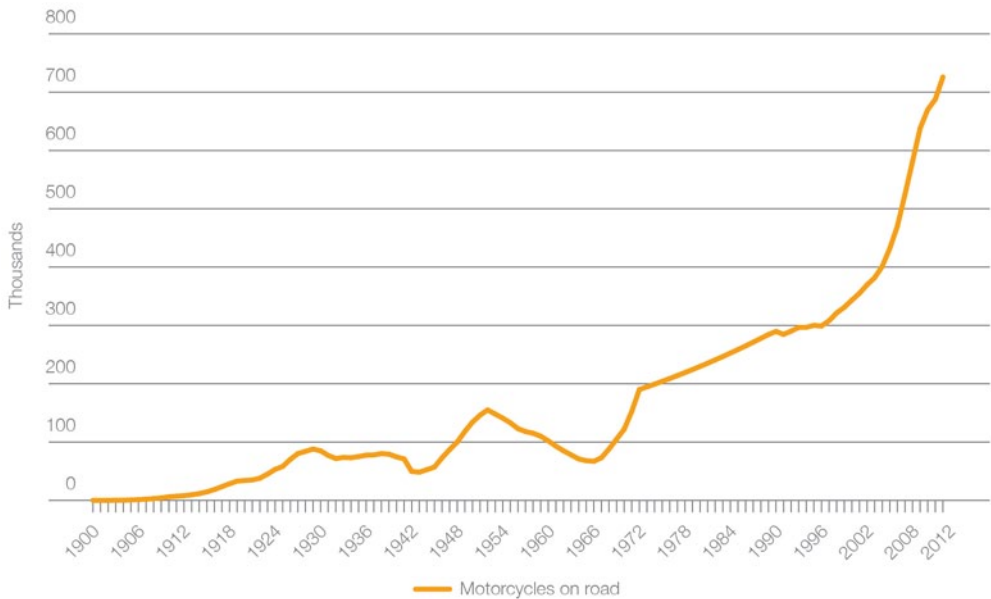
Source: Updated from Cosgrove 2011

If the mass transit patterns are examined more closely (Figure 3-11) then its decline measured in billion passenger kilometres between the end of World War II and 1980 is evident across all modes except for buses. Since then, mass transit has resumed an upward trajectory, with steady growth in heavy rail and to a lesser extent buses. However, despite this rise, the number of per capita trips on ground-based mass transit systems has not changed much for more than 30 years. In 1980 it was 108 trips per capita; in 2012 it was 105 (BITRE data). In other words, the rise in mass transit kilometres has been primarily due to population growth rather than a significant shift in modal share, although in some cities (or parts of cities) patronage is now growing faster than the population (BITRE 2012f).

Motorcycles and scooters

In many of the world's cities, the streets are thronged with motorbikes and scooters as people take advantage of this low-cost and space-efficient form of transport. In Australian transport policy, however, if they are mentioned at all it is usually in a discussion of safety. This can obscure the fact that they are an important and growing component of the urban transport system.

Figure 3-12 Motorcycles and scooters on the road 1900–2012 (projected)



Source: BITRE data

Figure 3-12 shows that the story of motorcycles and scooters has been one of fluctuating fortunes in Australia. From their beginning as essentially motorised bicycles at the start of the 20th century, motorcycles grew into a viable means of transport as engines, frames and (sometimes) suspension improved. For the first three decades of the century Australia had a thriving motorcycle industry using either local or imported components.

The growth was ended by the Depression which also meant the effective end of the local industry. Motorcycling grew strongly again after World War II as ex-military machines became readily available and cars were scarce and relatively expensive. This was also a period of technical innovation perhaps best exemplified by the Vincent HRD (partly designed by the Australian Phil Irving) which marked a watershed in design.

This renaissance was short-lived, however. Cars became more abundant and substantially cheaper in the 1950s which also coincided with the baby boom. It was also a period of relative technical stagnation in motorcycles although it did see the birth of the modern-day scooter in Italy.

Motorcycling's fortunes revived in the mid-1960s as the market was remade by cheap and reliable small Japanese motorcycles. The Honda Dream with the 'You meet the nicest people on a Honda' advertising campaign marked a clear change in perceptions of what motorcycling could be.

The industry was remade again with the advent of the Honda CB750 in 1969 – a machine so advanced it made all other large motorcycles obsolete at a stroke. This machine and its successors greatly widened the potential user base for motorcycles by offering inexpensive, reliable, clean and user-friendly machines for both the open road and city traffic.

In the last 10 years, motorcycles and scooters have undergone the greatest technological advances in their history. Engines are now vastly more reliable and efficient and motorcycles and scooters are possibly the most energy-efficient powered transport available. Emissions have also fallen as two stroke engines have declined to a minor portion of sales. Braking and handling improvements have greatly increased active safety, while technologies such as Anti-Lock Braking Systems (ABS), traction control, adaptive suspension and now airbag protection devices are spreading through the fleet. There has also been a flowering of different motorcycle types from the mega tourers that can weigh up to half a tonne fully loaded to small commuter bikes that weigh less than 100 kilograms.

Scooters have also undergone their own particular technological advances. While many such as Vespas can trace their roots back to post-war Italy, they have been joined by big-wheeled or maxi scooters and three-wheeled scooters that offer significant safety improvements in both steering and braking. They in turn are being joined by full-size electric scooters.

These advances have seen motorcycles and scooters become the fastest-growing segment of registered road vehicles (eight per cent growth per year for the last decade) with over 700,000 motorcycles and scooters on Australian roads today. A significant part of this growth has been in scooters. In the 1990s, there were fewer than 700 scooters sold a year in Australia. Now there are over 11,000 sold per year (Federal Chamber of Automotive Industries 2011). They currently represent 30 per cent of newly registered motorcycles and scooters and probably a higher proportion of those are used for transport rather than recreation (Victorian Government 2009).

The major advantage of motorcycles and scooters in the urban transport system is that they are very space efficient at a time when congestion is now a critical problem in cities. Depending on the attitude to filtering or lane splitting, they take up much less space than other vehicles in slow-moving or stationary traffic and up to five can park in a single car space. Consequently, cities in Australia are following their European counterparts in encouraging their use. In Melbourne, for example, motorcycles and scooters can park free on that city's wide footpaths, while in Canberra they can park free of charge in designated spaces that are plentiful throughout the city. The City of Sydney is implementing its *Motorcycle and Scooter Strategy and Action Plan and Strategy 2008–2012* which supports the provision of low-cost and secure motorcycle and scooter parking (City of Sydney 2008).

Improving motorcycle and scooter safety dominates discussion about the future growth of the mode. Great strides have been made in incorporating active safety into vehicle design. Passive safety has also been improved, in particular by better body armour and abrasion-resistant clothing coupled with an emphasis on rider training, nevertheless motorcycle and scooter riders are still an inherently vulnerable road user group. Many jurisdictions are now incorporating the needs of motorcycles and scooters into transport design through attention to marking paints, manhole covers and crash barrier specifications. If safety issues are addressed, the inherent advantages of motorcycles and scooters may see them become a steadily larger component of our transport system.



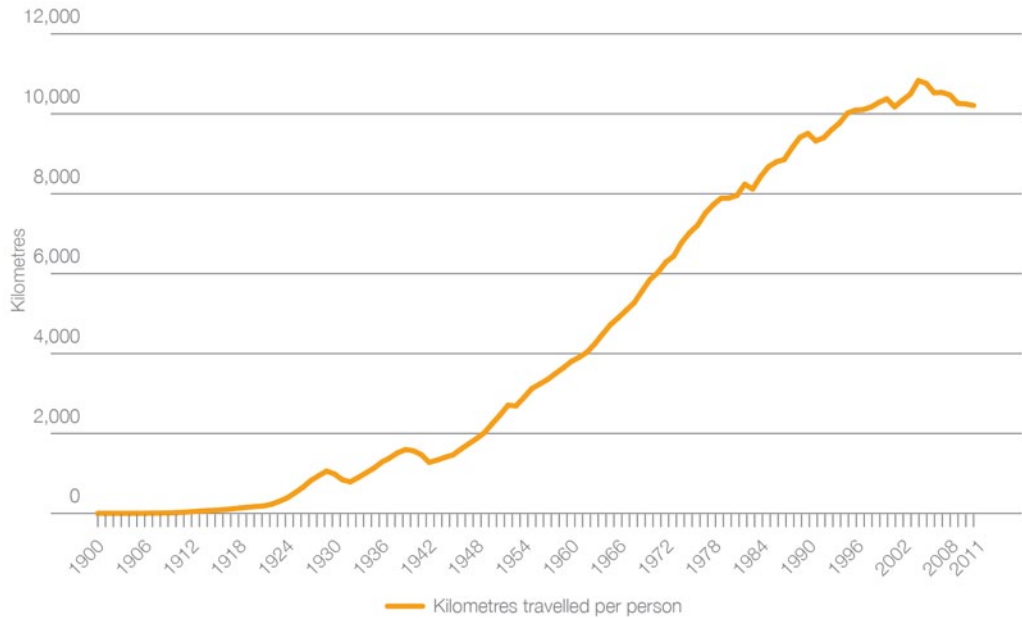
Row of scooters.

The relation ship between income growth and transport

There is a complex range of interlinking factors that determine if and how a person travels and what mode they will use. Fuel prices, generational differences in travel behaviour, economic conditions, technological innovations such as teleworking and changing industry structure all play a part. This section will focus on one factor that may be dominant – income.

When income is low, consumption is low. As income starts to rise, consumption starts to rise with it. As income continues to increase, however, consumption begins to plateau and in some cases fall. In other words, consumption is said to be saturated. This is of profound importance to the future transport patterns in Australian cities. For more than 70 years, the total transport task has been a combination of rising population multiplied by increasing per capita transport consumption. If per capita transport consumption stabilised or fell then new future transport infrastructure provision would be due to population increases only.

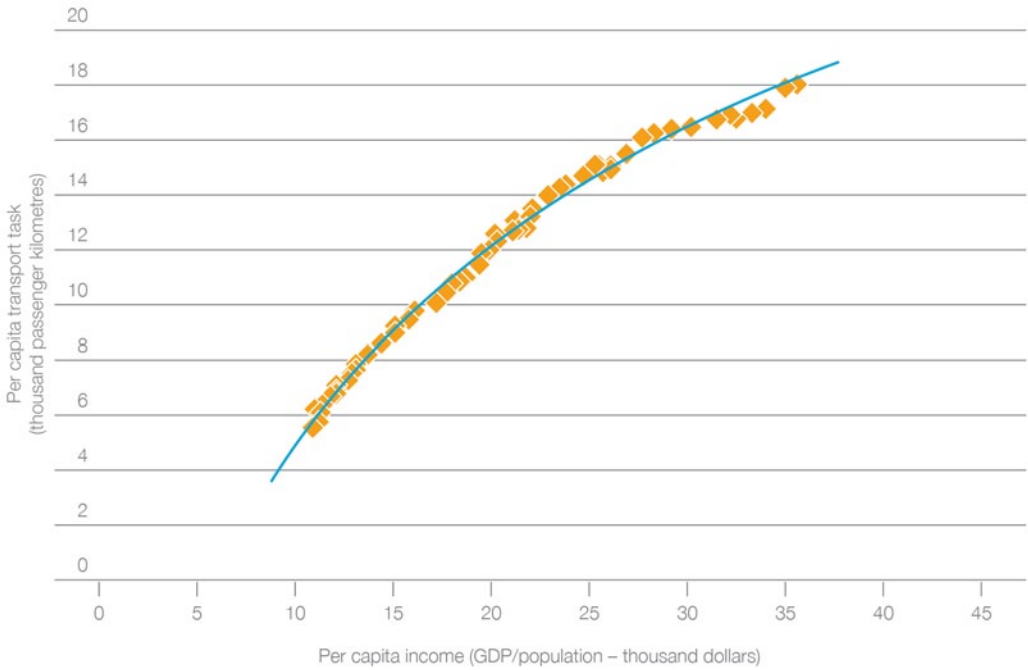
Figure 3-13 Total urban passenger transport consumption per person 1900–2011



Source: Updated from Cosgrove 2011

Figure 3-13 shows the total annual kilometres travelled per person in Australia since 1900. Travel consumption grew slowly in the first part of the 20th century punctuated by declines during the Great Depression and World War II. After the War, growth in travel increased markedly before beginning to plateau in the 1990 and peaking in 2005. Since then, there has been a decrease in per capita travel consumption.

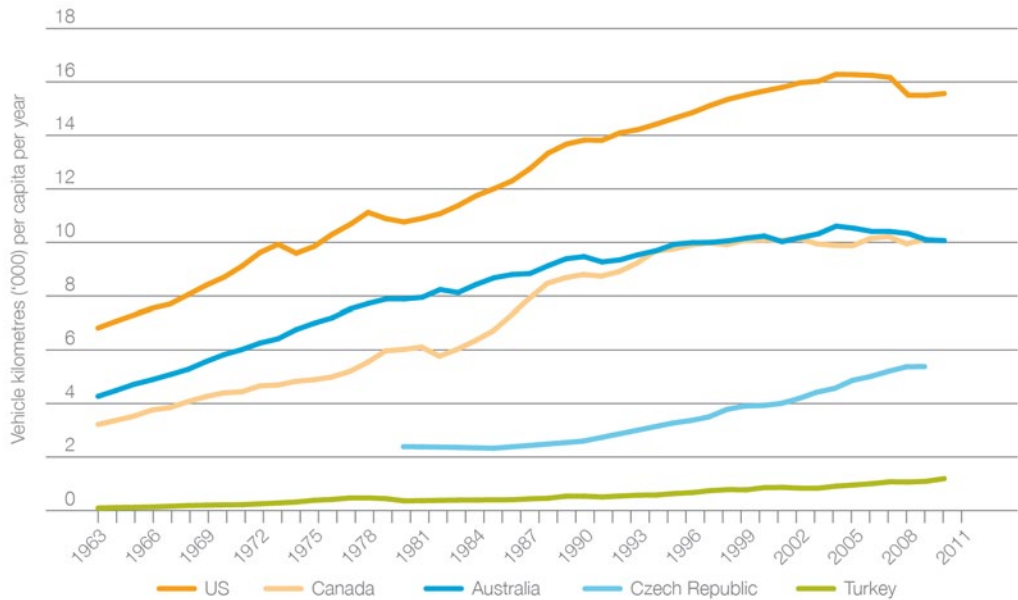
Figure 3-14 Relationship between income and the passenger transport task 1950–2005



Source: Cosgrove and Gargett 2011

Figure 3-14 shows the relationship between per capita income and per capita travel in Australia from 1950 to 2005. This indicates that, as national income grows, the amount of passenger travel per capita at first rises steeply but then begins to plateau.

Figure 3-15 International per capita travel consumption comparison 1963–2011

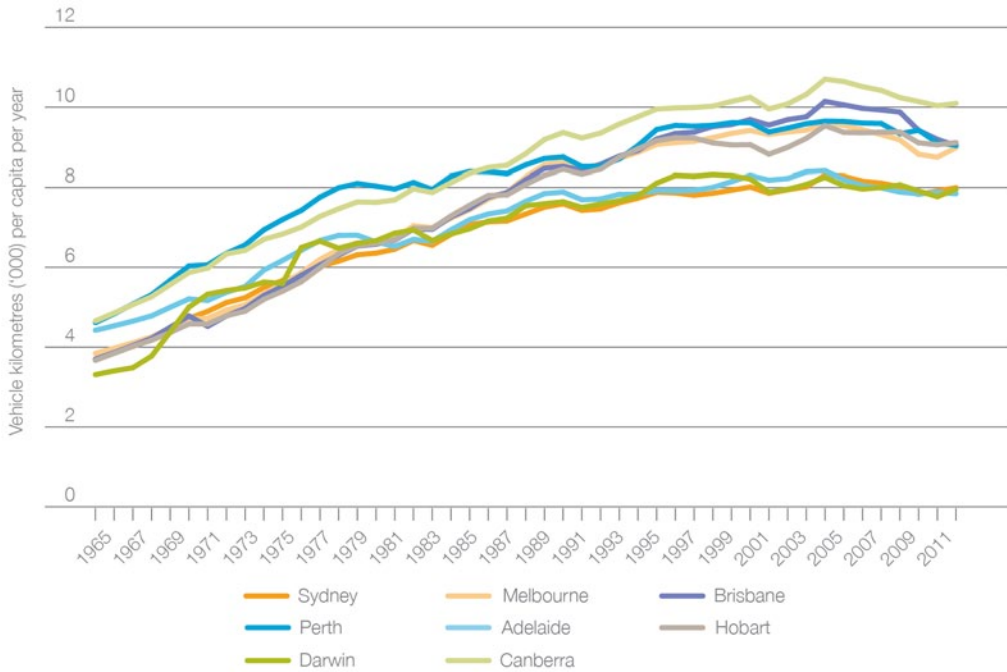


Source: BITRE 2012e

Figure 3-15 shows that this relationship between income and transport use seems common across a selection of high, middle and low income OECD countries. In Australia, Canada and the US, per capita travel rose steeply from the 1960s to the 1990s and then plateaued and fell in the first decade of this century. Intriguingly, the plateauing of consumption in most advanced economies commonly occurs when consumption reaches 9,000–10,000 kilometres per person irrespective of size and geography. The United States is the exception: the plateauing there occurred at around 16,000 kilometres per person (see further comparisons at BITRE 2012e).

A middle income country like the Czech Republic can expect that its per capita travel will continue to rise steeply as incomes rise. Countries with less advanced economies, on the other hand, are further back on the income scale and their per capita transport consumption is tracking only steadily upwards. Turkey is currently in this situation – in 2011, the average person was travelling a little over 1000 kilometres per year.

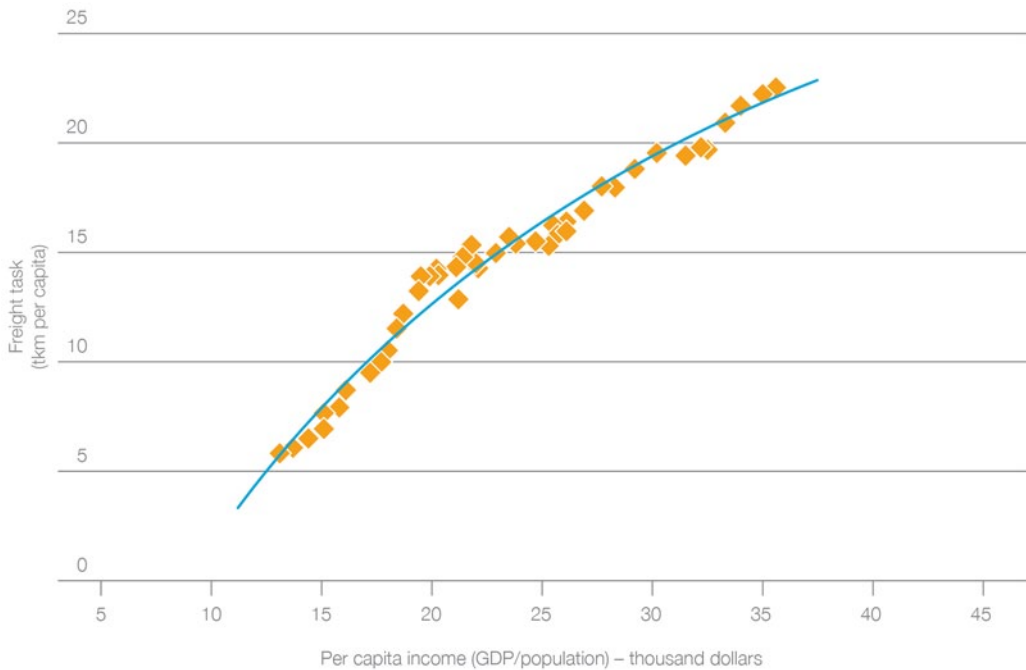
Figure 3-16 Per capita vehicle kilometres travelled on passenger transport in Australian capital cities 1965–2011



Source: BITRE 2012d

Figure 3-16 shows that the national trend in passenger transport shown in Figure 3-13 is reflected in the capital cities, although there are variations on the theme. Whether the decline in car use translates to a longer-term phenomenon is the subject of considerable debate and future State of Australian Cities reports will continue to monitor the trend.

Figure 3-17 Relationship between freight task and income 1961–2005



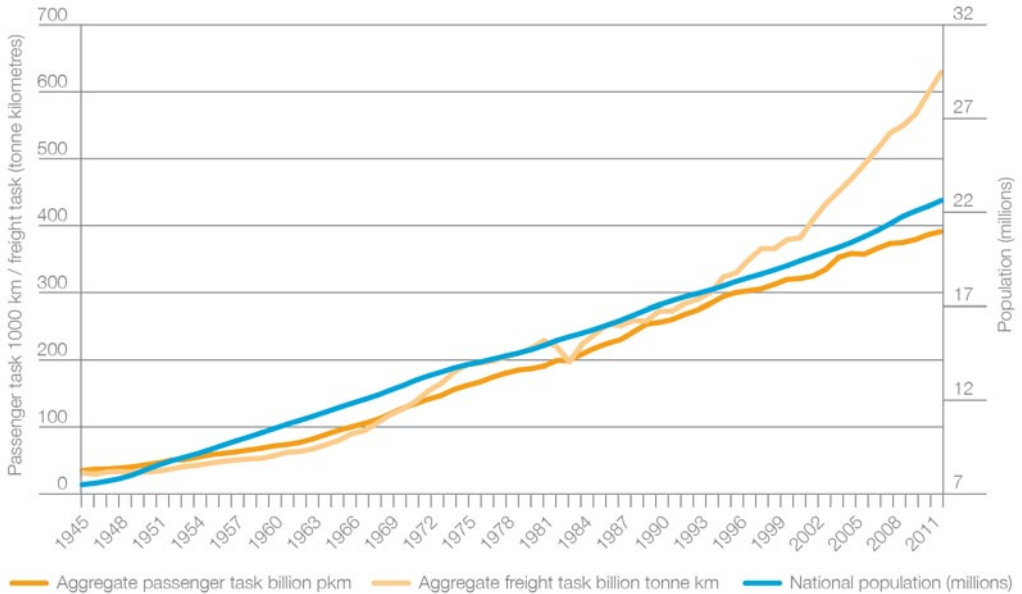
Source: Cosgrove and Gargett 2011

Figure 3-17 shows that the freight task has a different relationship to income than the passenger task. Rather than plateauing once income reaches a certain level, the freight task continues to rise. Note that while the passenger task is closely correlated with domestic incomes, the freight task is linked to exports and imports and in turn overseas incomes. In other words, the rapidly increasing income levels of Australia's trading partners will influence Australian domestic freight movements.

Macquarie Point, Hobart.

Image courtesy of Tasports and Alastair Bett Photography



Figure 3-18 National freight and passenger transport task 1945–2011

Source: Data from ABS 2012a, Cosgrove and Gargett 2011

Figure 3-18 shows that for 50 years after the end of World War II until the mid-1990s the freight and passenger task increases at a similar rate. Since that time, the passenger task has plateaued and declined while the freight task has continued to rise. This suggests that if per capita incomes continue to rise, freight will become an increasingly dominant part of the transport task generally and also in Australian cities. This will create a challenge for those cities or parts of cities where the road network has mixed demands from freight and passengers that cannot be overcome by scheduling. It will also put increased pressure on urban heavy rail networks where passenger and freight networks are entwined, such as in Sydney.

Transport scheduling

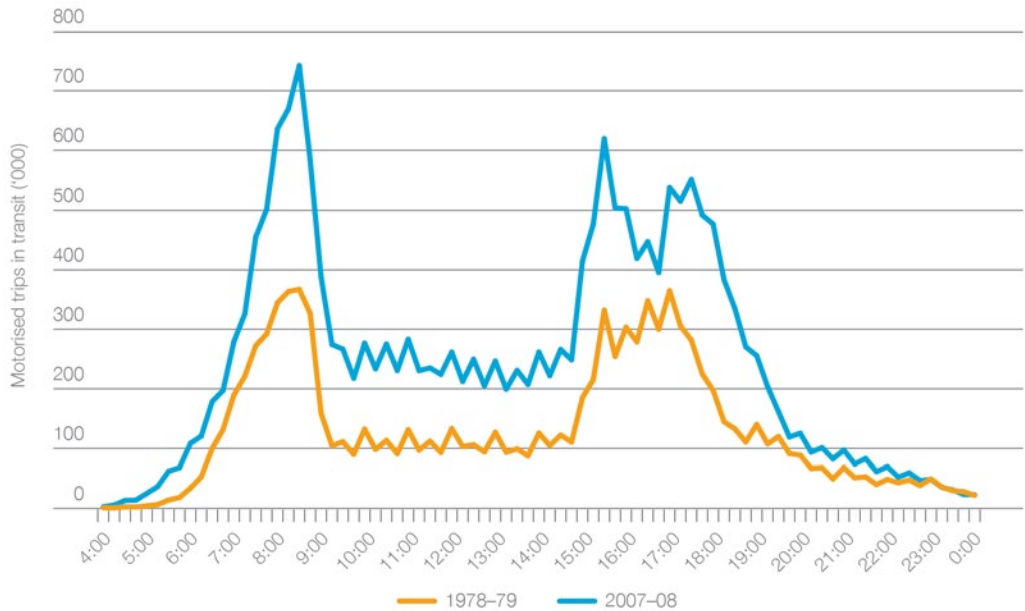
There are two main ways of measuring transport scheduling. The first is journey to work data collected by the ABS as part of the Census. The advantage of this data source is that it has records of where the commute started and finished and the transport mode. The disadvantage is that it only captures a quarter of urban passenger journeys. The journey to work data is particularly useful for analysing the industrial structure of cities and has been used extensively by Bureau of Infrastructure, Transport and Regional Economics (BITRE) in analysing Perth (2010), Melbourne (2011d) and Sydney (2012f) and South East Queensland (in preparation). The 2011 journey to work data was released in the final stages of the preparation of this report so detailed analysis has not been possible. However, it is briefly discussed in Chapter 5.

The second way to measure transport patterns is with Household Travel Surveys conducted by states and territories. These include all passenger travel, journey purpose, time and distance. Data from the Household Travel Surveys of Melbourne and Sydney is used extensively in this section.

Also helpful is the annual Household Income and Labour Dynamics in Australia (HILDA) survey which reports travel data (Melbourne Institute 2012).

Transport scheduling is a critical aspect of the urban passenger task. McGeoch compared a survey of travel distances and times in Melbourne in 1978–79 to one undertaken almost three decades later, in 2007–08 (2011). During this period, the boundaries of Melbourne expanded significantly and the later study reflected this change.

Figure 3-19 Motorised trips over a 24-hour period in the Melbourne Statistical Division 1978–79 and 2007–08



Source: McGeoch 2011

Figure 3-19 shows the number of weekday motorised passenger trips in the two periods. As shown nationally in Figure 3-10, the growth in the urban transport task is apparent, with a near doubling over the 30-year period. The scheduling of the task throughout the day remains similar. The morning peak is now sharper and proportionally larger in 2007 than it was in 1978. The afternoon peak loading meanwhile has developed two peaks – one after school and the other at the home commute, peaking at 5:30pm. Noteworthy is that this home commute occurred nearly an hour later in 2007 than it did 30 years before.

McGeoch also reported that in terms of peak periods for different transport modes over the intervening three decades, car and train journeys have moved 15 minutes and 30 minutes, respectively, later in the morning peak.

The high morning peak load has significant implications for the capacity of urban transport infrastructure. If it was possible to spread this peak it would enable much more efficient use of transport infrastructure, which during other parts of the day operates at well below capacity. This could also remove or delay costly augmentation to transport infrastructure.

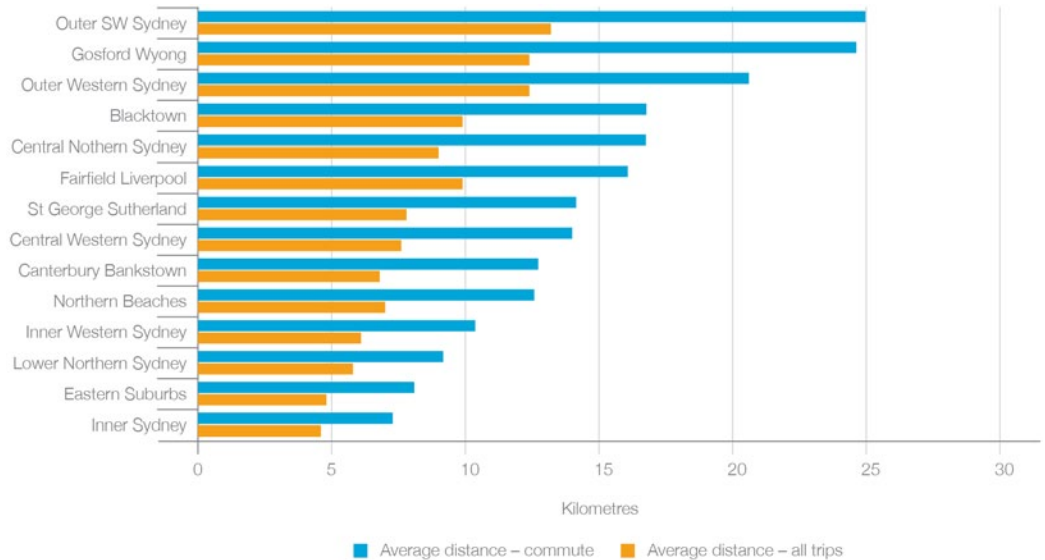
Table 3-1 Trip purpose Melbourne 1978–79 and 2007–08

Period	Year	Home	Work	Education	Personal Business	Shopping	Recreation	Transport of passengers	Other	Total%
07.15–09.15	1978–79	5.5	36.6	32.7	3.2	2.0	1.0	12.0	7.0	100
	2007–08	9.7	34.2	19.0	6.5	6.7	10.4	13.4	0.1	100
15.15–17.15	1978–79	70.5	1.6	0.4	5.5	6.9	3.5	8.3	3.3	100
	2007–08	60.6	3.9	0.6	4.9	8.5	11.5	9.9	0.1	100
All day	1978–79	40.6	13.6	8.7	7.8	8.4	5.8	8.9	6.2	100
	2007–08	37.2	16.6	5.0	6.7	10.5	15.0	8.9	0.1	100

Source: McGeoch 2011

McGeoch also examined the differences in travel purposes between the two periods (Table 3-1). There are two aspects of this table that are particularly noteworthy. The first is that only one person in three using motorised transport in the morning peak in both periods is someone going to work. The other two are using the network for other reasons, particularly education. The other is the rise of trips in the morning peak that appear to be discretionary. Recreation and shopping, for example, moved from three per cent of the morning peak in 1978 to 17 per cent 30 years later. It is interesting to note that the data in this table is almost exactly consistent with a similar study for Sydney in 2010–11 (NSW BTS 2012). This suggests that the pattern may be common across the larger capital cities.

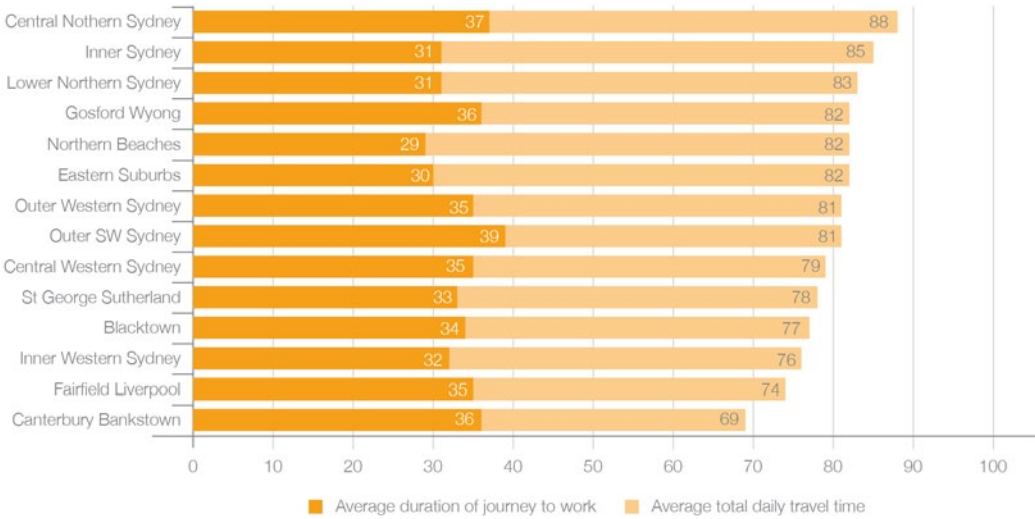
Figure 3-20 Average daily travel distances in Sydney's regions 2010–11



Source: NSW Bureau of Transport Statistics (NSW BTS) 2012

It is generally thought that those on the outskirts of major cities travel much longer distances than those in the centre. Data for trip distances for regions of Sydney from the NSW Bureau of Transport Statistics *Household Travel Survey 2010–11* (Figure 3-20) confirms this.

Figure 3-21 Average weekday travel times for regions of Sydney 2010–11



Source: NSW BTS 2012

However, Figure 3-21 shows that the total *time* devoted to travel was relatively consistent across the city and that residents of the CBD devoted some of the longest time to weekday travel.

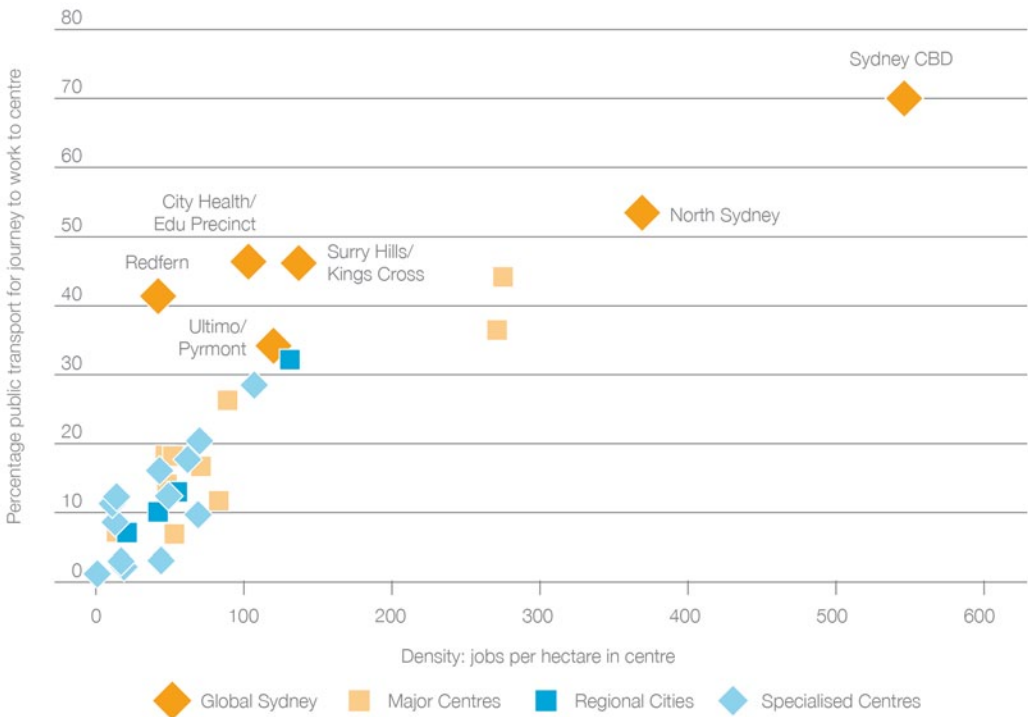
This is consistent with the BITRE analysis of commuting patterns in Perth (BITRE 2010), Melbourne (BITRE 2011d) and Sydney (BITRE 2012f), which shows a remarkable uniformity of commuting times across and between cities of between 30 and 35 minutes. McGeoch’s 2011 study of Melbourne travel patterns suggests that these times have not changed much for at least the last 30 years despite the major changes in urban geography structures and the rise of women as a major transport user group with different travel patterns over that time (Morris et al. 2010).

This suggests the operation of an interesting principle known as Marchetti’s constant. Cesare Marchetti was an Italian physicist who calculated that people will devote on average 90 minutes a day to travel and no more. If this is the case, then rather than the structure of cities shaping their residents’ travel time budgets, the residents’ travel budgets may be shaping cities. The question then becomes: is this leading to unproductive urban geographies? In other words, is the real cost of inefficient transport networks not in loss of time to individuals but, rather, are suboptimal employment densities leading to lower industry productivity, particularly in the growing transaction industries, a cost borne by the nation? This suggests that improving the efficiency of urban transport systems by putting people in their economically optimal location within a total travel time of 90 minutes may be the key to improving the productivity of cities.

Productivity and transport in cities

Concentrating jobs at sufficient density to generate better labour productivity means that large numbers of people must be moved to relatively small areas within an average total travel time envelope of 90 minutes or less. Since space becomes a critical constraint in CBDs and other dense centres, mass transit systems become the only viable solution. The theoretical capacity of a single commuter rail line operating at peak efficiency with acceptable crush levels is the same as a 10-lane freeway with an average car occupancy ratio of 1.2 (Hale 2011), although in practice it is somewhat less (Stephens and Adams 2012). This is one of the main reasons that 65 per cent of commuter mass transit usage in Melbourne involved travel to a workplace in central Melbourne and 59 per cent in Sydney (BITRE 2011d, BITRE 2012f).

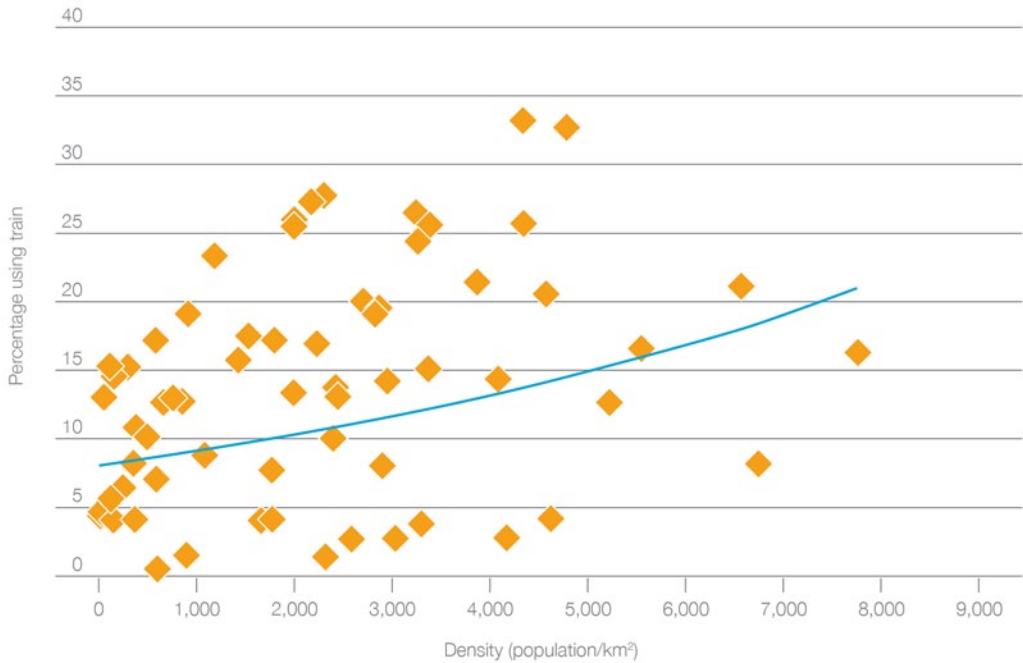
Figure 3-22 Relationship between mass transit usage and job density, Sydney 2006



Source: Daniels and Mulley 2011

Figure 3-22 shows the clear relationship between job density and mass transit use within Sydney.

Figure 3-23 Train use and residential densities, Sydney 2006

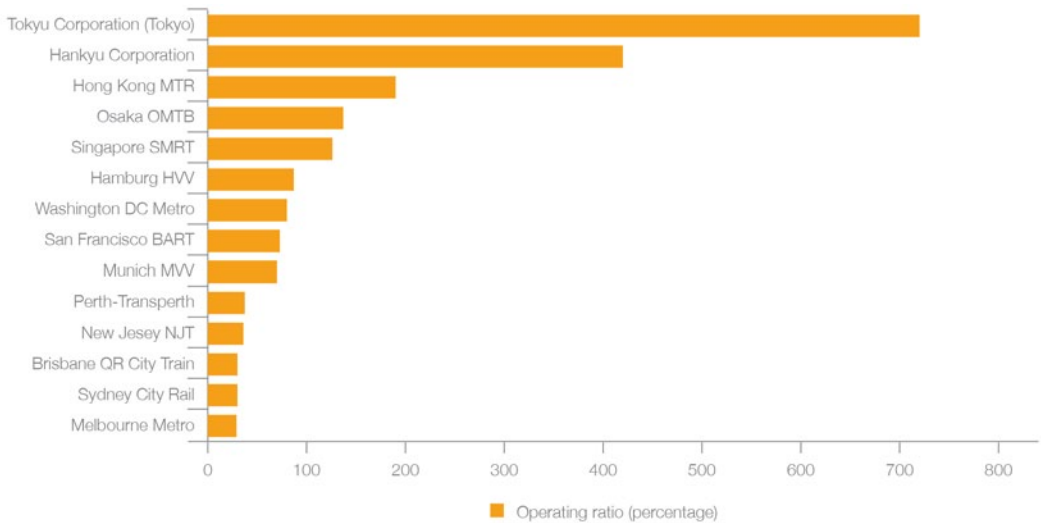


Source: Brooker and Gee 2009

The link between job density at destination and train use is much stronger than the link between residential density and train use (Figure 3-23). This indicates that the density of the destination is much more important than the density at the journey's origin for determining mass transit usage levels.

The transport mode doing the heavy lifting for high agglomeration industries is rail. Our rail networks are largely legacy systems that were built with substantial extra capacity and are capable of absorbing significant increases in loading without major additional capital costs. It is now clear, especially in Sydney and Melbourne, that much of this surplus capacity has been taken up in recent years with population growth and mode switching (Brooker 2010, City Rail 2012). This indicates that productivity rates in cities will be increasingly constrained by the capacity of mass transit systems, particularly rail. How to deal with this reality is now being debated across our major cities.

Figure 3-24 Fare recovery as a proportion of operating costs among selected international rail operators



Source: Hale 2011

Figure 3-24 uses 2007–08 data to show that fare recovery and other sources of revenue for rail systems in Australia are low by international standards. Asian rail operators generally capture the value of the rail line through property development in the same manner as the pioneering British and American rail did. The more prevalent practice in the West now is to allow the value of rail development to be captured by others. However, even by comparison with low-density cities such as Washington DC and San Francisco, Australian operational cost recovery is low.

Table 3-2 Fare recovery in Sydney's mass transit systems as a proportion of operating costs

	2008–09	2009–10	2010–11	2010–11 shortfall in revenue
CityRail	27%	24%	22%	\$2,333 million
Metro Buses	41%	38%	32%	\$648.1 million
Outer Metro Buses	14%	13%	11%	\$167.4 million
Total				\$3,148.4 million

Source: Data sourced from Independent Pricing and Regulatory Tribunal (IPART)

Table 3-2, using Sydney's mass transit system as an example, shows that the proportion of operating costs recovered in fares has been declining across all modes. The shortfall in the 2010–11 year exceeded \$3 billion in operating costs alone. A preliminary analysis by BITRE of cities where publically available data is adequate to make an assessment indicates that Sydney's mass transit system recovers 24 per cent of its operating costs through the fare box and Melbourne does better at 31 per cent, while Perth does best of all at 38 per cent. For Canberra's bus only system, however, users pay only 17 per cent of operating costs.

Table 3-3 Fare multiples under different levels of recovery

	30%	60%	90%
Sydney	1.25	2.5	3.8
Melbourne	0.97	1.9	2.9
Brisbane	0.94	1.9	2.8
Perth	0.79	1.6	2.4
Canberra	1.8	3.6	5.3

Source: BITRE analysis of publically available data

Estimates of the level of fares necessary to achieve 30, 60 and 90 per cent cost recovery can be seen in Table 3-3.

The current mass transit financial model of large Australian cities is not sustainable and presents serious challenges for future growth. Low levels of cost recovery in the context of the fiscal priorities of governments mean that, in the absence of new revenue, it will be difficult to fund any new investment in transport infrastructure or operations.

The current financial model also means that the economic benefits of concentrating jobs in city centres comes at a significant cost to the rest of the economy through the subsidisation from state and territory revenue of the mass transit system servicing it.

It is also evident that capitalising public transport subsidies into the land value surrounding mass transit systems can cause increasing social inequity. Higher land costs mean that those on lower incomes must live further away from public transport while those on higher incomes can afford to live within a convenient distance and can also benefit from highly subsidised fares.

Milsons Point station, Sydney.

Image courtesy of Richard Longman



Perth rail system

Low density Perth is typical of the post World War II suburban growth of Australian cities (Kane 2009). Despite its flat topography and high reliance on car use, Perth's radial rail system forms a key part of its transport system.

Significant investment has seen the rail network electrified and expanded from 66 kilometres in 1990 to 169 kilometres over the last two decades. The opening of the Joondalup (now Clarkson) line in 1992 and the Mandurah line in 2007 has effectively seen Perth complete the north–south spine of its radial system adding a significant catchment area for patrons. Use of the three pre-1992 lines – Midland, Armadale and Fremantle – has also more than tripled over the same period (BITRE 2012g).

The expansion was only made possible through the long-term vision of planners and engineers who designed roadways with wide central reservations on which the railways could be built.

The network is notable for the long distance between stations by Australian standards. The Clarkson line has an average of three kilometres between stations and the newer Mandurah line has six kilometres between stations, which means that average line speeds are relatively high. The Mandurah line has speeds averaging 85 kilometres per hour. Contributing to the high average is a focus on keeping train dwell times at stations low. In addition, Perth's network structure is simple, with minimal interface between passenger and freight lines. The simplicity of the system maximises capacity and minimises delays. Except at the extreme ends of the operating day, the maximum time between trains is 15 minutes (BITRE 2012f).

There is emphasis on safe, well-lit platforms and good complementary bus connections at stations with interchanges that improve the public transport experience by providing shelter to passengers, minimising walking distances and providing walkways over busy roads. There is also a strong focus on ensuring ease of access to stations, with free or low-cost park-and-ride facilities. All this has increased patronage on the Perth rail network which has grown from seven million trips in 1992 to 59 million in 2010–11 (BITRE 2012f).

Conclusion

This section began with a discussion about the need to increase national productivity and by extension, the productivity of major cities where three-quarters of the population work. It looked at the changing industrial structure of cities – in particular, the increasing concentration of economic value and employment in city centres. This raised the issue of the transport network needing to concentrate large numbers of workers in a relatively small area within a 45-minute travel time from home. It concluded that the mode most suited to this task was rail because it is the most space-efficient. However, rail systems in the larger cities are already at or near capacity. The situation is made worse by the financial structure of rail which seems unsustainable on the information available. It is clear that urban mass transit systems must become more sustainable by better cost recovery through the fare box and/or the capital value of the surrounding land. If not, the flow on effects to national productivity could be considerable.

Economic impact of ports to major cities

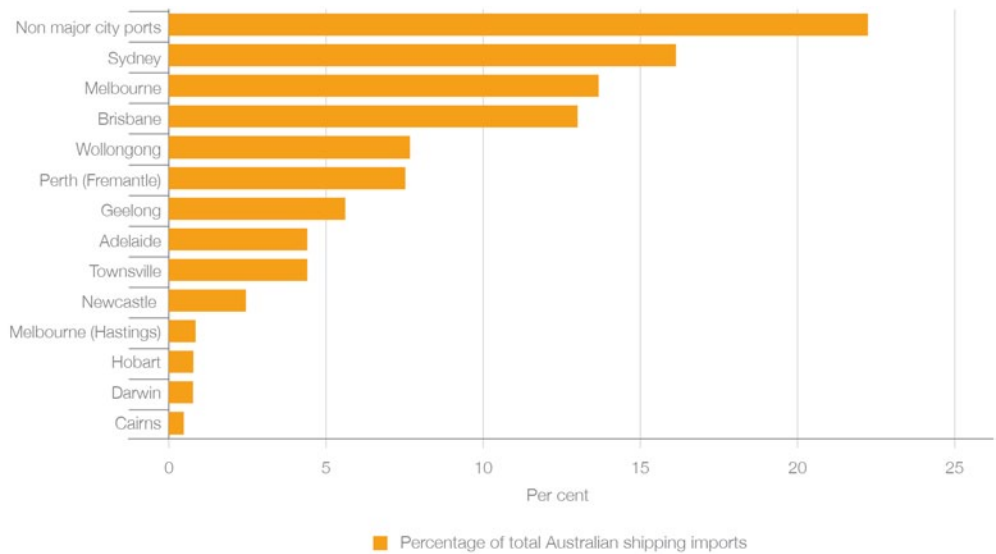
Ports in major cities are important nodes of economic activity, with cargoes of container goods, bulk goods and agricultural cargo operations for both import and export (BITRE 2012a). The majority of port movements are to and from international destinations. Interstate and intrastate freight shipping (known as coastal shipping) accounts for a modest share of the task, primarily between the mainland and Tasmania (mostly through Melbourne and accounting for 13 per cent of Melbourne’s container trade task) and between the eastern states and Western Australia (BITRE 2011a).

The major city ports handle most of Australia’s imports, as shown in Figures 3-25 and 3-26. Less than one-quarter of imports go through ports outside a major city. Melbourne’s docks handle the largest volume of imports by value and Sydney docks the largest volume of imports by weight (BITRE 2011a). Ports outside of the major cities account for a larger volume of exports, also illustrated in Figure 3-25. This is in part due to the volume of bulk raw materials shipped internationally from ports in regional and remote areas of Australia.

Figure 3-25 Proportion of imports and exports by volume (mass tonnes) for 2011–12



Source: Ports Australia 2012

Figure 3-26 Imports arriving by ship into Australian ports for 2011–12

Source: Ports Australia 2012

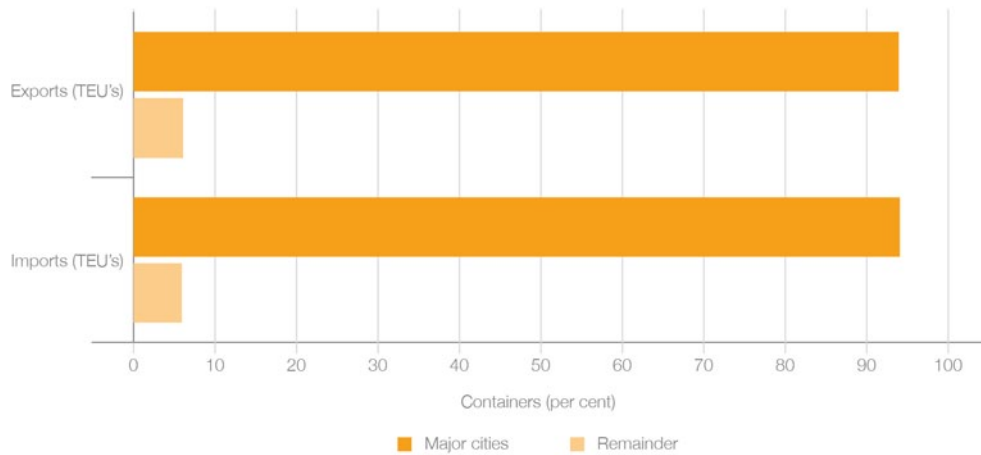
Increasing Australia's port productivity helps us compete better with ports and freight supply chain systems in other countries. Similarly, more productive ports reduce the cost of overseas manufactured goods for the Australian consumer and this flows on to the Australian economy (GHD 2010b). Productivity gains have been made in a number of ways, such as the automation of the Patrick Port of Brisbane operation and improvements in road and rail networks connecting the ports and the construction of intermodals.

Other non-cargo users of major city ports include the Defence Force (particularly at the ports of Darwin and Townsville), cruise lines (particularly at the ports of Cairns and Sydney) and the passenger and vehicular ferry between Melbourne and Devonport in Tasmania (99 kilometres from Launceston).

Containers

Figure 3-27 shows that freight container movements in Australia are strongly concentrated within the major cities with approximately 94 per cent of all container movements taking place within 10 major city ports. The majority of these movements take place within the five largest capital city ports; see Figure 3-28.

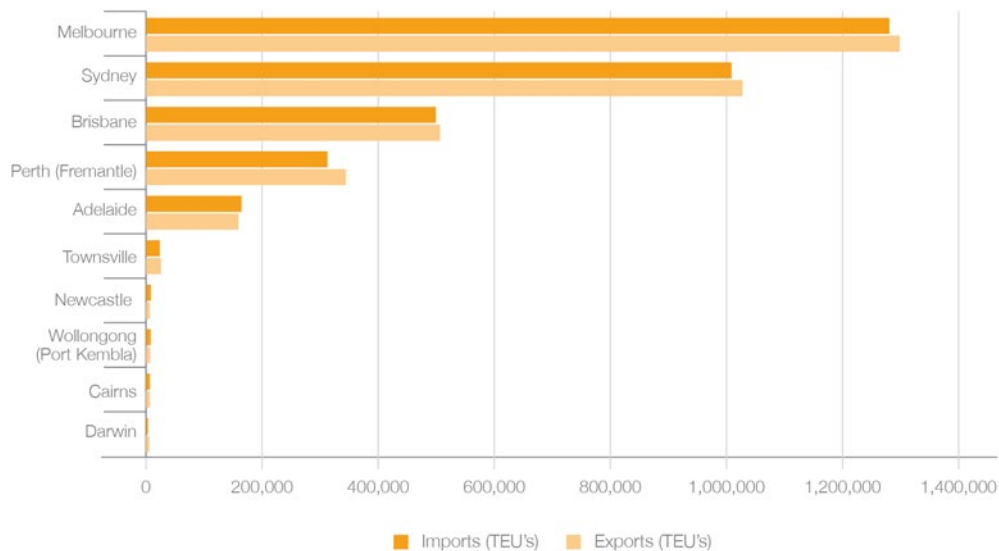
Figure 3-27 Container freight by major cities and the remainder of Australia for 2011–12



Note: Container movements are measured in Twenty-foot Equivalent Units (TEUs) – the standard unit for measuring shipping container volume. Includes all major cities that have ports.

Source: Ports Australia 2012

Figure 3-28 Container freight by major cities for 2011–12



Note: Container movements are measured in Twenty-foot Equivalent Units (TEUs) – the standard unit for measuring shipping container volume.

Source: Ports Australia 2012

The majority of container freight arriving in these ports is servicing the local metropolitan market. Figure 3-29 shows container movement for Fremantle Port (Perth). Freight typically travels 20 to 30 kilometres from Fremantle Port. Seventy per cent of import containers are unpacked within just 10 predominantly industrial suburbs of Perth and 32 per cent unpacked in just the three suburbs, Kewdale, Forrestfield and Welshpool (Main Roads Western Australia et al. 2012).

In Melbourne 87 per cent of container imports are unpacked within the metropolitan region (including the city of Geelong), 2.9 per cent go to regional Victorian destinations and 9.8 per cent go to interstate destinations. The Melbourne suburbs with the highest volume of container imports are Dandenong, Laverton North, Somerton, Altona and Tullamarine. Figures for container exports in Melbourne differ greatly to imports with just 54 per cent coming from within metropolitan Melbourne, 23 per cent from regional Victoria and a further 23 per cent from interstate. Less than 20 per cent of container freight travels outside of the immediate urban region (GHD 2010).

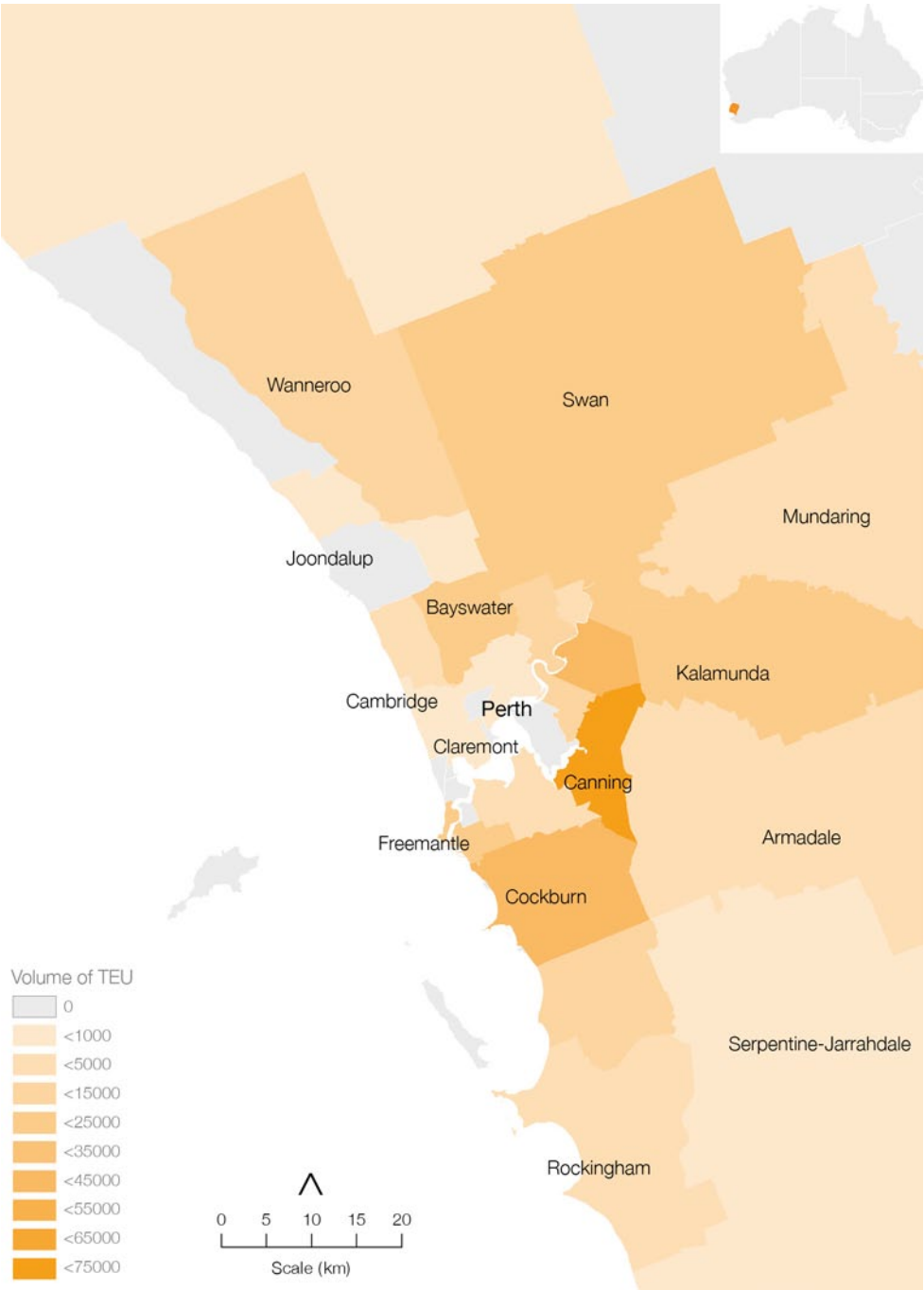
In Sydney 85 per cent of containers are packed or unpacked within 40 kilometres of Port Botany (Flynn 2011).

Newcastle Harbour, New South Wales.

Image courtesy of RDA Hunter



Figure 3-29 Container movement for Fremantle Port (Perth)



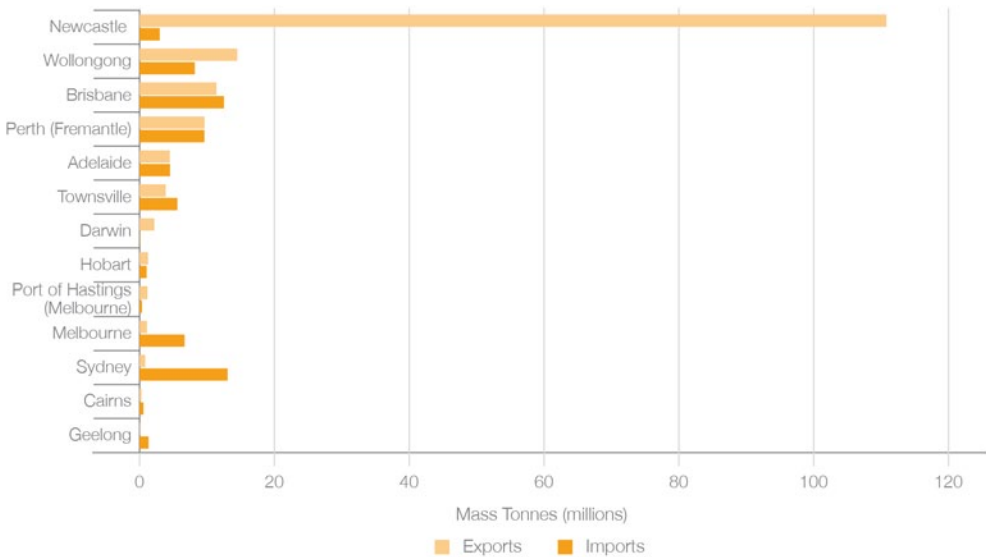
Note: Container movements are measured in Twenty-foot Equivalent Units (TEUs) – the standard unit for measuring shipping container volume.

Source: Data supplied by Fremantle Ports as a major partner in the 2012 Fremantle Port Container Movement Study in conjunction with Main Roads Western Australia, Government of Western Australia Department of Transport and Freight and the Logistics Council of Western Australia (Fremantle Port 2012)

Bulk goods and commodities

Ports in the capital cities are largely dominated by container trade. However, bulk goods and other commodities are significant in some of the smaller major cities, as can be seen in Figure 3-30. For example, the port of Newcastle has by far the largest share of bulk exports of the major cities (largely coal). Other cargo exported from major city ports include motor vehicles and motor vehicle parts, dominated by the Port of Melbourne, steel exports, largely from Wollongong and livestock exports predominantly from Perth and Darwin (Ports Australia 2012).

Figure 3-30 Bulk imports and exports by major city for 2011–12



Source: Ports Australia 2012

Land use planning

Ports are rarely destinations in themselves. They make up part of a broader supply chain in cities and affect and are affected by the urban road and rail systems. Congestion around ports and their wider supply chain network can cause considerable delays to freight movements. Freight movements around urban ports must compete with other road and rail users and bottlenecks are common at peak commute times.

Land use planning and development and wider supply chain networks can significantly affect the productivity of ports. As movements increase in line with our rapidly growing freight task, opportunities to expand will be limited unless additional land and buffers are protected. Ports such as Botany already have a pressing need for additional container storage space (GHD 2010a).

Statutory land use plans for Australian ports vary greatly in focus and detail. A common shortcoming is a failure to consider what will be needed to support ports in years to come (GHD 2010a). Land use plans for ports and integration with local and state government planning schemes and objectives are a significant component of Infrastructure Australia and the National Transport Commission's *National Port Strategy*.

Supply Chain

Freight by rail through cities often has to contend with urban passenger rail services and to a lesser degree with intercity and regional passenger services. Passenger rail is generally given priority over freight services and this has led to calls for an increase to the number of freight only railway track or freight only roads linking to ports. The Australian Government is supporting a growing network of intermodal terminals which can vastly increase the speed of freight transfer around the country and to and from ports.

Some cities have better segregation between urban passenger and freight railways lines than others. Perth has an extensive dedicated rail freight network linking freight terminals at Forrestfield/Kewdale and the Fremantle Port. Perth has only one kilometre of shared passenger-freight track and 121 kilometres of dedicated to freight. This is the largest dedicated freight rail network of any Australian city. The dedicated rail freight networks in other capitals cities are relatively small, ranging from 33 kilometres in Sydney to 66 kilometres in Melbourne, although all of the capital cities have direct freight rail access to ports. As a proportion of the total metropolitan route, Sydney and Brisbane have the most shared passenger – freight track at 42 per cent and 47 percent respectively.

Table 3-4 shows major city ports that are connected to intermodal terminals, direct railway access and statutory land use plans (Department of Infrastructure and Transport 2012, GHD 2010a).

Table 3-4 Major city port connections to intermodal terminals, direct railway access and statutory land use plans

Port with	Intermodal terminals	Direct railway access	Statutory land use plans
Sydney (Botany)	✓ (a)	✓	✗
Wollongong (Port Kembla)	✓	✓	✗
Newcastle	✗	✓	✗
Port of Melbourne	✓	✓	✓
Geelong	✓	✓	✓
Brisbane	✓	✓	✓
Cairns	✗	✗	✓
Townsville	✗	✓	✓
Adelaide	✓	✓	✗
Perth (Fremantle)	✓	✓	✓
Darwin	✓	✓	✗
Hobart (b)	✗	✗	✗

Note: (a) Moorebank Intermodal Terminal development planned to be operational from 2017

(b) Tasmanian shipping occurs through the Port of Burnie

Source: Department of Infrastructure and Transport 2012, GHD 2010a

Port of Brisbane.



Labour force participation

Background

Over the past couple of decades Australia's labour force participation has experienced strong growth. This has been largely due to increased participation of females aged 24 to 54 years, and both males and females aged 45 years and above (Borland 2011, Gilfillan and Andrews 2010, ABS 2012d). Between 2001 and 2011, the overall labour force participation of males remained relatively steady and rose by five percentage points for females, with most of the increase in older age groups (ABS 2012d).

The composition of Australia's workforce has also changed considerably over the past couple of decades. There has been a continuing trend of increased female, part-time and casual employment. New part-time and casual jobs have mostly been filled by women and young people (ABS 2012c, Borland, 2011). Women now make up around 70 per cent of the part-time labour force (ABS 2012c).

The shift to a post industrial economy has meant that employment in agriculture and manufacturing has declined, while employment in the sectors of finance, mining, construction, professional, retail, tourism and health care has increased. Somewhat related to this, the occupational composition of employment has become more polarised. There are now more jobs towards the top of the earnings distribution (such as management and professional jobs) as well as the bottom (such as carer jobs) and fewer jobs (such as clerical work) near the centre (ABS 2012c, Borland 2011). The labour force is also becoming more highly skilled, with a greater percentage of workers holding post school qualifications (SGS Economics and Planning 2012).

Workforce participation is very important to the productive capacity of the nation. While the size of the labour force is expected to grow over the next 40 years, the proportion of the population that is of working age is projected to decline due to the ageing of the population. Population ageing is a challenge universally affecting developed nations around the world (Australian Government 2010).

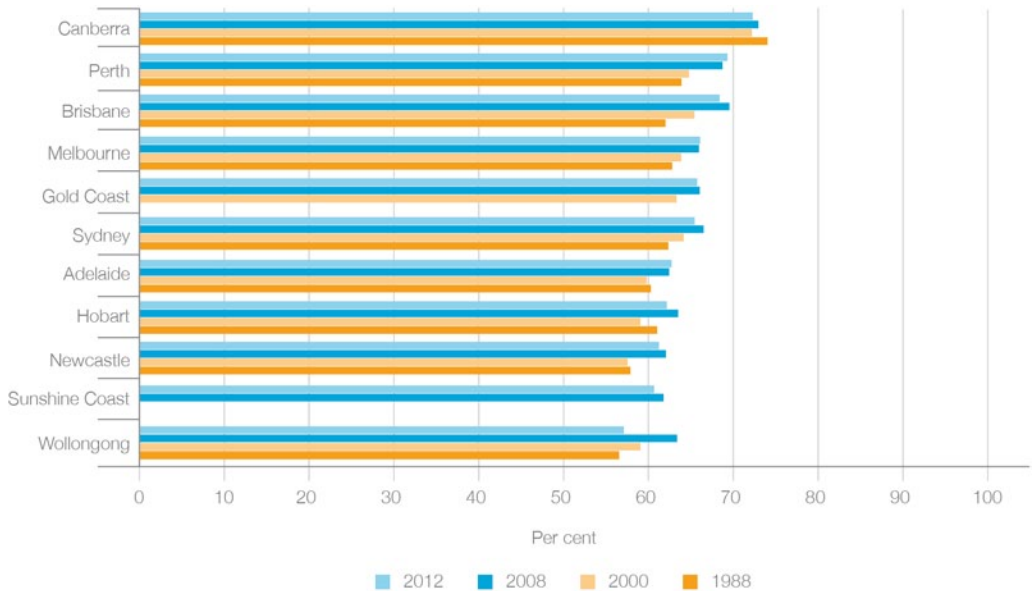
In Australia, this will place pressure on the economy, living standards and government finances because it will decrease the proportion of working age people supporting dependent children and the aged. It is already thought to be contributing to the slowing of Australia's economic growth (Gilfillan and Andrews 2010, Australian Government 2010). The number of people of working age to support every person aged 65 years and over is expected to drop from five in 2010 to 2.7 people by 2050. Over the next 40 years, the number of people aged 65 to 84 years in Australia will more than double and the number of those over 84 years old will more than quadruple (Australian Government 2010).

While population ageing is likely to lower Australia's overall participation rate, steps to improve participation of key workers aged 15 to 64 could help minimise this (Business Council of Australia 2008). Participation rates vary for certain sub-groups of the working age population, and some sub-groups offer a greater potential to boost workforce participation rates. There is also variation in participation rates across Australia's major cities. Some cities, particularly regional and smaller cities, offer greater opportunities to boost workforce participation rates because they have more underutilised labour capital (ABS 2012c, Skills Australia 2009).

Labour force participation by city

Unfortunately, the participation rates for all major cities are currently unavailable because the city areas used in State of Australian Cities reporting are not the same as the boundaries used to collect labour market statistics. The cities for which data was available are shown in Figure 3-31.

Figure 3-31 Labour force participation rates in selected major cities 1988–2012

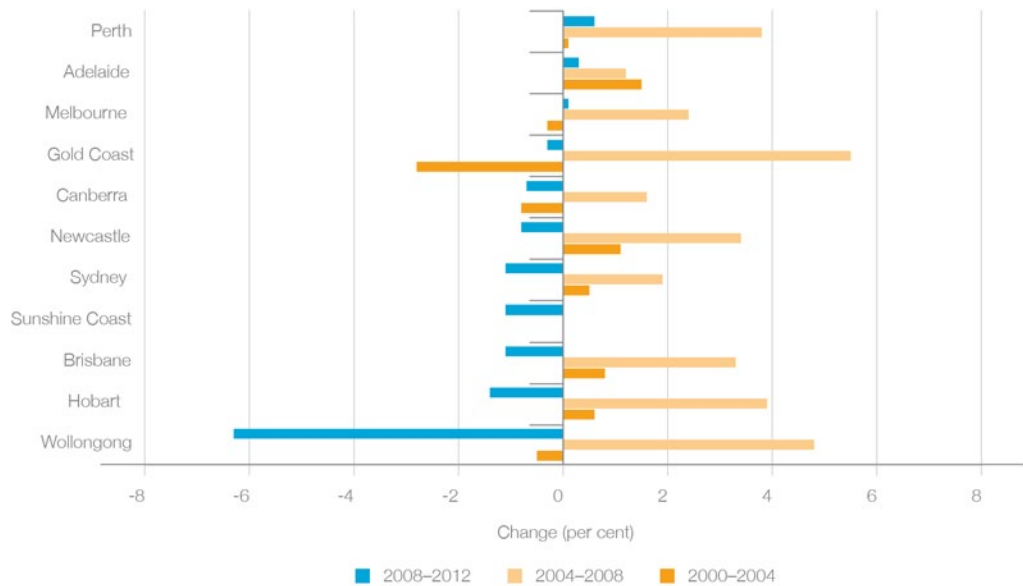


Note: Projection for 2012. Data not available for Sunshine Coast 1988, 2000, Gold Coast 1988. Data was not available for Darwin because the data collection area for the Darwin region covers the whole of the Northern Territory. Canberra does not include Queanbeyan because data is currently unavailable.

Source: Derived from ABS 2012d

Most of the major cities have experienced growth in their labour force participation rates since 1988. However, participation growth has slowed for many cities since 2008 and in some cities it has declined, possibly due to subdued economic conditions since the Global Financial Crisis and population ageing. Non-capital city participation rates are notably lower than their capital city counterparts.

Figure 3-32 Change in labour force participation rates for selected major cities 2000–12



Note: Projection for 2012. Data not available for Sunshine Coast 2000 to 2008. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

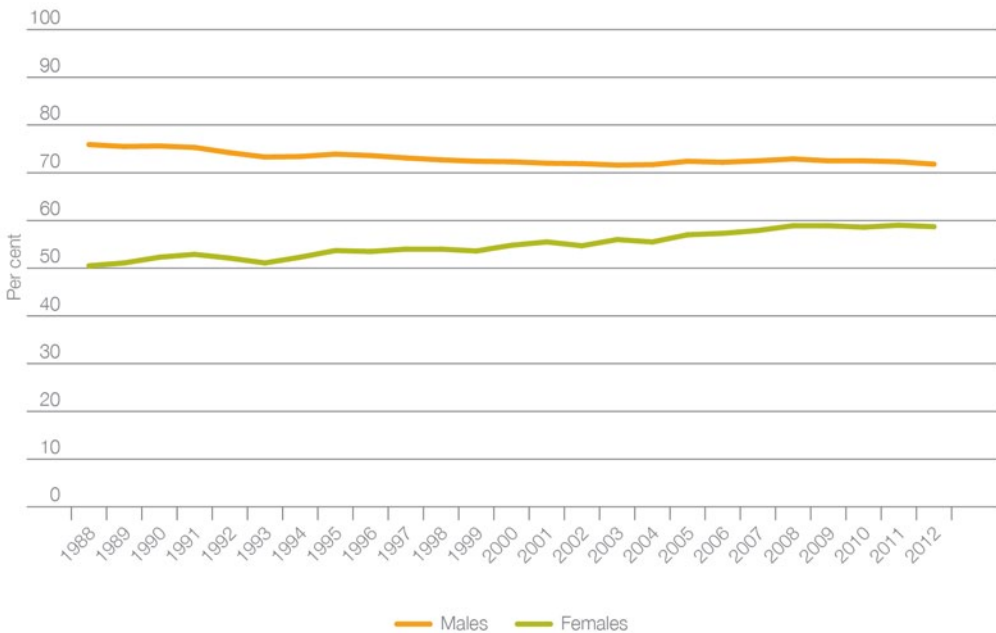
Figure 3-32 shows that Brisbane and Perth have enjoyed the highest growth in participation since 2000. Perth's participation rate has continued to increase since 2008; the only other city to do this is Adelaide, albeit at a lower rate. Canberra has the highest participation rate of the major cities, at over 70 per cent. However, it is the only major city for which data is available that is showing a decline since 1988.

Wollongong and Newcastle have some of the lowest participation rates, reflecting the trend of lower participation rates in non-capital cities. However, while Newcastle's rate has increased significantly since 1988, Wollongong's has not. Notably, Wollongong's rate has declined more than seven per cent since 2008 – a much faster decline than experienced in any other major city for which data is available.

Labour force participation by gender

Gender has a large influence on Australia's labour force participation, as it does in other developed countries. Figure 3-33 shows that males have a higher aggregate labour force participation rate (about 72 per cent) in Australia than females (about 59 per cent) (ABS 2012d). Women comprise 45.6 per cent of Australia's workforce. Of Australia's full-time employees, 35.2 per cent are female and of Australia's part-time employees, 70.4 per cent are female. On average, women working full-time earn 17.6 per cent less than men working full-time. The wage gap between males and females in Australia has remained relatively stable for the past 30 years (ABS 2012d).

Figure 3-33 Australian labour force participation rates 1988–2012

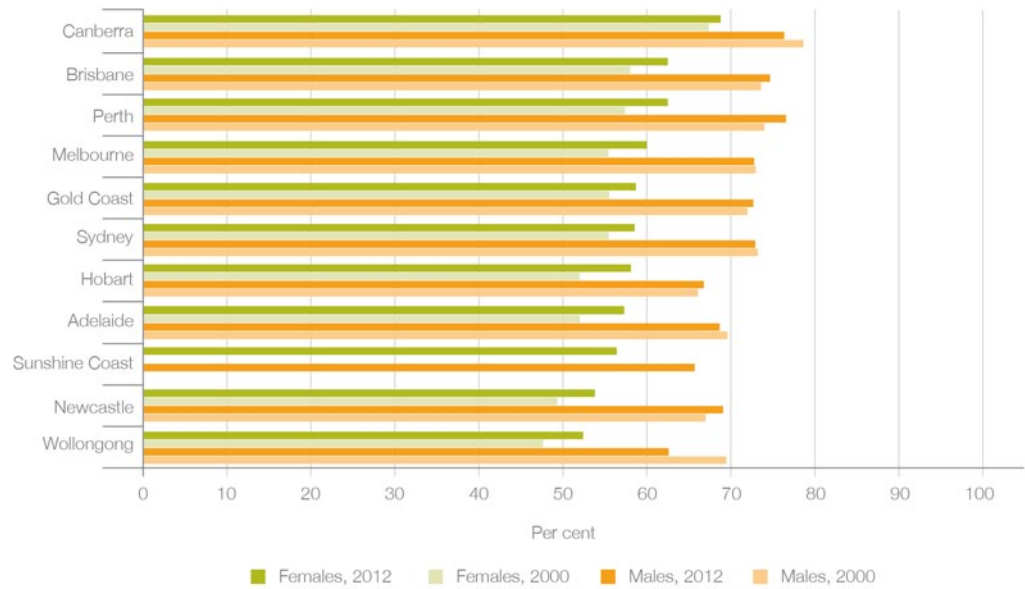


Note: Projection for 2012.

Source: Derived from ABS 2012d

Figure 3-33 shows that the increase in female labour force participation in Australia since 1988 has more than offset the decline in male participation. Female participation increased from around 50 per cent in 1988 to around 59 per cent in 2012, helping to boost Australia's total participation rate from around 63 per cent to around 65 per cent over the same period (ABS 2012c, ABS 2012d). However, the increase in female participation has levelled off since 2008. The male participation has remained relatively steady since 2002.

Figure 3-34 Labour force participation rates by gender for selected major cities
2000–12

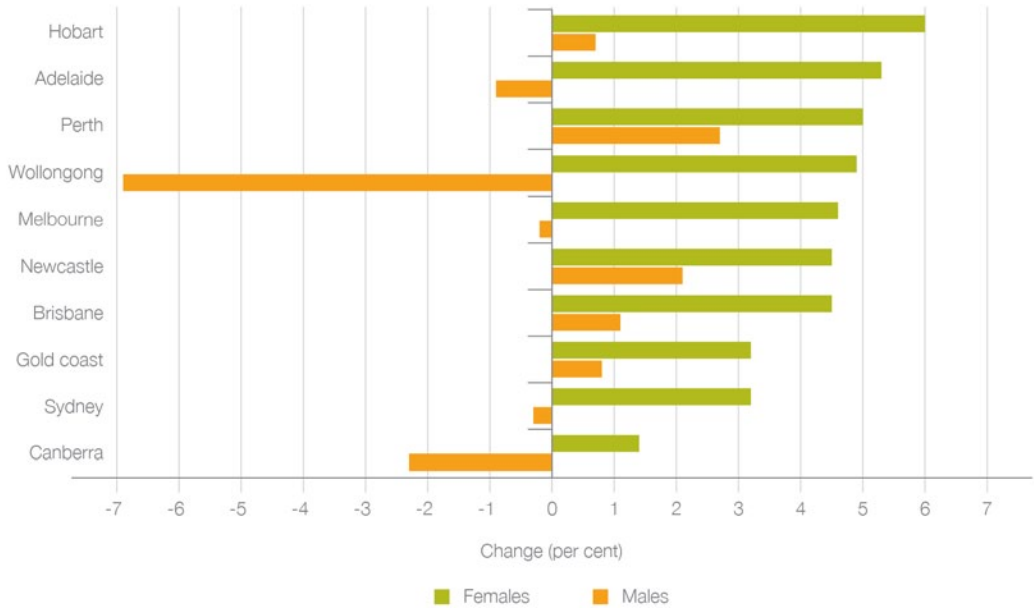


Note: Projection for 2012. Data not available for Sunshine Coast for 2000. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Figures 3-34 and 3-35 illustrate that most of the major cities (for which data is available) have followed similar female participation rate trends to the Australian labour force since 2000 – a notable increase in the female participation rate. Changes to male participation rates across the cities have been more variable. Wollongong’s participation rate changes are particularly interesting: between 2000 and 2012 its female participation rate increased by nearly five per cent, while its male participation rate declined by nearly seven per cent.

Figure 3-35 Change in labour force participation rates by gender for selected major cities 2000–12

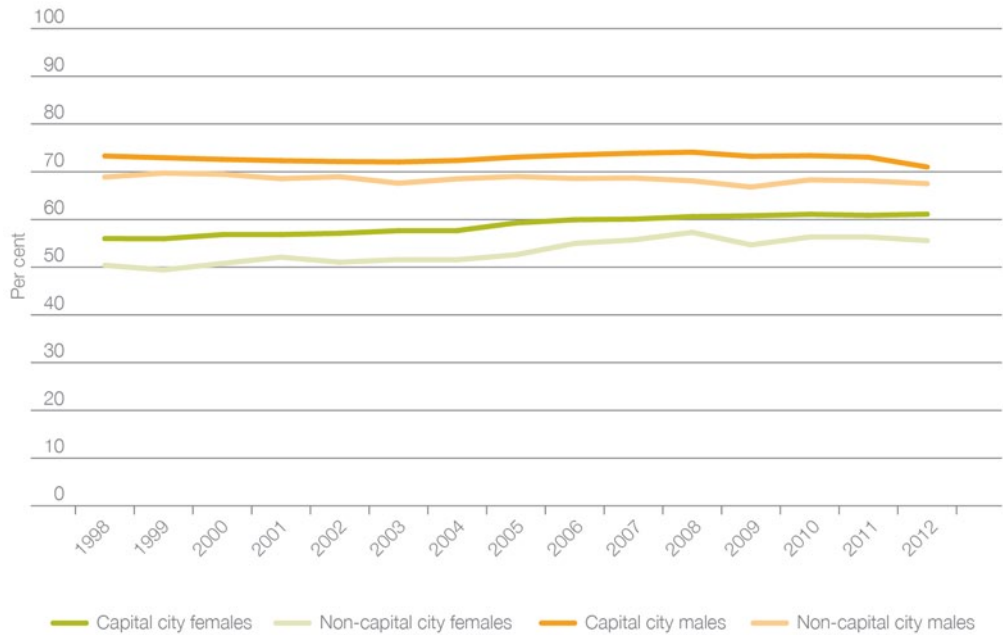


Note: Projection for 2012. Data not available for Sunshine Coast. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Labour force participation rates are significantly lower for males and females in non-capital cities compared to those in the capitals. This suggests that there may be more underutilised labour in non-capital cities and thus potential for boosting their labour force participation rates. However, capital city males and non-capital city males follow similar trend lines, as do capital city females and non-capital city females, as shown in Figure 3-36.

Figure 3-36 Average labour force participation rates for capital cities and non-capital cities 1998–2012



Note: Data based on selected capital and non-capital cities, where data is available.

Source: Derived from ABS 2012d

There has also been a significant increase in the estimated value of female human capital in Australia's largest cities. Measuring human capital is an inexact science but in a recent report based on the methodology in ABS 2008, SGS Economics and Planning estimated that the human capital value of females increased at a much faster rate than that of males from 1996 to 2006 in both Melbourne and Sydney, particularly for those with higher degrees and bachelor degrees (2012 pp. 65, 79: Tables 4 and 5). For Melbourne, the estimated value of human capital for males with a higher degree in the city increased by 108.4 per cent between 1996 and 2006, whereas for females it increased by 247.7 per cent. For males with a Bachelor Degree, it increased by 71.5 per cent and for females by 110.3 per cent. For Sydney the estimated value of human capital for males with a higher degree in the city increased by 93.6 per cent between 1996 and 2006, while for women it increased by 202.8 per cent. For males with a bachelor degree, it increased by 64.7 per cent, whereas for women it increased by 107.3 per cent.

Table 3-5 Estimate of Melbourne's human capital (\$ billions)

	1996	2001	2006	Growth 1996–2006
Males				
Higher degree	26.3	35.0	54.8	108.4%
Bachelor degree	117.2	154.0	201.0	71.5%
Skilled labour	153.9	187.7	213.3	38.6%
Unqualified	222.8	243.2	346.4	55.5%
Total	520.2	619.9	815.4	56.7%
Females				
Higher degree	10.9	19.3	37.9	247.7%
Bachelor degree	86.8	130.7	182.5	110.3%
Skilled labour	64.9	80.3	103.1	58.9%
Unqualified	199.6	219.7	261.3	30.9%
Total	362.2	450.0	584.8	61.5%

Source: SGS 2012 p. 65

Table 3-6 Estimate of Sydney's human capital (\$ billions)

	1996	2001	2006	Growth 1996–2006
Males				
Higher degree	39.2	53.1	75.9	93.6%
Bachelor degree	140.0	183.4	230.6	64.7%
Skilled labour	45.6	51.1	63.4	39.0%
Unqualified	276.1	317.0	445.2	61.2%
Total	500.9	604.7	815.1	62.7%
Females				
Higher degree	18.0	31.1	54.5	202.8%
Bachelor degree	95.0	143.2	196.9	107.3%
Skilled labour	47.1	49.0	62.1	31.8%
Unqualified	271.4	279.1	328.2	20.9%
Total	431.4	502.4	641.7	48.7%

Source: SGS 2012 p. 79

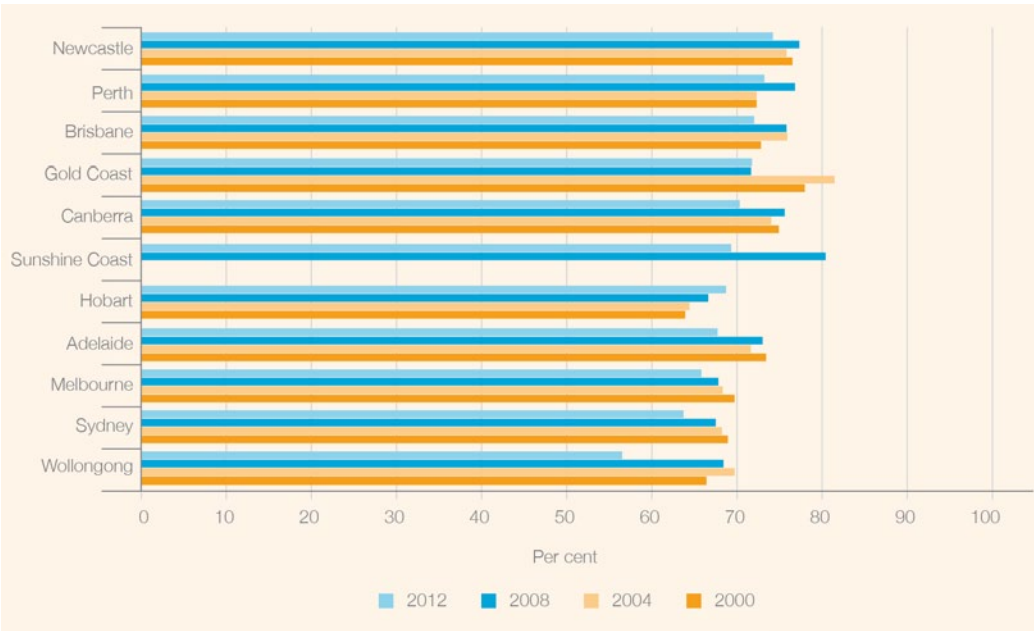
Labour force participation by age and gender

Labour force participation rates for those aged 15 to 24

Many young adults aged 15 to 24 years participate in full-time education or training. This reduces their participation in the workforce, although many combine study or training with part-time or casual work. The proportion of young adults involved in full-time education or training has been rising in recent decades and has delayed many entering the workforce, particularly in a full-time capacity. Young adults are choosing to stay in full-time education and training for longer, aligning with the trend of the Australian workforce experiencing an increase in skill and education levels.

The participation rates for this age cohort ranges considerably as shown in Figures 3-37 and 3-38.

Figure 3-37 Labour force participation rates for 15 to 24 year old males for selected major cities

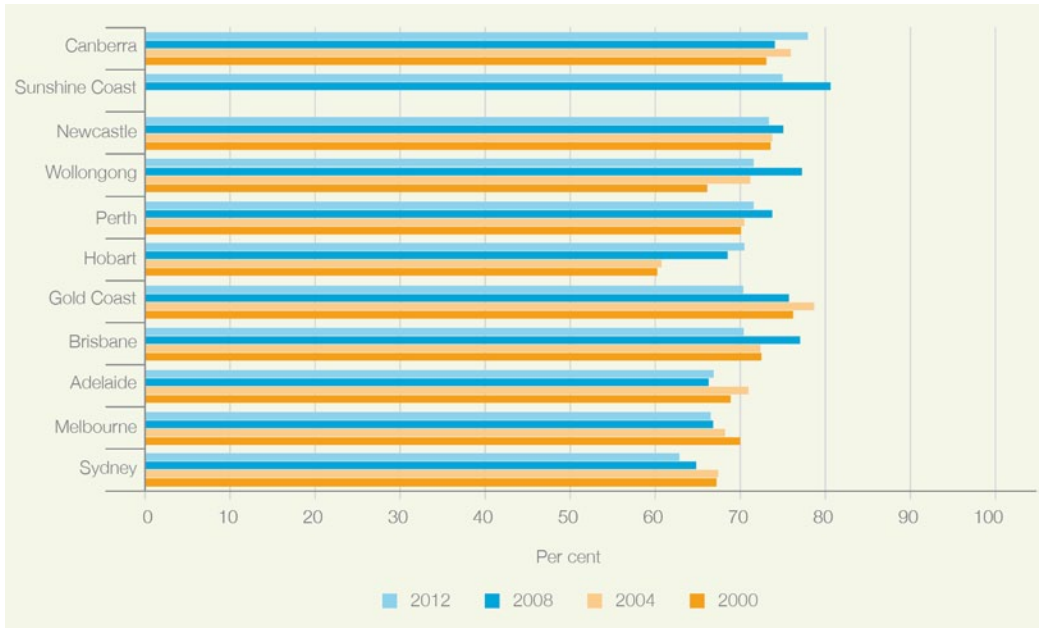


Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Labour force participation is similar for men and women in this age group. Differences begin to emerge when they reach an age where child bearing and rearing become common. Cities of note are Wollongong and the Sunshine Coast, which experienced a drop of greater than 10 per cent in their participation rates for young males between 2008 and 2012. Wollongong, the Sunshine Coast and Brisbane all experienced a fall in the participation rate of young females between 2008 and 2012 of more than five per cent. Hobart is the only city to have substantial gains in the participation of its young people between 2000 and 2012, with a nearly five per cent increase for males and more than double that for females.

Figure 3-38 Labour force participation rates for 15 to 24 year old females for selected major cities



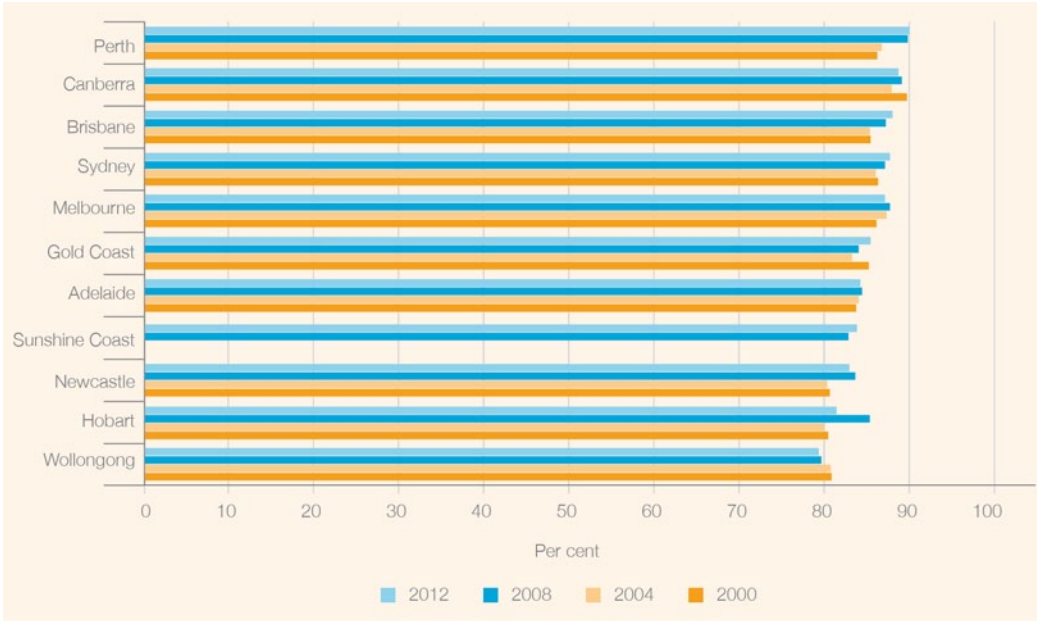
Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Labour force participation rates for those aged 25 to 64

The 25 to 64 year old age group is the largest and most significant contributor to the labour force in Australia. There is a notable difference between male and female labour force participation rates for this age group. Figure 3-39 shows that the 2012 labour force participation rate for males across the major cities for which data is available ranges from just under 80 per cent for males to just over 90 per cent. The participation rate for females ranges from 63 to 73 per cent. Canberra is an exception, with a female participation rate of just under 80 per cent.

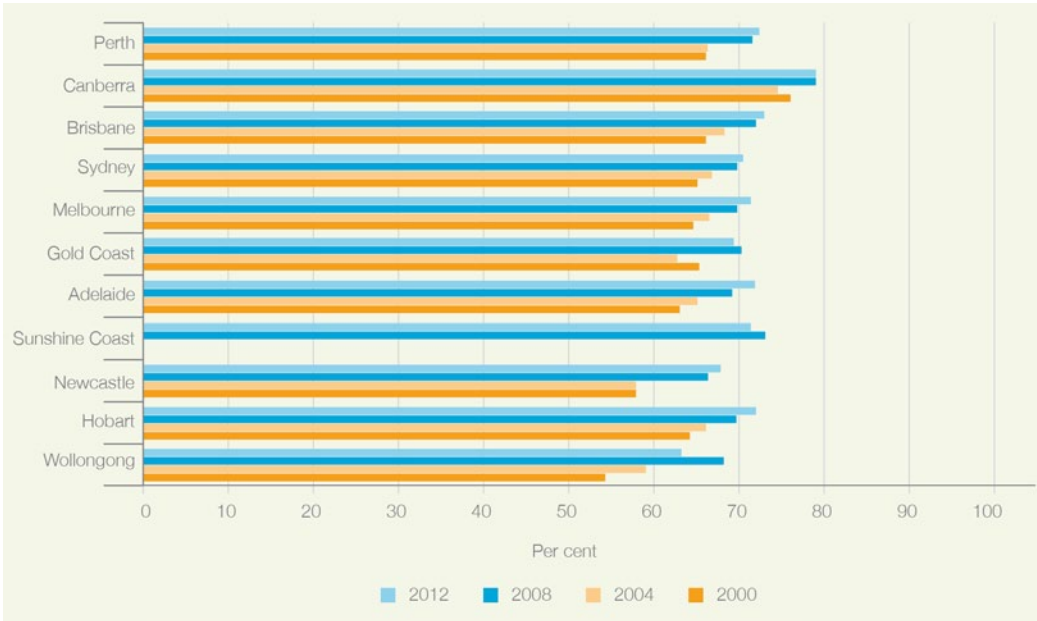
Figure 3-39 Labour force participation rates for 25 to 64 year old males for selected major cities



Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Figure 3-40 Labour force participation rates for 25 to 64 year old females for selected major cities



Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Figure 3-40 shows that while male participation rates have increased slightly since 2000 for most major cities, all the major cities for which there is data have experienced substantial increases in their female participation rates. On average, there has been a 6.8 per cent rise in the participation rate of females between 2000 and 2012, compared to only a one per cent rise for males.

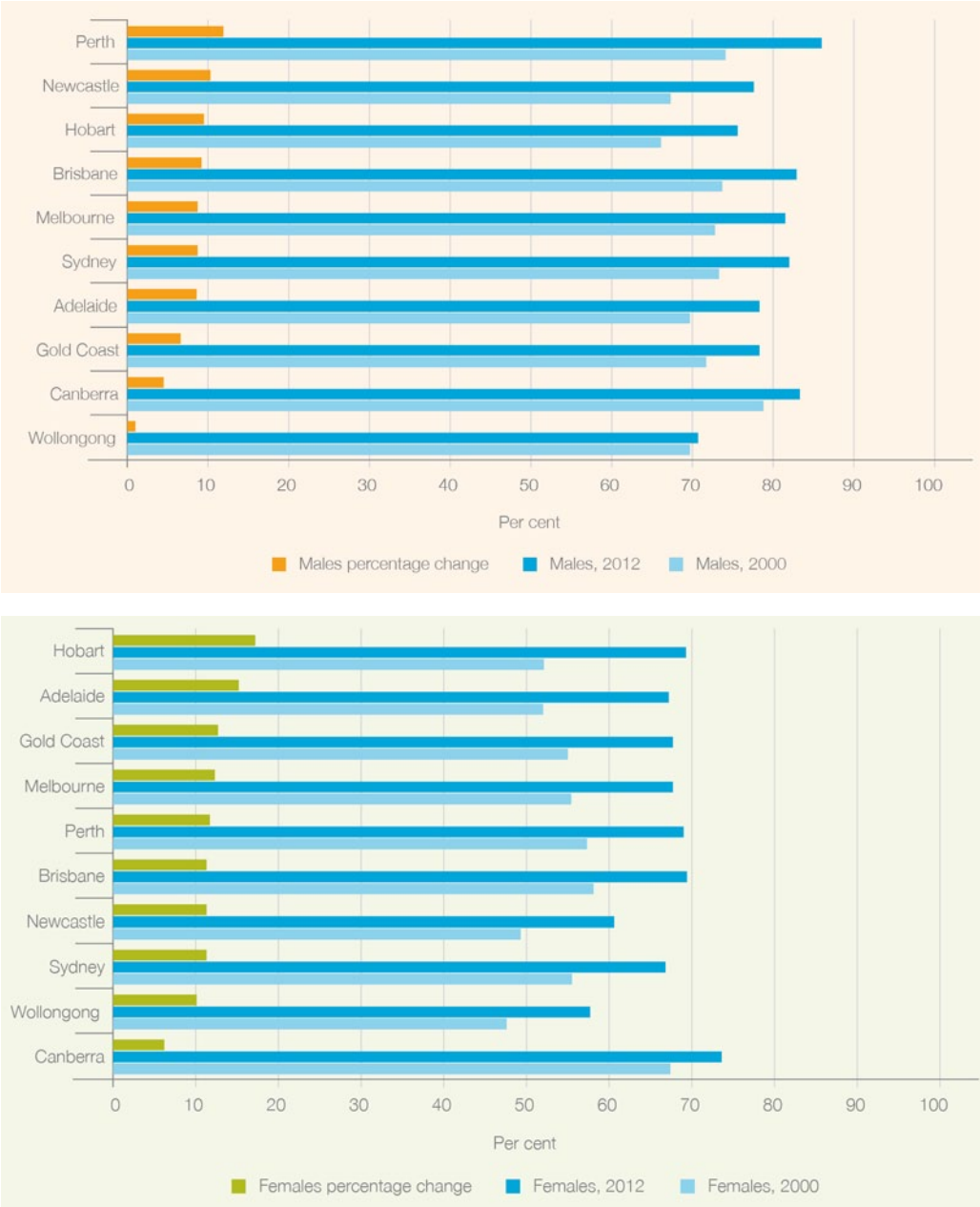
The increase in female participation has been largely driven by women aged 45 to 64, with their contribution to the total hours worked by Australians of working age jumping from 6 to 15 per cent over past 30 years. This significant increase is mainly due to a steady increase of women in this age group participating in the workforce, but also in part due to the ageing of the workforce resulting in women in this age group making up a greater proportion of the total working age population (Gilfillan and Andrews 2010).

Figure 3-41 highlights that participation rates for the 45 to 64 year old age cohort have increased dramatically since 2000 across Australia's major cities, particularly for women. Hobart and Adelaide are standouts for increases in female participation in this age category, both rising by more than 15 per cent. Newcastle and Perth are standout cities for increases in male participation for this age cohort, both experiencing increases of over 10 per cent since 2000.

Noosa, Sunshine Coast, Queensland.



Figure 3-41 (a) and (b) Changes to labour force participation rates for 45 to 64 year olds by gender for selected major cities 2000–12



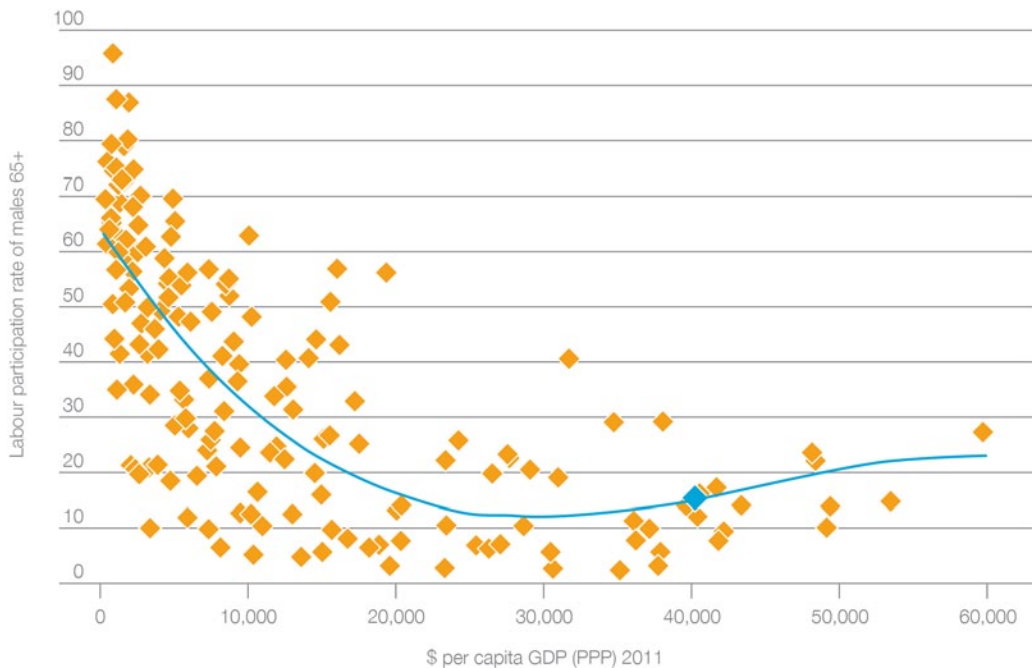
Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

The trend of increase in the labour force participation of older women is likely to continue. The longer a woman has been engaged in the labour force, the more likely she is to stay in it (Gilfillan and Andrews 2010, p. XIV). Younger women today have higher levels of education and greater engagement with the labour force than the generations before them. It is therefore likely that the participation rates for mature-aged women will continue to rise as younger women age.

Labour force participation rates for those 65 years of age and over

Figure 3-42 International relationships between GDP per capita and workforce participation rates for males 65 years of age and over

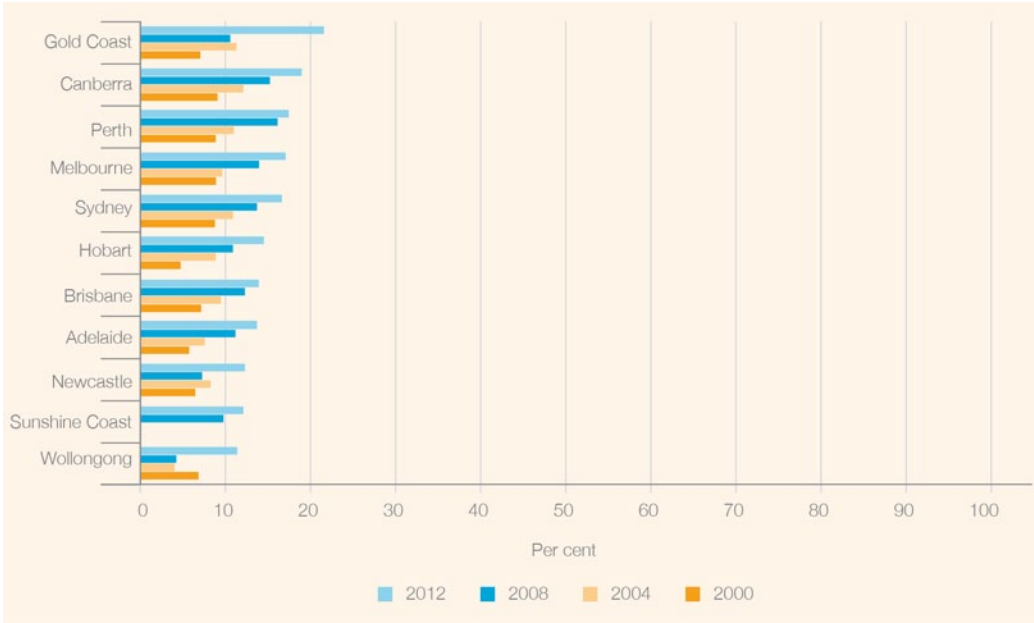


Note: Australia represented by large blue dot.

Source: From Lattimore 2012 reproduced by kind permission of the author

Lattimore (2012) surveyed international data on participation rates and found that as per capita incomes rose (also associated with improved health and education), the participation rates of those aged 65 and older fell steeply. However, as incomes continued to rise the trend was reversed, with participation rates of older workers increasing (Figure 3-42). This would suggest that Australia is likely to see increasing participation rates of older workers as per capita income rises.

Figure 3-43 Labour force participation rates for males 65 years of age and over for selected major cities

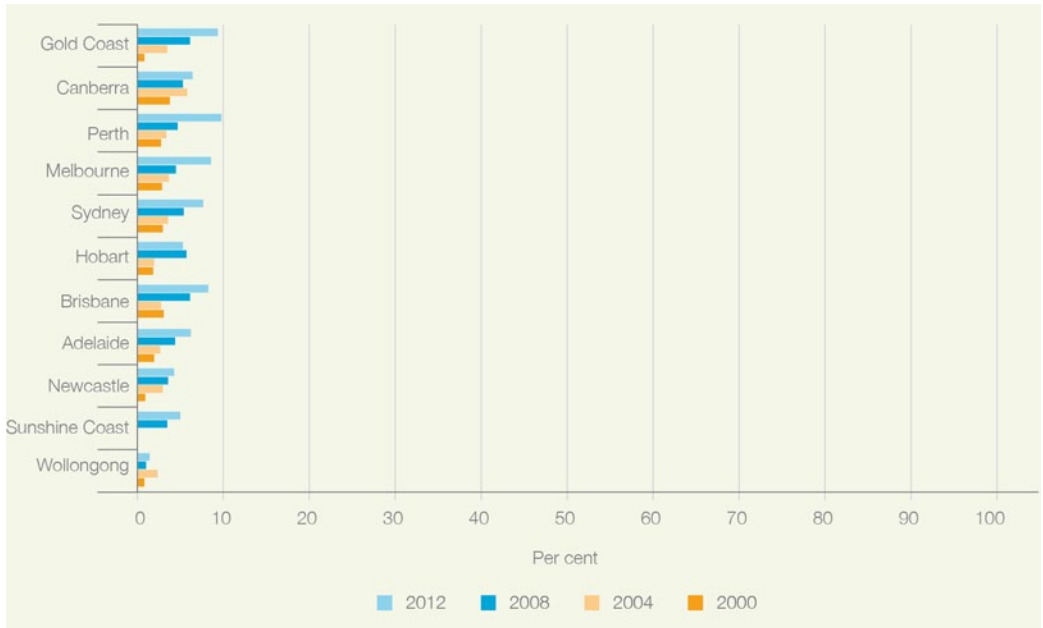


Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

All major cities for which data is available have experienced a remarkable increase in participation rates in the 65 years and over age group between 2000 and 2012 (Figures 3-43 and 3-44). However, some cities have experienced standout rates of growth since 2008. The Gold Coast and Wollongong experienced an increase in male participation of greater than seven per cent and Perth and Melbourne experienced an increase in female participation of greater than four per cent. The trend of increased participation in this age group is set to continue, with Australians indicating that they intend to work for longer and retire later in life than in the previous decade (Australian Human Rights Commission 2012).

Figure 3-44 Labour force participation rates for females 65 years of age and over for selected major cities



Note: Projection for 2012. Data not available for Sunshine Coast 2000 and 2004. Canberra does not include Queanbeyan.

Source: Derived from ABS 2012d

Female participation rates for those aged 65 and over are still well behind male rates. Additionally, female participation rates in this cohort have been growing at almost half that of the male rates since 2000. In the longer term this may change, as women with a greater attachment to the workforce reach this age.

Conclusion

The previous chapter looked at the age structure of Australia's major cities and concluded that there is an ageing trend in the population that in the absence of mitigating factors will lead to a drop in living standards as the number of working age people fall as a proportion of the population. There are two ways to offset this. The first is to ensure that those working are more productive. The first section of this chapter discussed the role of an economically productive spatial layout of the city (its industrial geography) and the associated transport networks in increasing the productivities of cities.

The second way of offsetting the effects on living standards of an ageing population is to increase workforce participation rates. Here, there are encouraging signs. Workforce participation rates in cities are generally rising, being driven for the most part by the increasing number of women entering the paid workforce. Not only are more women now working but also their human capital is increasing, meaning that their value to the Australian workforce is rising in both quality and quantity.

These trends are gradual. It has taken 25 years to narrow the gap between male and female participation from 25 per cent to 13 per cent. The gap in human capital, while narrowing, is still significant.

This section has also highlighted the gap in participation between the capital and non-capital major cities. Unlike the narrowing of the gender gap, this gap is much the same in 2012 as it was 14 years ago. Since two and a half million Australians live in non-capital cities, this represents a large pool of underutilised human capital.

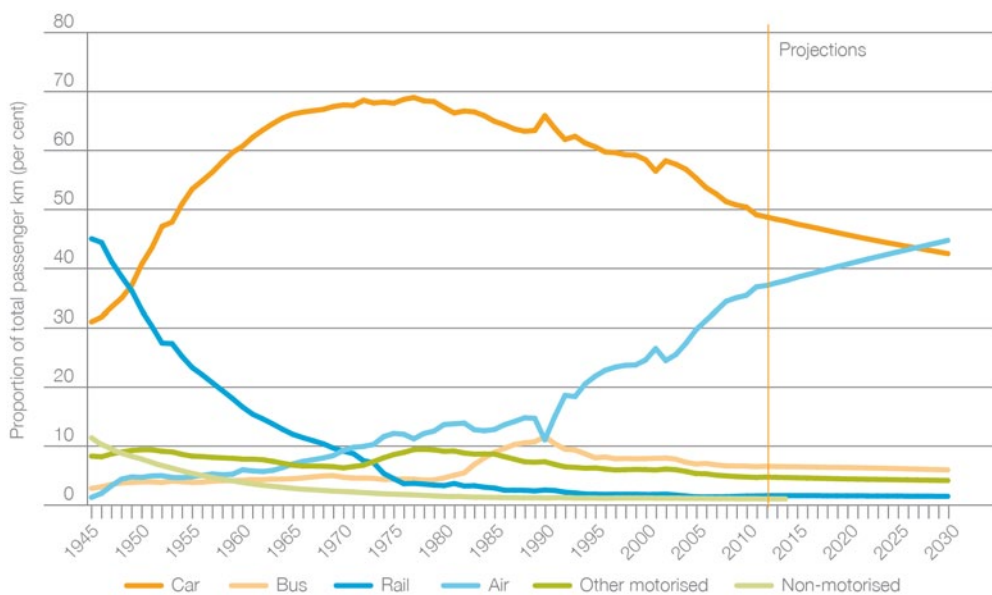
One of the highlights for productivity of the survey of workforce participation is the increase in participation rates of those over 65. People entering this age group now do so with better health and education than their predecessors and perhaps a greater expectation of maintaining a standard of living. It is likely that the proportion of older workers in the workforce will continue to grow.

While the above should not diminish the seriousness of the challenge of an ageing population detailed in the Intergenerational Reports (Australian Government 2010) it does suggest that, for major cities at least, there are mitigating factors.

Major city airports and airline travel

Current trends predict that, within major city urban areas, private vehicles will remain the dominant mode of transport in and around the city in the foreseeable future. Longer-distance inter-urban travel, including travel between major cities, is also of relevance. Inter-urban travel shows a general shift to air travel similar to the historical shift from rail to private vehicles in the 1950s (Cosgrove 2008). Private vehicles remain the preferred mode of transport and still account for the largest proportion of passenger vehicle kilometres travelled outside the major cities. However, trends indicate a continued decrease in private vehicle travel and a continued increase in air travel passenger vehicle kilometres (Cosgrove 2008, pp. 6–7). Figure 3-45 shows the modal share of Australian non-urban passenger travel and it can be inferred that the majority of these air movements are between the major cities.

Figure 3-45 Modal share of Australian non-urban passenger travel 1945–2030

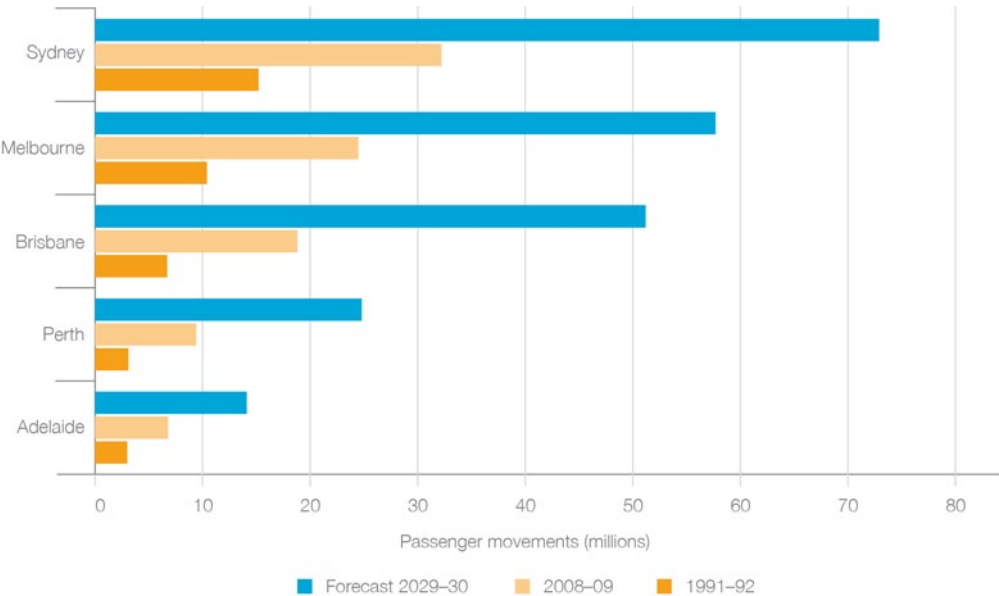


Note: The graph is based on all non-urban passenger travel in Australia. It can be assumed that about 84 per cent of trips represented will be between major cities based on the fact that the eight capital city airports as well as Cairns and the Gold Coast collectively account for this proportion of passenger movements.

Source: Updated figures from Cosgrove 2011, p. 3

Australia's airports constitute major hubs of economic infrastructure driving income, investment and employment in the major cities. The sum total of the economic value of the largest six airports in Australia has been estimated at \$25 billion per annum, accounting for approximately 2 per cent of Australia's total GDP (Tourism & Transport Forum and Booz & Company 2012, p. 6). Airports generate employment both directly and indirectly and it is estimated that 1000 jobs are created for every one million air passengers (Steering Committee Overseeing the Joint Study on Aviation Capacity in the Sydney Region 2012).

Figure 3-46 Forecast passenger movements 2029–30



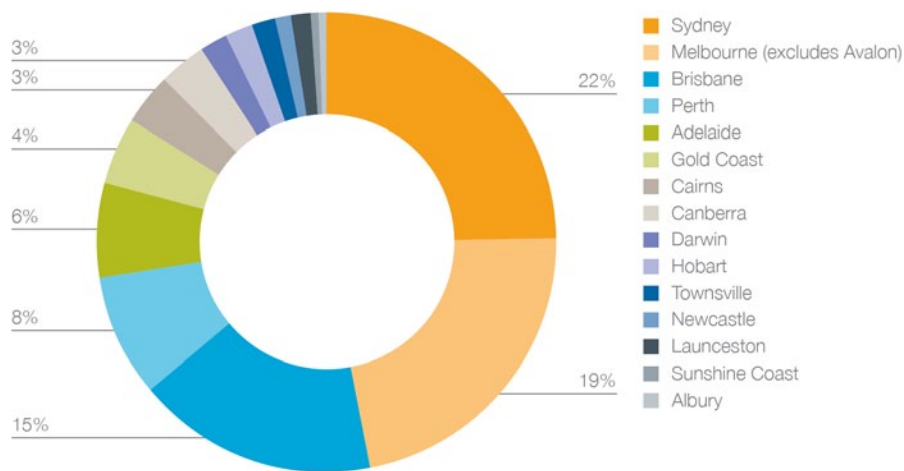
Source: Productivity Commission (2011)

The Productivity Commission report (2011) on Australia’s major airports indicates that passenger numbers in Australia are expected to double between 2009–10 and 2029–30, with Brisbane, Melbourne and Sydney airports each expected to cater for over 50 million passengers by 2029–30 (Figure 3-46).

Australia is particularly suited to domestic air travel, with our predominantly urban concentrations distributed over a vast continent. Domestic passenger movements between Australia’s major cities are significant even by global standards, with the Sydney to Melbourne air route ranking as the third busiest air route in the world and the Brisbane to Sydney air route as the 17th busiest air route in the world (BITRE, based on world-wide airline schedule data from OAG MAX for month of July 2012). Figure 3-47 shows the share of domestic passenger movements from Australian major city airports.

Airports in the eight capital cities as well as Cairns and Gold Coast collectively accounted for 77.4 per cent of all domestic passenger movements in 2011–12. Of the capital city airports, Perth recorded the largest increase in domestic passenger movements compared to the previous year with 11.5 per cent followed by Brisbane with 4.3 per cent. The other capital city airports recorded negative growth compared to the previous year (BITRE 2012i).

Figure 3-47 Share of domestic passenger movements 2010–11



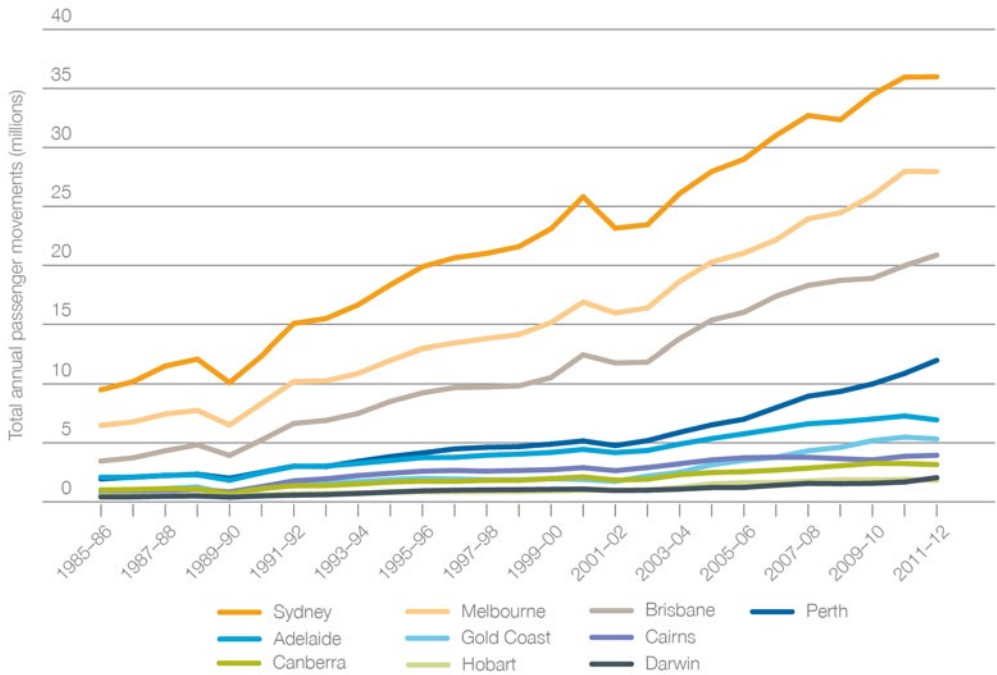
Source: BITRE 2011a

Ten Australian major city airports (the eight capital cities as well as Cairns and the Gold Coast) collectively account for 77.4 per cent of all domestic passenger movements (BITRE 2011b, Figure 3-47).

Melbourne Airport Terminal at Sunrise.

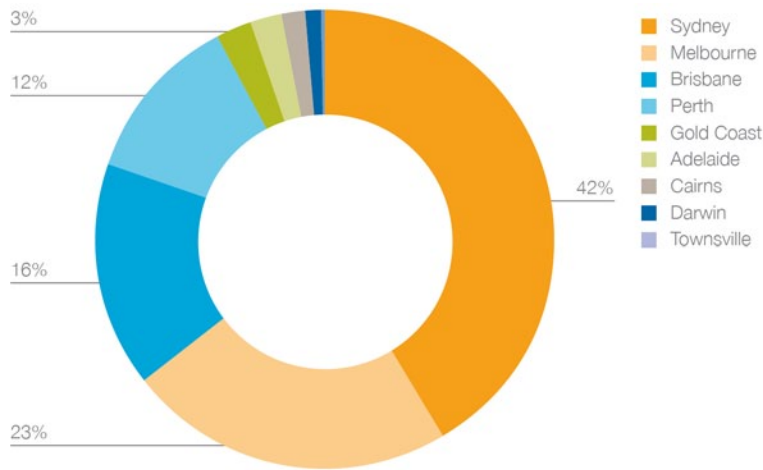


Figure 3-48 Total annual passenger movements 1985–86 to 2011–12



Source: BITRE 2012b, 2012c

The 10 most used airports in Australia experienced mixed growth trends in passenger movements during 2011–12 (Figure 3-48). Growth was most notable in Darwin (21.7 per cent) as well as in Perth (10.2 per cent), Brisbane (4.5 per cent) and Cairns (2.2 per cent). Passenger numbers were flat in Sydney (0.08 per cent) and Melbourne (-0.02 per cent). Some decreases were seen in Canberra (-2.5 per cent) and the Gold Coast (-2.9 per cent), while stronger decreases were recorded for Adelaide (-4.6 per cent) and Hobart (-4.7 per cent).

Figure 3-49 Share of international passenger movements 2010–11

Source: BITRE 2011a

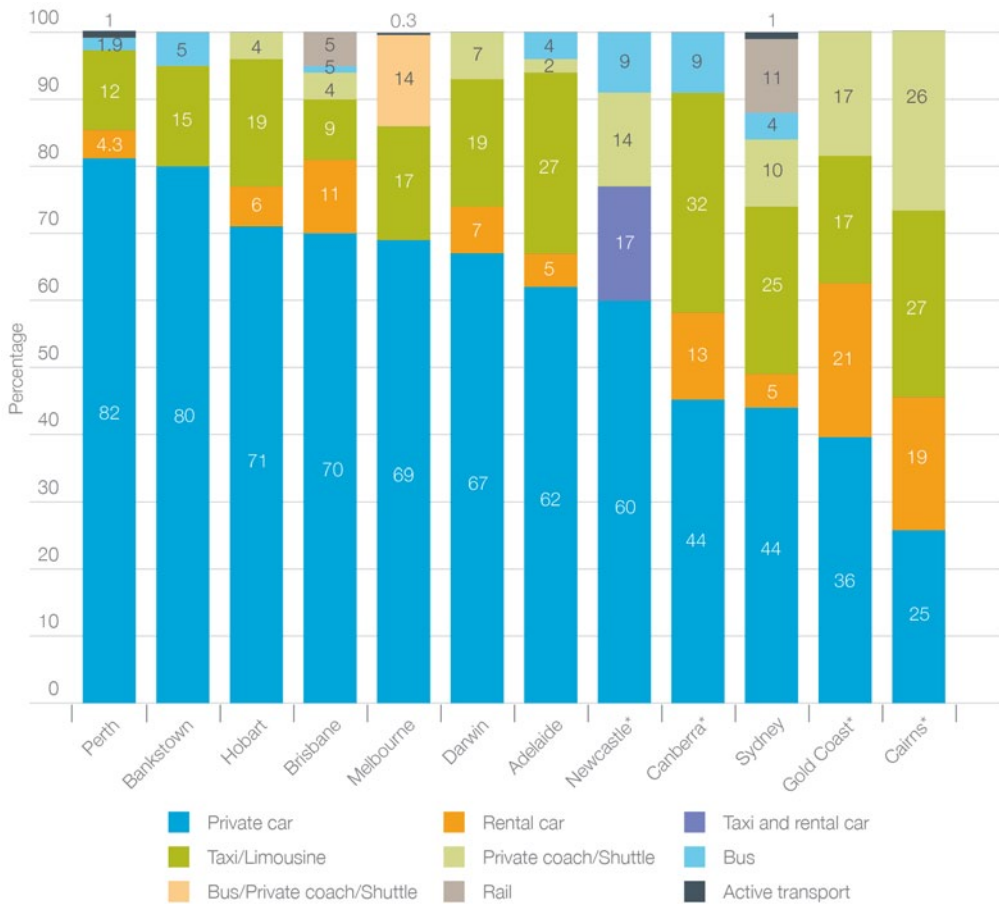
In 2011–12, international passenger movements grew at all major city airports except for the Gold Coast (-6.1 per cent), Cairns (-1.3 per cent) and Townsville where scheduled services ceased in October 2011 (BITRE 2012h).

Kingsford Smith currently services 40 international destinations and is by far the busiest international airport in Australia, accounting for over 42 per cent of all international passenger movements. (Figure 3-49). As well as catering for Sydney's population, the airport also acts as an international connection point for passengers from Canberra (65 per cent), Adelaide (22 per cent), Brisbane (nine per cent) and Perth (five per cent) (Steering Committee Overseeing the Joint Study on Aviation Capacity in the Sydney Region 2012). Also accounting for a large proportion of international passenger movements are Melbourne (23 per cent), Brisbane (16 per cent) and Perth (12 per cent). The remaining international airports made up a little over seven per cent of international passenger movements in 2011–12 (BITRE 2011c, 2012h).

International air freight is also an important sector of the aviation industry. The majority of freight is carried in the cargo hold of passenger aircraft, although some dedicated freight services fly out of Sydney and Melbourne. While air freight represents one-tenth of a per cent of total Australian international trade by volume, it represents 24 per cent of Australia's total international trade by value (Steering Committee Overseeing the Joint Study on Aviation Capacity in the Sydney Region 2012, p. 89).

Increasingly, airports are diversifying the services and facilities on airport land to include non-airport-related services. Some of these, such as freight forwarding businesses and hotels, have an obvious relationship with air transport. Other non-aviation developments, such as shopping centres, supermarkets, distribution centres and office buildings, are increasing in number – in particular at Melbourne, Brisbane, Perth and Canberra airports. These non-aviation activities have consequences for land access and congestion in and around airport precincts (Productivity Commission 2011).

Figure 3-50 Mode of travel to airports 2010



Note: Mode share does not equal 100 per cent due to rounding. In addition, Gold Coast figures were calculated with reference to base patronage that includes transfer passengers not using ground transport. For Melbourne, private car share includes drop-off and pick-up, onsite and offsite parking and rental car shares. Private car mode for Perth includes drop-off and pick-up, onsite and offsite parking, fast-track and valet parking. Newcastle mode share consists only of the Greater Newcastle mode splits. Sydney 'Private Coach/Shuttle Services' share refers to minibus service. Perth bus mode share data represents public transport mode share to the domestic terminal only.

Source: Tourism & Transport Forum and Booz & Company 2012, p. 15. Reproduced by kind permission of Booz & Company

The predominant mode of transport to major Australian airports remains by private car, ranging from 45 per cent of all trips to and from Sydney airport to 81 per cent of all trips to and from Perth domestic airport (Productivity Commission 2011). There is growing pressure on road infrastructure surrounding major city airports from both airport-related and non-airport-related traffic. This is leading to heavy congestion at peak times, impeding timely access to and from airports and consequently reducing productivity. Sydney, Perth, Brisbane and Melbourne airports are particularly affected by traffic congestion (Productivity Commission 2011). In response to this a number of cities are upgrading road infrastructure – for example, Perth’s Gateway WA project to upgrade roads surrounding Perth airport and Brisbane’s Airport Link tunnel (Department of Infrastructure and Transport 2012, Department of Transport and Main Roads 2012, Department of Transport 2012).

Public transport travel to airports is a relatively small proportion of all trips. Sydney and Brisbane airport are the only Australian airports that have passenger rail links, although the transport mode share is relatively modest, with 14 per cent of passengers travelling to or from Sydney airport by rail and five per cent of passengers travelling to or from Brisbane airport by rail (Productivity Commission 2011). Both the Sydney and Brisbane airport stations are privately owned and operated, with the Brisbane Airtrain also owning and operating the railway track. Both services are currently returning profits (Brisbane Airtrain 2012, Sydney Airport Link 2012).

Over the top, Kingford Smith Airport, Sydney.



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