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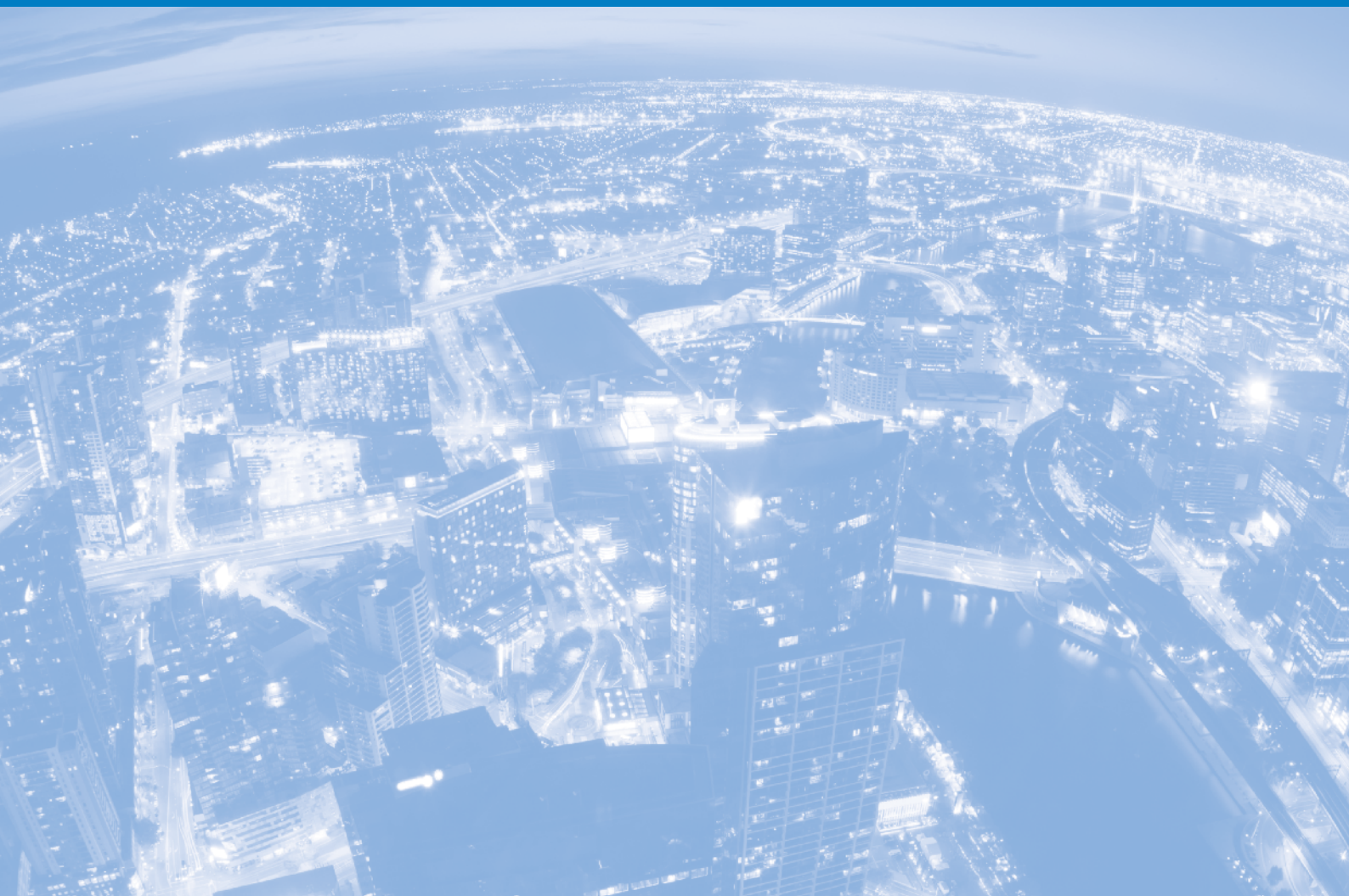
State of Australian Cities 2014-2015

Progress in Australian Regions



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Foreword

State of Australian Cities



Since 2010, the State of Australian Cities reports have examined the progress being made in our major cities.

These reports have provided insight into the vital role that Australian cities play in the growth of our economy and have tracked the overall progress made in Australia's major centres. The State of Australian Cities 2014 - 2015 once again looks at the drivers behind some of the public policy issues facing the country today and into the future.

In late 2014, the Department of Infrastructure and Regional Development produced *Progress in Australian Regions – Yearbook 2014* as a basis for this report. The *Progress in Australian Regions – Yearbook 2014* contains much of the pure statistical data that has underpinned previous State of Australian Cities reports and also explores progress in Australian regions across a range of indicators for the whole country.

Australia is a highly urbanised country. The populations of Australia's major cities are at record levels, as is the number of people employed. It is in our cities that the overwhelming majority of jobs are located and where the most new jobs are being created. The economic output of our major cities has grown and their national importance remains extremely high.

However, alongside that growth there is more demand on transport systems in Australia than ever before. This report examines population growth, economic growth and the increased traffic flows through our ports and airports and on our roads and rail lines.

Issues of space and the potential conflicts of the usability of cities with the utility and long term capacity of freight hubs, ports and airports and the movement of goods and people in cities is a challenge for policy makers. This report provides the evidence base for policy makers at all levels of government to consider those challenges now and into the future.

Mike Mrdak

Secretary

Department of Infrastructure and Regional Development

July 2015

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Chapter 1

Introduction



For a number of years, individual companies and organisations like the Organisation for Economic Co-operation and Development (OECD) have compiled indices purporting to rank the best or most liveable of the world's cities. In many instances one or more Australian cities have appeared at or near the top. In our media and across the community, the responses to this vary. For some it is a source of pride, for others proof that particular policy approaches or investments are working. For some individuals and communities, though, there is a sense that such claims do not mirror the realities of their day-to-day lives. Often such sentiment reflects concern about the speed of change, with changes in both the size and structure of cities bringing issues of housing, congestion and access to employment and services to the fore.

This report, the *State of Australian Cities 2014-2015 - 2015*, building on the *Progress in Australian Regions - Yearbook 2014*, provides evidence regarding progress in Australia's cities – how they contribute to the nation and which cities, and parts of cities, are progressing. They also provide important information on how our cities are changing.

As detailed in this report, the populations of Australia's major cities are at record levels, as are the number of people employed, reinforcing the national trend. It is in our cities that the overwhelming majority of jobs are located and where the most new jobs are being created, driving further their growth in population. The economic output of our major cities has grown and their national importance remains extremely high, although mining activity in regional Australia has seen the overall percentage contribution by major cities to Gross Domestic Product (GDP) dip slightly.

Similarly, our major cities have made the largest contribution to increases in important social measures like labour force participation. Significantly, more people in our major cities hold a vocational or higher education qualification, reflecting an increase in human capital.

Increased population and greater employment bring with them challenges, particularly the need to effectively manage competing demands for space. Nowhere is this more apparent than on our transport networks, which are critical to the movement of record numbers of people and goods.

In 2015 there is more demand for transport in Australia than ever before. Kilometres of total travel (all modes combined) within Australia are at the highest levels ever recorded, there are more trips through our airports (with our major cities home to our international and busiest domestic airports), there is more container traffic through our major city ports than ever before, and there are record numbers of registered motor vehicles in every state and territory.

Perhaps unsurprisingly, with increasing growth in total kilometres travelled, average commuting times in major cities have trended upwards.

With further growth forecast, in population and in passenger and freight demand, the findings of this report identify the challenges that policy makers will need to respond to in order to see continued progress in major cities.

Critically, this will mean the integration of long-term planning in order to anticipate and address growing demand and avoid unnecessary additions to transport tasks, making efficient use of existing transport infrastructure and identifying and planning for future needs.

There are clear differences in progress within cities on issues such as workforce participation and average duration of unemployment, but these suggest significant untapped potential. The decline in some parts of cities against indicators such as these and the trend towards spatial groupings of people with the least household wealth pose clear challenges for policy makers.

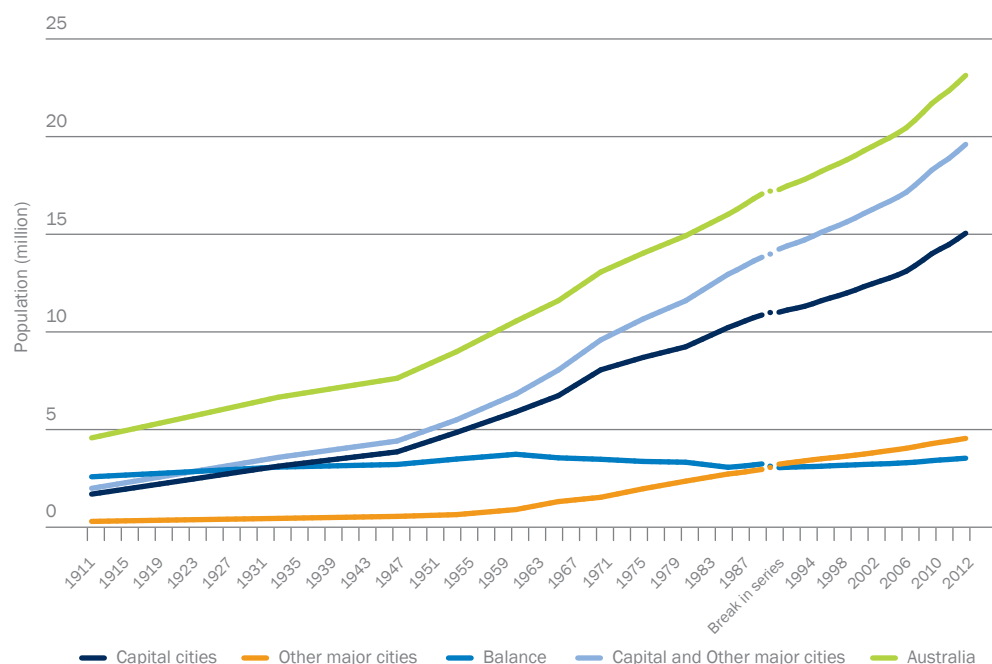
The first section of this chapter provides an overview of the report's main themes, and the key findings of each chapter. The second section discusses the report's methodology, definitions and use of data.

Overview

The **Population** chapter of this year's report notes the continued growth in population in all major cities and the ongoing trend in their status as the places where most Australians choose to reside (as shown in Figure 1.1).

It also examines the historical and differing population growth rates between our major cities and rural regional settlements.

Figure 1.1 Australia's urbanised population trends 1911–2013



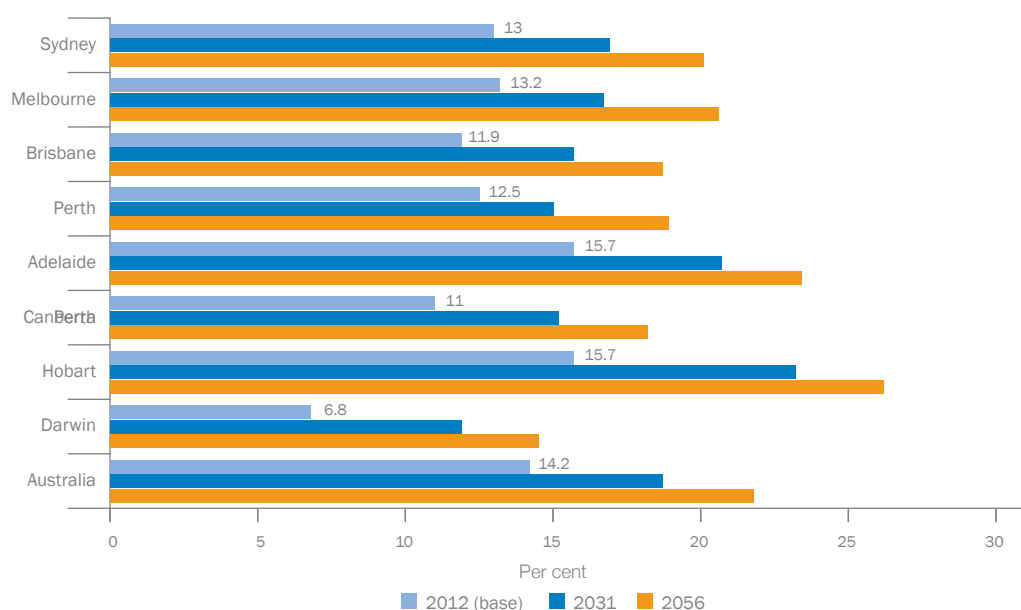
Source: ABS 2008, 2014a.

Note: Capital cities based on Greater Capital City Statistical Areas (GCCSAs) for 1971 onwards. Populations for previous years are based on earlier boundaries and may be inconsistent with GCCSAs. Major cities based on Significant Urban Areas (SUAs) for 1991 onwards. Populations for previous years are based on earlier boundaries and are generally inconsistent with SUAs.

Similar variations occur in the pattern of population ageing (as illustrated in Figure 1.2). One factor is that not all cities attract the same share of population growth through overseas migration.

Higher rates of overseas immigration usually mean the addition of people younger than the average age in the city, slowing the ageing of that population. The total number of people aged over 65 will still be highest in our largest cities, but the differing proportions and rates of out-migration from major cities of this age group highlight the different challenges our cities will face in supporting ageing populations.

Figure 1.2 Proportion of those aged 65 years and over in capital cities, 2012, 2031 and 2056



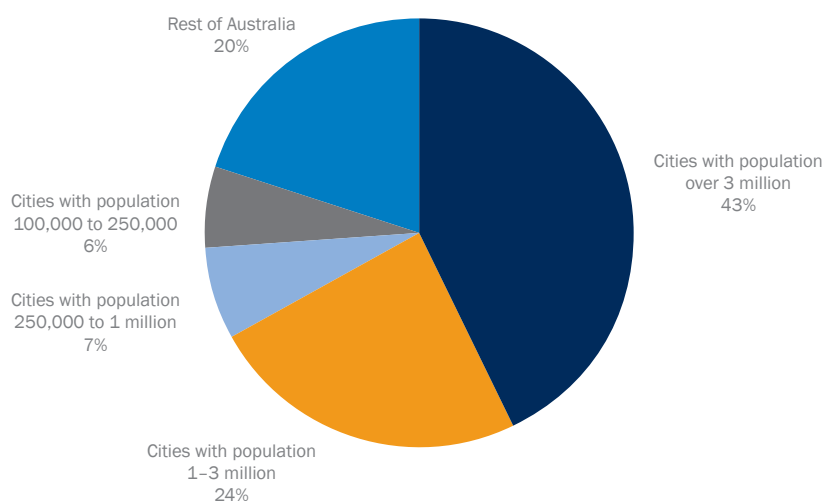
Source: ABS 2013.

The **Settlement** chapter examines the 2 distinct trends occurring across the largest of Australia's cities: one of growth locating at low densities on the urban fringe and the other of growth consolidating in high-density city centres.

In addition to considering the most recent data on the price premium being paid for proximity to the centre of our largest cities, it outlines changes over time in the types of housing in Sydney and Melbourne, the location of the increased proportion of apartments and semi-detached houses and the impact this is having on the densities of Australian cities.

The **Economy** chapter looks at the central role that our major cities have in generating GDP (illustrated in Figure 1.3) and providing jobs, with the already high percentage of all Australian jobs located in major cities continuing to grow.

Figure 1.3 *Proportion of Gross Domestic Product attributed to cities and regional areas of Australia, 2010*



Source: Derived from ABS Data by SGS Economics & Planning.

The location of jobs growth varies significantly, both between and within our major cities. The chapter considers how the changes in employment in different sectors have contributed to the variability in the location of employment growth. For example, professional services within cities generally favour central locations, while population-serving jobs, such as retail, education and personal services, are more dispersed and tend to follow the distribution of population. Industries such as manufacturing or freight and logistics locate in places that meet their specific infrastructure and land use needs, such as intermodal hubs or in close proximity to ports and airports.

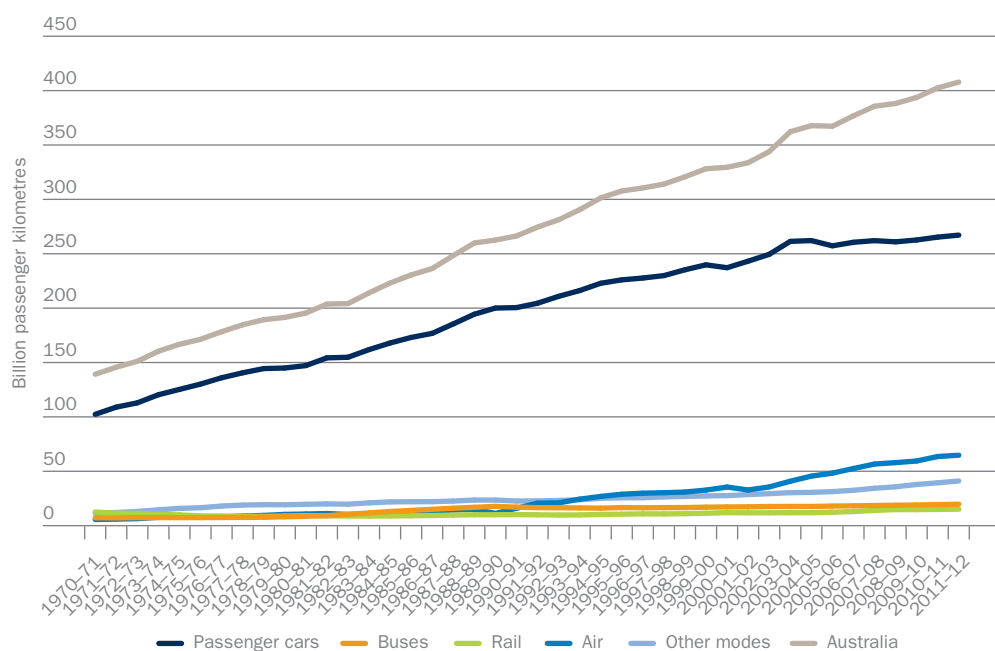
The **Human Capital and Labour** chapter considers the contribution that people make to the productivity of Australia's major cities and the way that city structures affect labour productivity. Human capital is a vital ingredient of economic growth and increases in human capital are reflected in labour force participation, labour mobility and the labour market.

The chapter also illustrates that economic progress has not been distributed evenly within and between cities against a number of economic indicators. For example, South-West Sydney has seen a decline in workforce participation rates, with the region now featuring some of the lowest workforce participation rates in Sydney. Finding solutions to such challenges represents a significant opportunity to boost intra-city economic growth and address areas of social disadvantage.

Transport infrastructure, services and systems play a key role in facilitating the movement of both people and goods. In many ways they are the arteries and veins of a healthy modern city.

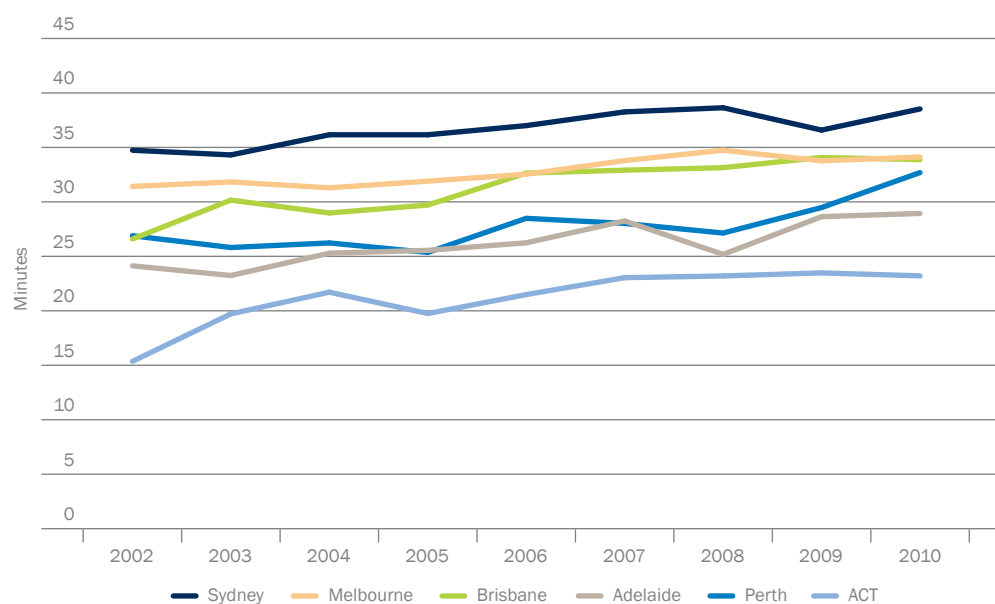
Changes to population, employment, education and other aspects of life in our major cities are impacted on by the availability of transport; they also impact upon our transport systems, adding to pressures on existing infrastructure and demand for future infrastructure capacity and services. This year's report features a chapter that looks at **Infrastructure and Transport** to highlight the importance of these issues in considering progress in cities.

The chapter begins by setting out the current state of play – noting that Australia in 2013–14 has record demand in almost every part of our transport networks, leading to the highest ever level of combined transport, as illustrated in Figure 1.4.

Figure 1.4 Growth in total passengers by mode of travel, 1970–2013

Source: BITRE 2013a

The **Infrastructure and Transport** chapter considers the patterns identified throughout the report, analysing the impacts such trends are currently having on the infrastructure and transport systems of cities. This includes the increasing time residents of major cities spend commuting to work, shown in Figure 1.5. It then looks at the different travel patterns from the different growing parts of cities, examining why, if the current patterns continue on trend, there will be a need to facilitate both car travel and active transport, albeit often in different parts of cities.

Figure 1.5 Average commuting times from residence to workplace by selected capital cities, 2002–2010

Source: BITRE analysis of HILDA customised data, provided by the National Centre for Social and Economic Modelling (NATSEM), BITRE 2013b. Note: Capital city geography is the ABS Statistical Division (Australian Standard Geographic Classification).

Noting the significant population growth largely living at the edges of our largest cities in detached housing, the report provides a basis for considering the impacts that will be felt by the Australian dollar retreating from record highs. The report notes that Australian cities continue to be heavily car dependant and vulnerable to changes in costs associated with vehicle use.

The other area of growth, in city centres, is likely to increasingly conflict with the operation of key transport infrastructure located nearby, such as Kingsford Smith Airport in Sydney or ports in Sydney and Melbourne. The report considers this, noting OECD research that suggests an economic imperative to retain port functions within cities.

In responding to changing industry structures and the impacts this can have on the location of jobs, much thought has been given to seeking ways to improve the co-location of jobs and people.

These discussions can often consider what is described as the 'self-sufficiency' of parts of cities. This measure is the ratio between the jobs and the employed residents in an area. It is important to note that this measure does not consider the extent to which the employed people in the area work in the area, rather than elsewhere.

This year's report considers the 'self-containment' of areas – the proportion of employed people residing in an area whose employment is in that area. A high self-containment rate indicates that there is a sufficient range and number of jobs in an area that employs local people.

Measuring self-containment is important, as it directly impacts on transport demand (both distance and type of travel) and because it reminds policy makers that to simply increase job numbers in an area is not necessarily sufficient to increase the employment of residents of that area. Such jobs could be filled by people travelling from elsewhere, particularly if the jobs require qualifications or skills not held by local residents (in much the same way that many resource sector jobs around Australia are filled by people resident in other locations).

This latter point is highlighted through a case study on the skills which are likely to be required for a new airport in South-West Sydney and how well the skills of residents in the area currently match those needs.

Key findings

Chapter 2 Population

- Australia has added an estimated 400,000 people since 2013, an increase in the total population to over 23.6 million people.
- Australians are predominantly urban dwelling people. More than 75 per cent live in the country's 20 largest cities, and over 60 per cent live in Australia's 5 largest cities alone – Sydney, Melbourne, Brisbane, Perth and Adelaide.
- Over the last decade Melbourne has seen the greatest growth in absolute terms, adding approximately 750,000 people, equivalent to more than 200 people per day. Australia's largest city, Sydney, while adding fewer people than Melbourne over the same period, still grew by almost 600,000 people.
- The fastest-growing cities in Australia since 2004 are the capital cities of Perth and Darwin, as well as the regional major cities of Cairns and Townsville. Each of these cities grew by at least 20 per cent over the decade, while Perth grew by more than 30 per cent.
- Australia's population is ageing. Over the past half century there has been a steady increase in both the number of older people and the proportion of older people in Australia. This presents challenges for transport and infrastructure across the country as well as health and aged care spending.
- It is in Australia's non-capital cities where the ageing population is more pronounced. Regional cities and the hinterland that surrounds them have a high number of older people. Cities such as Sunshine Coast, Wollongong, Geelong, Launceston, Newcastle - Maitland, Bendigo and Gold Coast – Tweed Heads have the highest proportion of their population over 65 years of age.
- Australia's strong population growth is projected to continue into the future, with the ABS's medium projection estimating that Australia will grow to just over 30 million people by 2031. The majority of this future growth is expected to occur in and around Australia's capital cities.

Chapter 3 Settlement

- Between 2012 and 2013, the fastest growing inner city areas in Australia were both located in inner Melbourne, with the ABS statistical areas of Melbourne and Southbank adding 5,400 and 2,100 additional people respectively over the year. Other inner city areas to experience substantial growth included Perth City and Waterloo in Sydney.
- Melbourne was also home to the largest population growth in fringe suburbs over the year 2012 to 2013, with the northern fringe suburb of South Morang adding 5,700 people. Strong fringe growth was also exhibited in Melbourne's Craigieburn-Mickleham and Point Cook, Sydney's outer north-west suburb of Parklea – Kellyville Ridge, and Perth's southern outskirts suburb of Baldivis.
- Accompanying a change in urban densities, dwelling stock in Australia's largest cities has shown a shift towards construction of semi-detached and apartment dwellings. Detached housing has declined as a proportion of all dwellings, while medium- and higher-density dwellings have increased slightly.
- Recent research undertaken by the Australian Housing and Urban Research Institute (AHURI) concluded that concentrations of social disadvantage were being pushed further towards city peripheries over the period 2001–2011. Recognising the importance of housing affordability closer to the fringe, the report notes that this outward movement of social disadvantage poses new challenges as these areas are already often poorly resourced in terms of accessible jobs, transport, facilities and services.

Chapter 4 Economy

- Australia's cities are important gateways to the global economy. They generate a majority of the country's GDP, and also house much of the nation's key economic infrastructure, such as ports and airports, which are critical to the prosperity of industries and sectors located all across Australia. Cities also house the majority of Australia's jobs.
- Improving the productivity of Australia's cities, and particularly labour productivity has significant benefits for the national economy.
- Australia's economic structure has changed considerably over the last half a century, with a steady and continued rise in business services and a long-term decline in manufacturing. These industries have considerably different spatial demands, and their respective rise and fall has had substantial impacts on the location of economic activity within cities.
- Connectivity can be a key determinant of a firm's productivity. Locating in a city that has high levels of connectivity (by mass transit, car or via airports or seaports) allows firms to achieve benefits. This is particularly so for firms in the advanced business services sector, which tend to be attracted to well-connected central city locations. Here they benefit from strong global linkages facilitated through agglomeration economies and access to the international gateways – airports and seaports.
- The changes in Australia's economic structure and the growth in global trade mean that Australia's ports and airports are more important than ever.
- Ports and the transport networks that support them are enablers of the economic growth and increased productivity facilitated through increased trade and their performance greatly impacts on many sectors of the economy across a broad geographical region.
- The interstate freight task is forecast to grow significantly in the coming decades, with commensurate pressure applied to transport infrastructure. This will be particularly felt in the cities where many freight movements originate and terminate; there are already capacity constraints being experienced as freight conflicts with the transport of people.
- Airports provide a gateway and first point of call for the increasingly valuable export industries of tourism and education. They also facilitate the movement of a large and rapidly growing business community that travels between cities, both domestically and internationally, for work and contributes significantly to economic growth in Australia. Strong jobs growth has also occurred near the airports of Australia's major cities.

Chapter 5 Human Capital and Labour

- Human capital is what enables people to earn a living; it is the knowledge and skills that enable them to contribute to a firm's production, which they are in turn remunerated for via a wage.
- People with higher education or high skill levels tend to have a much stronger connection to the labour force and are more likely to participate in the labour force for a larger proportion of their lives.
- Australia's labour force participation has experienced strong growth, largely due to increased participation of females aged 24 to 54 years. There has also been a particularly notable rise in the participation rate of people traditionally classed as nearing retirement, with many people aged 55 to 64 years now staying in the workforce for longer. The participation rate of people over 65 has also shown an upward trend.
- There is a significant labour force participation rate gap between capital and non-capital major cities representing a large pool of underutilised human capital in non-capital cities.
- A skilled workforce supports ongoing economic development and improves overall living standards. The percentage of people with a Certificate III or above who are employed in a skilled occupation is rising across Australia but most strongly in major cities.
- Cities attract human capital and the co-location of educated and innovative people amplifies the effect of human capital. The clustering of jobs and people in cities increases the range of jobs on offer to a worker and gives them greater choice in employment. This improved choice allows them to best match their skills to a job.
- Price premiums are generally paid for more highly educated workers; however, the price premium paid varies considerably between Australian cities, reflecting a city's differing economic structure, ability to attract and retain labour and local labour supply.

Chapter 6 Infrastructure and Transport

- Record levels of demand are being felt across Australia's transport networks, with our roads, public transport, freight, active transport and air travel all seeing record levels of activity. The increase in demand for transport reflects both record levels of population and the evolution of Australia's cities and their economies.
- Where people live and where they work within a city results in considerable variation in the transport task and the type of infrastructure demanded. It is therefore likely that there will be differing views on the suitability of investments in differing types of transport infrastructure, be it pedestrian or cycling infrastructure or the building of more motorways and railways. Investments in all of these are likely to be required, but funding for all (particularly at the same time) is unlikely to be available.
- The length of an average metropolitan trip climbed from around 2.5 kilometres at the start of the twentieth century (when urban passenger transport was still dominated by non-motorised travel) to a current length of close to 7.5 kilometres per trip.
- Inner city growth comes with challenges, particularly in those cities where important infrastructure assets such as ports and airports are close to this population growth.
- Policy makers looking to further assist areas with high populations and relatively fewer jobs will need to consider whether there are suitable matches between the skills needed to perform jobs and the jobs available in such areas.
- Simply creating jobs in an area is not necessarily sufficient to increase the employment of residents of that area, as those jobs could be filled by people travelling from elsewhere, directly impacting transport demand, both in distance and mode of travel.
- Major transport infrastructure can play a critical role in shaping the growth of cities, and if properly planned, can direct future housing and employment growth to areas that improve productivity and equality of access to jobs and services.

State of Australian Cities reports 2010-2014

The purpose of the State of Australian Cities reports is to bring together current research and data to present a comprehensive picture of how our cities are evolving, and to strengthen the knowledge base used to develop policy.

This is the fifth *State of Australian Cities* report since 2010. The first report covered the 17 major cities in Australia with populations over 100,000 people and was largely based on the Australian Bureau of Statistics (ABS) 2006 Census of Population and Housing. Key themes included: Australian cities in an international context; population and settlement; the productivity, sustainability and liveability of Australian cities; social inclusion and equity; and governance.

The 2011 report added an additional city (Albury–Wodonga) and examined some of the issues in greater detail, such as population growth, migration between cities and commuting flows within the largest capital cities.

The 2012 and 2013 reports drew from 2011 Census data, which meant slightly different boundary definitions for cities. These reports also included an evaluation of progress on implementing the National Urban Policy of the government at the time.

In 2013 an online dynamic mapping tool was introduced to complement the report. The interactive maps allowed readers to explore particular aspects of cities. These dynamic maps will be continued in future.

Utilising changed ABS geographic boundaries, the 2014 - 2015 report adds a further 2 cities – Bendigo and Ballarat. Mackay in Queensland is poised to join the ranks of Australia's major cities by the next Census. The report now addresses cities with populations above 85,000 people, based on the ABS Significant Urban Areas (SUA) geographic classification. This is regarded as the area most residents would recognise as comprising their city. Where possible, the State of Australian Cities reports have used long-term time series data to show how our cities – and their population, demographics, industry, land use and transportation – have changed over time.

Structure of reporting for 2014 - 2015

The Department of Infrastructure and Regional Development has prepared a new suite of publications that provide statistical information and analysis to support spatial policy and infrastructure investment decisions across Australia.

The *Progress in Australian Regions – Yearbook 2014* has been prepared that collates information about Australia's regions, including urban areas, within a single document. *Progress in Australian Regions – Yearbook 2014* can be found at the Department's website, www.infrastructure.gov.au.

The main objective of the *Progress in Australian Regions – Yearbook 2014* is to provide a measurement of progress for government policy makers, business, industry and other stakeholders to inform decision making where there are strong spatial implications. The *Progress in Australian Regions – Yearbook 2014* includes national progress indicators that will provide stakeholders with information to track progress in urban and regional areas. It provides information at a sub-state as well as a national level.

Complementing the *Progress in Australian Regions – Yearbook 2014* are a series of analytical publications that examine in greater detail issues impacting on progress in Australia's regions and cities.

These analytical publications include:

- *State of Australian Cities 2014-2015* which examines, in particular, how social and economic changes in Australia's major cities affect the type and quantum of future transport demand; and
- a regional publication, *Progress in Australia's Regions: State of Regional Australia*, which examines the major trends occurring in regions and the factors driving them.

Research methodology

This report has employed analytical methods and approaches from across the 3 main urban research traditions – empiricist, humanist and political economy – in order to improve our understanding of the changing nature of our cities.

The choice of data, analytical methods and insights are informed by all approaches in an attempt to encourage a range of views on the changing role of our cities under globalisation forces, national productivity and demographic growth pressures, all playing-out strongly in our cities.

In producing this and past reports we have been ably assisted by a broad group of research perspectives and data sources offered through leading institutions such as the ABS, AHURI, the State of Australian Cities Research Network (SOACRN), the Western Sydney Institute and the OECD Regional Development Programme.

Geographical boundaries

The State of Australian Cities reports use Australian Statistical Geography Standard (ASGS) boundaries defined by the ABS, that most closely relate to the built urban area of Australia's major cities.

In 2011 the ABS implemented a new geography, marking the first significant change in nearly 50 years. As part of the changeover, much of the geography used in previous State of Australian Cities reports was phased out.

Because data for the previous geographic boundaries is no longer reported, the new ABS geographical boundaries have been adopted, with the following changes:

- Capital cities that were previously defined as 'Statistical Divisions' (SD) are now defined as 'Greater Capital City Statistical Areas' (GCCSA).
- Non-capital major cities, which were previously defined as 'Statistical Districts' (SDist), are now 'Significant Urban Areas' (SUA).

Time series analysis

The implementation of the ABS's new geography standard has had implications for data time series analysis. Long-term data time series analysis is particularly important when observing change in cities as the impact of plans, policies and new urban infrastructure can be seen on urban structure and form over decades.

ABS has adopted a new geographic unit called a 'mesh block' which contains between 30 and 60 dwellings. Mesh blocks have 2 main advantages not inherent in the previous geography:

- They function like small building blocks that can be built up into a variety of geographies according to requirements, thus providing greater flexibility than previous measures.
- The areas of mesh blocks will remain stable over time which means accurate time series can be reliably constructed despite any future changes to geographic areas.

The ABS has published a limited number of time series using the units of the new geography. Where the ABS has published such time series, the State of Australian Cities reports have used them.

In previous reports, where time series for the new geography had not been published by the ABS, data was concorded for the State of Australian Cities reports using Statistical Local Areas (SLAs).

Unfortunately, SLAs are also being phased out. A mix of geographies will now be used to obtain long-term data time series.

Place of usual residence

All Censuses before 2006 were based on place of enumeration, that is, a person was counted where they were on Census night. In order to improve accuracy, the 2006 and 2011 Census data were also available by place of usual residence. In most cases, the difference is slight – often a fraction of a per cent – but it presents a dilemma to those constructing and analysing time series data.

This report generally uses the place of enumeration data pre-2001 and place of usual residence post-2001, because the value of long time series outweighs a slight loss in short-term accuracy. The exception is where the time series involves very small changes over the years, such as housing occupancy rates. In these cases, only places of usual residence data is used.

Data presentation consistency

Where time series data or other data needs to be represented in formats other than Greater Capital City Statistical Areas, Statistical Level 4 Areas, Significant Urban Areas or Remoteness classes, this has been kept to a minimum and has been based around common statistical building blocks at the Statistical Level 2 and for certain economic data at functional economic regions.

As time series data bases build over coming census periods, greater use of the new census categories will be possible. For continuity purposes, with past observations made at the level of 'Major City', the present report adopts similar boundaries to the previous reports. At the capital city level there is no practical difference under the new ABS geography, whereas there are minor differences for the remaining major cities, as described in the year book and as defined in this report. Readers will be alerted to these differences as they arise.

Use of the Yearbook indicator framework

The State of Australian Cities Report 2014 - 2015 draws on the progress and contextual indicators in the *Progress in Australian Regions – Yearbook 2014*. The information in the *Progress in Australian Regions – Yearbook 2014* builds on the 'Measures of Australia's Progress' publication from the ABS but has been extended to include a number of contextual indicators that provide a broader perspective to inform understanding of progress in Australia's regions.

The *Progress in Australian Regions – Yearbook 2014* brings together information about Australia's regions from a range of different sources. It presents that data in a consistent format over time and provides a statistical resource that can help answer the question of how regions are progressing against social, economic, environmental and governance indicators.

As a result, the *Progress in Australian Regions – Yearbook 2014* contains some data that has previously been set out in State of Australian Cities reports. Where relevant to specific analysis, this year's report cites the *Progress in Australian Regions – Yearbook 2014*, but otherwise readers are encouraged to consider the publications together to inform an understanding of progress in Australia's major cities.

Chapter 1 references

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Chapter 2

Population



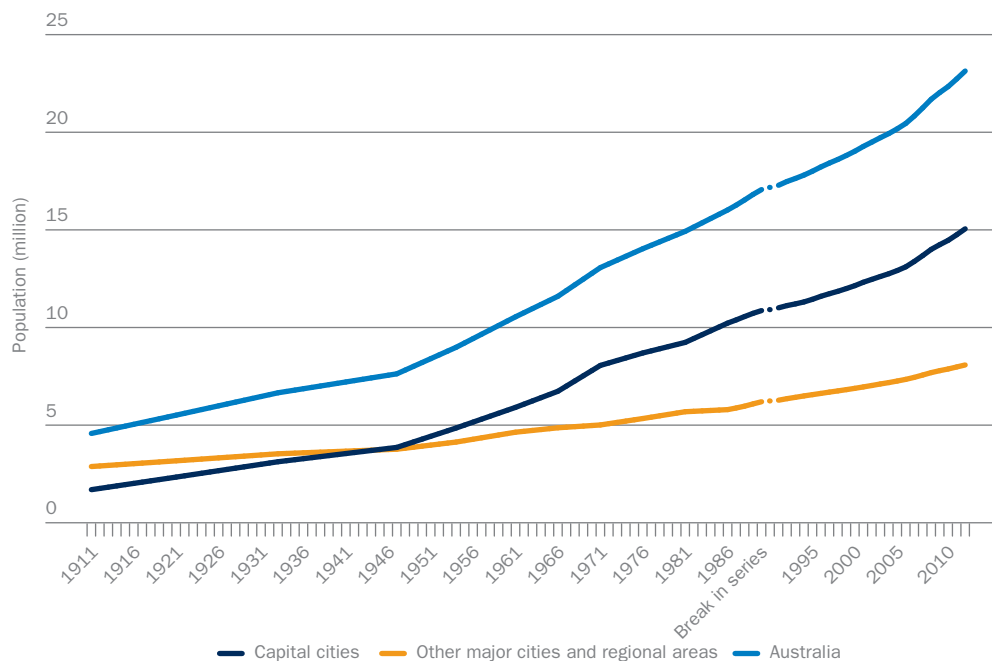
This chapter discusses the current demographic trends for Australia and the implications for its 20 major cities.

Australia continues to be more highly urbanised than the majority of the world, but the gap is closing. At present over 3.5 billion of the world's people live in cities (roughly half), with this projected to rise to 5 billion by 2030 (approximately two-thirds of the world's projected population) (World Bank, 2014). Australia's population continues to grow steadily, with the impacts of this growth felt most significantly in our cities.

Australia's population

Australia's population in 2015 is approximately 3.5 million more people than a decade earlier, increasing the total population of the country to over 23.6 million (ABS 2015a). Australia's average annual population growth of approximately 1.4 per cent is substantially higher than the OECD average of approximately 0.5 per cent. An increase of 330,200 people in the last year continues a decade's strong growth trend, particularly in capital and other major cities (Figure 2.1).

Figure 2.1 Capital cities share of population growth, 1911–2013



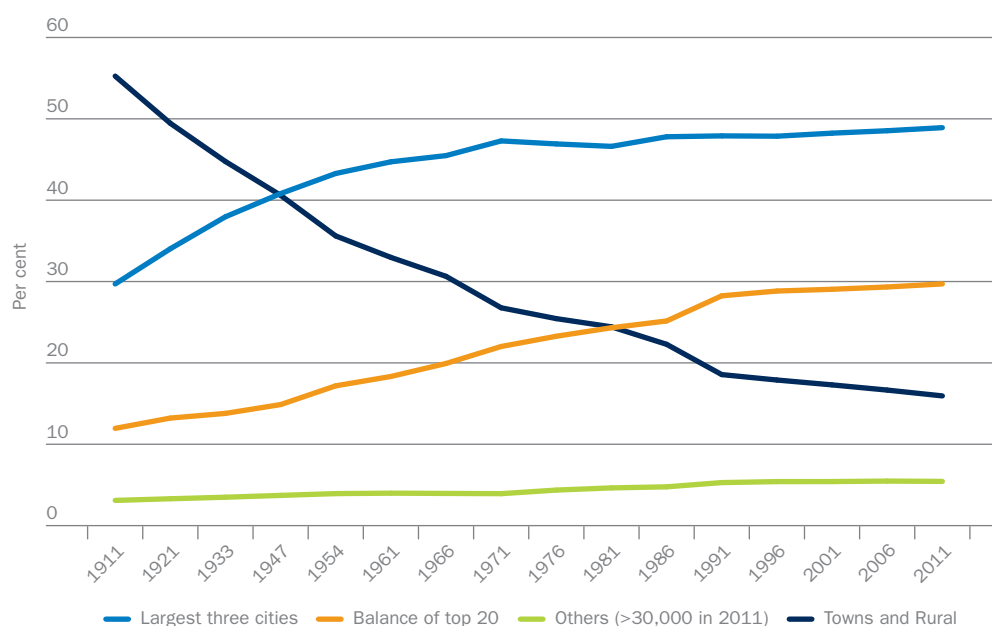
Source: ABS 2008, 2014a.

Demographic aspects of Australia's population

In 2013, more than 18 million Australians lived in the 20 major cities. Most of Australia's recent population growth has occurred in the cities, with the largest 20 all enjoying population growth over the last decade. This has been counterpoised by a marked decline in the proportion of the population living in towns and rural areas – a trend that commenced before 1911 (BITRE 2014).

Australia's major cities are now home to almost 80 per cent of the Australian population, the result of a process of urbanisation that has been occurring for more than a century. As Figure 2.2a shows, in 2011 almost half of the population lived in the 3 most populous capitals: Sydney, Melbourne and Brisbane.

Figure 2.2a Population proportion by settlement type, 1911–2011

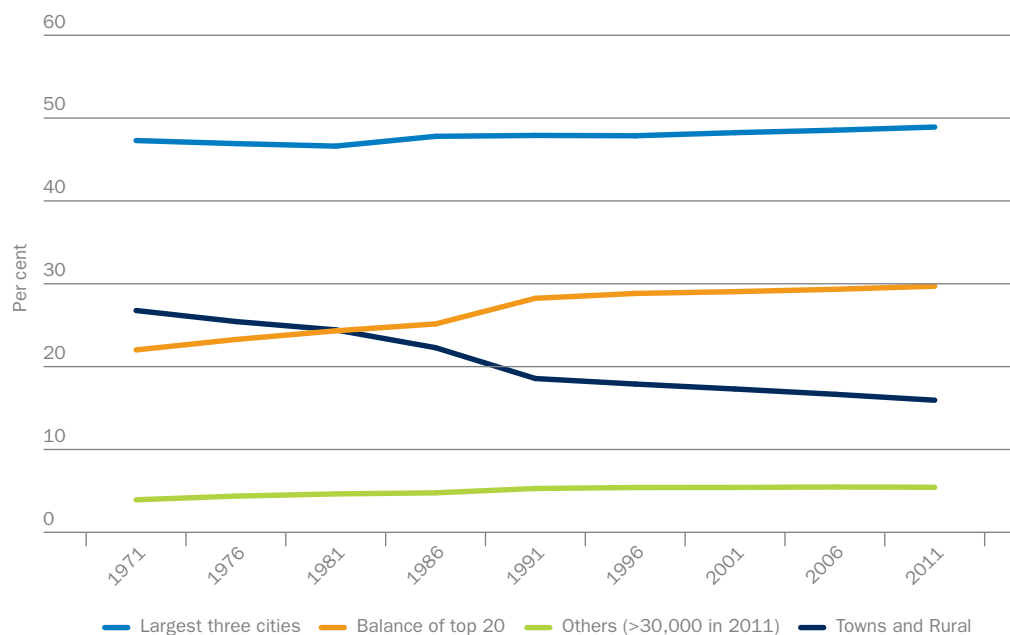


Source: ABS 2014b.

Approximately 15 per cent of the population lived in cities and towns of between 30,000 and 85,000 with the remainder in rural towns and remote settlements. The latter have experienced uninterrupted decline in the number of people living there since 1911, while the share of the population living in cities and towns of between 30,000 and 85,000 has remained steady since 1991 after a long and slight increase. The decline in the rural population is occurring predominantly in those areas inland and beyond the influence of major city peri-urban processes.

While the largest 3 cities' and smaller regional cities' share of the population has remained more or less steady since the 1980s, in a trend that has been ongoing since 1911, the remaining 17 major cities have experienced population increases, notably together they accommodated almost 10 per cent more of Australia's total population since 1971 as shown in Figure 2.2b.

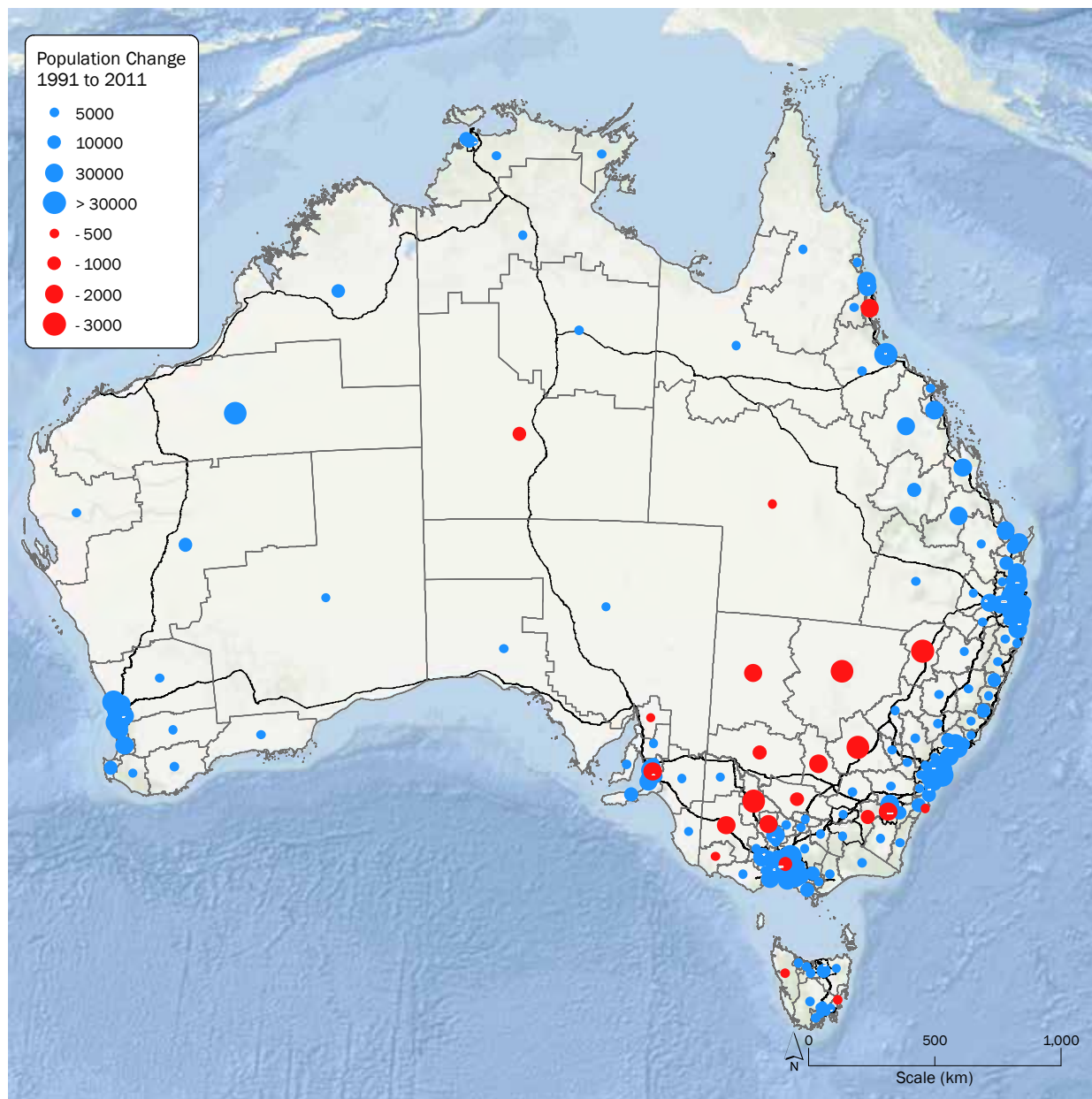
Figure 2.2b Population proportion by settlement type, 1971–2011



Source: ABS 2014b.



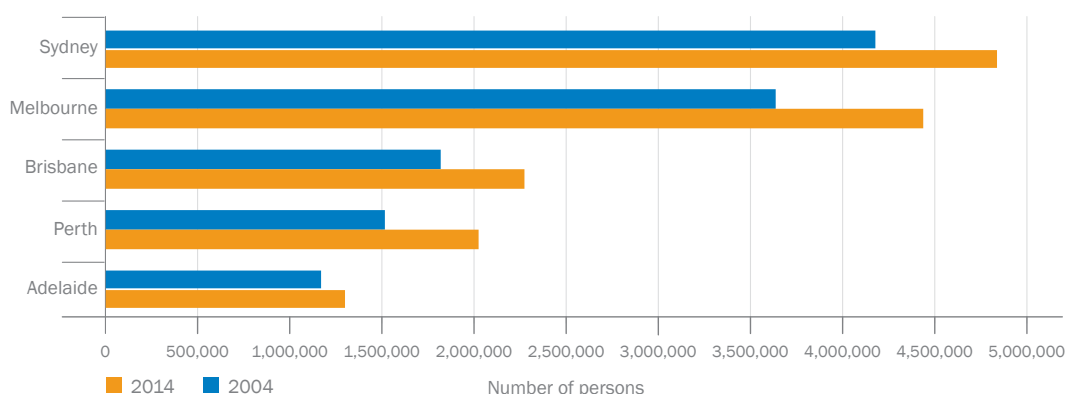
Map 2.1 Population compositional change, 1991–2011



Source: SGS Economics & Planning Pty Ltd.

Note: ABS data aggregated at SA3 level. Population change indicators are centred in the SA3 and do not always correspond with geographic locations.

Population growth in Australia's cities over the last decade has been substantial and concentrated in the east. Melbourne has seen the greatest growth in absolute terms between 2003 and 2013. Over this period the Victorian capital added approximately 750,000 people, equivalent to more than 200 people per day. Australia's largest city, Sydney, while adding fewer people than Melbourne over the same period, still grew by almost 600,000 people.

Figure 2.3 Population of most populous capital cities, 2004 and 2014

Source: ABS, 2015.

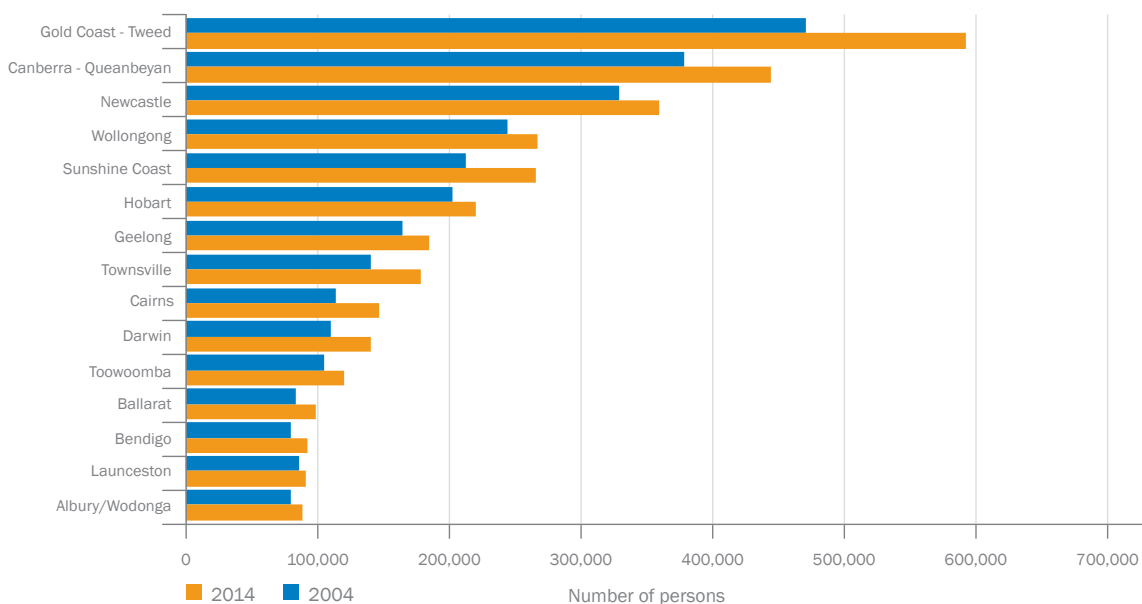
Note: Estimated Resident Population Figures used.

Although in absolute terms Melbourne and Sydney together accommodated over 1.3 million additional people, they were not Australia's fastest growing cities in percentage terms. The 7 fastest-growing Australian cities added over 1.2 million people between 2003 and 2013.

The capital cities of Perth, Brisbane and Darwin, as well as the regional major cities of Cairns, Gold Coast–Tweed Heads, Townsville and the Sunshine Coast, grew more rapidly than Melbourne and Sydney. Each of these 7 cities grew by at least 20 per cent over the decade. In the case of Perth and Cairns, the decade saw greater than 30 per cent growth.

Five of the 6 cities with the highest rates of population growth were in coastal Queensland, underscoring the ongoing peri-urban trend in Australia.

In contrast, the 6 slowest-growing major cities of Launceston, Hobart, Wollongong, Adelaide, Newcastle and Toowoomba experienced growth of below 1 per cent per year from 2010-14.

Figure 2.4a Population of other major cities, 2004 and 2014

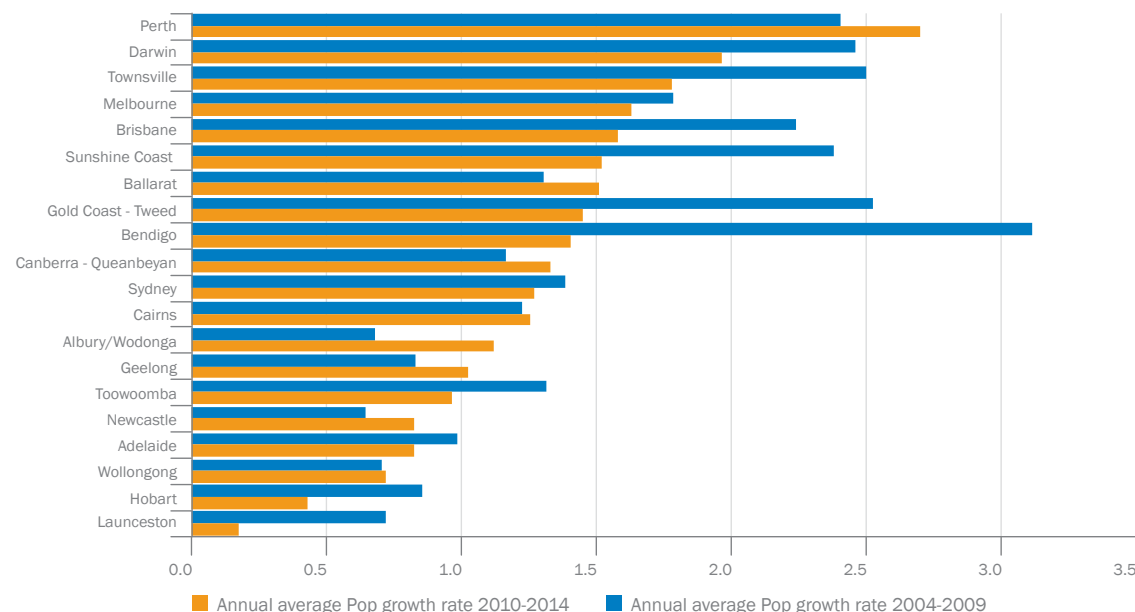
Source: ABS, 2015.

Note: Estimated Resident Population Figures used.

Note: Differences in Regional major cities' populations to that in previous State of Australian Cities reports is due to the current figures being based on the urban form approximated by the ABS Significant Urban Area instead of the approximated Statistical Districts used previously.

Figure 2.4a shows the difference in population growth rates of major cities from 2004- 2009 and 2010 -2014. Gold Coast-Tweed Heads, Cairns, Townsville and Sunshine Coast experienced reduced growth rates from 2010 to 2014, likely due to fewer jobs resulting from the Global Financial crisis. In part this also reflects a decline in Net Overseas Migration from a peak in 2008. The other factor behind these changes, Net Internal Migration, is playing out differently in each city.

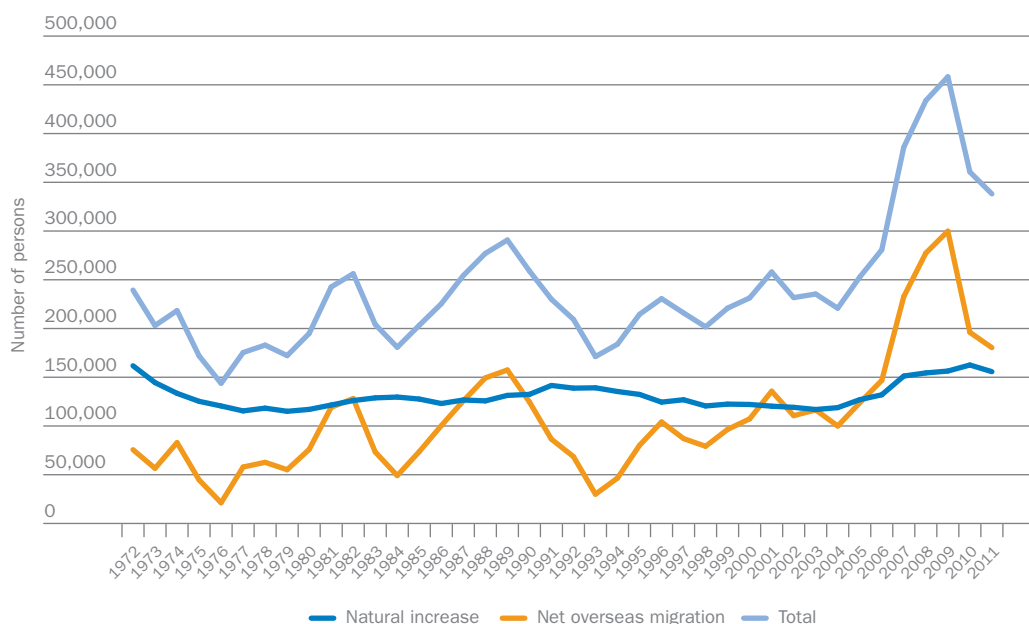
Figure 2.4b Major city population growth rates, 2004-2009 and 2010-2014



Derived from ABS 2015

Australia's population growth is driven by both natural increase and overseas migration, as illustrated in Figure 2.5, with total population growth closely mirroring the migration component. The natural increase in the population has ranged between 100,000 and 150,000 people per annum over the last 20 to 25 years.

Recently, overseas migration has played a more significant role in national population growth. Net inwards overseas migration has accounted for over 150,000 people per annum since 2006, with a peak of 300,000 in 2009. The Australian Government's Intergeneration Report 2015 assumes an annual net overseas migration of 215,000 people beyond the current forward estimates (Australian Treasury, 2015)

Figure 2.5 Components of annual population growth, 1972–2011

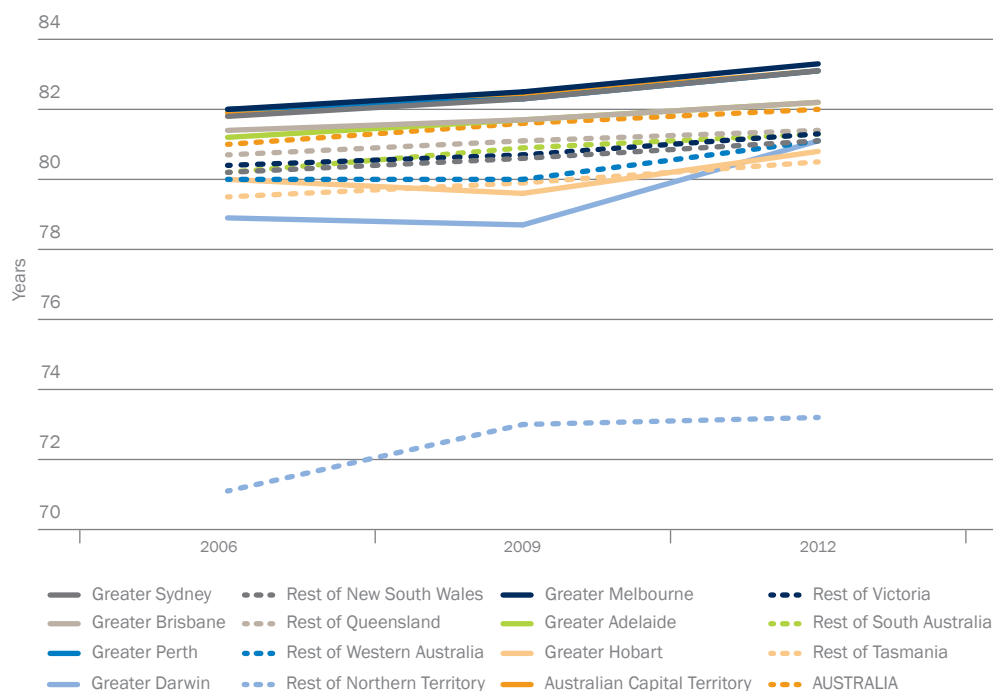
Source: ABS 2014b.

The Australian Government's Intergenerational Report 2015 projects that over the next 40 years, the proportion of the population aged over 65 will more than double. At the same time, growth in the population of traditional workforce age is expected to slow to almost zero, so that the number of people aged between 15 and 64 for every person aged 65 and over will fall to 2.7 by 2054-55 (Australian Treasury, 2015).

Between 1982 and 2013 the life expectancy of Australian women increased from 78.2 years to 84.3 years, while for males during the same period, life expectancy increased from 71.2 years to 80.1 years (ABS 2014e). Fertility rates, although more variable, declined from a peak in 1961 of 3.5 babies per woman, to a low in 2001 of 1.7 babies per woman, before increasing slightly to a rate of 1.9 babies per woman in 2013 (ABS 2014f).

As shown in Figure 2.6, Darwin and particularly the rest of the Northern Territory showed the greatest increase in life expectancy between 2006 and 2012, increasing by more than 2 years. However, both remain below the Australian average (DIRD 2014, table P1.1.1).

Several factors could influence the relatively lower life expectancy experienced in the rest of the Northern Territory and, until recently, Greater Darwin. The most likely factor relates to well-documented lower life expectancy experienced by Indigenous peoples. It is estimated that approximately 30 per cent of the Northern Territory resident population identified as Aboriginal or Torres Strait Islander in 2011 (68,850). In comparison, there are an estimated 208,476 Indigenous persons living in New South Wales and Aboriginal or Torres Strait Islanders represent only 2.9 per cent of the overall population of that state (ABS 2014).

Figure 2.6 Measure of life expectancy by capital cities and other areas, 2006–2012

Source: DIRD 2014, P1.1.1.

There are minor differences in changes to life expectancy in non-capital major cities which may be a reflection of the shift in the proportion of aged persons. For example, Ballarat residents' life expectancy increased from 79.9 years in 2006 to 80.7 years in 2012, in Bendigo from 80.6 to 81.2 years and Gold Coast-Tweed Heads from 81.6 to 82.7 years (ABS 2014e). The movement of younger people away from non-capital major cities also results in an increase to the proportion of aged persons.

Australia's ageing population

The overall result of increased life expectancy and fluctuating fertility rates is that the Australian population is ageing – that is, people are not having children at the same rate as in the past, and people are living longer. This means that the proportion of the Australian population aged over 65 is increasing as a share of the total Australian population.

Over the past half century there have been steady increases in both the number of older people and the proportion of older people in Australia. Between 2001 and 2011 the proportion of people aged 65 years and older increased by 1.5 percentage points from 12.7 per cent of the population in 2001 to 14.2 per cent in 2011 (ABS 2013c).

This proportional increase represents 645,473 more people moving into the older age groups over the decade. As at June 2012, there were an estimated 3.22 million people aged 65 years and over living in Australia (ABS 2013c).

This trend will continue and become more pronounced in coming decades. Latest projections by the ABS (ABS 2013b) show that, within a generation, the proportion of people aged 65 years and over will increase from 14.2 per cent in 2012 to 20 per cent in 2041. Over the same period the proportion of very old people (aged 85 years and over) will double from 1.8 per cent in 2012 to 3.6 per cent in 2041.

Economic implications of an ageing population

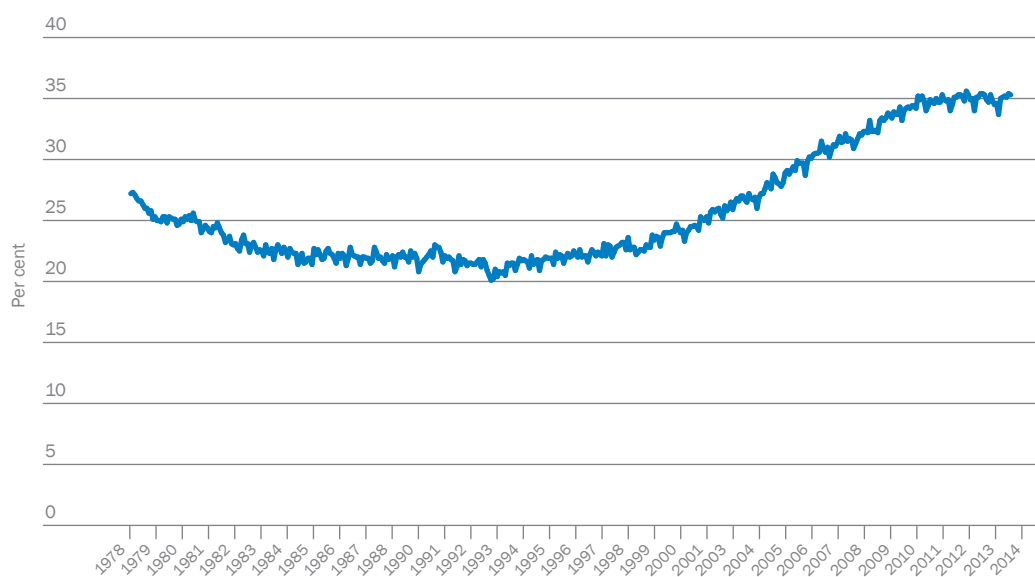
An ageing population presents significant social, cultural and economic challenges for governments in Australia. However, there are also benefits for communities, such as increased family child care, healthier old-age workers contributing to the tax base for a longer period of time and increased volunteer numbers (Betts 2014).

An ageing population means that the ratio between the elderly population and the working-age population is rising. This ratio is known as the aged dependency ratio. The Productivity Commission (2005) noted that, even if there were no further improvement in life expectancy and fertility rates, and migration were constant, population ageing would continue. The aged dependency ratio – specifically, the ratio of those aged 65 years and above to those aged 15 to 64 years – would still rise by nearly 16 percentage points from 2003–04 to 2044–45. The Productivity Commission (2013) has concluded that the increase in the aged dependency rate over the next half century will affect labour supply, economic output and infrastructure requirements.

Figure 2.7 shows that the labour force participation rate of Australians aged 55 and over in capital cities has increased from under 25 per cent to 35 per cent over the past 2 decades, with most of the increase occurring since 2000. This trend appears to have levelled off since 2010.

Many factors are likely to have influenced the increase in labour force participation for this age group over that period: for example, changes to superannuation taxation arrangements, a desire by some people to have greater financial security in retirement, continued increases in work force participation by females and macro-economic factors (for example, the Global Financial Crisis) potentially affecting retirement savings.

Figure 2.7 *Labour force participation of people aged 55 years and over in capital cities, 1978–2014*



Source: ABS 2014c.

Note: Greater Capital City Statistical Areas.

Demographic aspects of ageing for major cities

As noted earlier, the ageing population presents a number of challenges for Australia's future. The significant ageing of the population that is occurring nationally varies considerably across regions and within cities. This has significant implications for a range of planning and design activities, from housing and transport, to delivery of human services and the size of local workforces.

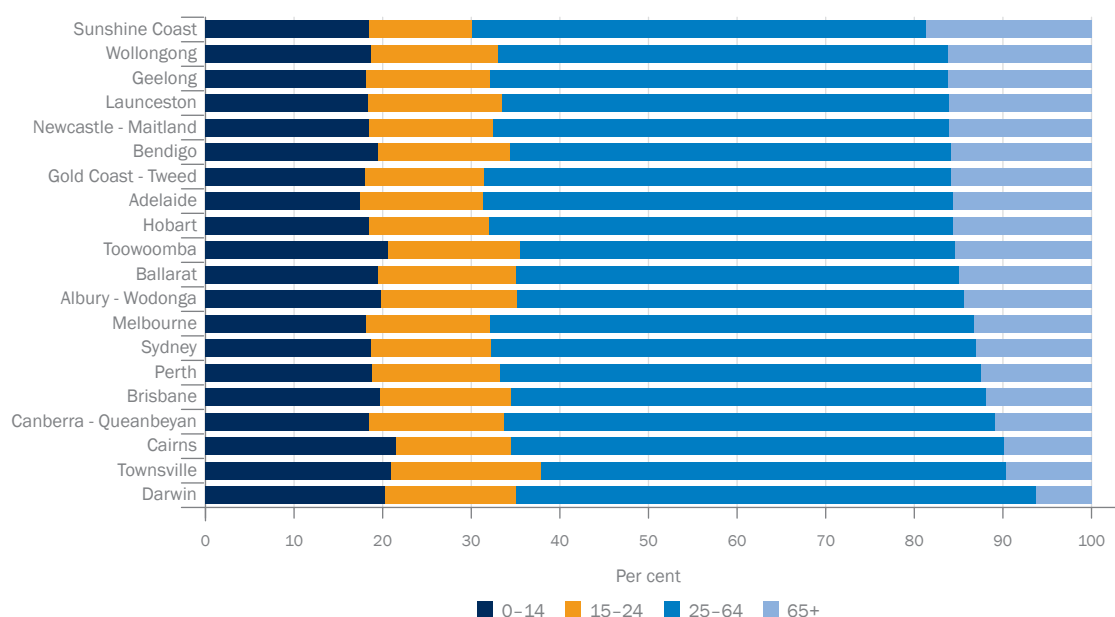
Net overseas migration is also one of a number of factors that create regional variations in age profiles, with a majority (81 per cent) of new settlers to Australia since the mid-2000s being younger than 40 years of age (ABS 2013b). Similarly, net internal migration – the movement of people between regions – influences the age structure of regions.

Figure 2.8 illustrates the age structure of Australia's 20 major cities. The proportion of population aged over 65 years is more pronounced in some regional cities. The Sunshine Coast has the highest proportion of population over 65 years of age, followed by Wollongong, Geelong, Launceston, Newcastle – Maitland, Bendigo and Gold Coast – Tweed Heads. Of Australia's capital cities, Adelaide and Hobart have the highest proportion of population aged over 65, and Darwin the highest proportion of population aged 25-64.

However, for the most part, Australia's capital cities have proportionately younger populations, with almost

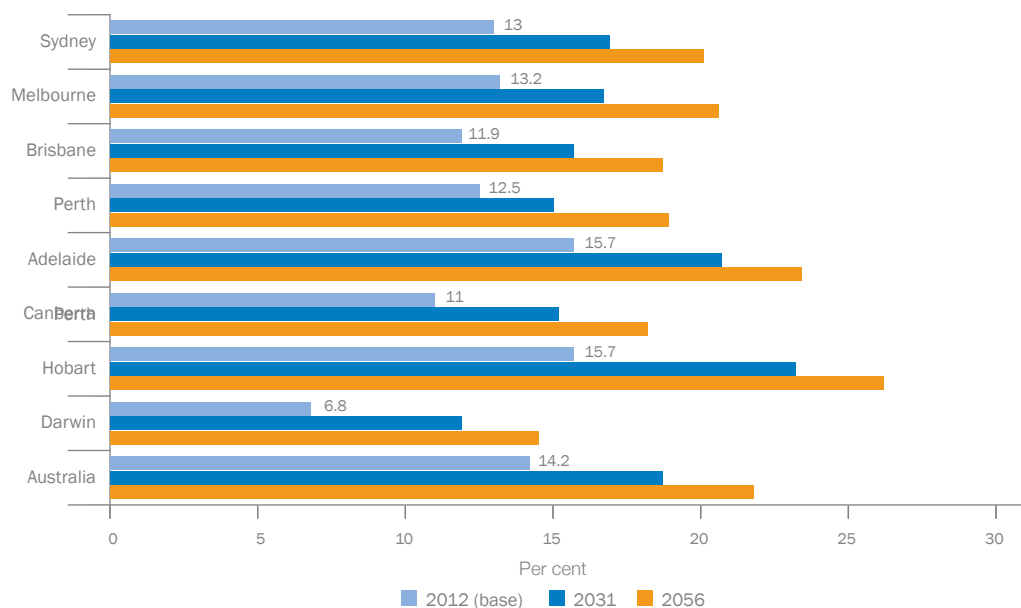
3-quarters (73 per cent) of people aged 25 to 29 years residing in Australia's capital cities – the highest proportion of any 5-year age group (ABS 2013a).

Figure 2.8 Age structure for 20 most populous cities, 2012



Source: ABS 2013a.

Nevertheless, ABS population projections suggest that all of our capital cities will have an increasing proportion of older people over the next half century. Figure 2.9 shows the 2012 projections for the proportion of people aged 65 years and over in the capital cities.

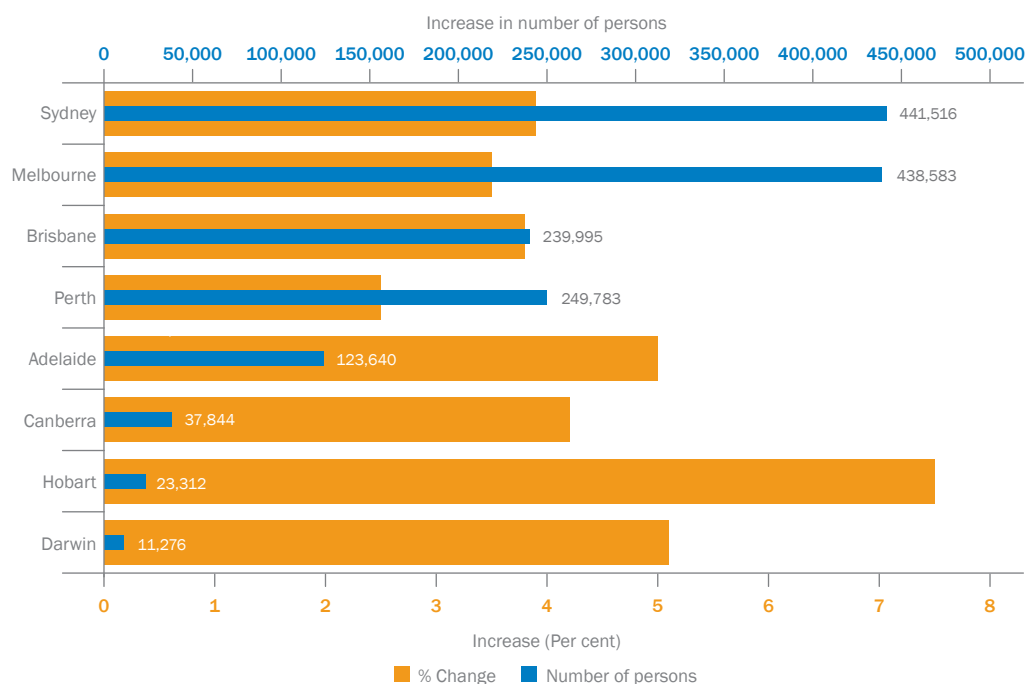
Figure 2.9 Proportion of people aged 65 years and over in capital cities, 2012, 2031 and 2056

Source: ABS 2013b.

Changes in the proportion of older people within populations can mask substantial differences in the absolute increase in the number of older people within cities and regions. As shown in Figure 2.10, between 2012 and 2031 the largest increases in the proportion of older people within capital city populations are projected to occur in Hobart (7.5 per cent), Darwin (5.1 per cent), Adelaide (5.0 per cent) and Canberra (ACT) (4.2 per cent). While proportional growth is important, it is also important to look at actual number increases. In real terms, the proportions in Hobart and Darwin equate to 23,312 and 11,276 people respectively.

However, absolute growth in the number of people aged 65 years is projected to be much larger in the other capital cities, with Sydney and Melbourne each projected to have more than 400,000 people aged over 65 years in 2031 when compared with present.

Overall the number of older people living in the capital cities by 2031 is projected to increase by over 1.5 million people, as shown by Figure 2.10.

Figure 2.10 Projected change in people aged 65 years and over in capital cities, 2012–2031

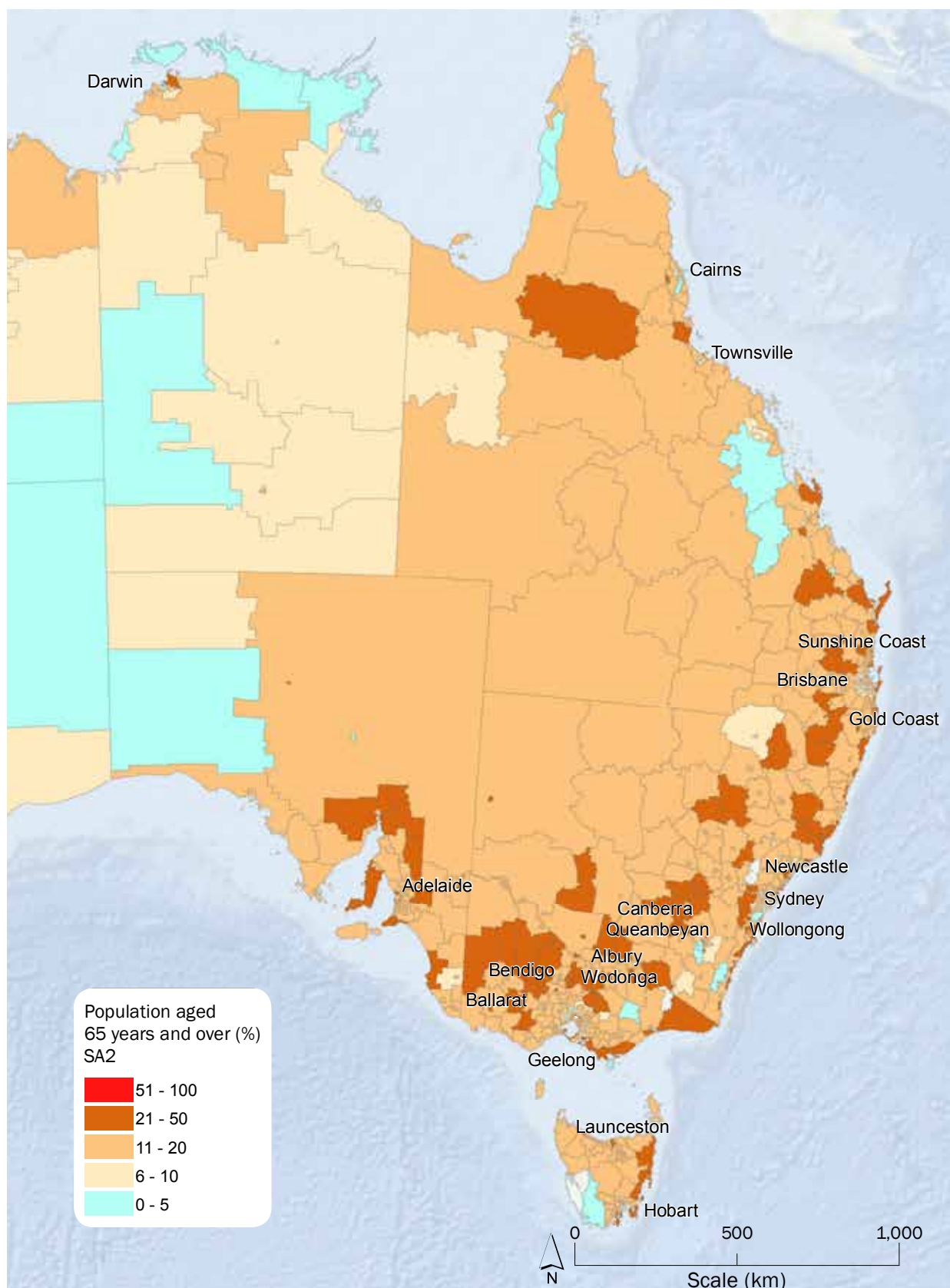
Source: ABS 2013b.

In general, it is in Australia's non-capital cities where the ageing population is more pronounced, albeit on smaller population bases. Regional cities and their surrounding rural hinterland and townships have a high proportion of young people moving away from them and also have a high proportion of older people moving into them. Young people may be relocating to larger towns or cities to undertake educational or employment opportunities that may not necessarily be available in their local area.

This means that regional cities will face significant age related challenges around their infrastructure and transport systems in the future. The regional non-capital cities affected will include Sunshine Coast, Wollongong, Geelong, Launceston, Newcastle - Maitland, Bendigo and Gold Coast–Tweed Heads, which have the highest proportion of their population aged over 65 years.

As Map 2.2 shows, for 2011 at ABS geographic level classification Statistical Area Level 2 (SA2), the regions with the highest proportions (above 21 per cent) of people aged over 65 years are found in a relatively narrow belt of east coast towns and in a chain stretching from the New South Wales/Victorian border to the Queensland Sunshine Coast.

Map 2.2 People aged 65 years and over by East coast Statistical Area Level 2 (SA2) geographic area, 30 June 2012



Source: ABS 2013f

State of Australian Cities 2013 online maps highlighted the areas in 18 of Australia's major cities in which the proportion of people over 65 years old had increased between 2001 and 2011.

The general pattern identified for most major cities was an increased proportion of older people in some outer and middle suburbs and a decline in the proportion of older people in the inner city areas. Such spatial patterns present challenges, particularly for transport and service delivery.

On the whole, OECD research shows that older people who drive will prefer to continue to do so for as long as possible. However, there may be an increase in the number of older Australians who cannot, or choose not to drive and require increased public transport options.

Older Australians will expect to have access to transport modes that meet their individual needs, especially as they approach 80 years of age.

Future transport systems and services will play an essential role in supporting independent, healthy ageing (OECD 2001), but dispersed aged populations combined with inadequate planning that necessitates travel to access services have the potential to create significant challenges.

Ageing in place

Ageing in place means being able to continue to live independently in the community but not necessarily in the family home. It can also mean living in a downsized home, a rented home (public housing or privately rented) or in alternative accommodation such as a caravan park or boarding house. The desire to 'stay put' depends more upon attachment to location rather than emotional attachment to the family home (Olsberg and Winters 2005).

Along with the economic implications of ageing and the spatial distribution of an ageing population, there are challenges around ageing in place. Older people generally have a strong desire to continue to live independently in the community – to retain their personal autonomy, flexibility and lifestyle choices for as long as possible (Olsberg and Winters 2005).

It is recognised that there is a need for governments at all levels to consider their approach to land use planning if ageing in place is to be a major strategy for managing the mobility and safety needs of older people. In particular, there are challenges around developing local services and facilities appropriate to an ageing community and supported by sufficient transport services (OECD 2001).

Population Projections

Population projections need to be used with caution considering they are only an estimate of future population, its characteristics and its distribution. Projections are only possible by making a number of assumptions about future fertility rates, life expectancy, net overseas migration, interstate migration and intrastate migration. Assumptions are informed by past trends and analysis of current population. While projections, particularly those made over the long term, may ultimately prove to be inaccurate, they provide the best picture of the future given the constrained information available in the present. Table 2.1 shows ABS projections of Australia's population in 2031 and 2061.

The population projections presented are not predictions or forecasts. They are an assessment of what would happen to Australia's population if the assumed levels of the components of population change – births, deaths and migration – were to occur over approximately the next 50 years.

Table 2.1 *Population growth projections, 2031 and 2061*

ABS population projections – Australia	2012 base population	2031 population	Growth to 2031		2061 population	Growth to 2061	
			Number	%		Number	%
Series A	22,721,995	31,873,432	9,151,437	40	48,264,035	25,542,040	112
Series B	22,721,995	30,501,192	7,779,197	34	41,513,375	18,791,380	83
Series C	22,721,995	29,279,478	6,557,483	29	36,775,636	14,053,641	62

Source: ABS 2013b.

Based on the ABS medium level projection, Australia's population is anticipated to grow to 30.5 million at June 2031, and approximately 41.5 million by 2061. These projections assume high rates of net overseas migration as well as higher life expectancy.

The *Progress in Australian Regions – Yearbook 2014* (Table C.1.1.2) has used the same ABS data to forecast population projections by region, but has not gone beyond 2026 projections.

Cities population projections

The ABS produces population projections for Australia, each state and territory and each capital city out to 2061 (Table 2.2). In addition, each state and territory produces its own set of projections for their respective jurisdiction, often using slightly different assumptions to those used by the ABS.

Table 2.2 *Population projections by capital cities, 2031 and 2061*

ABS population projections – B series	2012 base population	2031 population	Growth to 2031		2061 population	Growth to 2061	
			Number	%		Number	%
Greater Sydney	4,672,619	6,206,843	1,534,224	33	8,493,740	3,821,121	82
Greater Melbourne	4,248,344	5,984,219	1,735,875	41	8,580,556	4,332,212	102
Greater Brisbane	2,192,065	3,190,129	998,064	46	4,787,996	2,595,931	118
Greater Adelaide	1,278,432	1,566,929	288,497	23	1,920,727	642,295	50
Greater Perth	1,899,999	3,248,550	1,348,551	71	5,451,406	3,551,407	187
Greater Hobart	216,981	247,320	30,339	14	270,655	53,674	25
Greater Darwin	131,938	170,153	38,215	29	225,873	93,935	71
ACT (Canberra)	375,076	520,412	145,336	39	740,903	365,827	98
Total Capital cities	15,015,454	21,134,555	6,119,101	41	30,471,856	15,456,402	103

Source: ABS 2013b.

Based on these projections Australia's capital cities will increase their share of national population from 66.0 per cent in 2012 to 69.3 per cent in 2031 and 73.4 per cent in 2061.

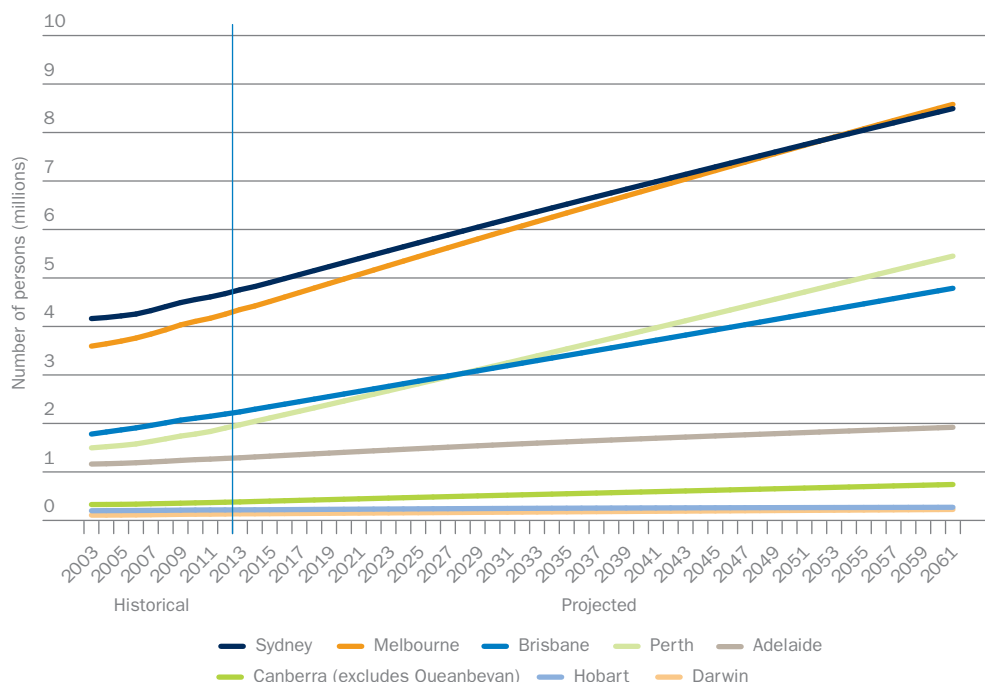
The majority of Australia's future population growth is expected to occur in and around its capital cities.

The projections suggest that over 75 per cent of Australia's future population growth to 2031 will occur in its 8 capital cities, rising to over 80 per cent of growth to 2061.

Based on the ABS medium projection, the population of Australia's capital cities is estimated to grow by approximately 6.1 million between 2012 and 2031 and by 15.5 million between 2012 and 2061. This means the projected growth in the population of capital cities to 2061 is more than the total current population of these capital cities – if realised, Australia's population living in capital cities will more than double by 2061.

Australia's capital cities are not all projected to grow at the same rate, with projections indicating that the current population hierarchy of Australia's major cities will be altered in the coming decades. As shown in Figure 2.11,

by 2061 the population of Perth is anticipated to surpass that of Brisbane, which will make it Australia's third most populous city. The population of Melbourne is also projected to surpass that of Sydney.

Figure 2.11 Actual and projected number of persons by capital cities, 2003–2061

Source: ABS 2013b, 2014d.

Note: The population projections presented are not predictions or forecasts; they are an assessment of what would happen to Australia's population if the assumed levels of the components of population change – births, deaths and migration – were to occur over the next 50 to 100 years. This figures are based on ABS Series B assumptions.

These projections are consistent with actual population growth exhibited over the past decade. Even under low series projections, Australia's population will increase by 6.5 million (more than the current populations of Melbourne and Brisbane combined) by 2031. A large majority of these additional people will be located in Australia's cities.

Population projections are affected by the rise and fall of overseas migration rates. The overwhelming majority of overseas immigrants settle in major cities, with a large proportion locating to the outer suburbs. In Perth the greatest number of overseas-born recent arrivals can be found in the north-west and south-east.

In Queensland, the majority of new arrivals settle on the Gold Coast–Tweed Heads or in Southern Brisbane. In Victoria they settle in the south-east and west of Melbourne (DIRD 2014, table C 1.1.4).

Movement between cities and states also impacts on population growth. New South Wales attracts over 60,000 of Australia's annual overseas migrants, but on average it loses around 20,000 people annually to interstate migration. By contrast, Queensland attracts around 25,000 domestic migrants in addition to approximately 45,000 overseas migrants who move to the state annually.

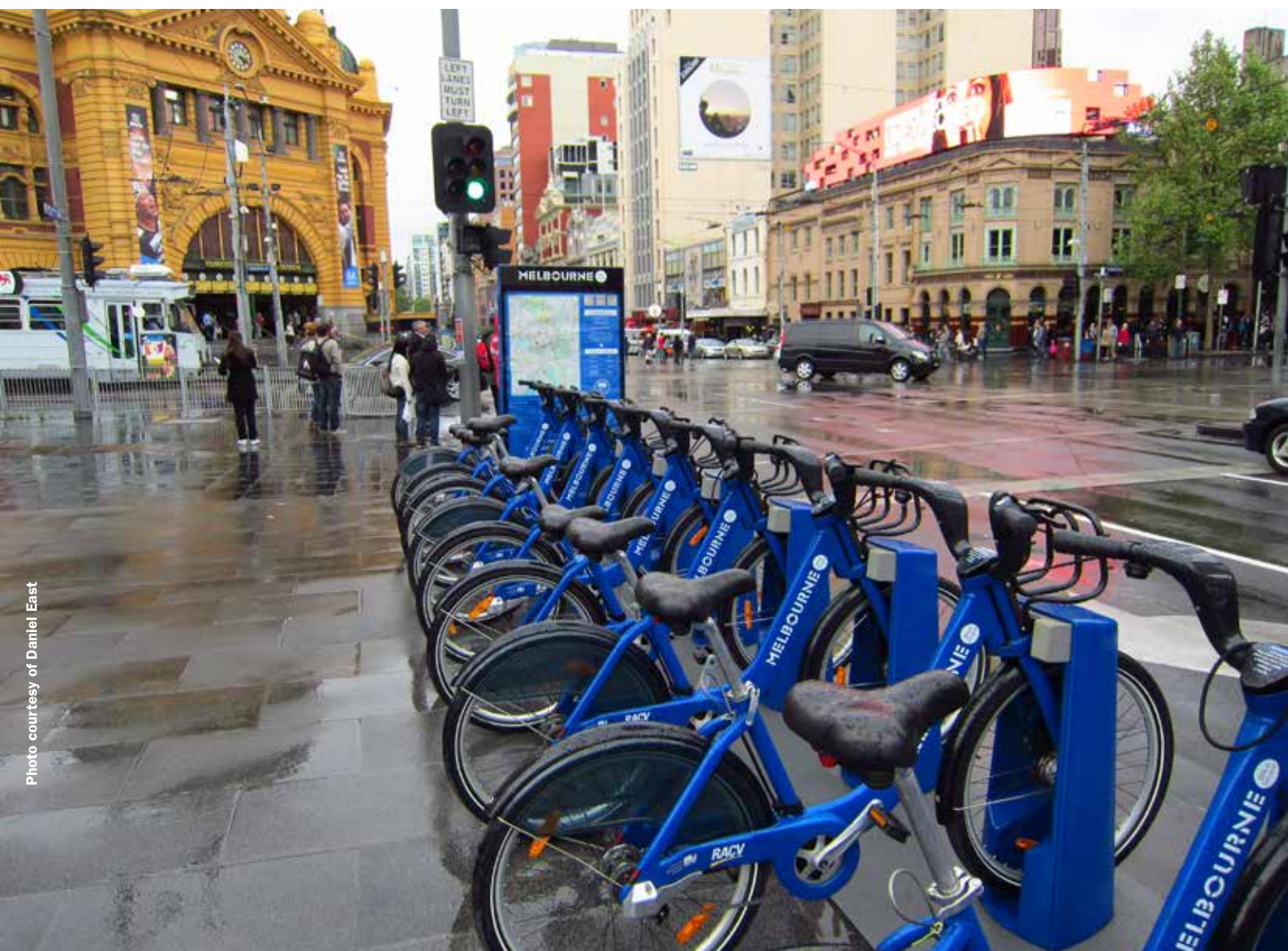
Conclusion

Australia's population continues to grow strongly. The population has risen by an estimated 400,000 people since 2013, increasing the total population of the country to over 23.5 million.

Australians are predominately urban-dwelling people. As cities continue to grow and age, there will be significant challenges, including in infrastructure and transport planning, for all levels of government. The 7 fastest-growing Australian major cities – Perth, Brisbane and Darwin, Cairns, Gold Coast–Tweed Heads, Townsville and Sunshine Coast – increased in total population by over 1.2 million between 2003 and 2013. That growth in population, as detailed in the Settlement chapter largely in detached housing at the edges of these cities, inevitably causes increased transport demand and issues around access to employment and services.

In addition, Australia's population is ageing. Over the past half century there has been a steady increase in the number and proportion of older people in Australia. This will lead to future challenges, including increased costs to governments for health and aged care. Future projected population increases, including new migrants, and changing demographics of an aging population will also offer challenges. Governments will need to find ways to manage the additional burden on transport systems and the costs associated with new infrastructure.

Australia's current population and the projected growth of our major cities have implications for the country's economy and the productivity of our cities. In addition, the spatial aspects of population change and growth cannot be considered purely numerically in a strict supply and demand manner without focusing on settlement patterns. These matters are discussed in the following chapter.



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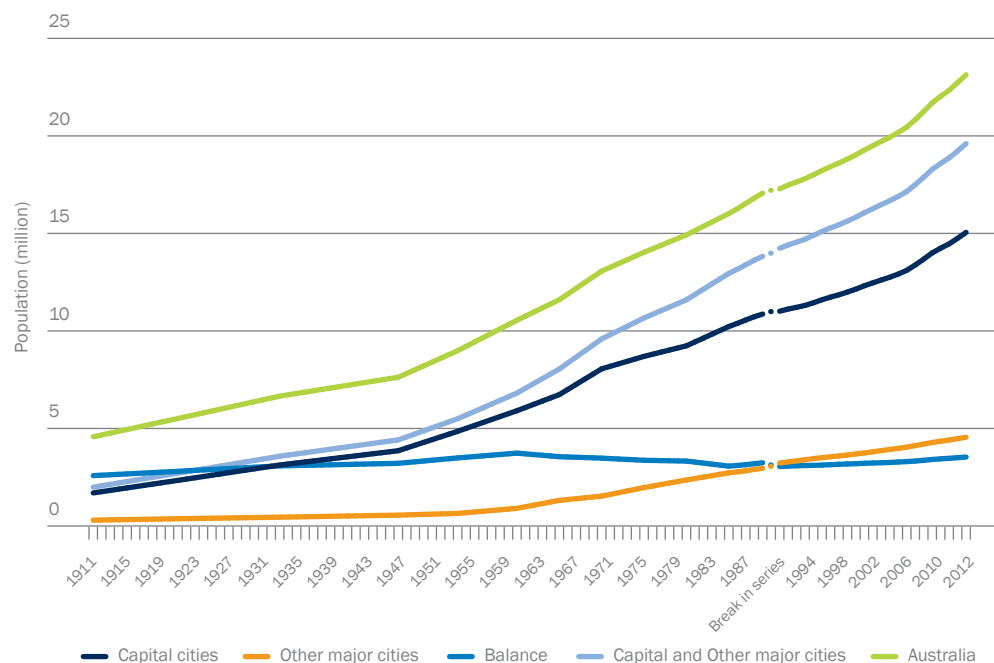
Chapter 3 Settlement



Australia's early settlement legacy

The growth in Australia's cities, discussed in the **Population** chapter and shown by Figure 3.1 – not only over the last decade but also over the last century – has also seen a marked decline in the proportion of the population living in regional towns and rural areas (BITRE 2014). While population growth is a factor, Australia's settlement history illustrates the strong role that changing economic conditions have had on the distribution of population across the country.

Figure 3.1 Population urbanisation trends 1911–2013



Source: ABS 2008, 2014.

Note: Capital cities based on Greater Capital City Statistical Areas (GCCSAs) for 1971 onwards. Populations for previous years are based on earlier boundaries and may be inconsistent with GCCSAs. Major centres based on Significant Urban Areas (SUAs) for 1991 onwards. Populations for previous years are based on earlier boundaries and are generally inconsistent with SUAs.

Since early European settlement the importance of building cities and towns stood out as a distinctive feature of Australia's settler colonies (Mcintyre 1999). In a dramatic decline between 1850 and 1870, 30 per cent of rural settlers and miners moved into the rapidly-growing towns and cities (Blainey 1994). By the 1880s, half of the Australian population lived in towns. This figure rivalled Britain's urbanisation rate and surpassed those of the United States and Canada.

Ballarat, mid-1880s



Source: ©The Sovereign Hill Museums Association. Reproduced with permission.

The decline in rural population that continued throughout the Twentieth Century resulted in the concentration of population in so-called “sponge” regional cities that we see today (Salt 2001). This growth pattern partly explains the increased population of regional cities such as Ballarat and Bendigo, as well as several locations along the Queensland coast, with each drawing population from their surrounding rural and small town hinterland (BITRE 2014a).

Early Infrastructure

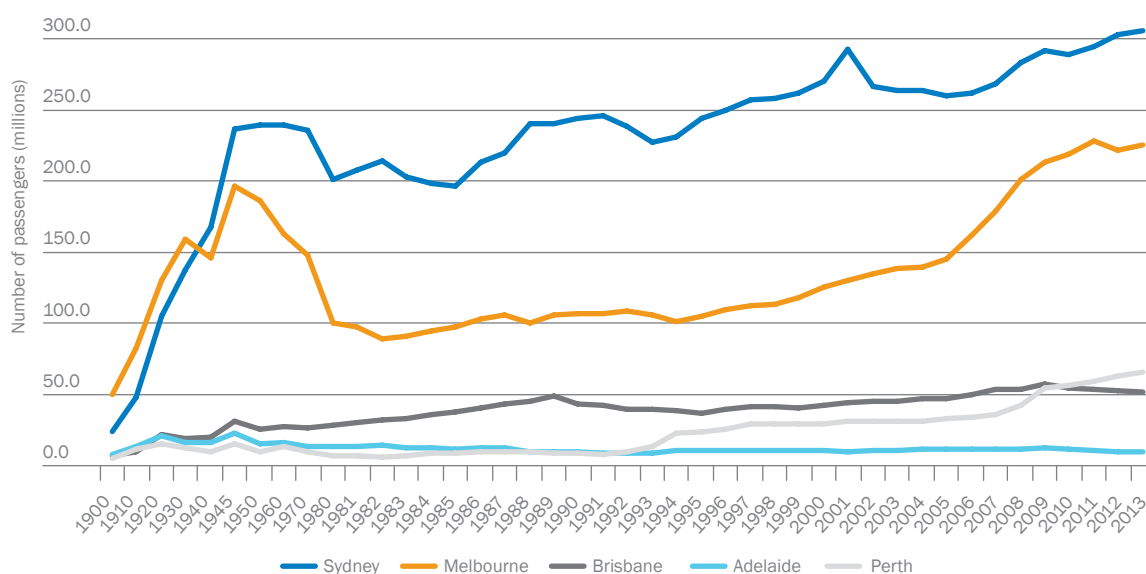
For the most part, Australia's cities have a long settlement history. Their initial locations were chosen based on a range of geographical, political, historical and cultural factors. With the exception of Canberra, all of Australia's capital cities are located on the coast and have significant port infrastructures. Many sites were initially chosen to provide easy access to natural resources, both as a means of supporting the local population and for export.

Once early city infrastructure was established – most notably the port infrastructure – other activities clustered around it. Through further investments made in infrastructure – waste treatment plants and sports stadiums, airports and electricity grids, the advantage of high levels of urbanisation has been reinforced over time.

Over the years that followed the establishment of Australia's cities, many billions of dollars of private and public funds were invested in their infrastructure. For example, the rail networks of both Sydney and Melbourne were constructed for the most part in the late 19th century and early 20th century.

In recent decades, patronage on Sydney and Melbourne's rail networks has increased markedly (Figure 3.2). This increase has been driven by a range of factors, including the emergence of the CBD based knowledge economy, improved transit infrastructures, rising fuel prices and road congestion factors. In Melbourne in particular, rail patronage has increased by almost 63 per cent (an increase of 83 million trips per year) in a decade despite the general trend toward dependency on cars in our cities (SOAC 2012). This increased use of rail networks in Melbourne is in excess of what could be expected given Melbourne's 18 per cent population growth over the same period.

In tandem with the increase in rail patronage, there have been changes in the built form around the rail network, with intensification and expansion of the central business district (CBD) as well as an increase in higher-density housing development along transport corridors and around train stations. The construction of Melbourne's inner city rail loop in the 1980s played a big part in improving CBD jobs access; previously losing out to competitive suburban center job locations.

Figure 3.2 Rail passenger journeys, selected capital cities, 1900–2013

Source: BITRE 2014b.

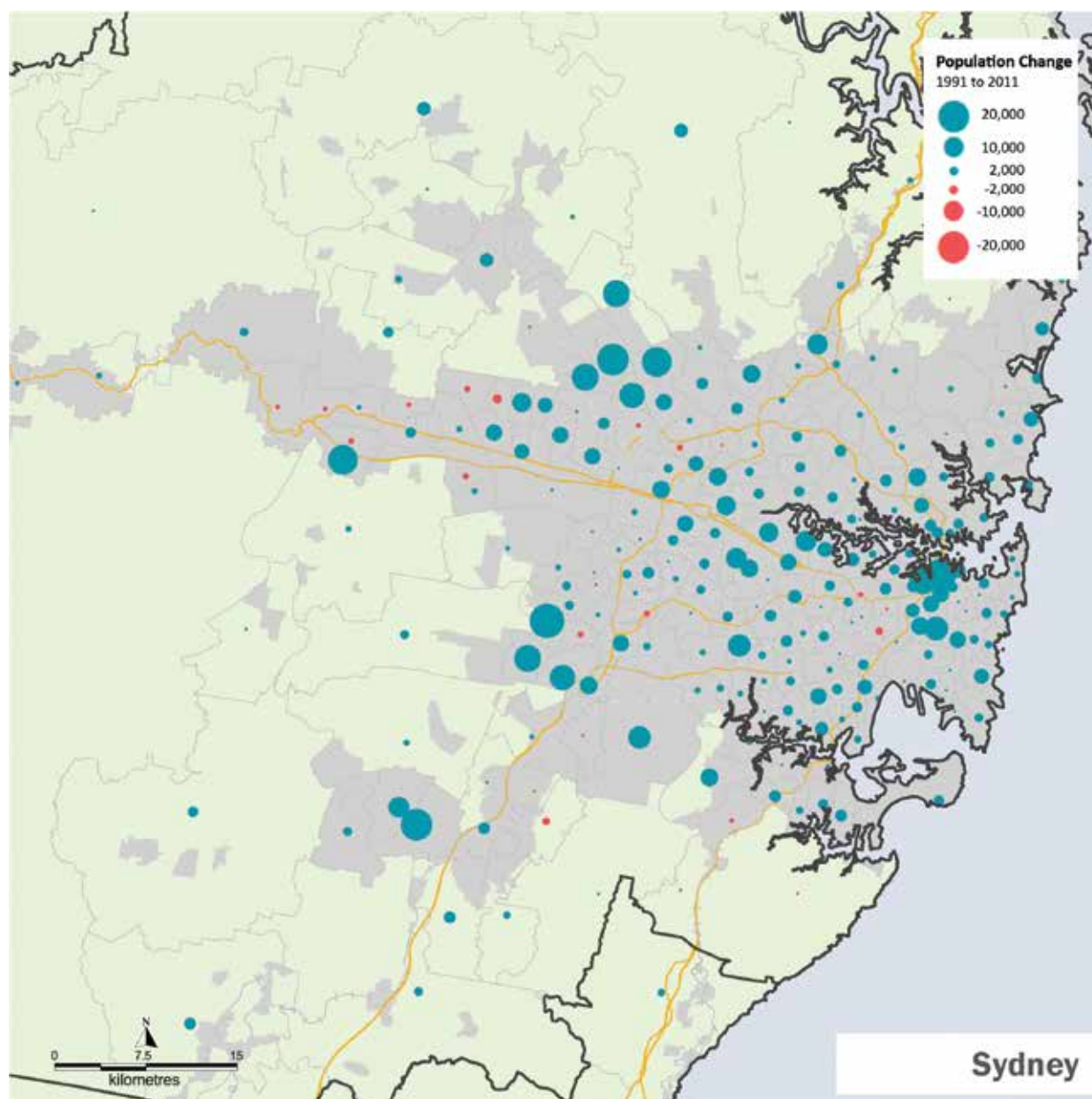
As shown in Figure 3.2, the earlier peak in rail passenger journeys in Melbourne and Sydney occurred in the late 1940s and early 1950s and on a much smaller population base. The rail patronage resurgence exhibited in Sydney and Melbourne, and in Perth since 2009, also demonstrates the stepped change in infrastructure requirements that occurs as cities grow beyond certain population thresholds. Until recent decades, cars have been an appropriate and timely mode of transport for many in the city, increasing the prosperity of the city and allowing for previously unattainable levels of mobility. However, the increased urban population of these cities means that higher-capacity transport modes are now necessary.

Population distribution within Australia's cities

As the **Population** chapter of this report showed, there has been a decline in many rural towns and a movement of population towards the coast. The distribution of population across Australia has also changed over time, driven by changes including technology and economic restructuring. These drivers have also had a profound impact on the distribution of population within Australia's cities, particularly its largest ones.

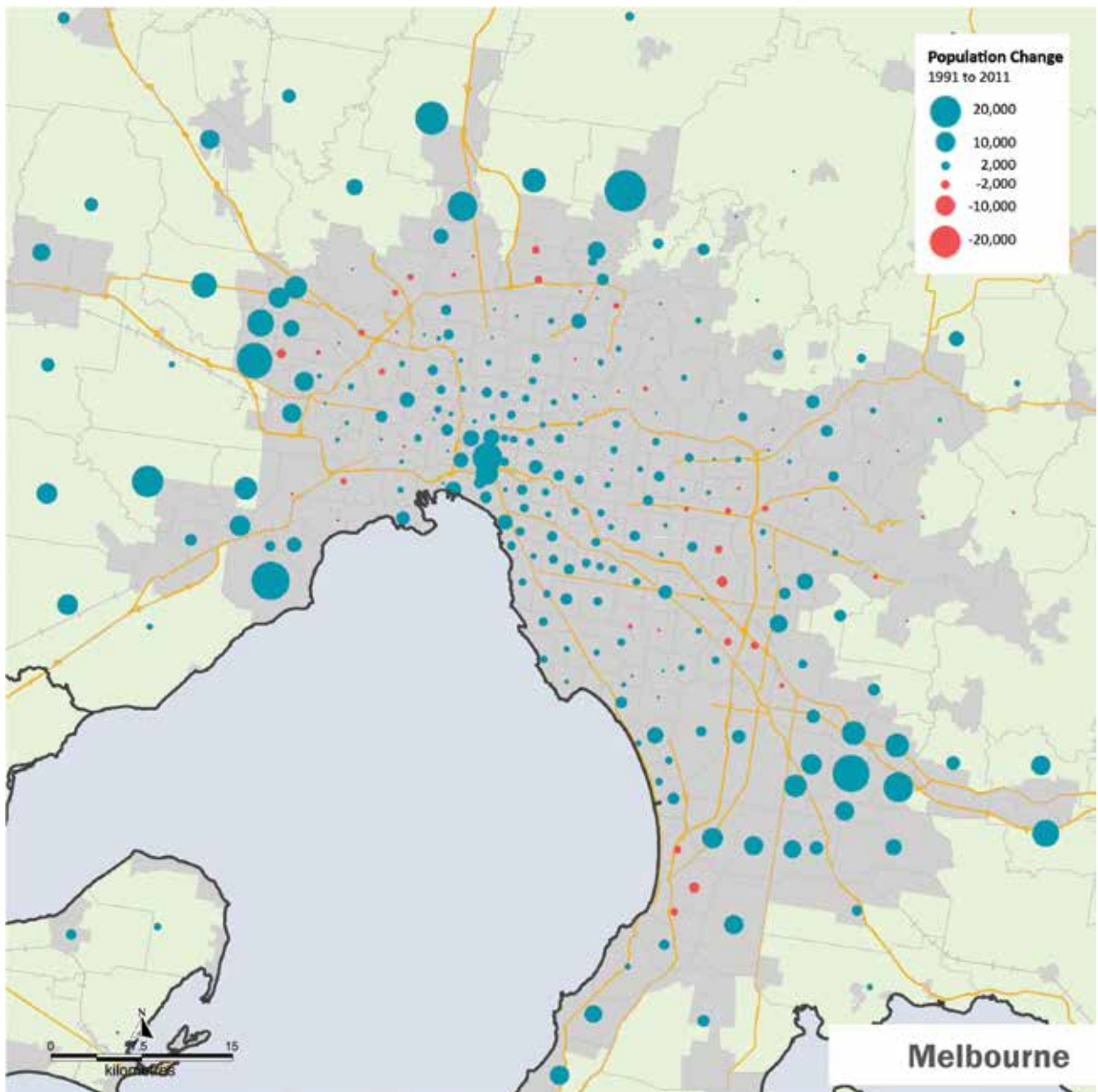
While the spatial distribution of population growth varies from city to city, in general there are 2 distinct trends occurring together across Australian cities: low density growth on the urban fringe and high density growth in and immediately around city centres. These 2 trends are shown in Maps 3.1 to 3.5, which show the historical change in population in ABS geographic classification Statistical Area 2 (SA2) in each of Australia's 5 largest capital cities between 1991 and 2011.

Map 3.1 Population compositional change, Sydney, 1991-2011



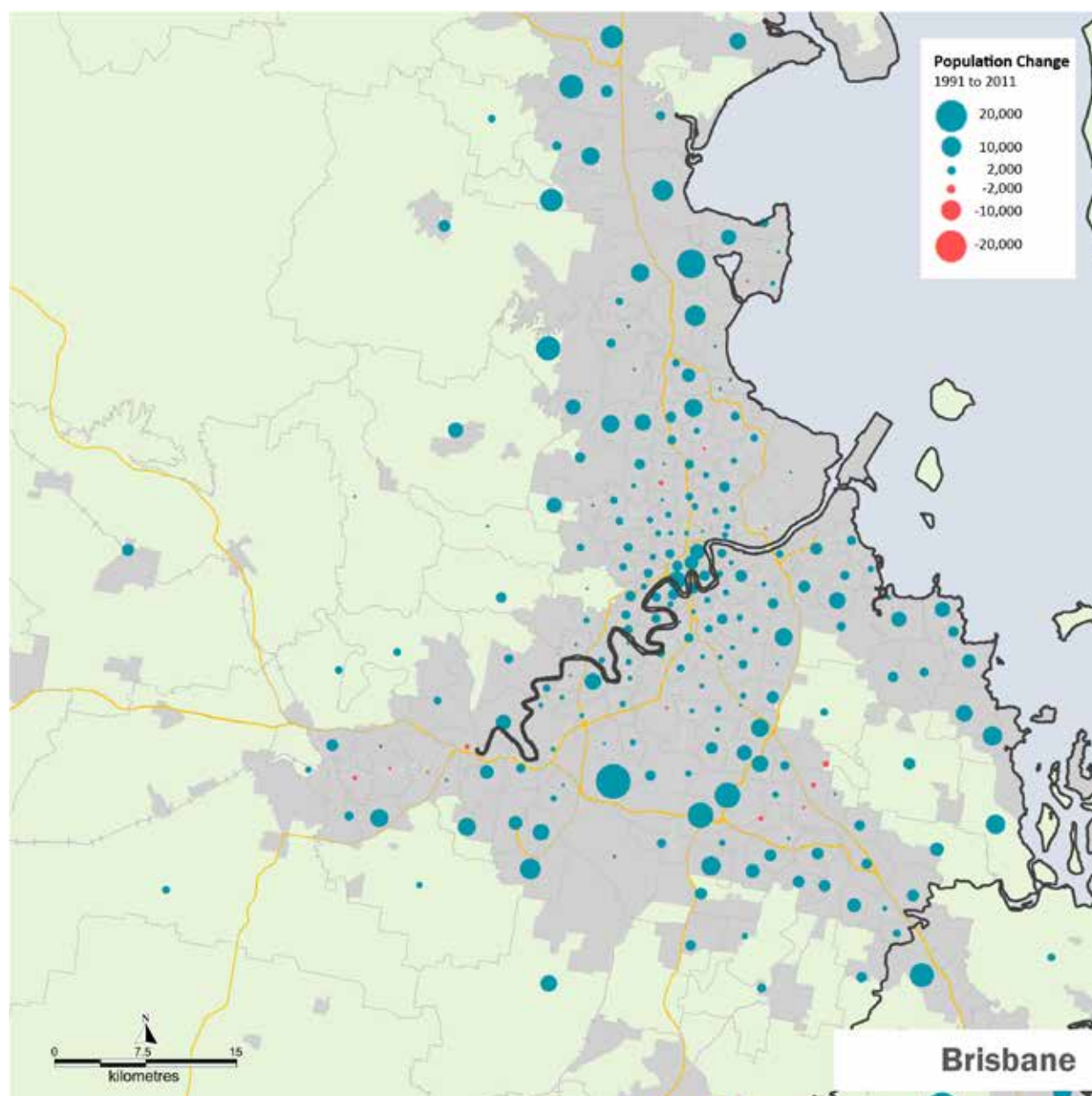
Source: SGS Economics & Planning.

Map 3.2 Population compositional change, Melbourne, 1991–2011



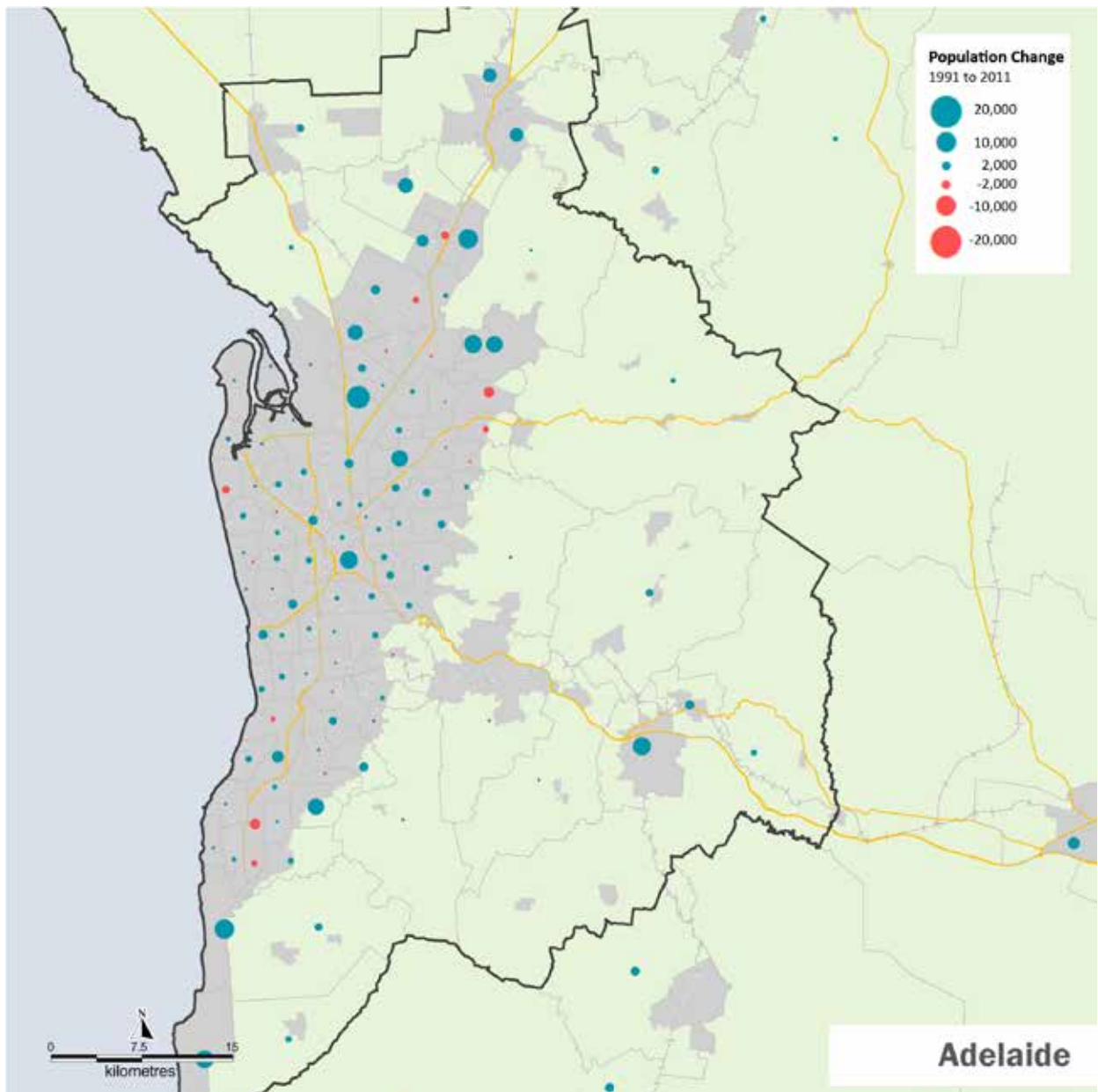
Source: SGS Economics & Planning.

Map 3.3 Population compositional change, Brisbane, 1991–2011



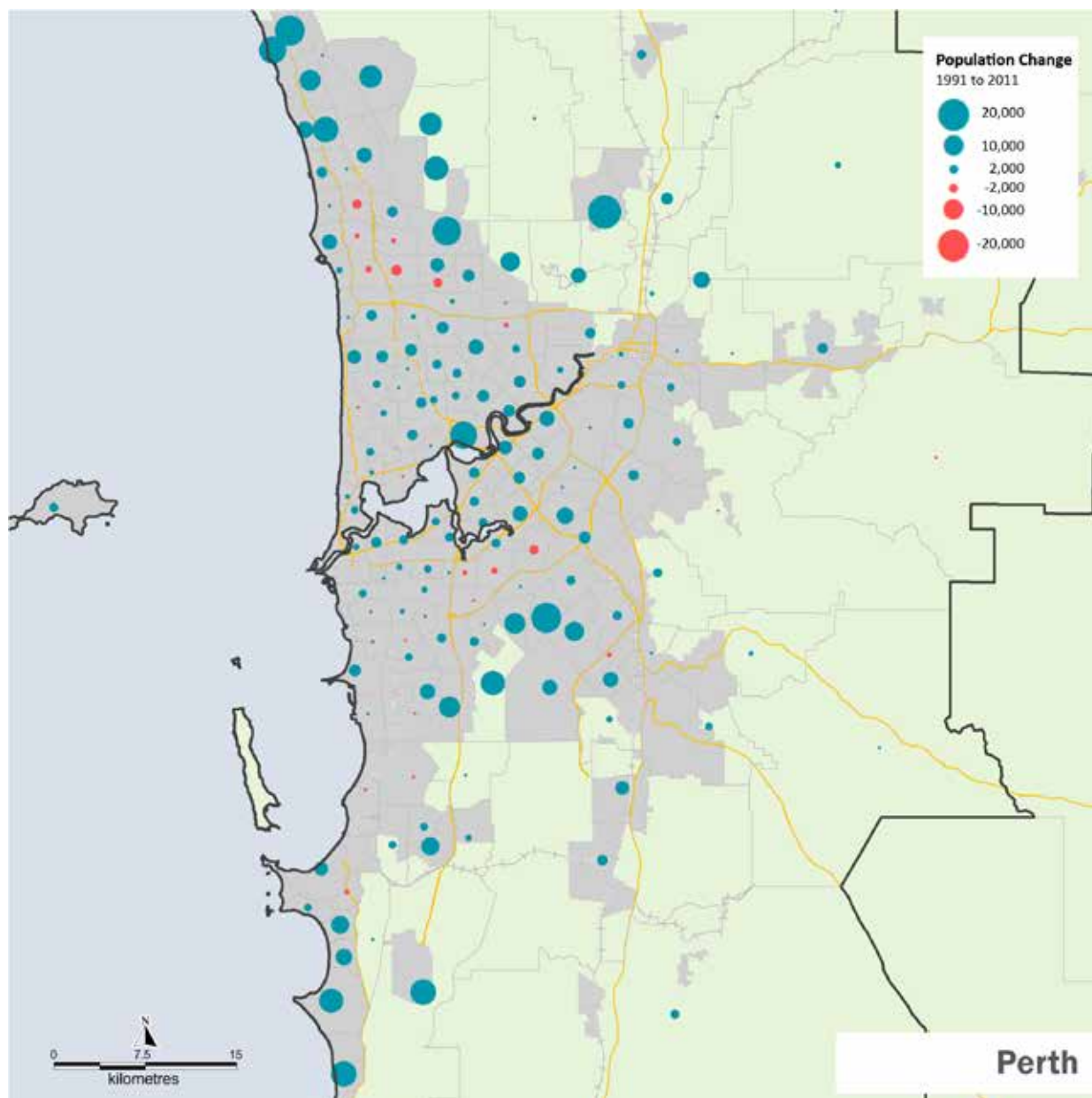
Source: SGS Economics & Planning.

Map 3.4 Population compositional change, Adelaide, 1991–2011



Source: SGS Economics & Planning.

Map 3.5 Population compositional change, Perth, 1991–2011



Source: SGS Economics & Planning.

Between 2012 and 2013, the 2 fastest-growing SA2-level inner city areas in Australia were both in inner Melbourne: the SA2 areas of Melbourne and Southbank added 5,400 and 2,100 additional people respectively over the year.

Other inner city areas to experience substantial growth included Perth City (1,700 additional people) and Waterloo–Beaconsfield in Sydney (1,100 additional people) (ABS 2013).

Melbourne was also home to the largest population growth in fringe suburbs over the period 2012–13, with the northern fringe suburb of South Morang adding 5,700 people. Strong fringe growth was also exhibited in Melbourne’s Craigieburn–Mickleham and Point Cook SA2 areas, with each adding 3,200 people.

In Sydney, Parklea–Kellyville Ridge SA2 area in the north-west growth corridor grew by 3,400 people, while Baldivis on the southern outskirts of Perth and Ellenbrook, to the city’s north-east, recorded growth of 3,200 and 2,500

people respectively. The outer suburban area of North Lakes–Mango Hill to Brisbane’s north was one of the fastest-growth areas in the state, adding over 1,900 people over the year (ABS 2013).

Regional cities also experienced significant growth, particularly in Queensland and Victoria. In Queensland, the Gold Coast and Sunshine Coast SA4 areas added 11,200 and 6,100 people respectively, while in Victoria, the Geelong SA4 area recorded growth of 4,800 people, (ABS 2013).

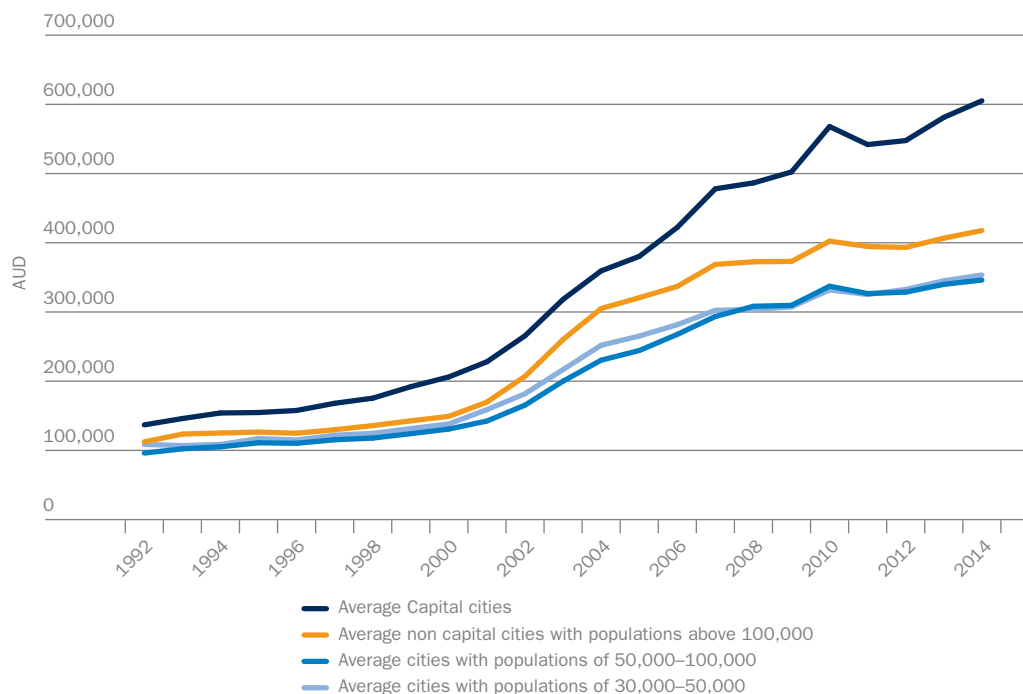
While traditional low density suburban-style growth is still occurring on the fringes of Australia’s cities, there is a growing settlement pattern of high-density housing located in the inner city and along major transport corridors, particularly public transport routes.

Maps offering a magnified view and a variety of information overlays can be found on the Department of Infrastructure and Regional Development website under State of Australian Cities at <http://www.infrastructure.gov.au/infrastructure/pab/>.

Accompanying this growth pattern are changes in the density of development and the mix of housing types, both of which are reflective of changes in urban land values. In Australia’s 2 largest cities of Sydney and Melbourne, residential property prices have shown a substantial and mostly sustained rise in value since the mid-1990s, except for a short plateau period around the time of the Global Financial Crisis (GFC). This is also the case in the inner, middle and outer regions of these 2 cities. However, the Progress in Australian Regions – Yearbook 2014 shows that in other capital cities the growth of residential property prices can be less evenly distributed.

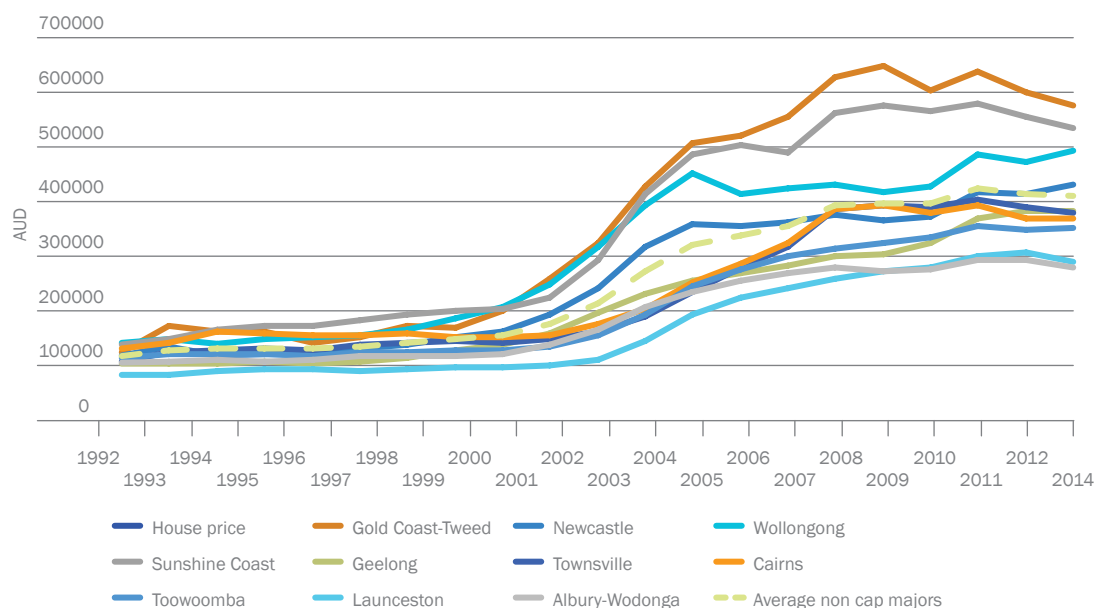
For instance, while Brisbane residential property prices rose on average, prices in Logan and Ipswich fell. Other cities also differed from the nationwide trend of increasing residential property prices, with the average residential property price in the Gold Coast – Tweed Heads, Sunshine Coast and Townsville falling in the period 2009 to 2013 (DIRD 2014).

Figure 3.3a Australian city groupings house prices (nominal prices), 1992–2014



Source: Derived from ABS Data by RP Data Pty Ltd, 2014.

Figure 3.3b shows that non capital major cities initially show a similar tracking to other cities as a narrow price band up until 2000-01, then followed by a wide range of price trajectories. Overall prices have not recovered strongly following the Global Financial Crisis for some of these cities.

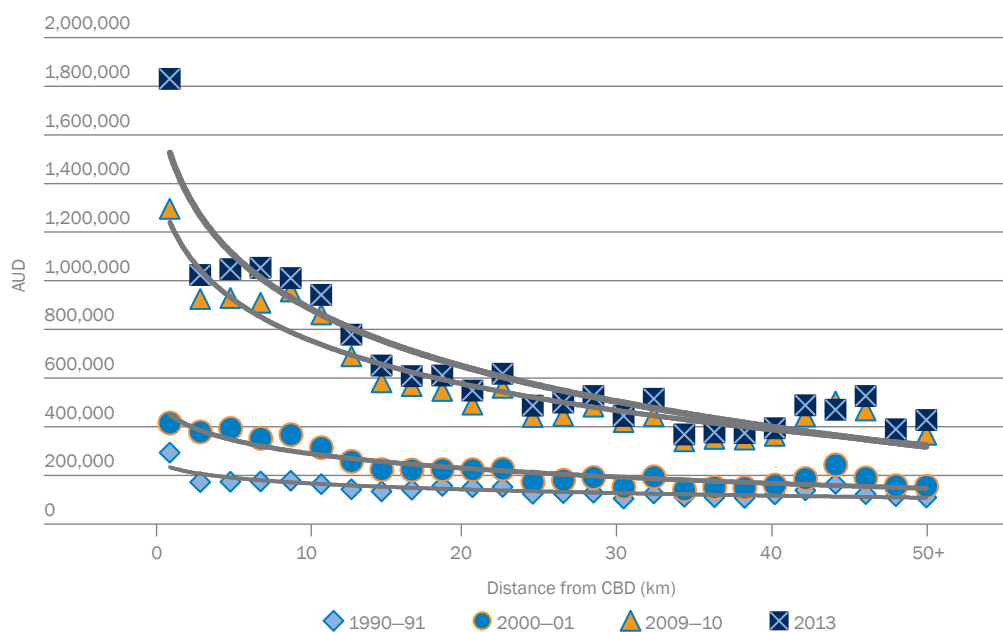
Figure 3.3b Australian non capital major cities house prices (nominal prices), 1992–2014

Source: Derived from ABS Data by RP Data Pty Ltd, 2014.

However, while house prices have increased substantially on average, increases are not uniform across cities.

Large price premiums are increasingly being paid for homes that are within close proximity to the CBDs of Australia's cities.

Analysis undertaken on behalf of the Valuer-General of Victoria illustrates that, at least in the case of Melbourne, the price premium being paid for proximity to the central city has in fact recommenced its earlier rapid rise in the few years since 2009–10 (Figure 3.4).

Figure 3.4 Nominal house prices in Melbourne by distance to central business district, 1990–91 to 2013

Source: SGS Economics & Planning.

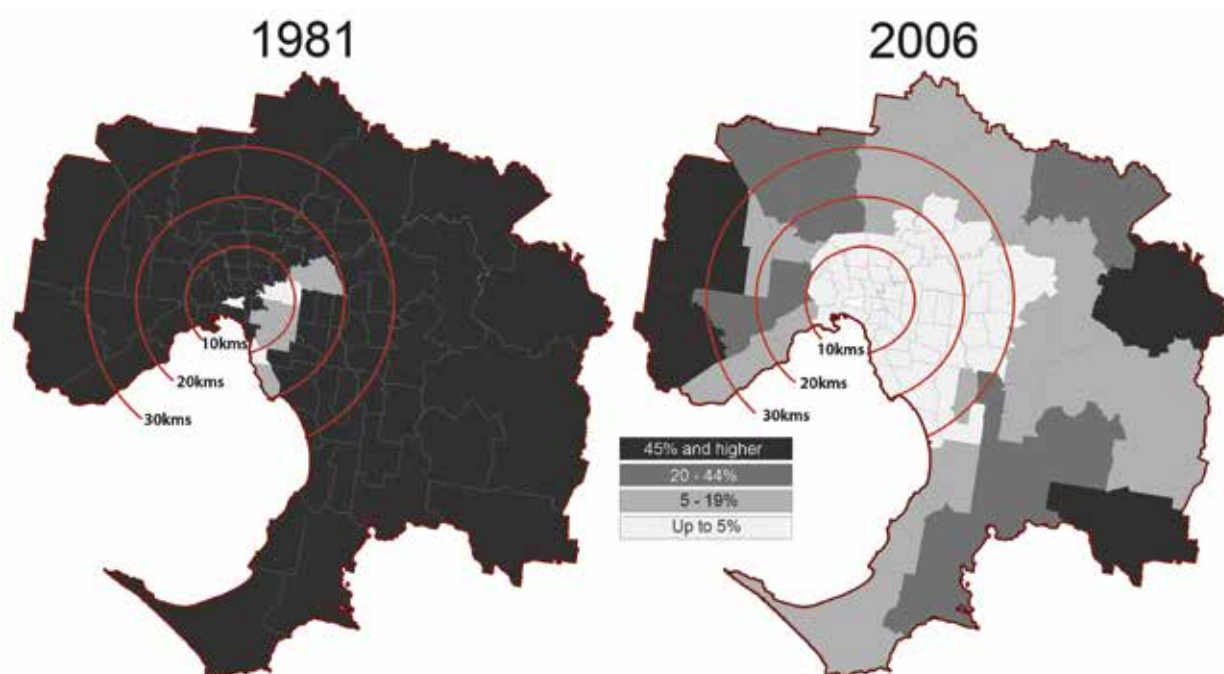
The **Economy** chapter of this report will explore one of the factors driving the price premiums associated with proximity to the CBD, the changing economic structure of Australia's cities in recent decades. The prevalence of higher-paying jobs in the CBD drives up prices for houses with good access to these economic opportunities.

In terms of the built form of cities, this price premium is having ramifications for the type of urban development that is occurring. Marked increases in density are occurring where price premiums are highest. This price premium is also facilitating substantial changes in the type of dwellings that are being provided.

Jobs and housing

Australia's cities are now increasingly characterised by the significant spatial divide between areas of highly productive jobs and the areas of population based services, reflected through the price premiums associated with houses that have better access to the city centre.

Map 3.6 *Proportion of houses sold which were affordable by low to moderate income purchasers in Melbourne, 1981–2006*



Source: Hulse et al. 2010.

While there is evidence that Australia's major cities are increasing in density because of the construction of higher-density apartment developments in inner city locations, there remains strong growth in the detached housing market in urban fringe locations. However, urban fringe areas are becoming more distant from many of the established employment, education and health opportunities.

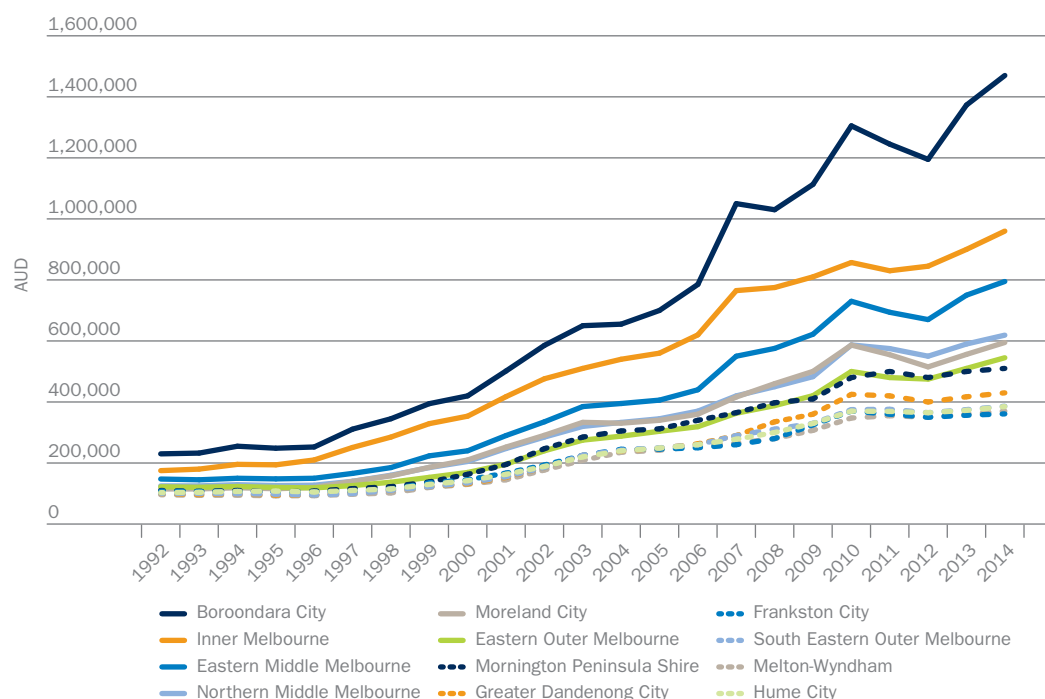
There are concerns held by researchers, state governments and local councils that while land release on the urban fringe may have once been a valid strategy for boosting the supply of affordable housing, this approach may be increasingly problematic.

Recent research undertaken by the Australian Housing and Urban Research Institute (AHURI) concluded for those cities under study, Sydney, Brisbane and Melbourne, that clusters of social disadvantage were increasingly being pushed further towards city peripheries over the period 2001–11. The report notes that the outward movement of social disadvantage is being driven by housing affordability factors and it poses new challenges, because these areas are already poorly resourced in terms of accessible jobs, transport, facilities and services (Hulse et al 2014).

The concentration of high land values in the inner city parallels the concentration of high wage employment in the CBD and central city, as previously discussed. Employment is further explored in the **Economy** chapter.

However, Figure 3.5 shows the way in which, in Melbourne, inner urban regions and municipalities such as the Boorondara, inner, northern and eastern statistical districts and the inner Melbourne and Moreland statistical districts are pulling away from price growth rates of the middle and outer ring regions. The differences mean residents of outer urban regions are likely to be increasingly constrained in their ability to move to inner regions.

Figure 3.5 Divergence in house price growth across Melbourne (nominal prices), 1992–2014



Source: Derived from ABS Data by RP Data Pty Ltd, 2014.

Australia's changing housing stock

Accompanying the change in urban densities in Australia's largest cities is the increase in the number of semi-detached and apartment dwellings being constructed.

The number of detached houses has declined as a proportion of all dwellings, while the number of medium- and higher-density dwellings has increased. In the past this shift was relatively small; however, recent building activity data indicates a notable change in the balance (SGS Economics & Planning 2013b). This is variously attributed to capital city strategic plans that emphasise infill housing; rising transport congestion; and the improved relative attractiveness of smaller, more expensive dwellings in high-amenity and jobs-rich locations (SGS Economics & Planning 2013b).

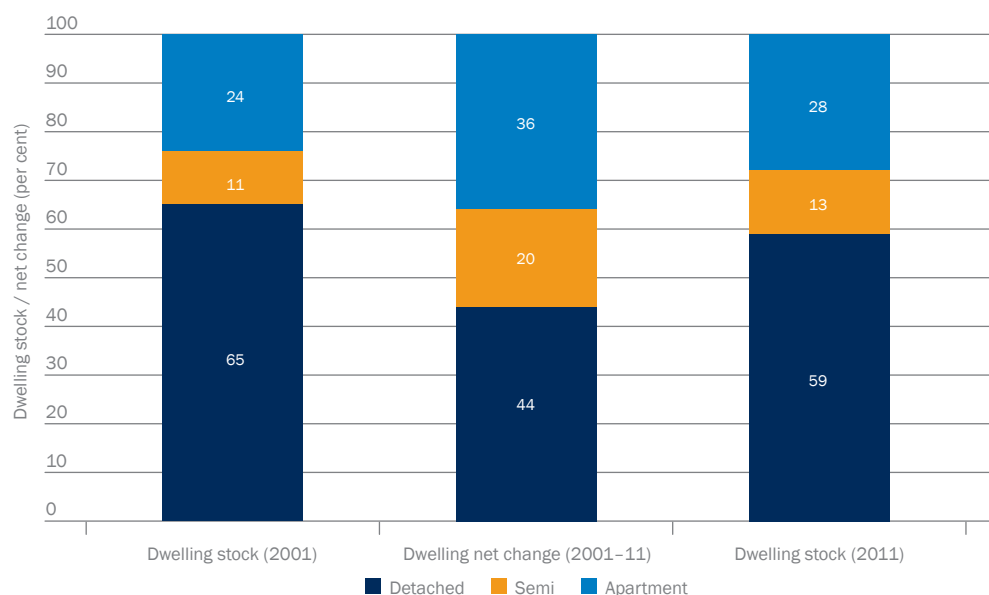
As shown in Figures 3.6 and 3.7 for Sydney and Melbourne – Melbourne in particular – detached housing makes up the majority of all housing types. However, in the period 2001 to 2011, this dominance started to decline.

In Sydney, semi-detached and apartment dwellings make up 56 per cent of all new dwellings built over the last decade, whereas they made up only 35 per cent of Sydney's total housing stock at the start of the decade, in 2001.

Similarly, in Melbourne, semi-detached and apartment dwellings made up 41 per cent of all new dwellings constructed between 2001 and 2011 as shown for Figure 3.7. In 2001 higher density-housing made up only 24 per cent of the housing stock of the city and in 2011 it accounted for 29 per cent.

The result of these housing development trends is that apartments and semi-detached houses are becoming increasingly common in Australia's 2 biggest cities. However, with over a century of housing development mainly focused on the construction of detached housing, changing the share of housing types across the whole city will take decades.

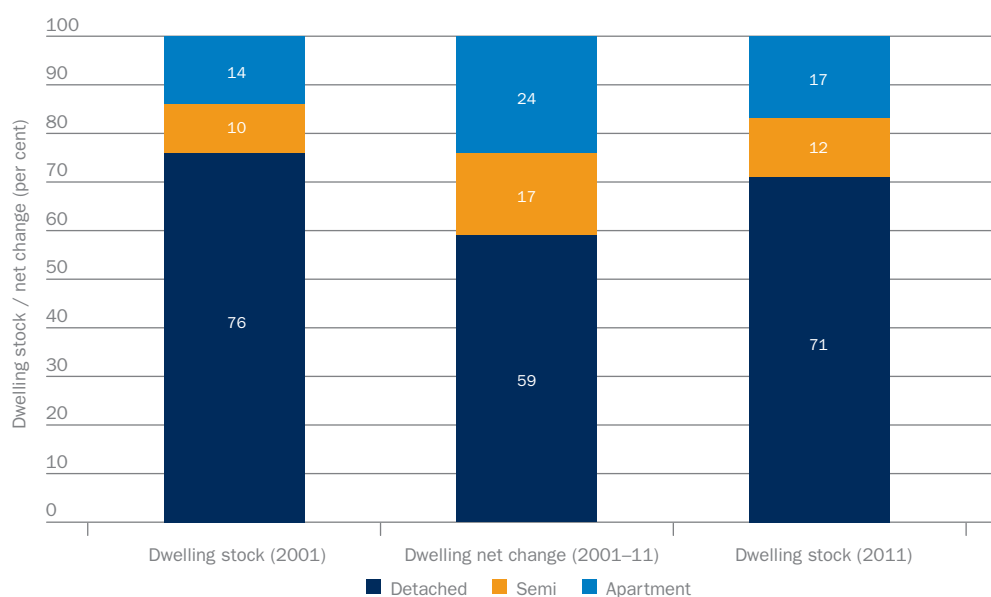
Figure 3.6 Proportions of dwelling stock and net change by type, Sydney, 2001–2011



Source: ABS Census data adapted by SGS Economics & Planning 2013b.

While the proportion of apartments and semi-detached houses is increasing as a share of total dwellings, these developments differ substantially from detached dwellings in terms of the number of bedrooms. Of all flats, units and apartments across Australia, the vast majority (82 per cent) have 1 or 2 bedrooms. Conversely, of all detached houses across Australia, 89 per cent have 3 or 4 bedrooms (SGS Economics & Planning 2013b).

Figure 3.7 Proportions of dwelling stock and net change by type, Melbourne, 2001–2011

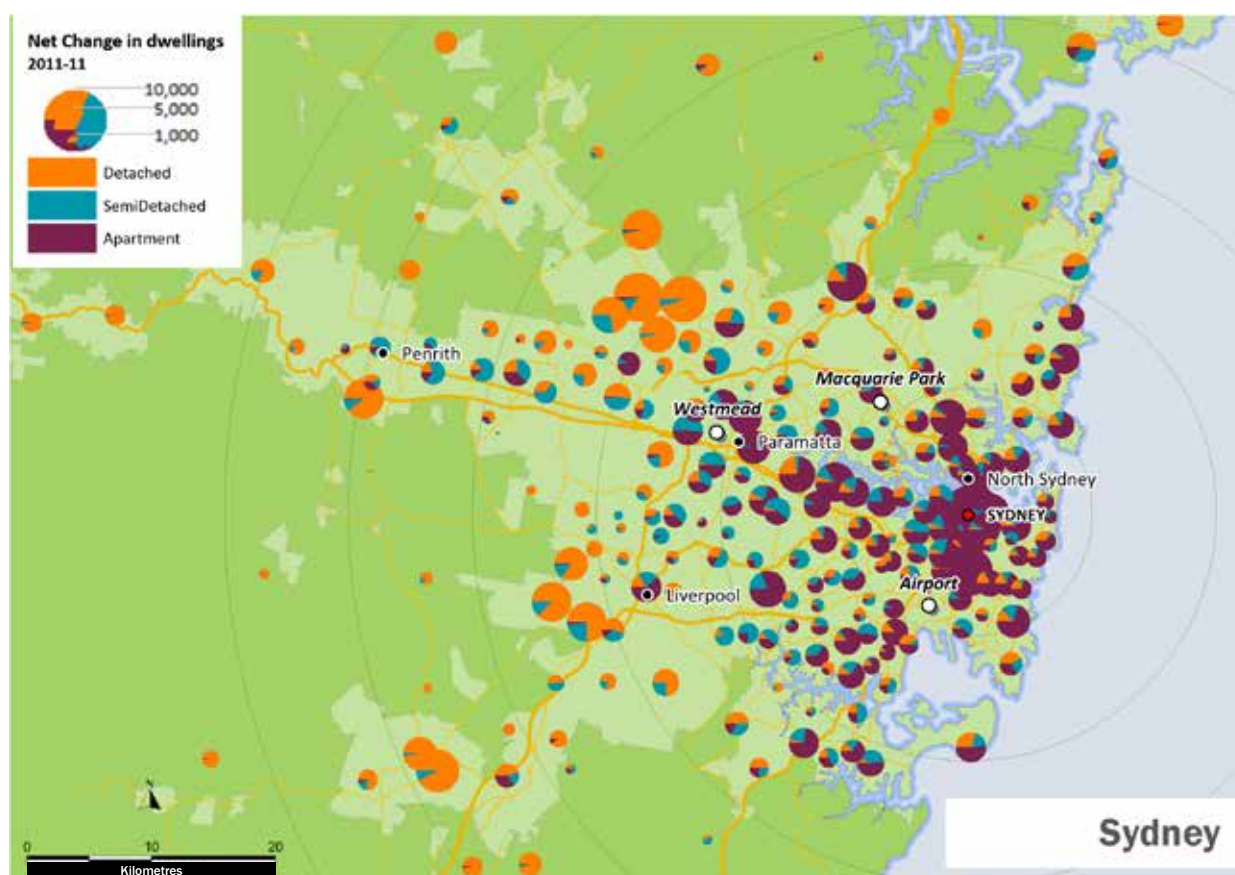


Source: ABS Census data adapted by SGS Economics & Planning 2013b.

Of the detached houses being built, the proportion of large houses with 4 or more bedrooms is increasing as a share of total detached housing. The proportion of houses of this size has increased from 32 per cent of all detached housing in 2001 to 39 per cent in 2011 (SGS Economics & Planning 2013b). As the National Housing Supply Council (2013) notes, growth in the number of larger homes may reflect changes in the purchase price of land, with high land prices in and around capital cities impacting on who can afford to build and the nature of the dwellings they demand.

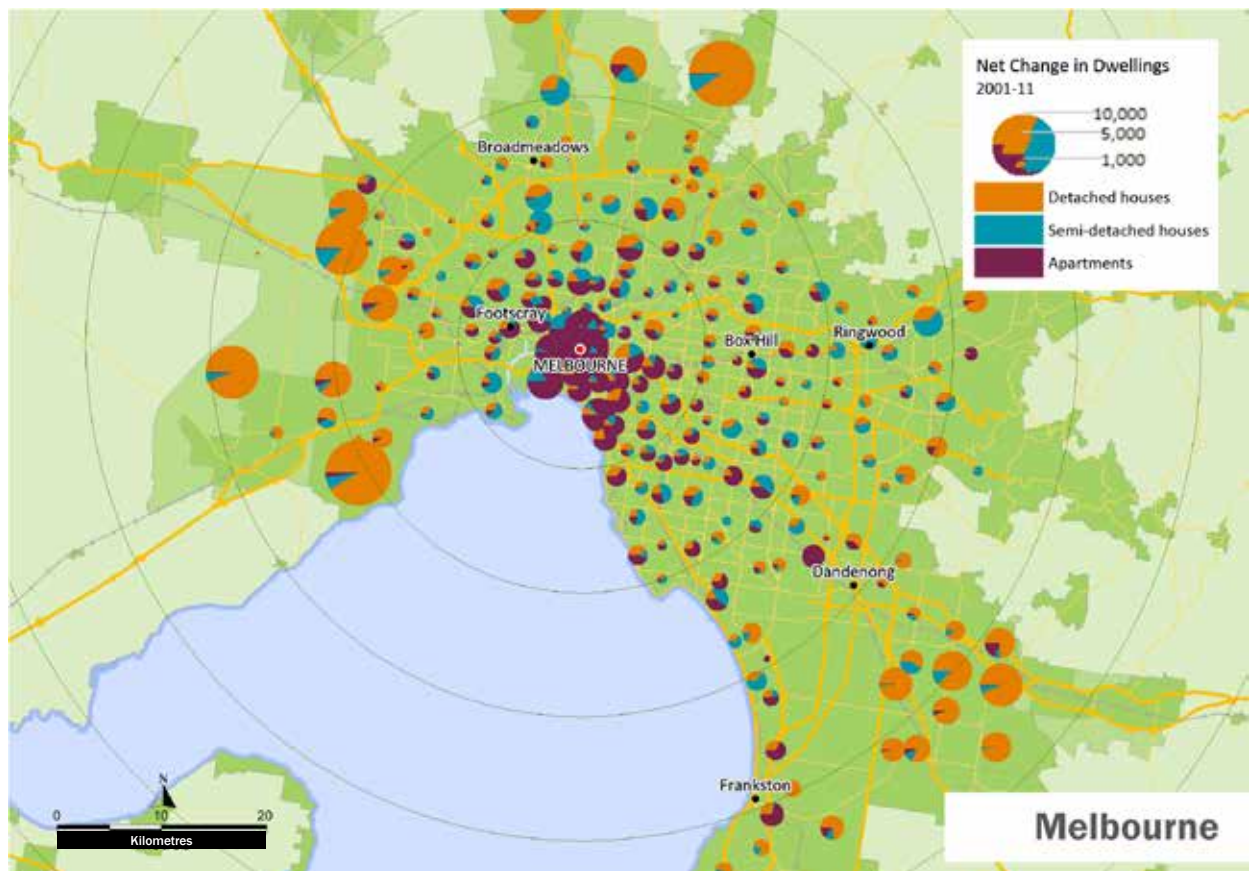
Despite the historical approach to development, in certain locations, notably those close to the city centre and major transport routes, the mix of housing stock and the density of suburbs is in many cases changing rapidly. Maps 3.7 and 3.8 illustrate spatially these changes in housing stock across Sydney and Melbourne. They show a clear pattern of detached housing construction in outer growth corridors and significant apartment development in the inner city, as well as along transport corridors.

Map 3.7 *Distribution of dwelling net change, Sydney, 2001–2011*



Source: ABS Census data adapted by SGS Economics & Planning 2013b.

Map 3.8 *Distribution of dwelling net change, Melbourne, 2001–2011*



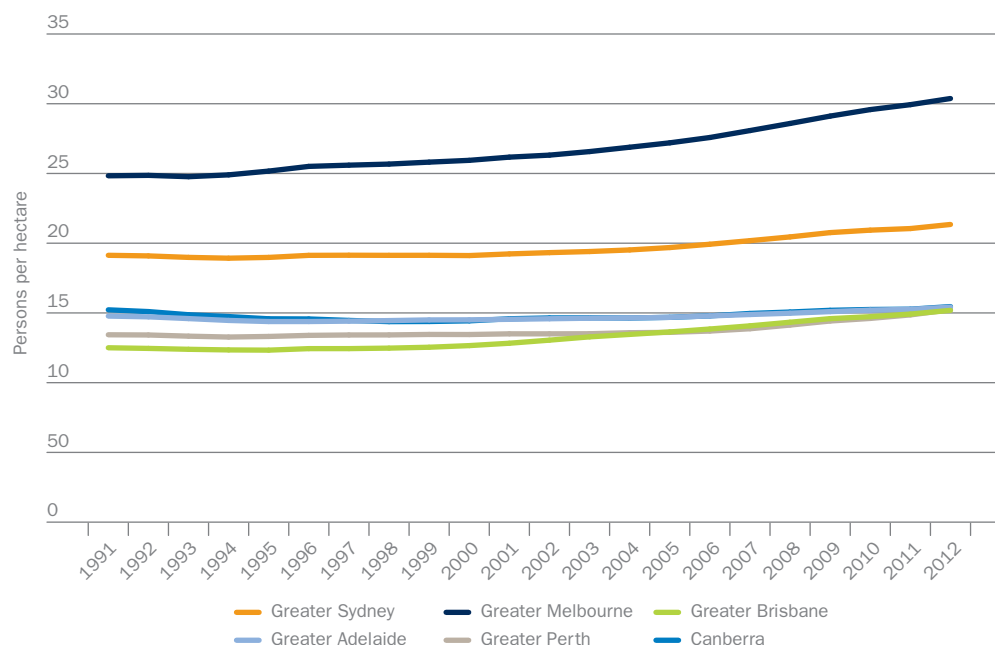
Source: ABS Census data adapted by SGS Economics & Planning 2013b.

Changing densities within Australia's cities

Because a significant number of apartments are being constructed near city centres, Australia's largest cities have become more population dense in recent times, although they can be seen as sprawling when compared with more compact 'high rise' cities like New York or Hong Kong.

Figure 3.8 illustrates the changing population-weighted density of Australian cities. It shows a noticeable increase in densities across Australia's 6 largest cities, initially from the mid-1990s but escalating in the early 2000s (Loader 2013a). Population-weighted density is calculated by taking a weighted average of the density of all parcels of land that make up a city, with each parcel weighted by its population. This measurement technique lessens the impact of large, low-density land parcels, such as industrial areas and public open space, on measurements of density and therefore it better reflects the density of the urban areas within which people actually live and interact.

Figure 3.8 Changing population-weighted density of Australian cities, 1991–2012

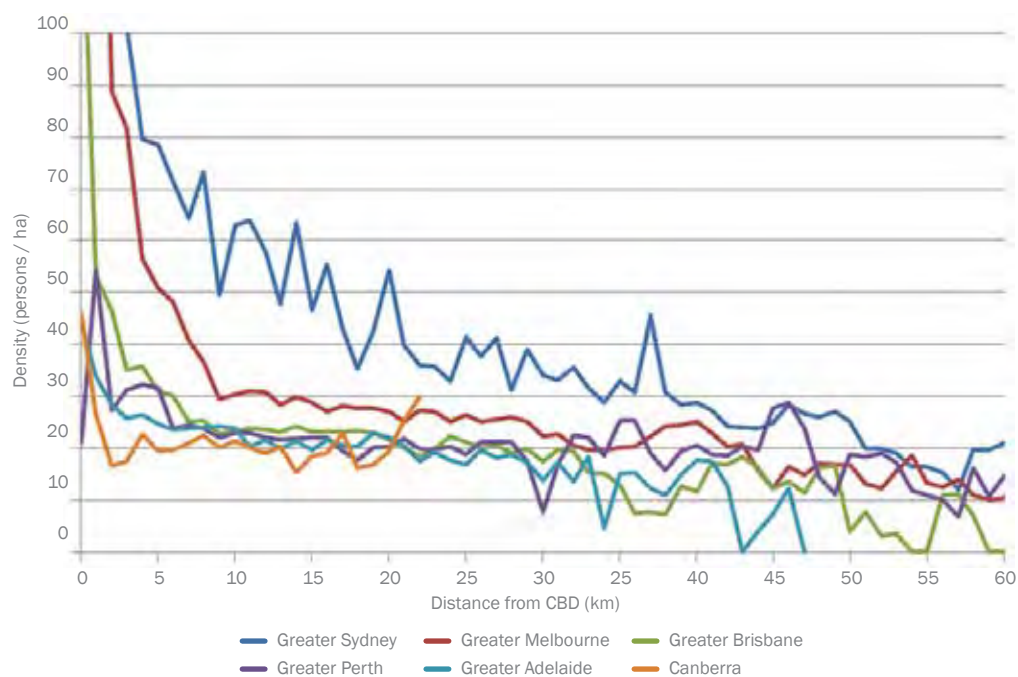


Source: Loader 2013a.

The rise in density of Australian cities can be attributed to increased infill development (as per the above-mentioned increase in apartments and semi-detached dwellings) in established suburbs as well as shrinking lot sizes for detached dwelling developments on the urban fringe (Loader 2013a).

As Figure 3.9 illustrates, density is highly correlated with distance from the CBD, particularly in Australia's largest cities.

Figure 3.9 Population-weighted density by distance to CBD



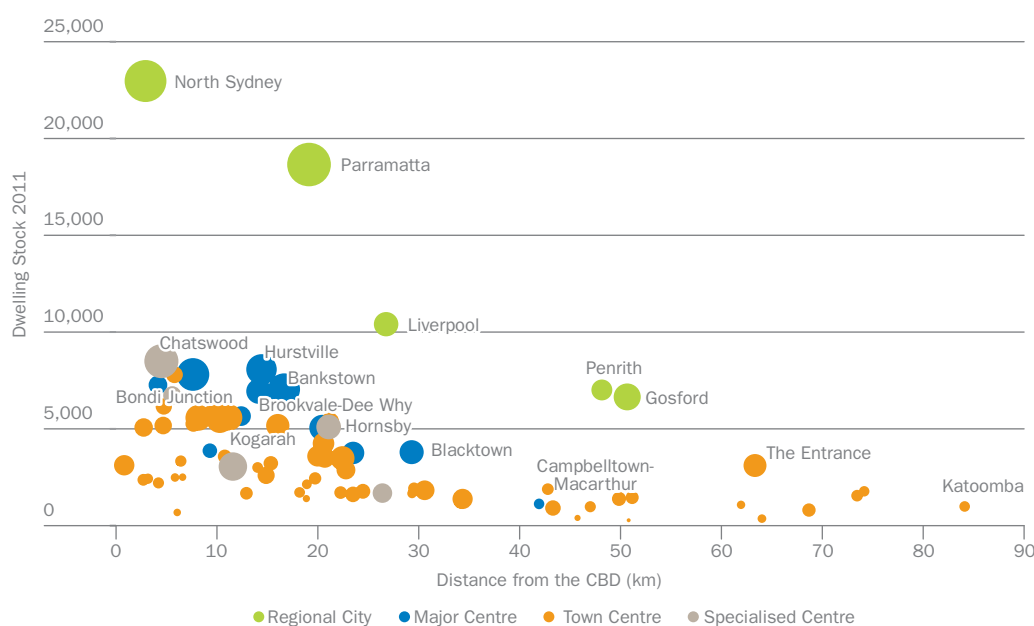
Source: Loader 2013b.

Figure 3.9 also illustrates that while population density in each Australian capital is highest in the CBD, with the exception of Sydney and to a lesser extent Melbourne, density drops off considerably to more traditional suburban densities within 5 to 10 kilometres of the CBD. Sydney exhibits a notably different density pattern:

not only is the city considerably denser in total, but density declines with distance from the CBD in a much more gradual fashion, with several peaks reflecting consolidated multi-nodal centres.

Sydney's more multi-nodal nature is evident in Figure 3.10, which illustrates the number of dwellings located in each of Sydney's defined centres (excluding the CBD), their distance from the CBD, and their change in dwellings over the period 1996–2011. The clear downward sloping left-right trend confirms that there is a relationship between proximity to the CBD and the number of dwellings in each centre (SGS Economics and Planning Pty Ltd 2013a).

Figure 3.10 *Change in number of dwellings in centres, Sydney, 1996–2011*



Source: ABS Census data adapted by SGS Economics & Planning 2013b.

Note: Definitions of 'centres' in figure are defined in the metropolitan strategy plan for Sydney.

The centres in Melbourne follow a similar development trend to their counterparts in Sydney, with centres closer to the CBD both housing the highest number of dwellings and growing significantly over the last 15 years.

As shown in the **Infrastructure and Transport** chapter of this report, ports and airports are a significant driver of economic growth in cities in their role as gateways for trade and travellers. In considering population densities in major cities, the conflicts associated with increased densities around airports and ports must be recognised.

For instance, the suburbs of Wynnum and Wynnum West (near the Port of Brisbane) saw an increase in population of over 100 per cent in the decade 2001 to 2011. Similarly, the suburbs adjacent

to the Port of Botany in Sydney also saw an increase in population of over 100 per cent in the same period (State of Australian Cities interactive maps – see <http://www.infrastructure.gov.au/infrastructure/pab/>).

This population growth in adjacent suburbs has significant impacts on both the people in those areas and the utility of the ports, with wide-reaching implications for transport, congestion and freight movements.

Conclusion

The historical preference for settlement in urban areas in Australia has made a significant impact on the form and structure of the settlement patterns and transport systems of our cities. Building on that history of urbanisation, in general there are currently 2 predominant locations for population growth occurring across Australian cities: extensive low-density growth on the urban fringe and significant growth in high-density city centres. This has led to large price premiums being paid for homes that are within close proximity to the economic activity in the CBDs of Australia's cities, and concentrations of social disadvantage being pushed further towards city peripheries. It is problematic for both Australian cities and most parts of regional Australia, to access transport and jobs as there are areas across Australia that are generally underserved by transport services (Infrastructure Australia 2015).

Housing density will continue to trend upwards as the value of land close to the inner city parallels the concentration of high-wage employment in the CBD and central city. However, there are clear social and economic challenges in outlying areas that are not as well-resourced in terms of accessible jobs, transport, facilities and services. Opportunities inherent in proximity to city centres are increasingly likely to be out of reach for people on the outer fringes of cities.

As the **Economy** chapter of this report will explore, this outward movement of disadvantage and population is occurring concurrently with an inward concentration of higher-order jobs, placing many residents far from the opportunities of the inner city and adding considerable pressure to the increasingly strained transport network.

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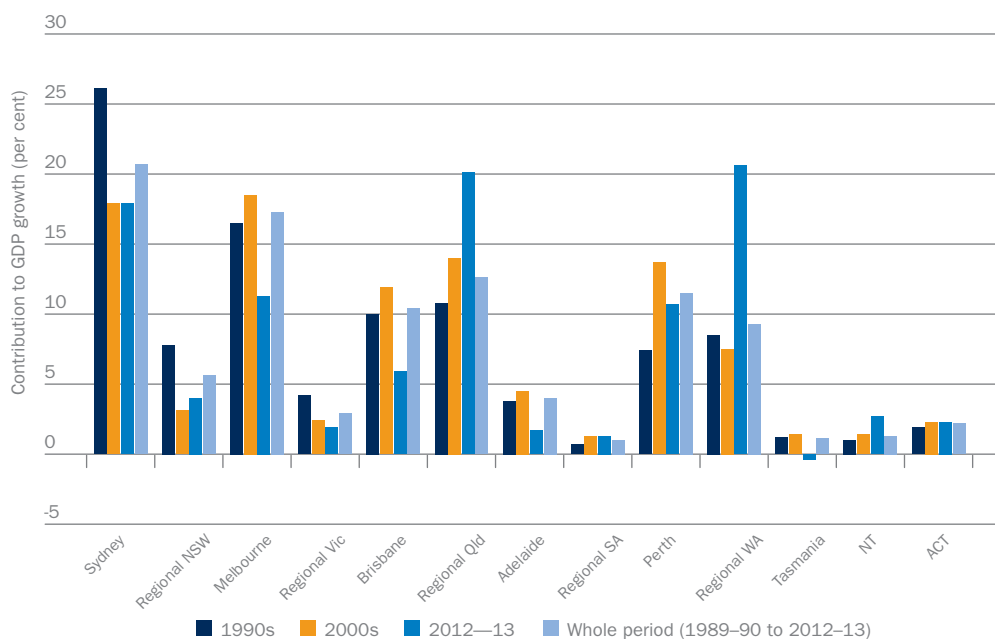


Chapter 4 Economy



Cities are critically important parts of the national economy and gateways for much of Australia's interaction with the global economy. While globally competitive export-orientated industries across the country are a significant component of national prosperity, Australia's major cities are where the majority of the country's Gross Domestic Product (GDP) is generated. They house much of the nation's key economic infrastructure such as container ports and airports, which are critical to the prosperity of industries and sectors located across Australia.

Figure 4.1 *Contribution to Gross Domestic Product growth (volume measure) by cities and regions, 1990's, 2000's and 2012–13*



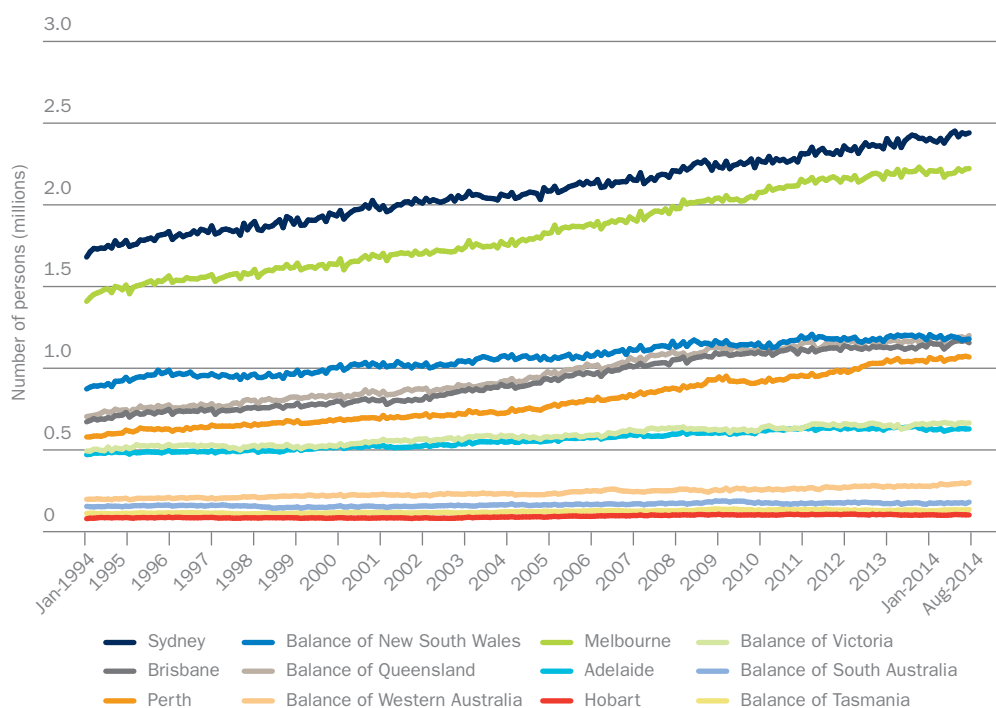
Source: SGS Economics & Planning 2014.

Infrastructure plays a key role in improving the productivity of Australia's cities. It has a direct impact on the volume of capital stock in the economy and an indirect effect on productivity (Productivity Commission 2009). Urban infrastructure assets – road networks, public transport, ports, airports and utility networks – all have the ability to catalyse and direct urban growth that supports more economically productive and socially inclusive cities.

The long-term health of the national economy depends on the enhancement, renewal and maintenance of productivity given the expected decline in Australia's terms of trade after an extended 'boom' and, as discussed in the **Population** chapter, the effect of an ageing population. Cities are home to fast-growing, high-productivity sectors that rely on the efficient functioning of the city to thrive. The economic infrastructure found in cities is therefore increasingly central to Australia's productivity.

Not only is a majority of GDP generated in Australia's major cities but a majority of Australian jobs are also located in urban environments, particularly in capital cities as shown in Figure 4.2. In 2014, more than 7.6 million people were employed in Australia's state capital cities, with slightly more than 4 million employed in regional or remote areas (ABS 2014). Changes in economic structures and international trade as well as an increased drive to enhance productivity benefits will have an impact on the Australian workforce, the effect of which will be felt most strongly in the major cities.

Figure 4.2 Jobs distribution by capital city and balance of state, 1994–2014



Source: ABS 2013a.

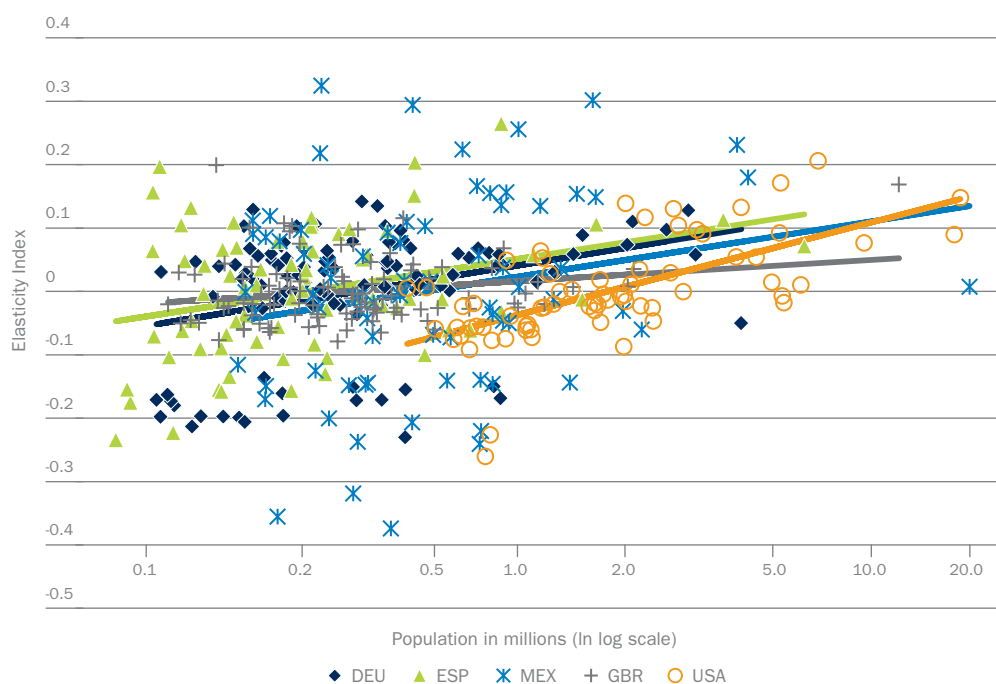
The international context – cities and global competitiveness

In a recent OECD study taken across 5 countries and 140 cities (Ahrend et al. 2014), the relationship between city size and productivity was established. This empirical analysis showed that a doubling in city size was associated with an increase in productivity of between 2 per cent and 5 per cent over and above those productivity gains from broader economic processes.

Figure 4.3 presents the level of city productivity premiums indexed against city populations. The study further found that city productivity is positively associated with the population of nearby cities (within 300 kilometres) (Ahrend et al. 2014).

The 5 lines in the chart represent cities productivity premium trends, by city sizes, for each country. The natural logarithm of population is on the horizontal axis, the vertical axis plots city productivity, estimated by applying individual wage regressions to national micro-data in order to control for workforce composition of cities.

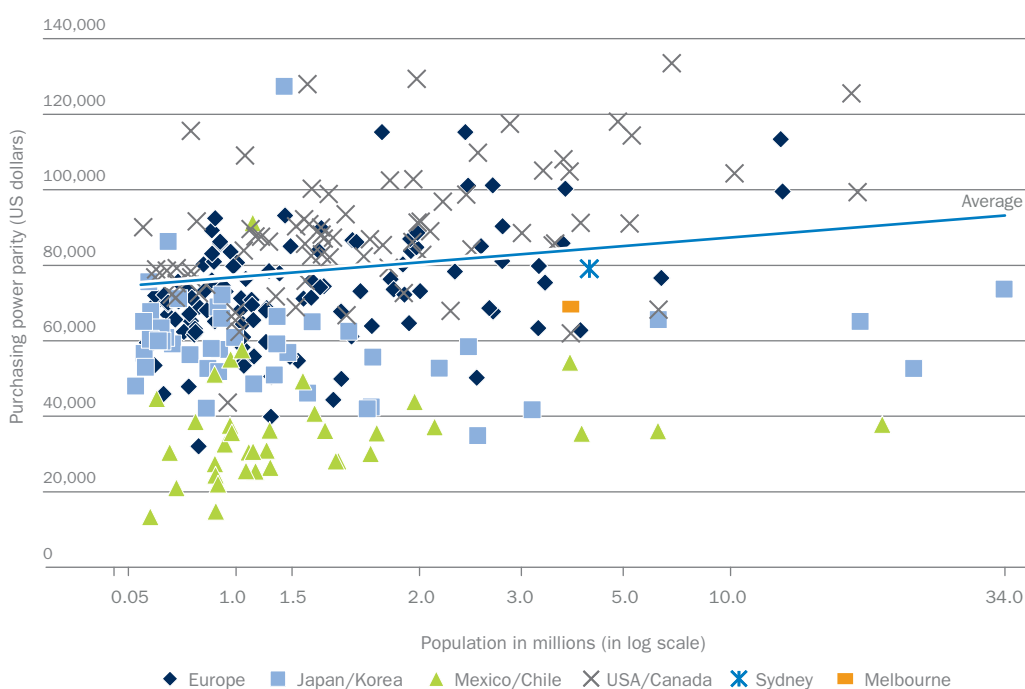
Figure 4.3 Population size and productivity premium by cities in North America, Mexico, Germany, Great Britain and Spain



Source: Ahrend et al. 2014.

The study also found that the presence of a port increases city productivity by 3 per cent. However, it did not examine the importance of metropolitan airports.

Figure 4.4 International metropolitan area labor productivity, 2010



Source: Ahrend et al. 2014.

Asian cities tend to cluster in the lower mid-range of labour productivity in cities of between 500,000 to 1.5 million persons. Metropolitan Sydney and Melbourne (shown in Figure 4.4) are below international average levels of labour productivity by constant US dollars purchasing power parity (or PPP) for similar sized cities in the scope of the study (Ahrend et al. 2014).

Research by Loughborough University World Cities Group and the Chinese Academy of Social Sciences, which rated Asian-Pacific cities in 2010 in terms of their international linkages and relative importance, has shown that Sydney is the only Australian city that is close to the leaders of the overall group of 500 cities in terms of its Global Urban Competitiveness (Table 4.1). Except for Melbourne and Sydney, all of Australia's cities ranked outside the top 100 Asian-Pacific cities for Global Urban Competitiveness. Enright and Petty (2013 p.42), commenting on Australia's ranking observed that:

Only Sydney and Melbourne are in the upper tier on some measures. Cities tend to manage flows of goods and service, finance and people on a local, national and regional and global basis. If global cities are not just a result of dynamic national economies, but a major contributor, then Australia would appear to be disadvantaged compared with many other countries.

Table 4.1 *Selected Australian capital cities competitiveness rankings within the Asia-Pacific, 2009-2010*

Cities	Economics	Global urban competitive-ness		GDP		GDP per capita		GDP per square kilometre		GDP growth		Patent application	
		Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Tokyo	Japan	0.92	3	1.00	1	0.64	69	0.37	19	0.09	472	0.27	41
Singapore	Singapore	0.76	8	0.25	14	0.44	157	0.28	31	0.36	172	0.05	183
Seoul	Korea	0.74	9	0.40	6	0.31	193	0.53	8	0.16	363	0.07	150
Hong Kong	China	0.74	10	0.33	7	0.39	181	0.24	47	0.28	239	0.05	177
Yokohama	Japan	0.68	21	0.20	17	0.44	160	0.36	22	0.15	387	0.41	16
Osaka	Japan	0.68	24	0.32	8	0.50	126	0.14	117	0.07	499	0.31	34
Shanghai	China	0.64	37	0.26	11	0.14	251	0.04	258	0.57	70	0.09	122
Taipei	China	0.63	38	0.11	42	0.33	190	0.21	60	0.11	443	0.18	75
Sydney	Australia	0.62	46	0.30	10	0.56	97	0.15	108	0.13	414	0.01	281
Nagoya	Japan	0.61	49	0.19	19	0.69	45	0.47	10	0.08	490	0.17	79
Beijing	China	0.59	59	0.20	16	0.10	287	0.01	375	0.56	71	0.08	130
Kawasaki	Japan	0.59	61	0.07	67	0.43	163	0.40	15	0.09	473	0.41	15
Sagamihara	Japan	0.58	70	0.04	149	0.45	148	0.35	23	0.16	364	0.32	31
Shenzhen	China	0.58	71	0.15	25	0.14	252	0.06	223	0.74	21	0.15	85
Chiba	Japan	0.56	82	0.05	100	0.47	134	0.16	95	0.09	476	0.37	23
Saitama	Japan	0.56	84	0.06	84	0.42	166	0.23	53	0.11	440	0.39	20
Kyoto	Japan	0.56	86	0.09	49	0.53	113	0.09	171	0.10	450	0.29	40
Melbourne	Australia	0.55	91	0.25	13	0.54	110	0.03	307	0.23	283	0.02	237
Macau	China	0.55	93	0.02	236	0.36	187	0.54	7	0.56	72	0.00	343
Brisbane	Australia	0.51	136	0.12	35	0.51	121	0.07	199	0.17	352	0.01	260
Canberra	Australia	0.44	229	0.03	205	0.67	53	0.03	295	0.18	338	0.01	292
Hobart	Australia	0.43	238	0.02	293	0.67	52	0.03	305	0.23	281	0.01	244
Adelaide	Australia	0.43	243	0.06	80	0.44	162	0.03	297	0.12	430	0.01	257

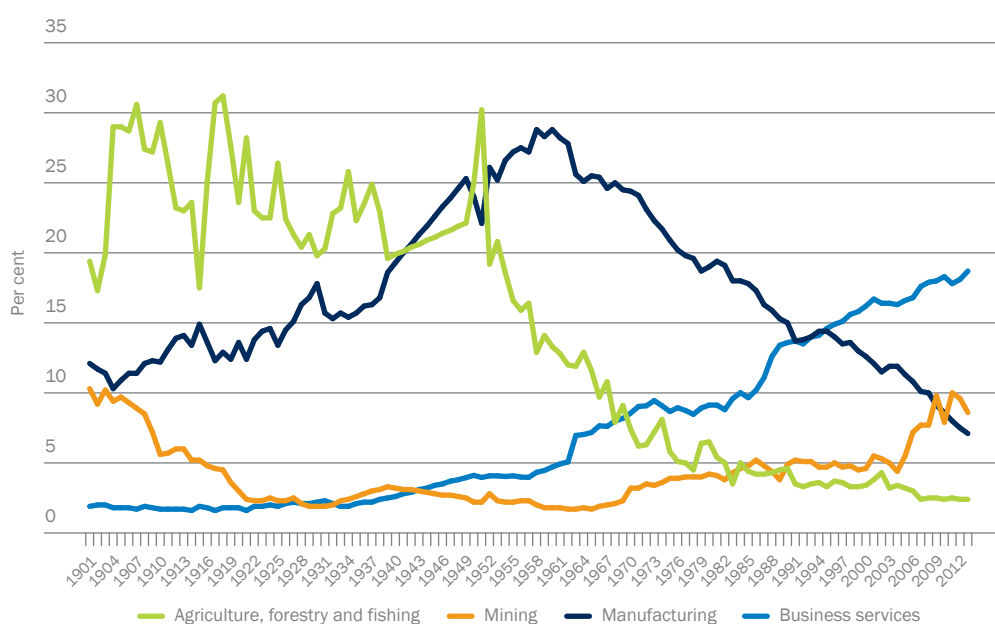
Source: Enright and Petty 2013.

Australia's changing economic structure

The Australian economy has undergone several stages of transition in its modern history. Each stage has had distinct implications for its cities, their economic makeup and the urban structure and form built to serve that stage. A high-level historical overview of these periods of economic transition provides valuable context to understanding the current state of the economy and its possible future direction. It is important to acknowledge that our cities still maintain layers of urban structures from economic periods now past.

Figure 4.5 illustrates the historical transition of the Australian economy by depicting the relative shares of GDP produced by 4 selected export-oriented industries over the 20th and early 21st century.

Figure 4.5 *Industry share of total Australian Gross Domestic Product, selected industry sectors, 1901–2013*



Source: ABS 2013c, Butlin 1985.

Note: Interpolation between 1939 and 1949 due to break in series.

The Australian economy before World War II was heavily reliant on agriculture, forestry and fishing industries. This sector accounted for between 20 and 30 per cent of national income, with fluctuations based on global agriculture markets and domestic climatic conditions. The sector saw a large spike in 1951 (due to a wool boom brought about by the Korean War), but since then the sector's share of national income has been dwarfed by growth in other sectors, and the role of cities in Australia's economy has expanded.

Figure 4.5 also illustrates the pronounced rise, then fall, of manufacturing over the last 100 years.

The rapid industrialisation that commenced around the time of Australian federation, continued in the inter-war years and accelerated during World War II, saw a substantial increase in the importance of manufacturing to national GDP before it peaked in the initial phases of the long post-World War II boom. At its peak, manufacturing accounted for almost 30 per cent of Australia's GDP. In cities, this economic growth saw the suburbanisation of jobs, with large-scale automobile, textile and other manufacturing industries set up under protectionist policies. As these policies were gradually wound back and the process of globalisation took hold, the share of GDP generated in the manufacturing industry sector has steadily declined since the 1960s.

Alongside a sustained period of growth in business services, the impact of the resources boom, especially in the last decade, is also evident (Figure 4.5).

Through the period of the 1980s to early 2000s, the mining sector consistently represented around 5 per cent of Australia's GDP. In the decade that followed, mining's share of GDP jumped considerably, with the sector growing to around 10 per cent of GDP at the peak of the resources boom in 2010. In this period, over half of Australia's per capita income growth came from improvements in the terms of trade, driven by the resources boom and, in particular, China's commensurate economic rise (Department of Industry 2013). The impact of the mining boom has been felt in cities as much as in rural and regional Australia, with output increasing in city economies and many employees of mining companies living in capital cities.

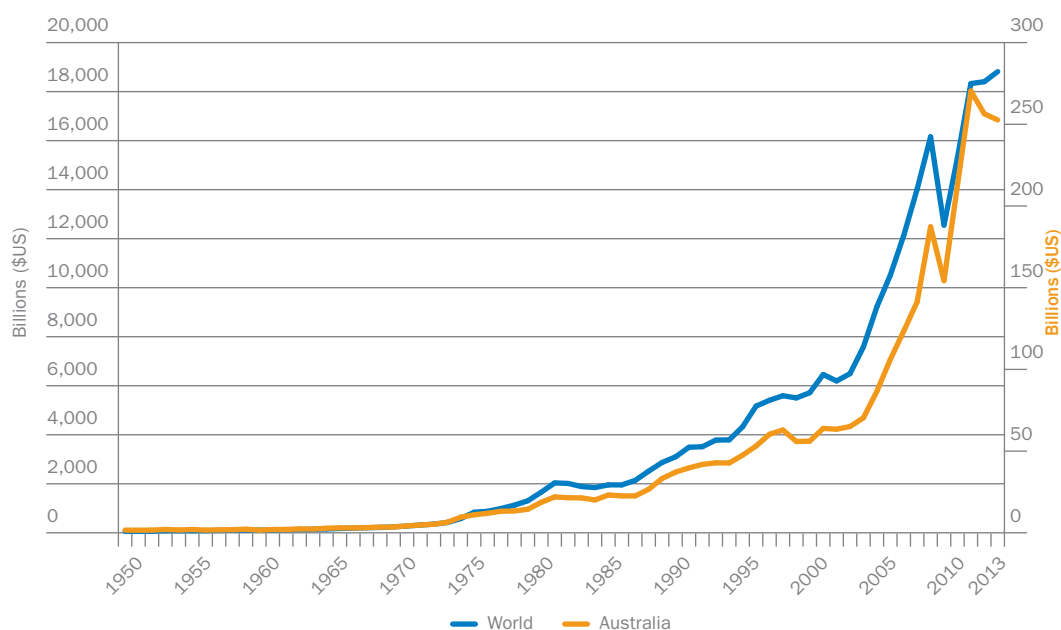
The resources boom, economic growth in the Asia-Pacific region, the increase in Australia's terms of trade, the ratio of export prices to import prices and the fluctuations of the Australian dollar have all had implications for the composition of the Australian export and import markets. The competitiveness of certain industries and sectors has altered significantly over time, resulting in fresh waves of structural economic change.

The growth of global trade

Trade exists because people, regions, and nations have a competitive advantage in supplying a tradable commodity, be it a natural resource such as iron ore, or a service such as expertise in financial mergers and acquisitions. Trade allows for specialisation, and as such individuals, cities, and nations profit from playing to their strengths. Trade is crucial because openness to trade is correlated with economic growth (OECD 2012).

World trade has increased dramatically in recent decades, with global merchandise trade increasing from around US\$4 trillion in the early 1990s to over US\$18 trillion in 2013 (Schwab (ed.) 2013), as shown in Figure 4.6.

Figure 4.6 World and Australia total merchandise trade, 1948–2013

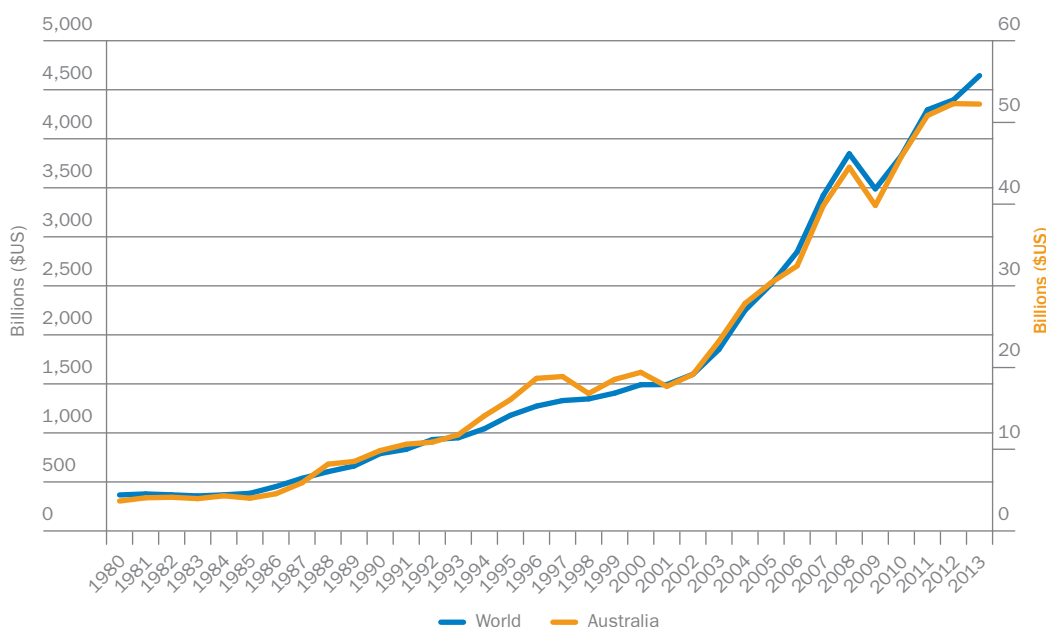


Source: World Trade Organization Statistical Database 2014.

Note: Derived from World Trade Organization Statistical Database for imports and exports using WTO valuations.

Note: Some of the increase in Australia's trade results from the appreciation of the Australian dollar.

Figure 4.7 shows how global trade in commercial services has also increased dramatically since the early 2000s now amounting to over US\$4 trillion (Schwab (ed.) 2013).

Figure 4.7 World and Australia total commercial services trade, 1980–2013

Source: World Trade Organization Statistical Database 2014. Note: Excludes government services.

Note: Derived from World Trade Organization Statistical Database for imports and exports using WTO valuations.

Note: Some of the increase in Australia's trade results from the appreciation of the Australian dollar.

This growth in the value of global trade has, on average, increased at nearly twice the pace of world production, reflecting the increasing prominence of international supply chains and the trade in components of final products (Schwab (ed.) 2013). This is not unique to Australia; trade in components of manufactured goods and intermediate goods are over 3 times greater than flows of final goods, and are growing at a faster rate (McKinsey 2014).

This increase in trade has important implications for city infrastructure, especially ports and airports and the land transport links that serve them.

The Progress in Australian Regions – Yearbook 2014 shows that the value of international freight through Australian ports and airports increased by more than \$140 billion between 2006–07 and 2012–13. The largest increase of approximately \$66 billion occurred in major cities – up from \$287 billion to \$353 billion – while remote areas have experienced the next largest increase of almost \$31 billion, related mainly to bulk commodities like iron ore (DIRD 2014, C 2.2.2).

What Australia is trading

Australia exports high-value services such as education, business services and tourism, as well as mining and agricultural products, in which the nation has a clear competitive advantage. Australia's resources and energy sectors also continue to drive our economic growth (see Table 4.2).

The Bureau of Resources and Energy Economics (BREE 2014) forecasts Australia's resources and energy export earnings to reach \$251 billion (in 2014–15 dollars) in 2018–19. BREE predicts that over the next five years iron ore exports will grow at an average annual rate of six per cent, totaling 889 million tonnes in 2019. Despite an increase in 2013–14 of 31 per cent in Iron ore export values to \$74.8 billion, they are expected to decrease 4.2 per cent in 2014–15. Australia is expected to become the world's largest exporter of Liquefied Natural Gas (LNG) by 2019, with total exports predicted to reach 78.4 million tonnes, worth around \$52.2 billion in 2014–15 dollar terms. Metallurgical coal exports are predicted to increase by 1.2 per cent annually to 198 million tonnes in 2019, worth around \$28.2 billion in 2014–15 dollar terms, and thermal coal by an annual average of 4 per cent to 239 million tonnes in 2019, worth \$20.2 billion in 2014–15 dollar terms.

Table 4.2 Australia's top 25 exports, 2011–2013

Rank	Commodity	2011	2012	2013	% growth	
					2012–13	5-year trend
1	Iron ores & concentrates	64,097	54,447	69,492	27.6	19.4
2	Coal	46,691	41,273	39,805	-3.6	-1.6
3	Education-related travel services	15,144	14,467	15,020	3.8	0.1
4	Natural gas	11,084	13,416	14,602	8.8	12.6
5	Gold	15,077	15,526	13,898	-10.5	0
6	Personal travel (excl education) services	11,661	12,148	13,115	8	1.6
7	Crude petroleum	11,451	10,988	9,016	-17.9	2
8	Wheat	6,076	6,531	6,085	-6.8	11.1
9	Aluminium ores & concentrates (incl. alumina)	5,443	5,273	5,904	12	-0.4
10	Beef	4,684	4,754	5,695	19.8	3
11	Copper ores & concentrates	5,437	5,255	5,192	-1.2	6.9
12	Professional services	3,259	3,836	4,562	18.9	4.6
13	Other ores & concentrates	4,544	4,217	4,486	6.4	4.2
14	Business travel services	3,573	4,031	3,954	-1.9	9.6
15	Technical & other business services	3,452	3,555	3,877	9.1	1.2
16	Aluminium	4,657	3,774	3,675	-2.6	-6.7
17	Copper	3,861	3,349	3,373	0.7	3
18	Medicaments (incl. veterinary)	3,278	3,849	3,085	-19.8	-1.9
19	Meat (excl. beef)	2,375	2,370	2,884	21.7	5
20	Refined petroleum	2,938	3,271	2,743	-16.1	-0.1
21	Wool & other animal hair (incl. tops)	2,837	2,524	2,608	3.3	5.4
22	Cotton	2,537	2,626	2,604	-0.8	51
23	Oil-seeds & oleaginous fruits, soft	1,287	1,780	2,516	41.3	44.6
24	Financial services	1,289	1,627	2,468	51.7	9.1
25	Other transport services	2,233	2,268	2,367	4.4	1.1
Total		313,078	300,436	318,539	6.1	4.1

Source: DFAT 2013.

Australia's major imports include high-value services such as personal travel (tourism), and commodities such as crude oil and petroleum products, passenger motor vehicles, machinery and transport equipment, computers and telecom equipment and parts, as shown in Table 4.3.

Table 4.3 Australia's top 25 imports, 2011–2013

Rank	Commodity	2011	2012	2013	% growth	
					2012–13	5-year trend
1	Personal travel (excl. education) services	22,550	22,437	24,725	10.2	5.6
2	Crude petroleum	20,827	21,567	20,227	-6.2	7.6
3	Passenger motor vehicles	14,159	16,919	18,290	8.1	6.1
4	Refined petroleum	14,306	15,871	18,229	14.9	7.8
5	Freight transport services	8,363	9,228	9,348	1.3	0.3
6	Telecom equipment & parts	8,323	8,746	9,068	3.7	6
7	Medicaments (incl. veterinary)	8,530	8,201	7,831	-4.5	2.9
8	Computers	6,634	6,777	6,943	2.4	4.3
9	Passenger transport services	6,389	6,901	6,839	-0.9	3
10	Goods vehicles	6,153	8,562	6,436	-24.8	5.7
11	Technical & other business services	4,733	5,107	6,182	21	4.9
12	Professional services	2,678	3,631	5,050	39.1	10.3
13	Gold	6,396	5,841	4,796	-17.9	-13.3
14	Charges for intellectual property	3,982	4,044	3,992	-1.3	3.1
15	Business travel services	2,992	3,493	3,574	2.3	0.9
16	Civil engineering equipment & parts	4,264	6,822	3,464	-49.2	6.9
17	Heating & cooling equipment & parts	2,173	2,265	3,212	41.8	6.5
18	Furniture, mattresses & cushions	2,780	2,905	3,176	9.3	2.8
19	Pumps (excl. liquid pumps) & parts	1,726	2,418	3,172	31.2	2.2
20	Vehicle parts & accessories	2,648	2,932	2,797	-4.6	2.9
21	Measuring & analysing instruments	2,635	2,950	2,774	-6	0.3
22	Rubber tyres, treads & tubes	2,672	3,053	2,748	-10	10.4
23	Electrical machinery & parts, nes	2,509	2,608	2,725	4.5	2.7
24	Iron, steel, aluminium structures	1,550	1,889	2,647	40.1	33
25	Mechanical handling equip. & parts	1,987	2,541	2,579	1.5	6.8
Total		301,423	324,026	328,806	1.5	4.0

Source: DFAT 2013.

The OECD characterises Australia's linkages to global value chains as weak because its exports are largely unprocessed raw materials and do not integrate with most typical high value-added global supply chains (Department of Industry 2013). Nevertheless, Australia exports high value-add services such as financial services and technical and other business services. Table 4.3 shows that Australia also imports some of these services, as well as manufactured goods.

This lack of integration is true also for Australian manufacturing, with most specialised manufacturing occurring in low- and medium-technology intensity sectors that are either upstream in the supply chain (for example, primary aluminium and steel) or at the final stages of processing, such as processed food (Department of Industry 2013).

Trade in services within Australia has grown significantly in the last decade. Melbourne Institute's Asia Link Index shows services trade between both Australia and Asia and Australia and the rest of the world grew by 80 per cent and 43 per cent respectively in the period 2000–2011, and 60 per cent within cities. Education constitutes the largest service export, amounting to \$9.8 billion or 48.2 per cent of Australian services exports to Asia in 2011 (Department of Industry 2013).

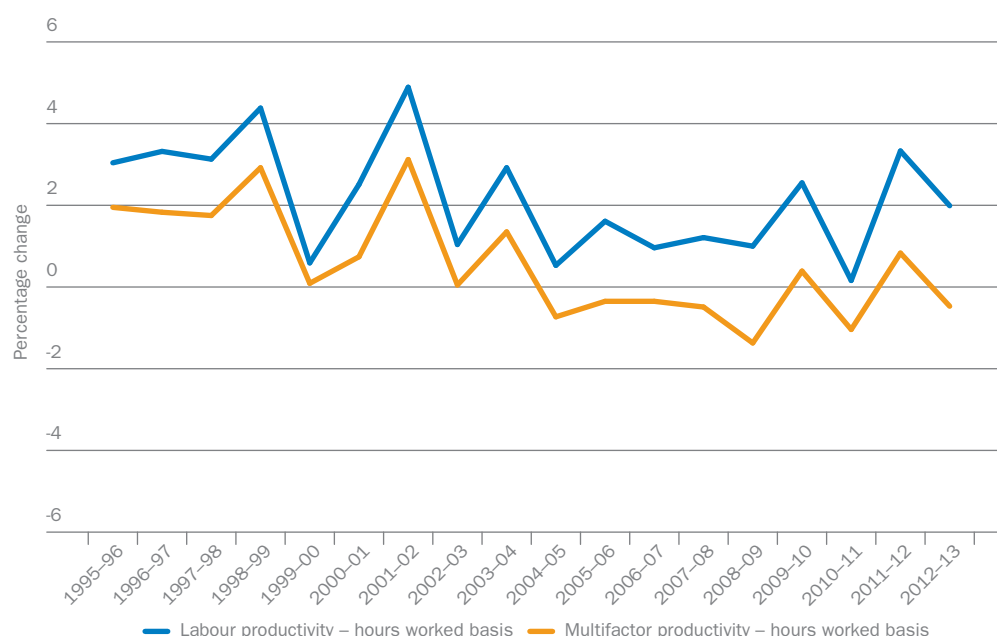
Productivity of Australia's cities

Cities contain economic infrastructure critical to national productivity, including hosting many of Australia's important international gateways. Cities as a whole are highly productive; however, this productivity is not spread evenly across cities and there are strikingly large differences in levels of productivity between

cities (Abel, Dey and Gabe 2011). A lift in the functioning capacity of Australia's major cities will provide a considerable stimulus for reversing the current decline in national productivity and global competitiveness (IPA 2012).

Productivity can grow through technological advances, new products, capital intensity and the flexibility and efficiency of the allocation of labour and capital (Australian Government 2010). As shown in Figure 4.8 related to Australia's labour productivity and multifactor productivity, the measure of a combination of production inputs, including labor, materials and capital, has risen and fallen irregularly and has been in overall decline since the high of 2001-02.

Figure 4.8 Labour productivity and multifactor productivity measures (market sector industries aggregate), 1995-96 to 2012-13



Source: ABS 2013e.

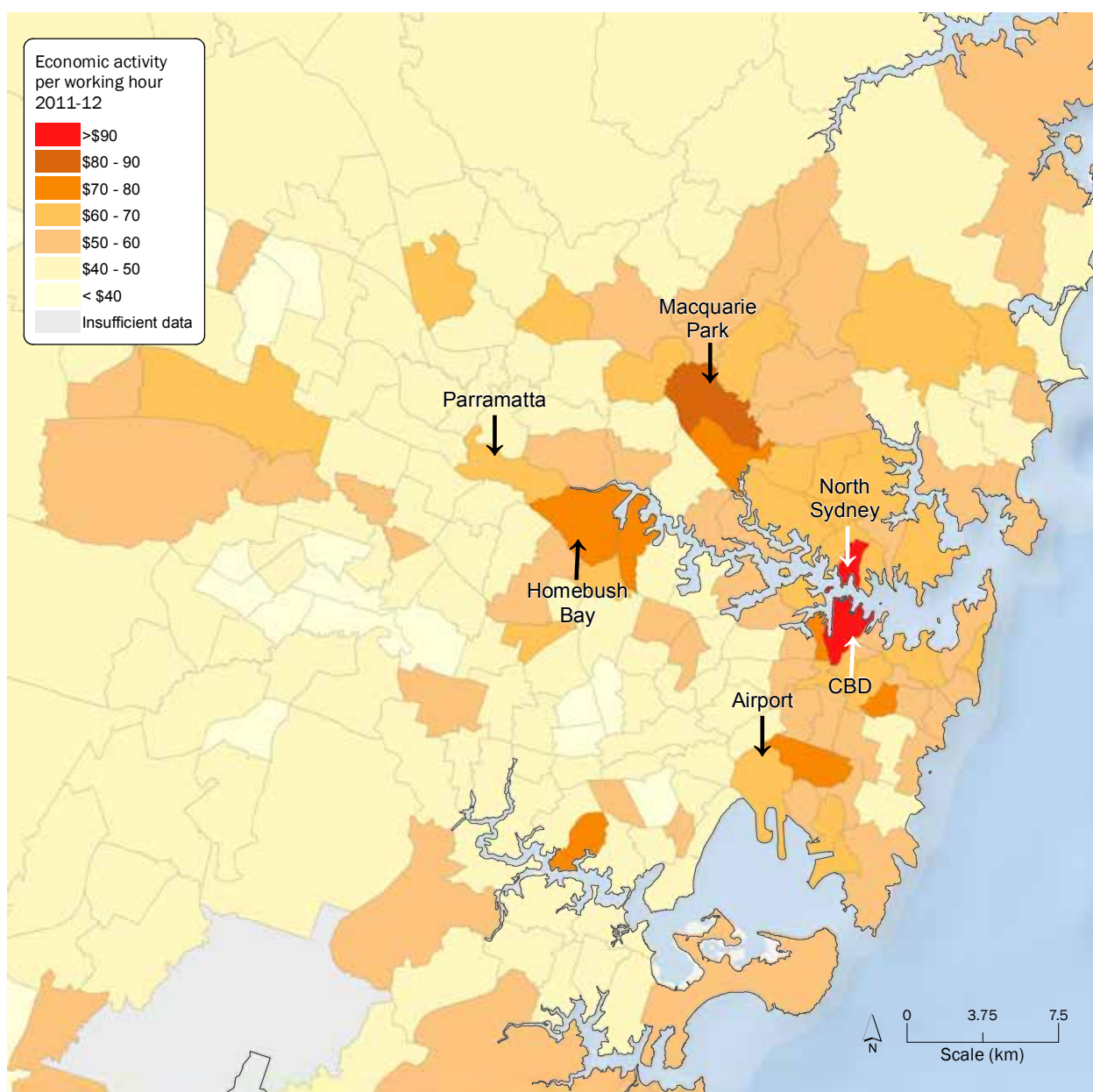
Productivity is measured as the quantity of output that can be produced with a given amount of input. Productivity growth requires producing more outputs with the same or fewer inputs (workers and capital).

Connectivity can be a key determinant of a firm's productivity. Firms can achieve benefits by locating themselves in a city that has high levels of connectivity (by mass transit or car or via airports or seaports). For example, producing for a larger customer base will tend to reduce unit costs. With increased numbers of clients, firms may be able to specialise in a particular field and gain efficiencies through more focused skill development and innovation in that field. Furthermore, a large and diverse marketplace also presents a firm with many potential clients, freeing it from reliance on a single customer and reducing risk.

As a result of the increased connectivity of industries within Australian cities, highly globally connected firms, particularly those in the advanced business services sector, tend to be attracted to well-connected central city locations. These highly accessible locations give them access to all the inputs that make their businesses so profitable – a large (global) market of potential clients and a diverse and deep pool of labour. Nevertheless, as the Grattan Institute has argued, residential patterns and transport systems mean that central business district (CBD) employers have access to only a limited proportion of workers in metropolitan areas, particularly in the case of Sydney (Kelly 2013).

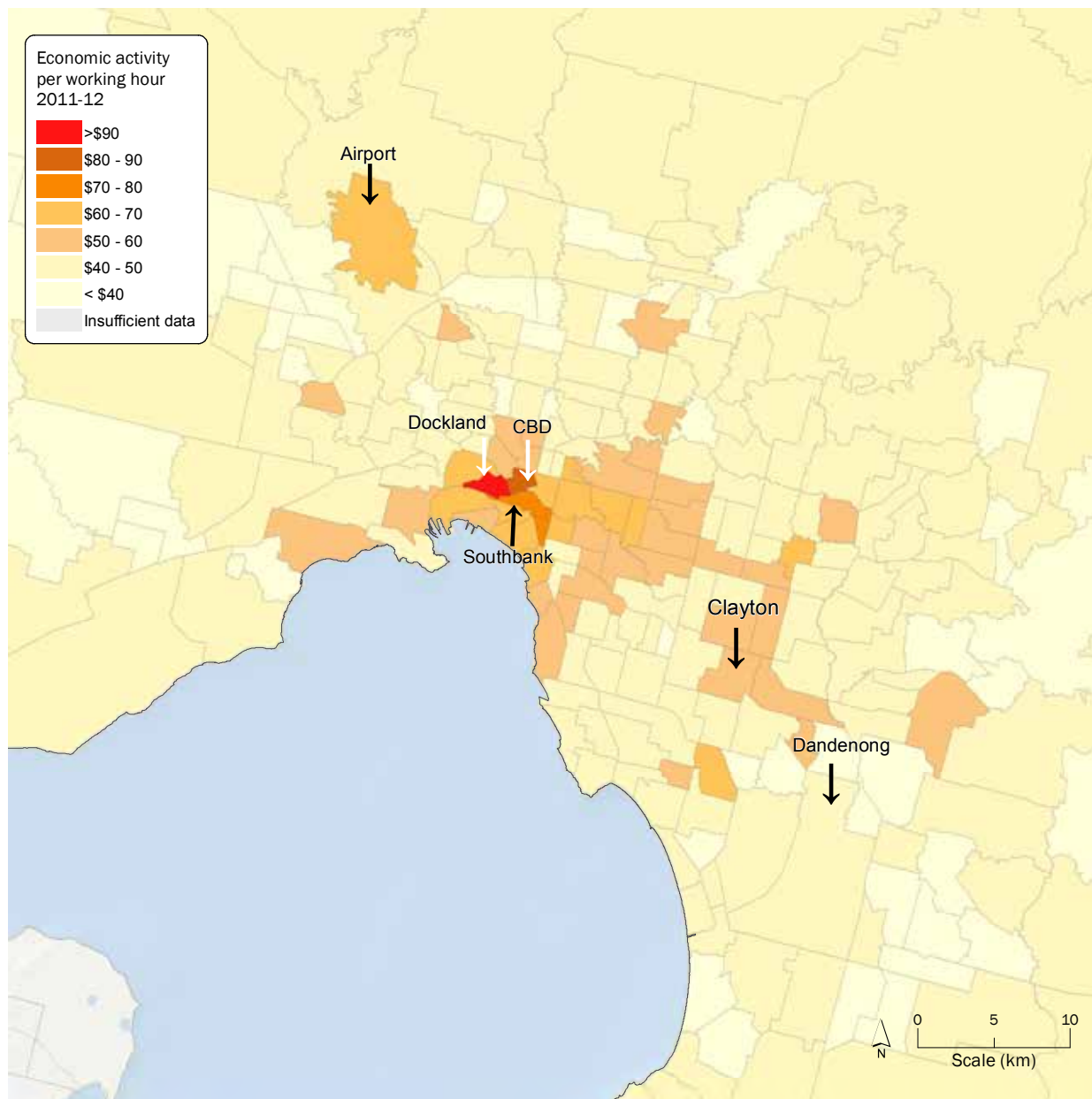
Thus the intensity of economic activity is much higher in dense urban locations (often, but not always, in CBDs), both in quantum and in terms of the productivity of individual workers, which in turn is reflected in higher wages. The varying productivity (calculated as dollars per person per hour) of Australia's major cities is illustrated spatially in the maps below, as discussed by Kelly and Donegan (2014).

Map 4.1 Sydney's productivity, 2011–12



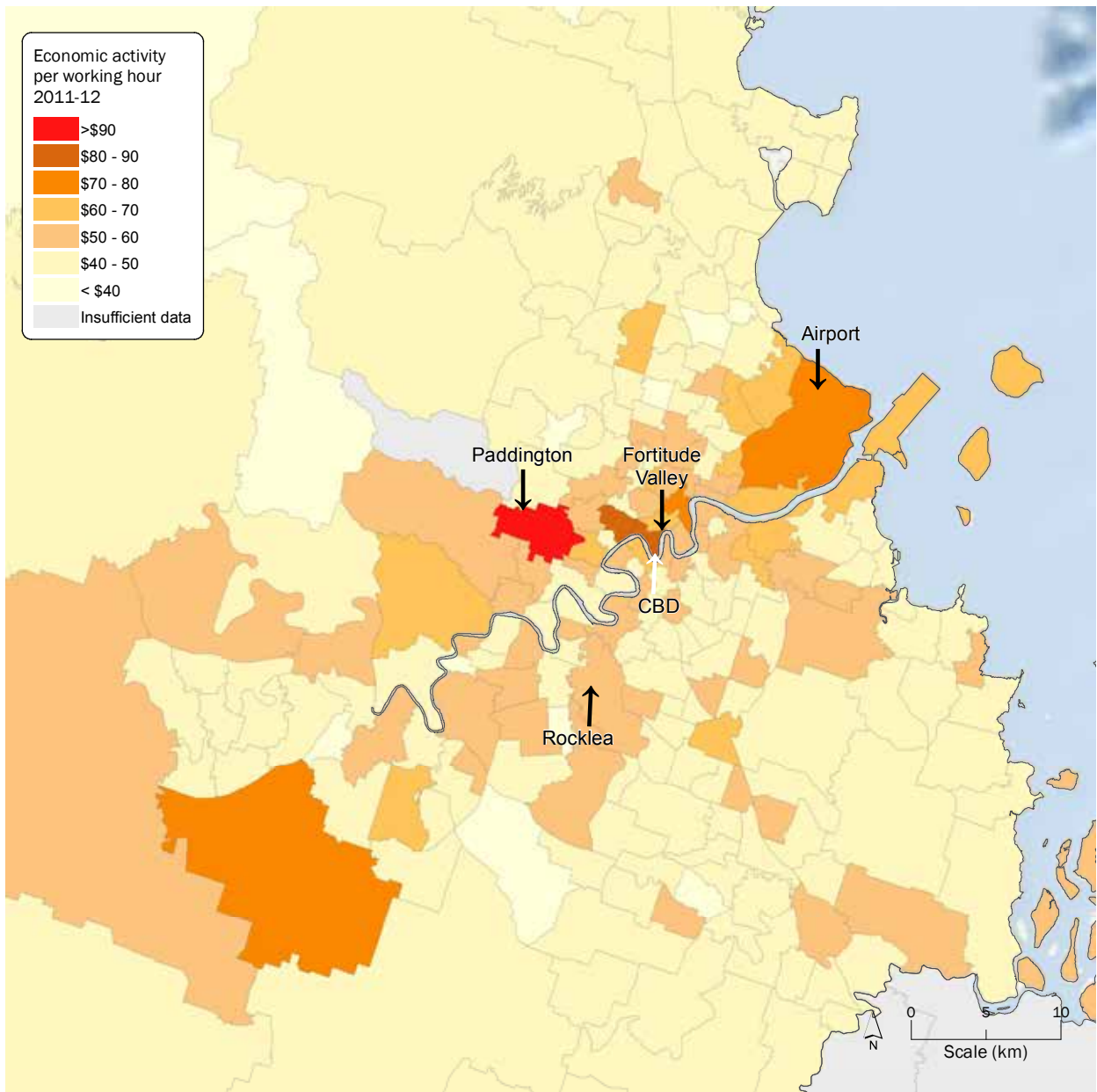
Source: Kelly and Donegan 2014.

Map 4.2 *Melbourne's productivity, 2011-12*



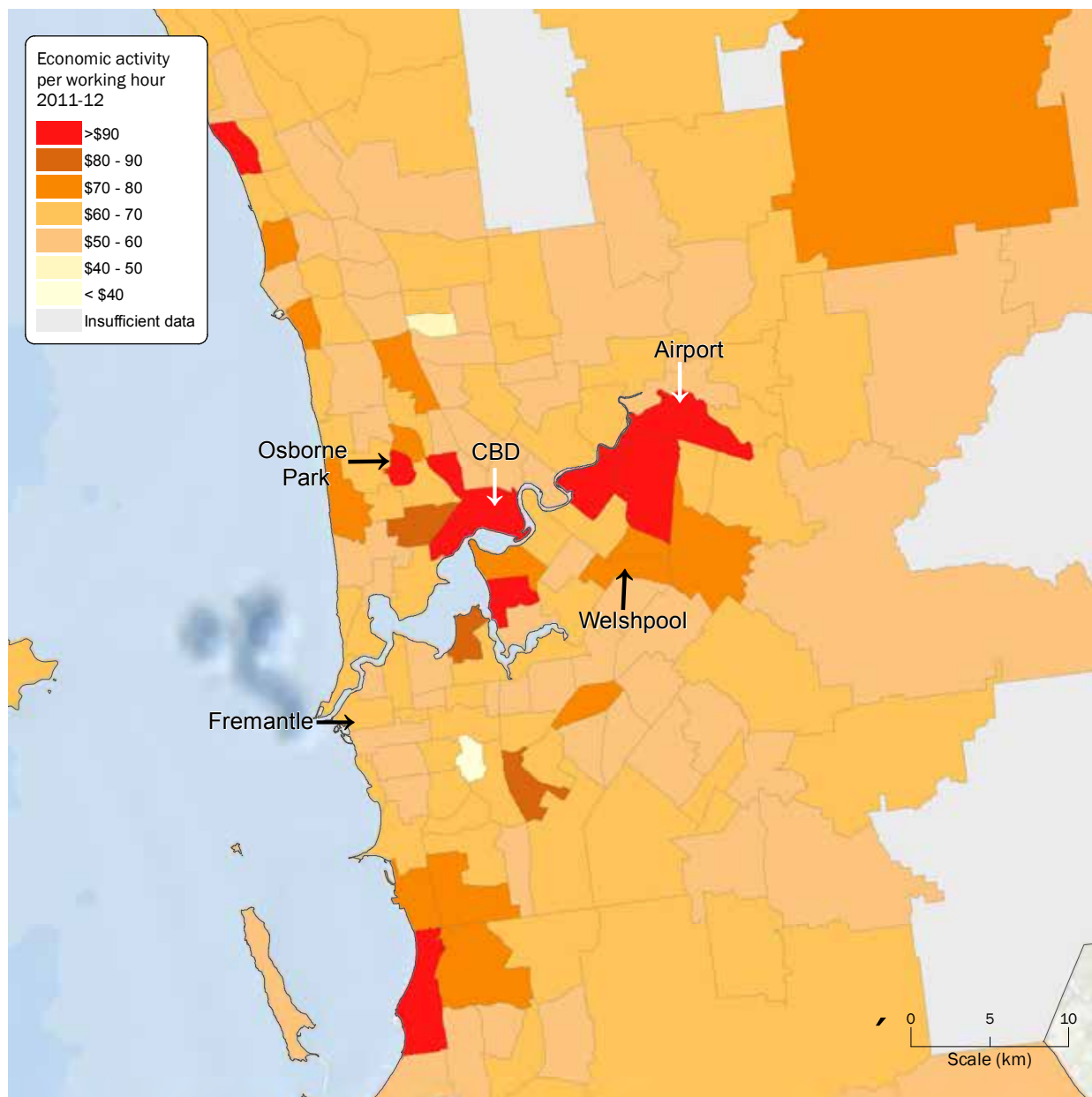
Source: Kelly and Donegan 2014.

Map 4.3 *Brisbane's productivity, 2011–12*



Source: Kelly and Donegan 2014.

Map 4.4 *Perth productivity, 2011-12*



Source: Kelly and Donegan 2014.

The above maps clearly illustrate the spatial dimension of productivity, with central city areas and the land surrounding airports producing substantially more economic activity per working hour than other areas.

Ensuring that Australia's most productive regions – the inner areas of its cities – remain unconstrained, efficient and productive is critical. With such dense economic activity occurring within these relatively small areas, even minor inefficiencies can have a major impact on Australia's national economy and remedying those inefficiencies can reap large economic benefits (PWC 2014).

The changing economy and employment structure

The infrastructure needs of Australian cities are evolving. The World Economic Forum considers labour market rigidity and transport infrastructure constraints as key contributors to Australia's relative decline from the 10th most competitive economy in 2003 to the 21st most competitive economy in 2013–14 (Schwab 2014). Furthermore, Infrastructure Australia estimates that infrastructure bottlenecks cost approximately 0.5 per cent of annual GDP and the value-add (economy-wide spending) attributable to infrastructure services was 13.3 per cent of GDP in 2011, over 70 per cent of which is transport-related (Infrastructure Australia 2008 and 2015).

Changes in economic geography have been paralleled by a settlement pattern that has often seen high population growth on the urban fringes. The result is a widening spatial divide between jobs and residents across many of Australia's cities, with significant implications for productivity growth.

The distinction between types of employment within Australia is important in understanding the cities' economies, as different jobs have varying spatial characteristics and demands. Broadly speaking, within cities (WAPC 2003, BITRE 2013):

- services such as finance and insurance, as well as professional services favour central locations;
- population-serving jobs, such as retail, education and personal services are more dispersed and tend to follow the distribution of population; and
- some industries, such as manufacturing, freight and logistics and wholesale locate in places that meet their specific infrastructure and land use needs.

These locational preferences are reflected in the growth of different industries across different parts of Australia's cities between 2001 and 2011 (BITRE 2013), as shown in Table 4.4.

Table 4.4 *Main industry contributor to job growth*

Sector of city	Main industry contributor to job growth
Inner	Property and business services in Melbourne, Brisbane and Perth. Finance and insurance in Sydney.
Middle	Health and community services in Sydney, Melbourne and Brisbane. Construction in Perth.
Outer	Health and community services in Sydney, Melbourne and Brisbane. Retail trade in Perth.

Source: BITRE 2013.

Urban economists theorise that the firms that choose to locate in the city centre do so because they draw benefit from being in proximity to suppliers, clients, staff and even competitors. This concept is called agglomeration and it has become a powerful theory in explaining the competition for scarce CBD real estate.

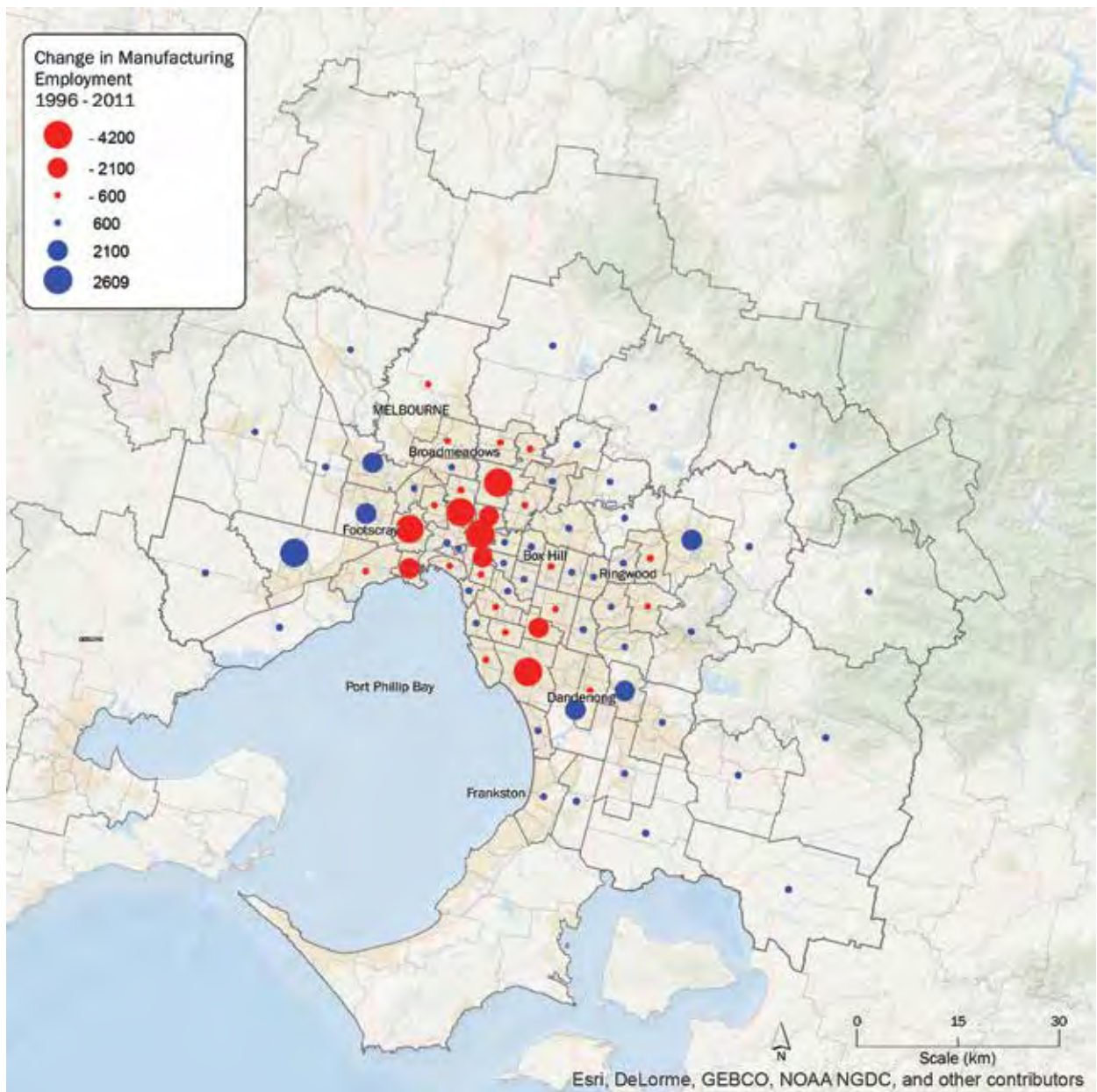
With different job types having differing spatial distributions across each of Australia's major cities, there is a heavy concentration of economic activity in the centre of cities, while the bulk of the city – the parts where most people live – have relatively low levels of economic activity (Kelly and Donegan 2014). Map 4.5 illustrates that professional services jobs have grown across Melbourne, but especially in its centre.

Map 4.5 Professional services jobs concentration in Melbourne's suburbs, 1996–2011

Source: SGS Economics & Planning 2014.

Paralleling the concentration of certain types of employment in the inner city since 1996, the middle suburbs have lost much of the traditional jobs base provided by manufacturing industries. This change in economic structure and its impact on the spatial distribution of jobs is illustrated in Maps 4.5 and 4.6, with Melbourne an example of a nationwide trend. The central city has seen significant growth in professional services employment (Map 4.5), while in Melbourne's middle suburbs, there has been a steady loss of a considerable number of manufacturing jobs since 1996 (Map 4.6). This change in economic geography reflects productivity differences across cities for different industries, as outlined in previous State of Australian Cities reports.

Map 4.6 *Manufacturing jobs concentration in Melbourne's suburbs, 1996–2011*



Source: SGS Economics & Planning 2014.

Employment change

With trends like that shown for Melbourne, city centres have increasingly become the single largest location of employment. Cities are home to fast-growing, high-productivity sectors that rely on the efficient functioning of cities to thrive. The social and economic geography of Australia's major cities has been changing significantly over the past few decades. Rapid technological advancements, market liberalisation and lower costs of transport, communications and computation have driven unprecedented global marketplace integration and are also changing cities. As shown in Table 4.5, the inner cities of Sydney, Melbourne, Brisbane and Perth are by far the most important single centres of employment.

Table 4.5 Employment clusters in the centres of cities and in selected suburban centres, 2011

Rank	Greater Sydney	Jobs	Greater Melbourne	Jobs	Greater Brisbane	Jobs	Greater Perth	Jobs
1	Sydney – Haymarket – The Rocks	251,452	Melbourne	186,129	Brisbane City	116,133	Perth City	134,275
2	North Sydney – Lavender Bay	43,021	Dandenong	54,232	Rocklea – Acacia Ridge	24,004	Subiaco – Shenton Park	22,062
3	Parramatta – Rosehill	42,625	Southbank	33,992	South Brisbane	22,759	Osborne Park Industrial	20,977
4	Macquarie Park – Marsfield	38,627	Docklands	32,037	Fortitude Valley	20,109	Welshpool	17,946
5	Pymont – Ultimo	29,691	Richmond	29,975	Paddington – Milton	16,759	Nedlands – Dalkeith – Crawley	17,713

Source: BITRE analysis of ABS Census of Population and Housing place of work data for 2011, extracted from Tablebuilder. BITRE 2013.
Notes: Based on 2011 SA2 boundaries. Excludes undefined place of work in capital city.

Between 2001 and 2011, Australia's CBD's and inner suburbs saw significant jobs growth. Of the employment centres located in the middle and outer suburbs of Australia's cities, jobs growth has been high in Sydney's Ryde (which houses Macquarie Park commercial centre). This area is ranked 4th in Table 4.5 above.

Additionally, strong jobs growth has occurred near the airports of Australia's major cities, with jobs growth in Belmont, Hume – Craigieburn and Pinkenba – Eagle Farm areas attributed to the activities of the respective airports (BITRE 2013).

The Progress in Australian Regions – Yearbook 2014 shows that in the decade to 2011 Sydney City and the Inner South employed residents grew by over 1 quarter – an increase of 38,000 persons – by comparison, in Sydney's Inner West and South West, a much lower 14 per cent and 11 per cent more residents were in employment compared with 2001. The Gold Coast experienced the second highest increase of employed persons with an increase of 73,800 persons and Newcastle-Maitland recorded the largest increase in the employment rate of all the major cities, 4.6 percentage points (DIRD 2014).

Table 4.6 Fastest-growing areas (centres of cities), 2001–2011

Rank	Inner sector SLAs	City	Job growth	Middle and Outer sector SLAs	City	Job growth
1	Southbank– Docklands	Melbourne	38,500	Ryde	Sydney	16,800
2	Sydney Inner	Sydney	30,300	Swan	Perth	15,600
3	Perth Inner	Perth	27,100	Hume– Craigieburn	Melbourne	11,300
4	Melbourne Inner	Melbourne	26,800	Belmont	Perth	10,900
5	Melbourne Remainder	Melbourne	14,700	Wyndham North	Melbourne	10,500
6	Sydney West	Sydney	12,300	Cockburn	Perth	10,200
7	City Inner	Brisbane	11,000	Pinkenba – Eagle Farm	Brisbane	10,100
8	South Brisbane	Brisbane	10,500	Rockingham	Perth	9,700

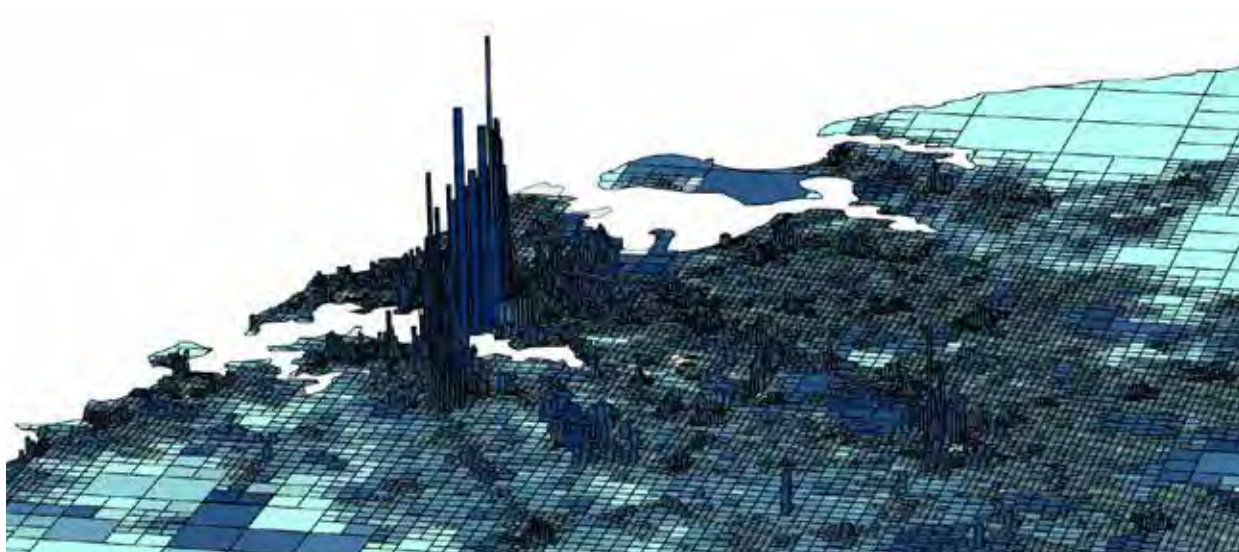
Source: BITRE analysis of ABS Census of Population and Housing place of work data for 2001 and 2011, and BTS online journey to work tabulations for 2001 (table 19), BITRE 2013. Note: Covers SLAs in Sydney, Melbourne, Brisbane and Perth Statistical Districts only. 2001 and 2011 data converted to 2006 ASGC boundaries.

Major cities within Australia have experienced a large increase in the number of jobs in knowledge-intensive industries – industries where innovation and creativity are central to competitive advantage. The growth of these industries has a distinct spatial element, as they tend to concentrate in central areas of cities. The manufacturing and retail jobs that had previously provided the backbone of overall jobs growth were generally located in the suburbs (Department of Sustainability and Environment 2007).

The concentration of jobs in the city centre and specialist business parks, including those in close proximity to airports, reflects an increasing need of businesses to locate in dense urban environments, despite the high price premiums attached to these locations. As O'Connor and Rapson (2003) note, 'the central region has maintained its dominance of new economy employment but has relinquished some of the retail, medical and other services it once provided to suburbanites'.

Maps 4.7 and 4.8 show the largest economic outputs of our 2 largest cities spatially.

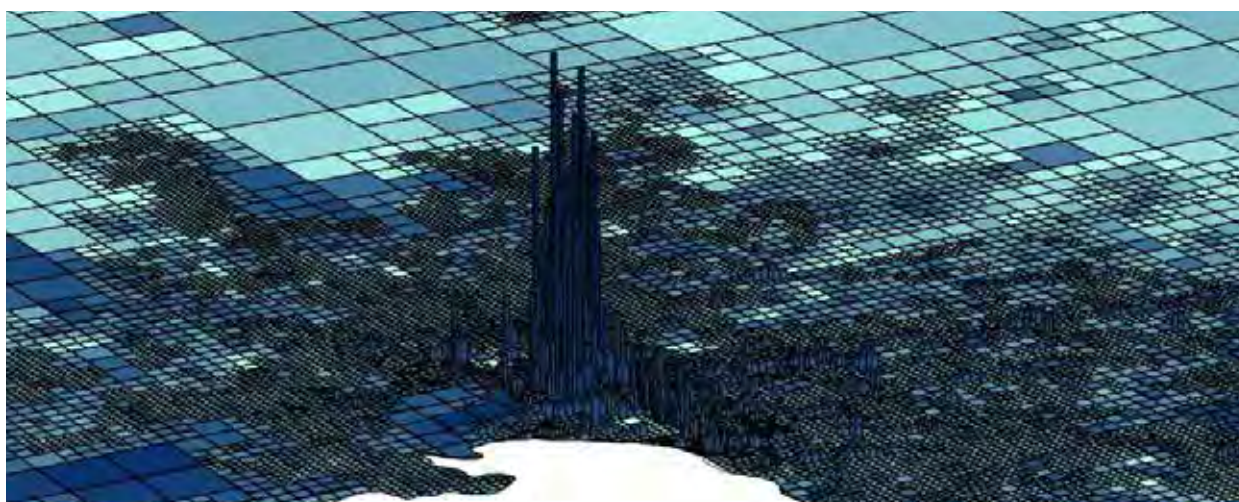
Map 4.7 *Economic output density, Sydney*



Source: Map supplied by PwC, developed using PwC's Geospatial Economic Model v. 1.0, April 2014.

The Progress in Australian Regions – Yearbook 2014 shows that Sydney City and Inner South and the Eastern Suburbs have a high density of knowledge-intensive industry workers (as high as 44 per cent of workers), while in North Sydney and Hornsby almost half of workers (49.3 per cent) are classified as employed in knowledge-intensive industries. Melbourne has a similar percentage of people employed in knowledge-intensive industries (36.1 per cent), while the other capital cities have a lower concentration of these workers (DIRD 2014, Table C 3.3.1).

Map 4.8 *Economic output density, Melbourne*



Source: Map supplied by PwC, developed using PwC's Geospatial Economic Model v. 1.0, April 2014.

The business services sector, which includes financial and insurance services, professional, scientific and technical services and real estate services, has grown as a share of the Australia's national economy (GDP) from 5 per cent in 1961 to almost 20 per cent in 2011. The economic reforms of the 1980s facilitated a rapid reconfiguration of the economy towards knowledge-intensive services. This sector contains many of the knowledge-intensive jobs that tend to cluster in cities. The growth of this sector has centred on Australia's major cities, with approximately four-fifths of these types of jobs located in Sydney, Melbourne, Brisbane, Adelaide and Perth (ABS 2014). This trend was also apparent in non-capital major cities, for example employment in knowledge-intensive industries in Cairns and Gold Coast-Tweed Heads increased by over 3 percentage points from 2006 to 2011 (DIRD 2014).

Ports

One of the most striking aspects of the economic restructuring, not only within Australia but also more broadly across the global economy, is the dramatic increase in trade. Ports and the transport networks that support them are enablers of the economic growth facilitated through increased trade and their performance greatly impacts on many sectors of the economy across a broad geographical region. The worldwide separation of place of production from place of consumption, coupled with the rapid development of many countries, has resulted in massive and sustained increases in both bulk and containerised cargo shipping.

Resource exports are Australia's highest-value export. Ports that export bulk mining resources and agriculture products play an important role in the national economy that occurs largely outside cities (the exceptions being Townsville, Newcastle and Wollongong). Trade in bulk goods often involves a supply chain stretching back into regional hinterlands. While there is a sustained increase in traffic in urban ports, as demonstrated in Figures 4.9 and 4.10, the importance of regional ports cannot be overstated. Ports like Port Hedland and Dampier have a significant impact on Australia's economy and productivity. The volume of freight through Newcastle port increased by 53.1 million tonnes from 95.6 million tonnes in 2008-09 to 148.7 million tonnes in 2012-13, the highest increase in volume of freight through an Australian port in a major urban area.

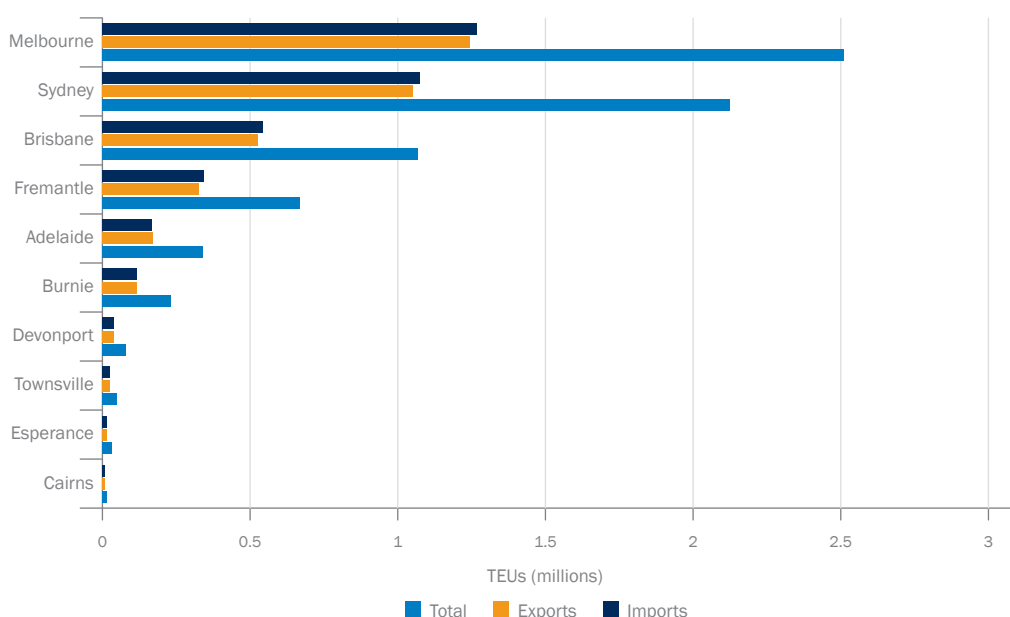
However, in the urban context, trade competitiveness is heavily dependent on effective access to international shipping services and port networks (UNCTAD 2013). According to the 2011 world port rankings, Melbourne is the 47th biggest port for container traffic globally, Sydney is 62nd and Brisbane is 99th.

The role of urban ports

The volume of Australia's total containerised trade is forecast to increase by almost 5 per cent a year over the next 2 decades, to reach 18.7 million TEUs¹ in 2031-32 (BITRE forthcoming).

In further considering the role of ports in major cities, it is evident that the biggest container ports in Australia have grown even bigger in recent times, with the Port of Melbourne projected to be handling 5.5 million containers per year by 2025, causing significant implications for landside freight routes. In addition, Port Botany (Sydney) forecasts it will handle 7 million containers per year by 2030. Figure 4.9 shows the total number of shipping containers, both full and empty passing through the top 10 Australian ports.

Figure 4.9 Top 10 Australian ports by highest number of shipping containers (full and empty), 2012-13

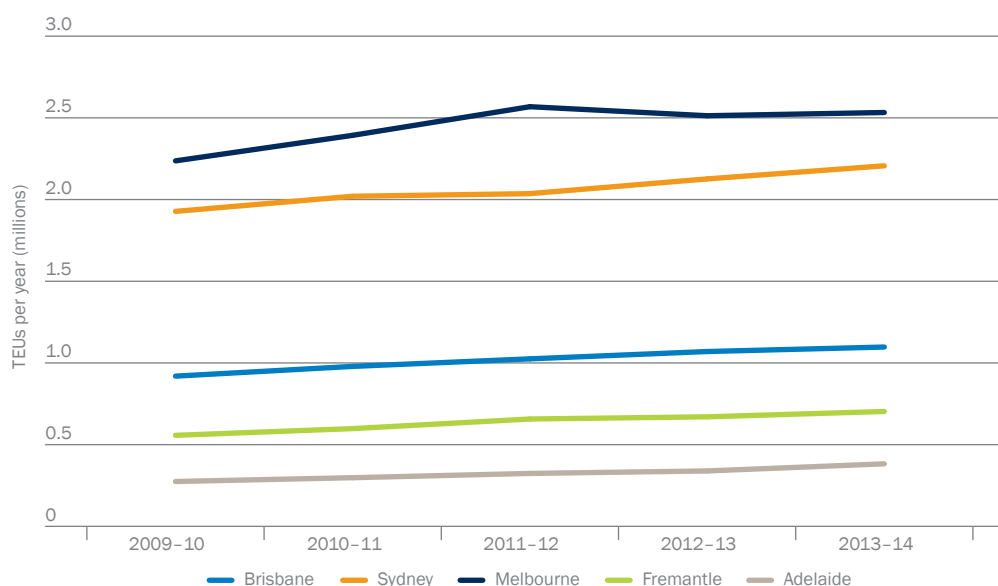


Source: Ports Australia 2013.

¹ Twenty-foot Equivalent Unit (TEU) is the measurement of cargo capacity commonly used to describe the capacity of container ships based on the volume of a 20-foot-long container.

The growth in container trade has mainly been felt at Australia's major urban ports, with the Port of Melbourne, Port Botany (Sydney), Port of Brisbane, and Fremantle Port (Perth) all recording a substantial growth in container movements (see Figure 4.10). Over the last decade, the ports of Melbourne, Adelaide, Fremantle and Sydney recorded an average growth rate of between 4.5 and 5.5 per cent (BITRE 2014b). This continued growth will have impacts on the transport systems within cities as the containers are transported and unpacked; their contents redistributed; containers being returned or filled, chiefly within cities. The additional freight task and the impacts of more freight on the roads and railways are discussed in the **Infrastructure and Transport** chapter.

Figure 4.10 Growth in container trade at Australia's largest ports, 2009–10 to 2013–14



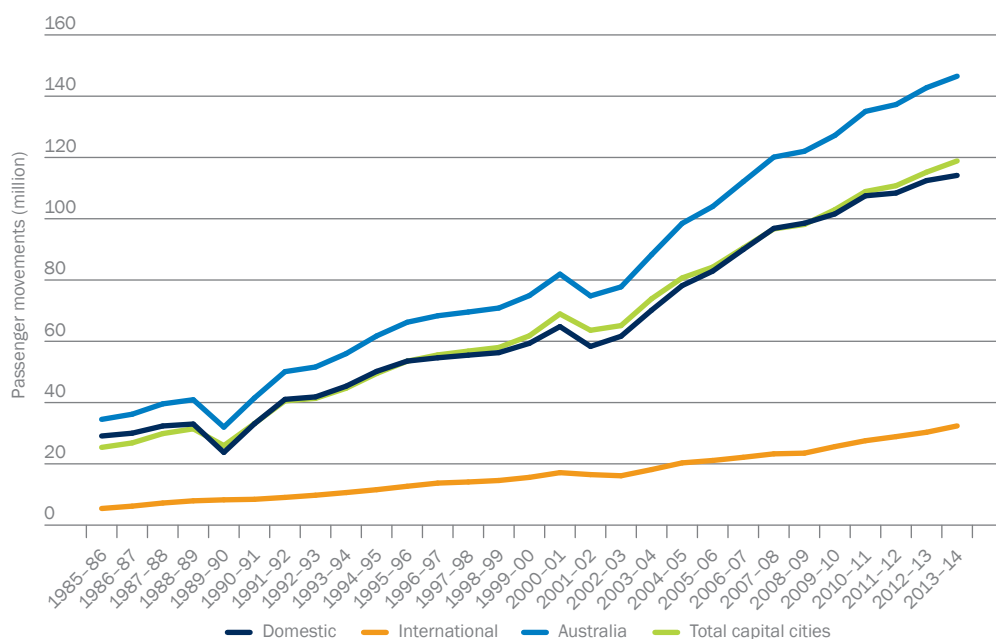
Source: BITRE, Waterline (various years).

The role of airports

Unlike ports, where commodities move in significant volumes through many non-major cities (such as Dampier and Port Hedland), Australia's international airports are all located in major cities. While the majority of Australian international trade once historically relied on seaborne transport through ports, the movement of people, high-value goods and services through airports has become integral to modern trade.

As Australian cities grow, and firms and the individuals within them increasingly specialise, work-related air travel is becoming increasingly common. This means that easy access to airports is an integral consideration for businesses. The total number of passengers moving through Australia's airports has increased by an average of almost 5 per cent per year in the last 20 years, rising to 146.5 million in 2013–14 (BITRE 2014a). Growth in the number of passenger movements has been particularly strong since the early 2000s.

Growth in the number of domestic passenger movements has made up the majority of this, although the number of international passenger movements has also grown significantly (see Figure 4.11).

Figure 4.11 Air passenger movements through all Australian airports, 1985–2013

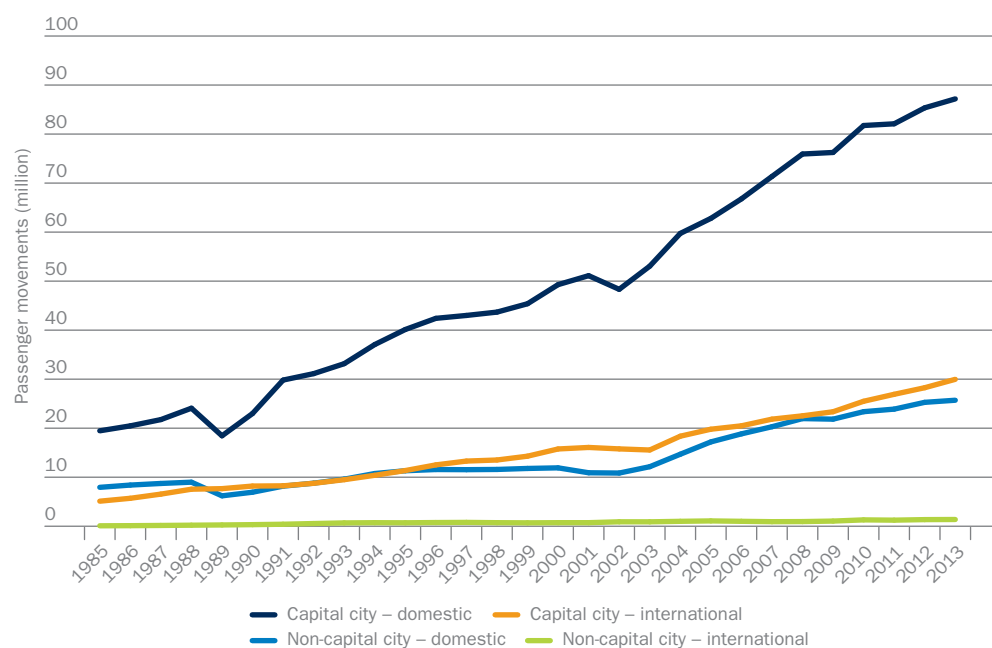
Source: BITRE 2014a.

This strong year-on-year growth in passenger numbers is forecast to continue, with the number of domestic and international passenger movements projected to increase by 3.3 and 4.9 per cent respectively per year to 2031 as shown in table 4.7.

At this rate, the number of passengers passing through Australia's airports is forecast to more than double by 2031 compared with 2010–11 figures. Australia's airports may therefore need to accommodate the movement of 207 million domestic passengers and 72 million international passengers each year (BITRE 2012).

Australia's biggest and busiest airports are in capital cities, with these major airports responsible for the vast majority of passenger movements both internationally and domestically (Figure 4.12).

Figure 4.12 Air passenger movements through capital city airports, 1985–2013



Source: BITRE 2014a.



Sydney Airport is currently, and forecast to remain, Australia's busiest airport. By 2031, Sydney Airport is forecast to have 72 million passenger movements annually, followed by Melbourne, Brisbane, Perth and Adelaide. Growth is anticipated to be fastest in Perth, Brisbane and Darwin (Table 4.7).

Table 4.7 Air passenger movements by airport, actual and projected, 2010–11 to 2030–31

Airport	Number of movements			Annual average growth rate	
	Actual 1991–92 (millions)	Actual 2010–11 (millions)	Forecast 2030–31 (millions)	Actual 1991–92 to 2010–11 (per cent)	Forecast 2010–11 to 2030–31 (per cent)
Capital city airports					
Sydney	15.2	35.8	72.0	4.6	3.6
Melbourne	10.4	28.0	60.4	5.4	3.9
Brisbane	6.7	19.9	45.1	5.9	4.2
Adelaide	3.0	7.3	13.5	4.7	3.1
Perth	3.1	10.9	25.7	6.9	4.4
Hobart	0.7	1.9	3.5	5.6	3.0
Darwin	0.6	1.8	4.2	6.3	4.2
Canberra	1.4	3.2	6.1	4.7	3.3
All capital city airports	41.0	108.9	230.5	5.3	3.8
Non-capital city airports					
Newcastle	0.1	1.2	2.2	17.9	3.1
Cairns	1.8	3.9	8.0	4.1	3.7
Gold Coast	1.5	5.5	13.1	7.1	4.4
Townsville	0.5	1.6	3.4	6.6	3.7
Launceston	0.5	1.2	2.0	5.0	2.7
5 airports total	4.3	13.4	28.7	6.1	3.9
Other airports	5.3	12.8	20.1	4.8	2.3
All non-capital city airports	9.6	26.2	48.8	5.4	3.2
All airports	50.6	135.1	279.2	5.3	3.7

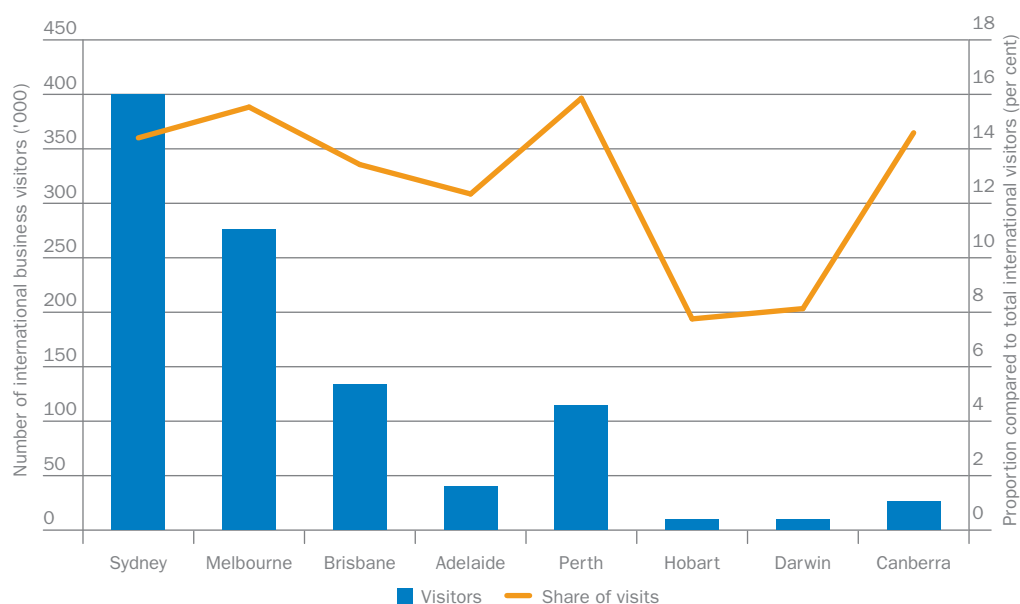
Source: BITRE 2012.

Some cities see a higher proportion of business travelers amongst their international visitors. As shown in Figure 4.13, there were an estimated 400,000 international business travellers to Sydney in 2012–13 compared with other capital cities like Melbourne (276,000) and Brisbane (133,000).

However, as a proportion of the total number of international visitors travelling to Sydney, business travellers represented an estimated 14 per cent of visitors, while the comparable proportion of business travellers to Melbourne and Perth in 2012–13 is higher at an estimated 16 per cent. The estimates for Hobart and Darwin had the lowest proportion of international business travellers to capital cities, with only 8 per cent of visitors travelling for business.

Cairns had over double the rate of international visits per 1,000 residents of any non-capital city in 2012. The largest relative increase in international visitors, of 68 visits per 1,000 residents, was in Bendigo, 2006–2012.

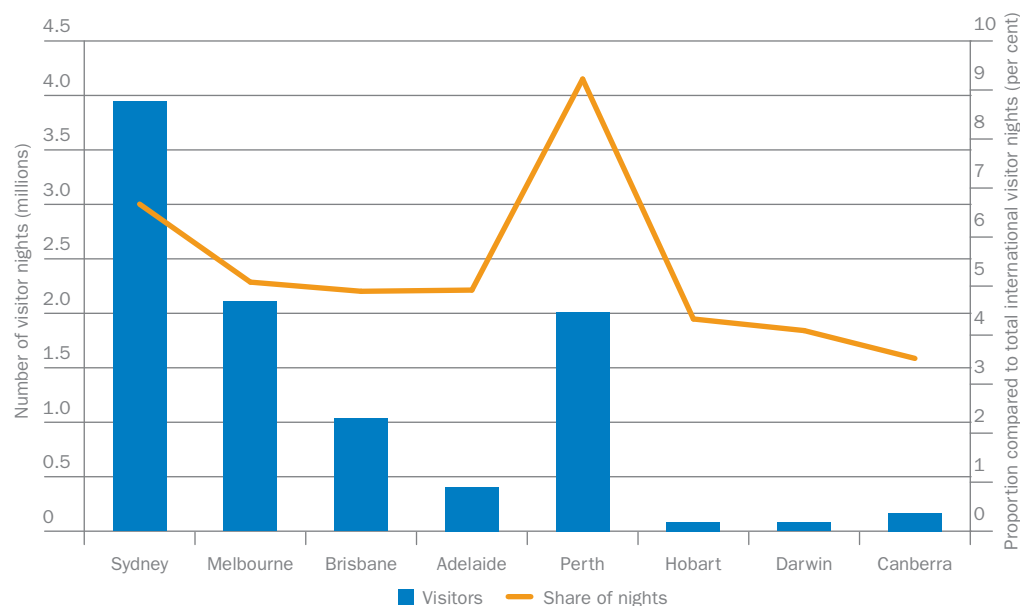
Figure 4.13 *Estimated number and proportion of international business visitors by capital city, 2012-13*



Source: Tourism Research Australia 2013.

Similar to the estimate for overall number of visitors, in 2012-13 the survey of visitors to Sydney estimated a considerably higher number of international business visitor nights compared with other capital cities (almost 4 million), as shown in Figure 4.14. Melbourne, with just over an estimated 2 million international business visitor nights, and Perth, with an estimated 2 million international business visitor nights, were the second and third highest capital cities respectively.

Figure 4.14 *Estimated number and proportion of international business visitor nights by capital city, 2012-13*



Source: Tourism Research Australia 2013.

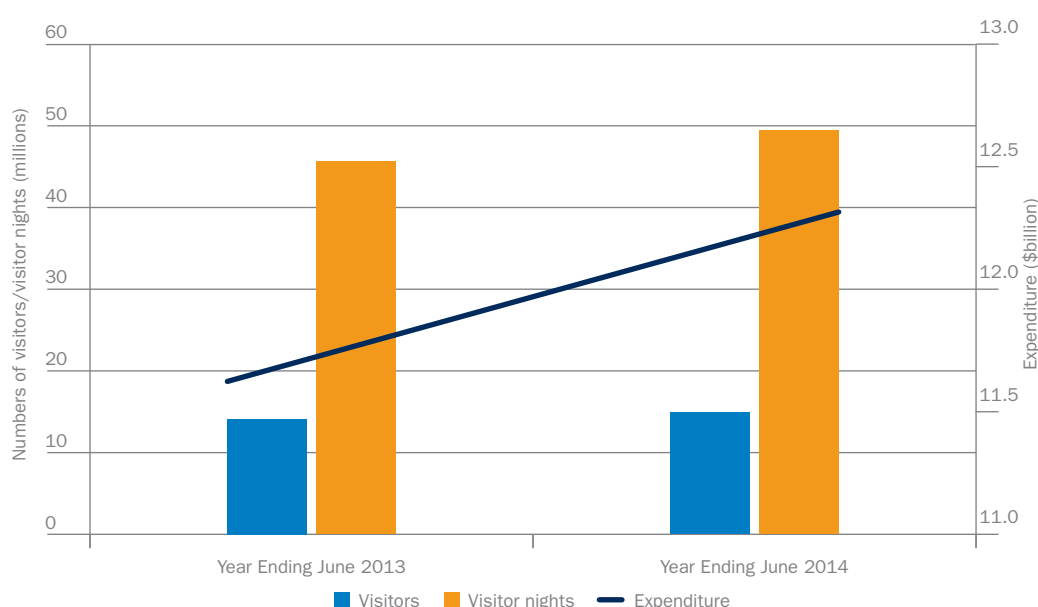
The role of domestic business travellers

To the year ending June 2014, based on surveys where passengers indicated their main reason for travel was business, it was estimated that there were approximately 14.9 million domestic trips undertaken for business purposes. This represents an increase on the figure for the year ending June 2013 (up from approximately 14.1 million).

In terms of number of visitor nights, for the year ending June 2014, as shown in Figure 4.15, there were an estimated 49.4 million business visitor nights for Australian residents travelling for business. The total expenditure of these individuals whilst travelling for business was an estimated \$12.3 billion, an increase compared with the year ending June 2013 (45.6 million business visitor nights and \$11.6 billion in expenditure respectively).

This would indicate that, in a similar way to international business travellers, domestic business travellers create substantial economic activity during their trips, be they intrastate or interstate.

Figure 4.15 *Estimated number of domestic business travellers, (overnight visitors, visitor nights and expenditure), 2013-2014*



Source: Tourism Research Australia 2014.

There are quite apparent differences between the states and territories in terms of the composition of their domestic business travellers. For example, in New South Wales and Victoria, business visitors are estimated to account for approximately 17 per cent of the total number of domestic visitors overall. In comparison, within the Northern Territory and the Australian Capital Territory, over 30 per cent of domestic visitors indicated in the survey that they are travelling for business.

The estimate of the highest number of business-related trips in the year ending June 2014 occurred in New South Wales (4.5 million visitors). Around 57 per cent of this figure is intrastate travel. This is similar to the estimate for Victoria, where the comparable intrastate travel figure is 55 per cent.

In Queensland business travel accounted for 69 per cent and for Western Australia it was 67 per cent. This may reflect the differing levels of activity in each state's economy, and business travel associated with the resources industry.

Conclusion

While it can be argued that globally competitive export-orientated industries are a significant component of national prosperity, the bulk of the economic activity and productivity drivers of the economy occur within the cities that are the gateways to the global market. This gateway function is facilitated through the application of knowledge-intensive processes benefiting from agglomeration economies and the capacity, strength and efficiency of city airports and seaports.

Increasing the productivity of cities helps to improve the productivity of the whole country. Transport infrastructure can play a critical role in productivity increases for urban economies through improving accessibility to global and national markets. Seaports and airports have a crucial role to play as the gateways to Australian cities and the Australian economy for trade and travellers.

It is clear that business and knowledge sector employers favour central city locations due to strong global linkages facilitated through access to these international gateways; the airports and ports. In addition, the freight task is forecast to grow significantly in the coming decades with commensurate pressure on the landside transport infrastructure in cities where many freight movements originate and terminate.

It is also clear that the distribution of jobs across a city is not even, both in terms of the number of jobs and the type of employment. There is a marked spatial distribution in industry employment structures in cities with population-serving jobs being more dispersed and tending to follow where population is growing. Changes in the economic structures in the city and the clustering of higher-paying and more productive knowledge sector jobs in the city centre are in stark contrast to the relatively low levels of economic activity further from the CBD, in the places where many people live. The **Human Capital and Labour** chapter explores these issues in more detail.

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Chapter 5

Human Capital and Labour



This chapter looks at the contribution that people make to the productivity of Australia's major cities and the way that city structures affect labour productivity.

Human capital is what enables people to earn a living; it is the knowledge and skills that enable them to contribute to a firm's production, for which they are remunerated. The OECD defines it very broadly as 'the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being' (Liu 2012).

Human capital is a vital ingredient of economic growth, along with physical capital (plant and machinery) and infrastructure. It plays a particularly important role in the knowledge economy.

Human capital can be expanded through investments, such as formal education or on-the-job training and experience, that improve worker skill and subsequently increase their productive capacity, benefiting themselves, employers, and the broader economy.

Economists are unable to directly measure human capital (Liu 2012), but they can measure it indirectly, using indicators such as the productivity of the population, the populations' level of education, or its rate of labour force participation. This chapter considers such measures for Australian cities.

Labour force participation

The labour force participation rate is a measure of the proportion of people either currently employed or actively seeking work compared with the total working age population. The higher the labour force participation rate, the higher the potential economic output and, if everything else is unchanged, the higher the level of Gross Domestic Product (GDP) per capita.

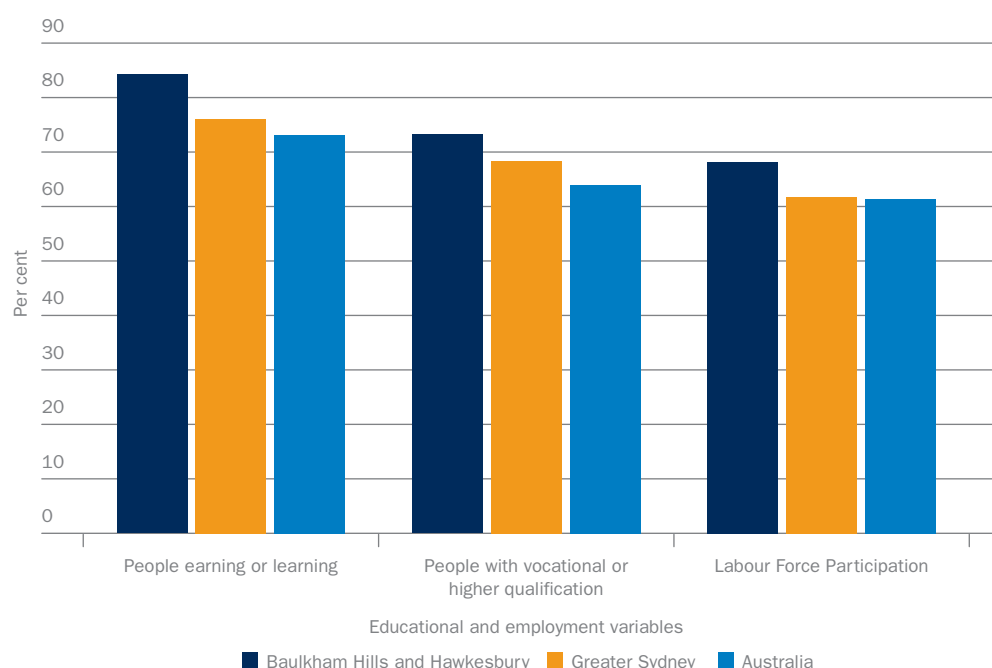
Higher workforce participation may also reduce fiscal pressures associated with welfare support and address other consequences of long-term unemployment. These include negative impacts on individual financial and psychological well-being, poorer health outcomes and the loss of employability skills (Brotherhood of St Laurence 2014).

Higher workforce participation also improves social inclusion and equity. Key benefits of this include increased social cohesion, inclusion and tolerance, reduced crime rates, strengthened social capital, increased quality of civic life (active citizenship, civic and political participation), increased charitable giving and participation in community services and technological change (that is, improved ability to adapt to and use technology) (National VET Equity Advisory Council 2011).

The *Progress in Australian Regions–Yearbook 2014* shows that those areas with a higher percentage of labour force participants have correspondingly higher levels of people with vocational or higher education qualifications along with higher levels of people aged 15 to 24 who are earning or learning (see Figure 5.1). For example, the Baulkham Hills and Hawkesbury region of Sydney has:

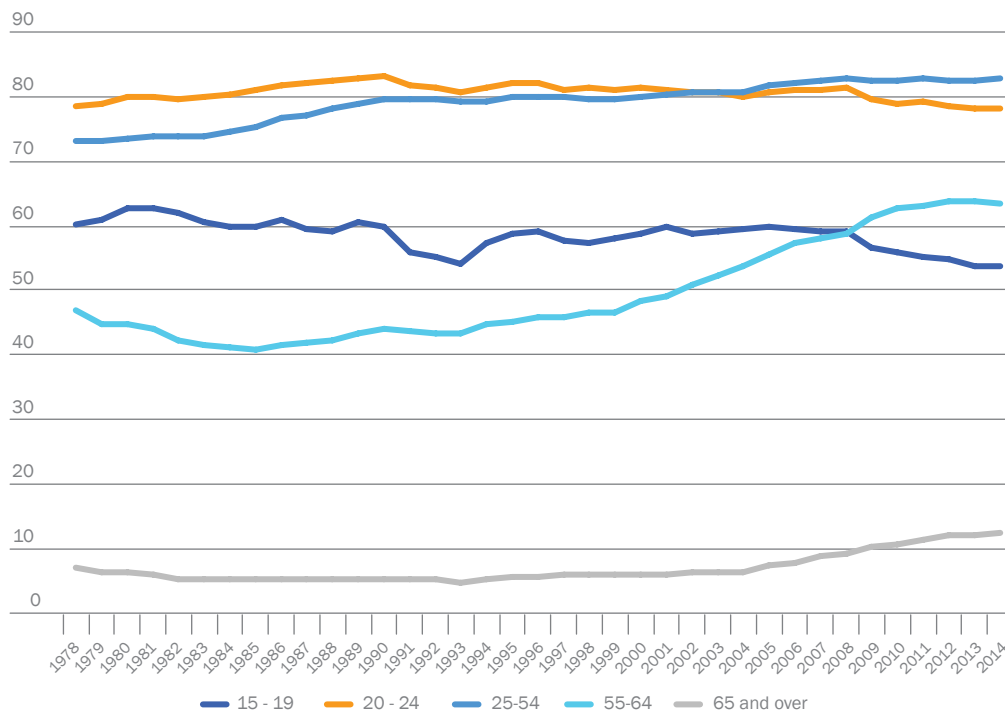
- a labour force participation rate of 68.2 per cent, which is 6.5 percentage points higher than the Greater Sydney region's rate of 61.7 per cent
- a higher proportion of people with vocational or higher education qualifications than the comparable figure for Sydney (nearly 5 percentage points higher)
- a higher proportion of people aged 15 to 24 who are earning or learning than experienced in the Greater Sydney region (more than 8 percentage points higher).

Figure 5.1 Selected comparisons of earning or learning, vocational or higher qualifications and labour force participation



Source: DIRD 2014.

Over recent decades, Australia's labour force participation has experienced strong growth, largely due to increased participation of females aged 24 to 54 years and increased participation for both males and females aged 45 years and above (Borland 2011, Gilfillan and Andrews 2010, ABS 2012b). There has been a particularly notable rise in the participation rate of people traditionally classed as nearing retirement, with many people aged 55 to 64 years now either staying in the workforce for longer or seeking employment. The participation rate of people over 65 has also shown an upward trend (Figure 5.2), rising from 6.5 per cent in 2001 to 11.8 per cent by 2013–14.

Figure 5.2 Labour force participation rate by selected age groups 1978 - 2014

Source: ABS 2014a.

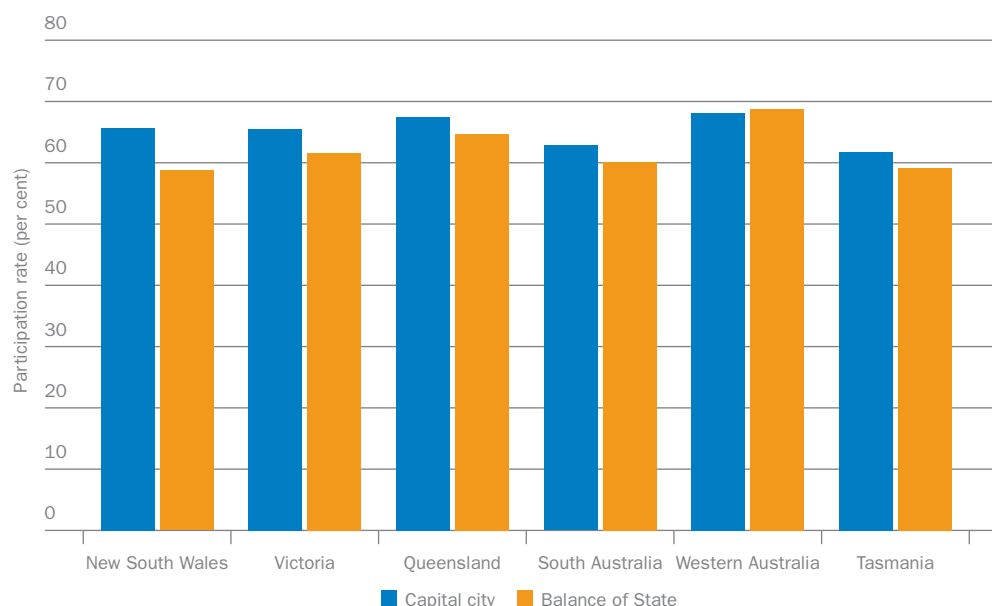
Note: Each year is calculated as from January to December with the exception of 2014, which is calculated from January to August.

The 2015 Intergenerational report found that, in the absence of overseas migration, the ageing of Australia's population will lead to a fall in living standards as a consequence of the falling share of working age people in the total population (Australian Treasury 2015). There are two main ways to offset this. The first is to ensure an environment exists whereby the current workforce is able to be more productive. The second is to provide circumstances in which labour force participation rates increase. Given that Australia is highly urbanised and urban areas have significantly higher labour force participation rates, this has the potential to counteract to some extent, the impact on participation rates of Australia's ageing population. These options have been detailed in the recent Australian Government Intergenerational Reports (Australian Government 2007, 2010, 2015). The 2015 report projects that by 2054-55 the labour force participation rate for Australians aged 15 and over would have fallen from 64.6 per cent today to 62.4 percent. The report notes that female employment is anticipated to continue the strong growth seen over the past four decades, from 66 per cent of women aged 15 to 64 today to 70 per cent in 2054-55. Participation rates for people aged over 65 are also projected to increase strongly, from 12.9 per cent today to 17.3 per cent in 2054-55 (Australian Treasury, 2015).

People with higher education levels tend to have a much stronger connection to the labour force and are more likely to participate in the labour force for a larger proportion of their lives. Additionally, young people, particularly females, are more highly educated than the generation before and are much more likely to participate in the labour force than the generations preceding them.

Analysis of labour force participation is traditionally not spatially framed; it does not consider the impact of geography on outcomes. But data shows that cities are linked to higher participation and reveal different labour force participation outcomes between cities.

These findings show that infrastructure and land use have important influences on participation, as does the state of the local economy, with strong economic conditions generally enabling more people to join or stay in the labour force.

Figure 5.3 Labour force participation in selected capital cities

Source: ABS 2014a.

Large cities and capital cities tend to have higher workforce participation rates (see Figure 5.3). The majority of capital cities have a clearly higher rate of participation, while Western Australia's difference can be attributed to the regional mining industry in that State. It should be noted that in most instances 'balance of state' includes

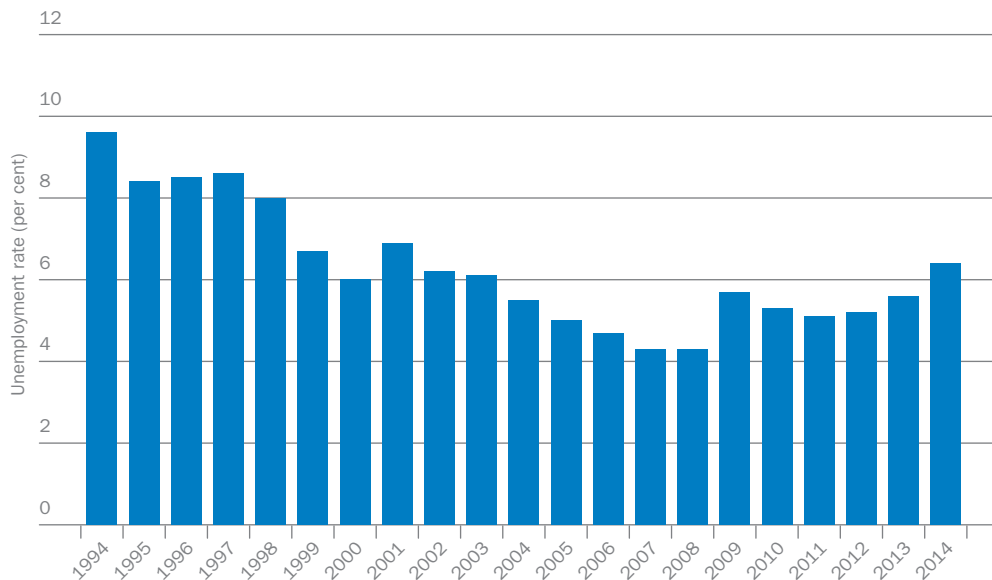
regional major cities, where for example, participation rates in Newcastle – Lake Macquarie, Cairns and Wollongong (Illawarra) were 62.7, 62.6 and 56.9 percent respectively.

The higher participation rate is partially explained by workers with high human capital being drawn to cities, but also suggests that cities have an important effect on increasing or activating workers' human capital. In this way, cities can have a positive effect on national productivity. Being in a city also tends to encourage development of the human capital of their resident populations, and thereby lift the ability of workers to deploy their human capital productively. In fact, international evidence has recognised that individuals' productivity generally rises with the size of the city in which they work (Ahrend 2014).

There is a labour force participation rate gap between capital and non-capital major cities. For example, in December 2014, the labour force participation rate was 72 per cent in the Eastern Suburbs of Sydney and 57 per cent in the Illawarra (there is a distance of approximately 80 kilometres between the two) (Department of Employment 2014). Interestingly, the labour force participation rate in Cairns was 62.6 percent in 2014 yet it was one of only two cities that did not record an increase in labour force participation rates between 2001 and 2011. It experienced a decrease of approximately 2.4 percentage points, although it still had participation rates well above the national average in 2011. Since approximately 2.5 million Australians live in non-capital major cities, this could represent a large pool of underutilised human capital.

Labour force participation rates differ greatly not just between cities but also within cities. There are areas within major cities that have significantly lower labour force participation and this represents another pool of underutilised human capital.

Employment, underemployment and unemployment need to be considered along with labour force participation to get an accurate picture of labour supply and utilisation. Australia's seasonally adjusted annualised unemployment rate, shown in Figure 5.4, highlights that employment levels have not fully recovered to pre-Global Financial Crisis (GFC) levels.

Figure 5.4 Australia's unemployment rate (seasonally adjusted), 1994–2014

Source: ABS 2014a.

Note: Each year is calculated as from January to December with the exception of 2014, which is calculated from January to August.

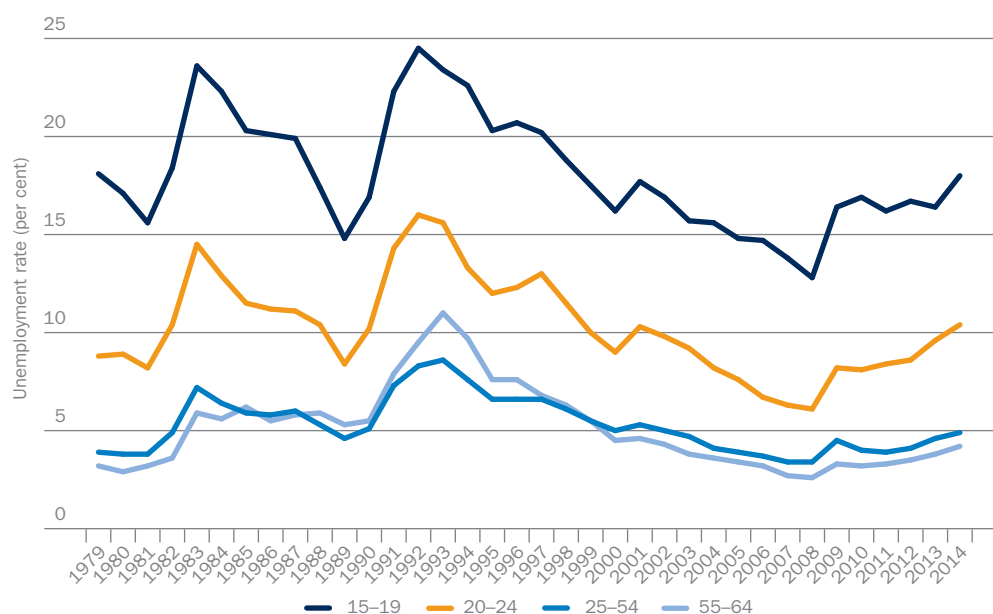
However caution should be taken when assessing 'unemployment' at such an aggregate level, as there are different types of unemployment, and unemployment is not distributed evenly across the Australian population; there is substantial variation both spatially and between demographic groups.

In addition, the impacts of unemployment are distributed across cities in an uneven manner. For example, the Progress in Australian Regions – Yearbook 2014 data records the average duration of unemployment in North Sydney and Hornsby in 2013 was 19 weeks, while the average for South-West Sydney was 55 weeks. While this was a decrease from 62 weeks in 2003 (DIRD 2014, table P 2.3.1), it remains well above the citywide average of 39 weeks.

Cities with lower unemployment are likely to attract more workers with high human capital. Cities with higher unemployment tend to have lower cost of housing and may attract less-skilled people.

Demographic changes can also have an impact on employment, particularly with respect to the issue of ageing (discussed in the **Population** chapter of this report).

As indicated above, unemployment can be unevenly spread across the population, particularly in different age groups, as shown in Figure 5.5. Notably, younger jobseekers experience disproportionately higher rates of unemployment, particularly during economic downturns, such as the recessions in the early 1980s and 1990s and the Global Financial Crisis (GFC) (2008–09).

Figure 5.5 Australia's unemployment rate by age, 1979–2014

Source: ABS 2014a.

Note: Each year is calculated as from January to December with the exception of 2014, which is calculated from January to August.

The rise in the 15–19 and 20–24 age groups' unemployment rates since approximately 2008, when considered alongside the fall in labour force participation rates observed for these groups (Figure 5.2), shows the significant post GFC impact on young people attempting to enter the workforce. There are significant differences in the change of unemployment rates in non-capital major cities, reflecting the different regional economies centred there. For example, the unemployment rate for Gold Coast-Tweed Heads dropped from 9.9 per cent in 2001 to 7.5 per cent in 2011. Over the same period, in Launceston it dropped from 9.5 per cent to 6.6 per cent, in Sunshine Coast it dropped 4.3 percentage points to 7.1 per cent and in Toowoomba it dropped from 7.4 per cent to 5.1 per cent.

Underemployment generally refers to people in casual or part-time employment who would prefer to work a greater number of hours. It was estimated that in September 2014 over 1 million Australians were

underemployed (Roy Morgan Research 2014). Underemployment will often disproportionately impact on young people and, in a similar way to unemployment, can have detrimental impacts on both individuals and society in terms of financial and psychological well-being and the effective utilisation of skilled labour.

Labour mobility and labour market disadvantage

A person's human capital has implications for their labour mobility and influences how likely they are to experience labour market disadvantage. The more educated a person is, the more likely they are to participate in the labour force.

For the nation, a skilled workforce also supports ongoing economic development and improves overall living conditions. The *Progress in Australian Regions – Yearbook 2014* shows that the percentage of people with a Certificate III or above who are employed in a skilled occupation is rising across Australia, but the strongest growth is in major cities. For example, Greater Adelaide recorded an increase of 10.1 percentage points in the number of people with a Certificate III or above in the period 2001–2011, while the rest of South Australia recorded an increase of 6.4 percentage points. The Sunshine Coast saw an increase of 12.3 percentage points, while the rest of Queensland rose by 9.1 percentage points.

In Western Australia, Perth saw an increase of 9.5 percentage points, while the rest of Western Australia rose by 5.3 percentage points. In Victoria, Melbourne saw an increase of 10.5 percentage points while the rest of Victoria rose 8.5 percentage points.

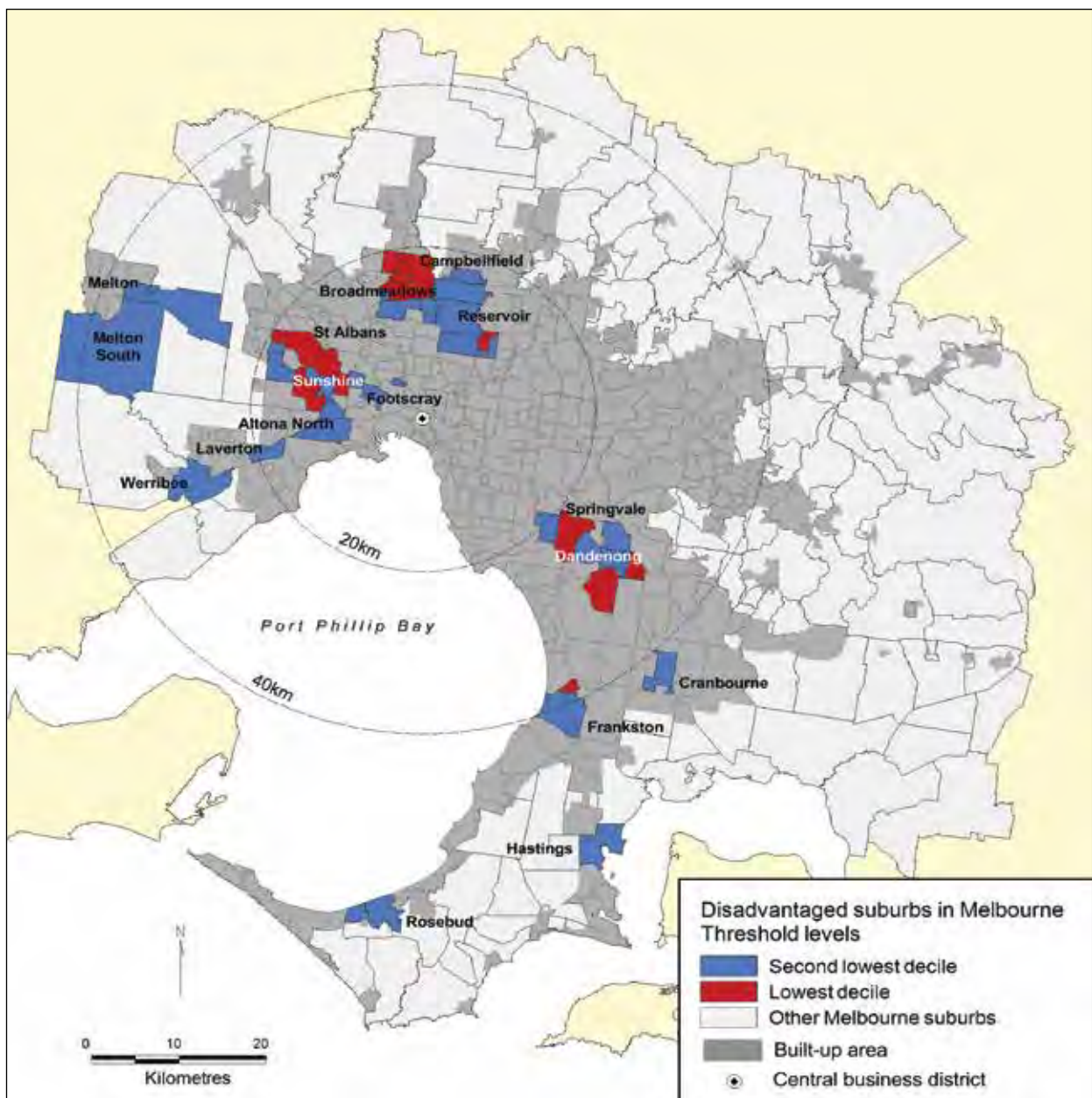
For the country as a whole, the *Progress in Australian Regions – Yearbook 2014* also records a nationwide trend in the growth in the number of people with a vocational or higher qualification (DIRD 2014, table P 2.1.1).

It has been found that individuals with high levels of human capital, education, experience or training, have the capacity not only to respond to work opportunities in a wide variety of locations but also to access the search networks and institutional support that enables them to relocate regionally, nationally and even internationally (2009). It is apparent that certain cities and parts of cities have much higher unemployment rates and higher estimated rates of underemployment. Those areas tend to be on city fringes, where access to jobs and institutional support is relatively poor.

Young people may be especially disadvantaged by poor transport connectivity. In areas with the weakest public transport connectivity, young people find it difficult to access labour markets. By virtue of their age or lack of work experience, skills and finances, their transport options may be limited to public transport, restricting the range of jobs available to them across a city.

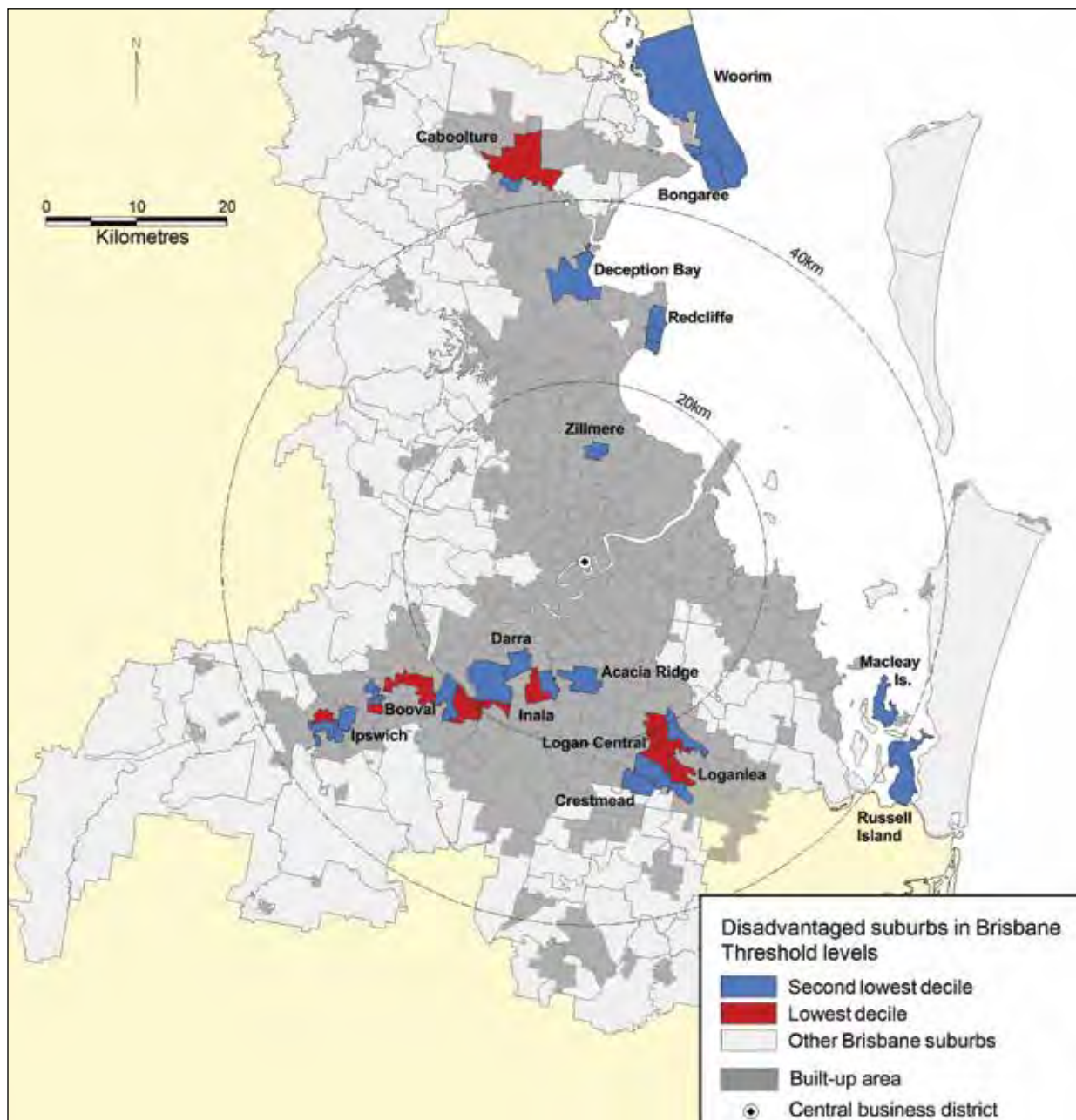
In 2011, Sydney, Melbourne and Brisbane, 177 suburbs, or 10 per cent of all suburbs, were classed as 'disadvantaged' with 1.7 million people living in the disadvantaged suburbs (16 per cent of the total population of the 3 cities) (AHURI 2014). Disadvantaged suburbs in these 3 largest cities formed distinct spatial clusters or corridors, predominantly in middle and outer suburbs and peri-urban areas.

Map 5.1 *Disadvantaged suburbs in Melbourne: lowest and second-lowest decile threshold levels*



Source: AHURI 2014.

Map 5.2 Disadvantaged suburbs in Brisbane: lowest and second-lowest decile threshold levels

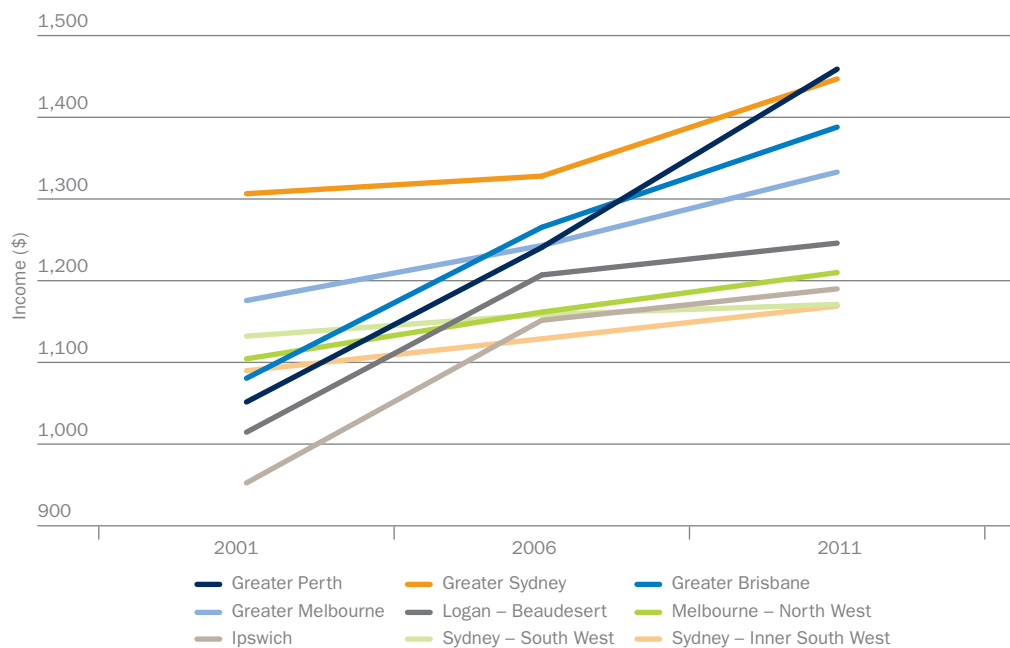


Source: AHURI 2014.

As shown in Maps 5.1 and 5.2, disadvantaged areas can be seen in 3 clear clusters in the west, north and south east of Melbourne, and in a corridor stretching inland along the Brisbane River and in the south of Brisbane's metropolitan area.

The *Progress in Australian Regions – Yearbook 2014* gives an indication of this spatial distribution when recording the trend in real median weekly household incomes in different parts of Australian cities. For example, progress is shared differently between and across cities, as shown in Figure 5.6.

For example, while for all of Greater Sydney real household weekly income grew from \$1,300 in 2001 to approximately \$1,450 in 2011, in South-West Sydney real weekly household income grew by less than \$50 over the same period. In comparison the real median weekly household income for Mackay grew by \$580, from \$992 in 2001 to \$1,572 in 2011.

Figure 5.6 Selected real median weekly household incomes, 2001–2011

Source: DIRD 2014.

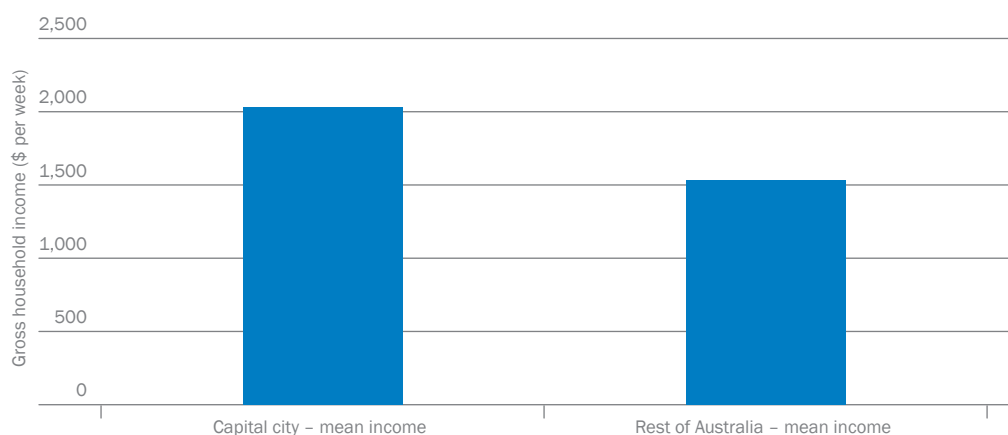
Human capital in cities

As discussed, cities attract human capital, but they do more than that. By co-locating educated and innovative people, they amplify the effect of human capital.

The clustering of jobs and people in cities increases the range of jobs on offer to a worker and gives them greater choice in employment. This improved choice allows them to best match their skills to a job, and in the process work in a number of different jobs and gain a range of experiences (which can be seen as on-the-job investment in their human capital).

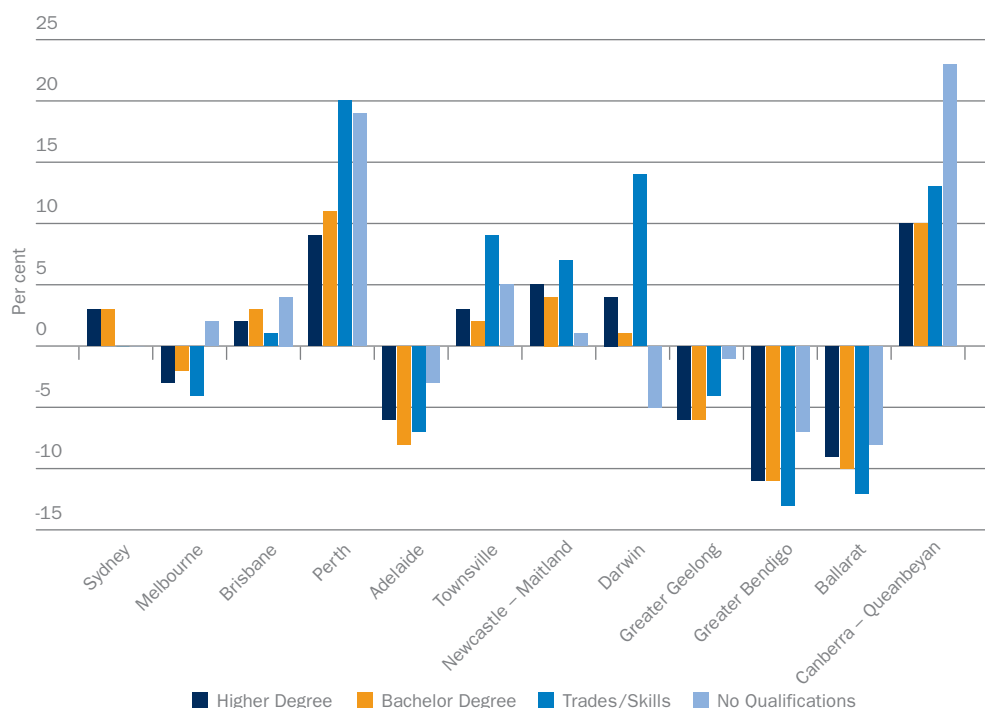
Human capital is particularly important in post-industrial or ‘knowledge-intensive’ economies, which are increasingly located in the inner parts of Australian cities. Educated people in close proximity can spark new combinations of ideas and technologies that add value. Reflecting the rise of knowledge intensive industries, the price premium paid to more highly skilled labour throughout the developed world has increased dramatically since the 1970s.

Highly productive firms and workers with high human capital means higher productivity and wage premiums paid to workers. Earnings in Australia’s largest cities tend to be higher than in the regional areas of their states, principally reflecting the higher value added (Figure 5.7).

Figure 5.7 Average Australian personal income, 2011–12

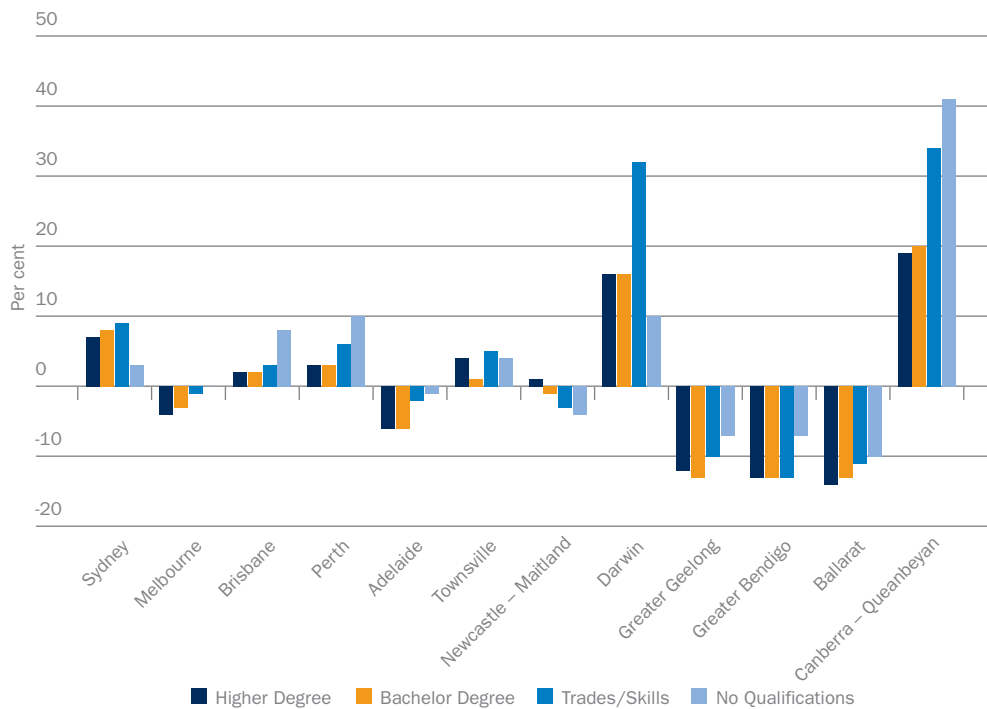
Source: ABS 2012b.

Figures 5.8 and 5.9 show the education-based price premiums by qualification of males and females in selected major cities against the Australian average for that level of qualification. Differences in lifetime earnings based on level of education (measured in terms of qualification) reflect the price premium that those with higher levels of education (human capital) can command in a labour market.

Figure 5.8 Education price premium paid in selected major cities compared with the Australian male average lifetime earnings per qualification, 2011

Source: ABS 2012a, SGS Economics & Planning 2014.

Figure 5.9 Education price premium paid in selected major cities compared with the Australian female average lifetime earnings per qualification, 2011

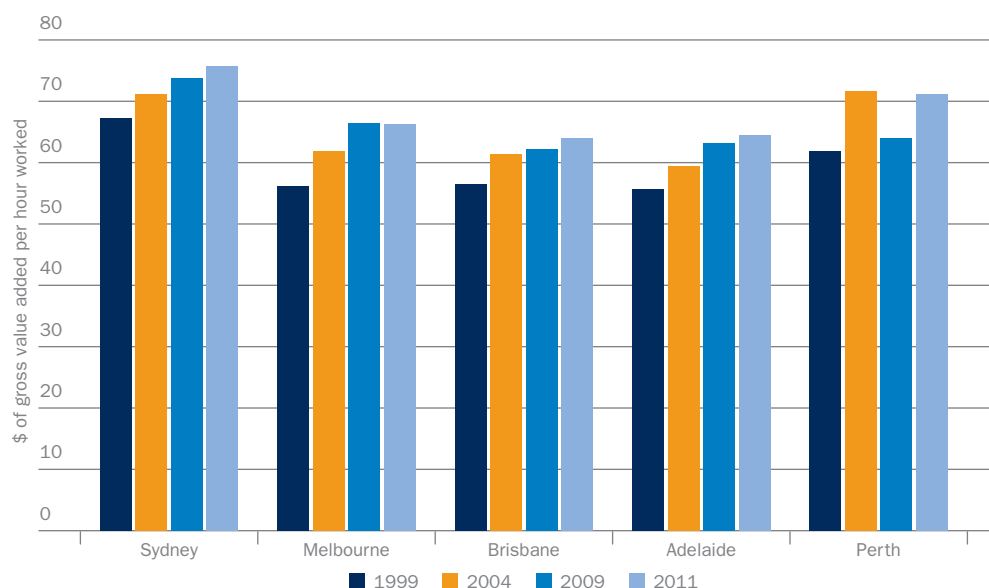


Source: ABS 2012a, SGS Economics & Planning 2014.

Lifetime earnings by qualification level vary considerably from city to city in Australia, reflecting the different economic and industry structure of Australia's cities and other localised factors.

The premium for educated workers offered in Melbourne and Adelaide is below the national average and the premiums offered in other large cities. Canberra–Queanbeyan offers considerably higher wages than the Australian average for all qualification levels, particularly for trade qualifications or no qualifications. Perth, Townsville, Newcastle–Maitland and Darwin offer price premiums for trade qualified individuals, particularly males. This is likely to reflect the mining-based economies of these cities. Greater Geelong, Greater Bendigo and Ballarat offer considerably lower lifetime wages when compared with the Australian average.

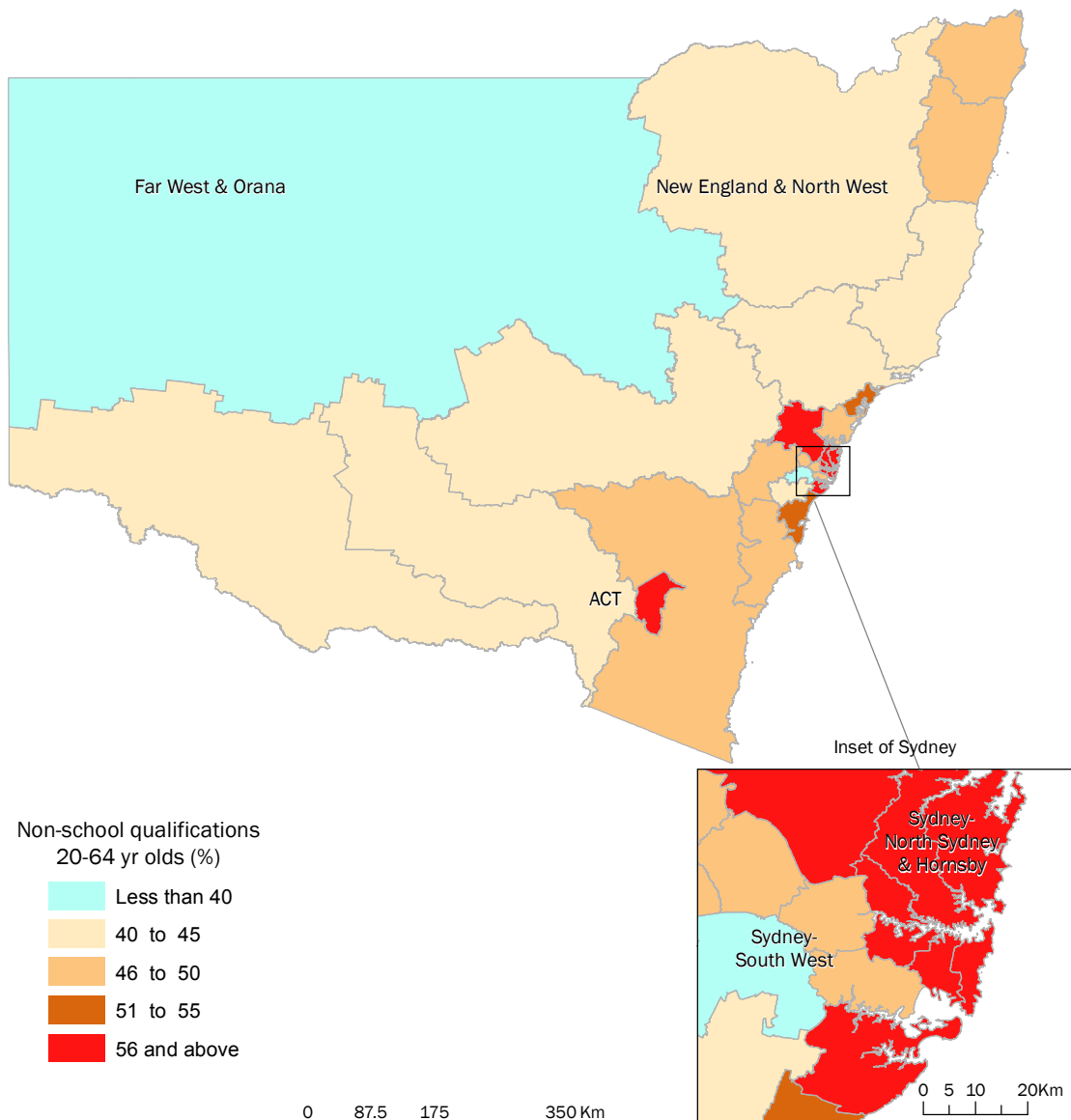
Labour supply in a city is also influenced by factors such as the livability or the cost of living, safety, climate and amenity. As a result, some labour markets may pay a price premium because attracting certain types of labour is challenging. Canberra–Queanbeyan, for instance, has a large number of workers with higher degrees and bachelor degrees, whereas workers with trade qualifications and no qualifications are less prevalent.

Figure 5.10 Labour productivity by selected capital cities, 1999–2011

Source: COAG Reform Council 2012.

Australia's cities offer differing environments for workers. Sydney has the highest worker gross value added per hour and also contains the region with the highest intensity of further education, suggesting human capital is highly concentrated there. Perth has the highest labour force participation rate, reflecting the strong economic growth that has created many jobs and attracted workers from across Australia and the world.

Lifetime earnings by qualification level also vary considerably from city to city in Australia, reflecting the different economic and industry structure of Australia's cities and other localised factors. Workers with more education gather in cities, and residents of cities tend to become more educated.

Map 5.3 Population with non-school qualifications aged 20–64 years, New South Wales, 2011

Source: ABS 2012a.

Map 5.3 illustrates that high human capital tends to cluster in and around cities – it can be seen how non-school education rates, that is, post secondary school education, tend to be higher in cities compared with rural and regional centres. The effect is driven by both migration of highly qualified people and higher likelihood of existing residents pursuing non-school qualifications. Higher education rates are not perfectly analogous to higher human capital, but alongside data on earnings and labour force participation they provide evidence that cities are human capital hotspots.

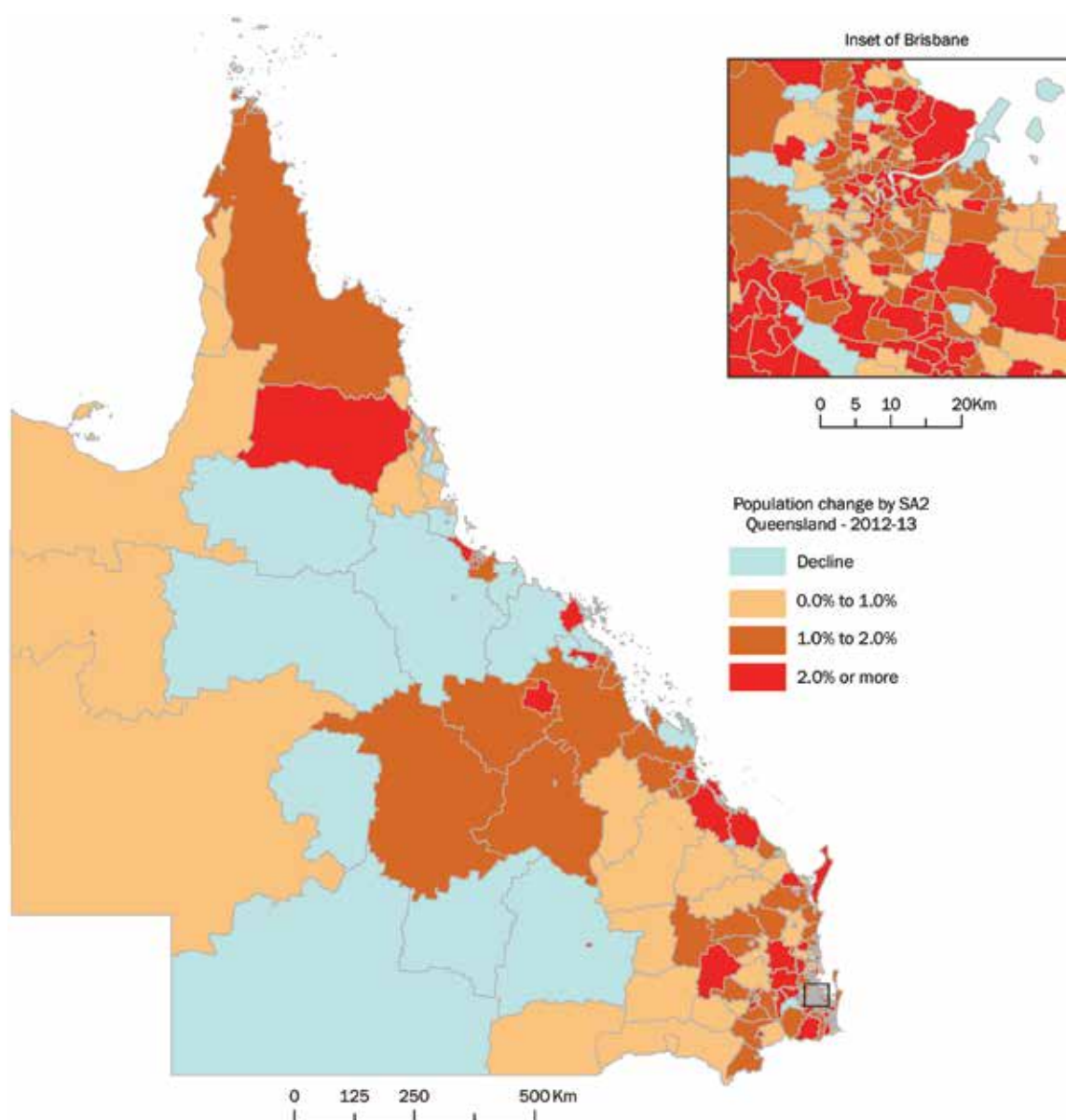
Certain parts of Australia's cities tend to be more productive than others; there are particularly dense centres where high value jobs are clustering and high levels of human capital accumulate (PwC 2014).

The spatial dynamic of human capital, whereby both high-quality jobs and individuals with higher human capital concentrate in inner cities, presents substantial issues for equity of access to opportunities. As discussed in the **Population** and **Settlement** chapters of this report, this creates long commutes for some workers, as the majority of new housing is located on the urban fringe. Workers with poorer transport options may find accessing the high-skill, high-paid jobs in the city centre too difficult and be locked out of that employment market, reinforcing the spatial divide.

One of the biggest advantages of cities in developed countries is their ability to develop and attract talented people – those with high human capital. Map 5.4 shows that in Queensland in 2013, city populations tended to grow faster than other areas.

The pattern is essentially consistent across Australia – international migrants move to cities, and there is a steady flow of young productive people from rural and regional areas to metropolitan areas.

Map 5.4 Population change by Statistical Area Level 2, Queensland, 2012–13



Source: ABS 2014b.

Businesses compete to attract highly educated and skilled workers. Many select locations for growth on the basis of the potential to attract talent there. Talented individuals are usually highly mobile; they want to live in places with the best career opportunities and the best quality of life. Individuals with high human capital have the ability to relocate to these places (Economist Intelligence Unit 2012). Urban environments that stimulate urban culture and creativity with mixed use, higher densities and a myriad of small businesses are the types of environments in which these individuals prefer to live and work (Montgomery 2007).

In that regard, all the other aspects of cities beyond 'the economy', such as built heritage, good architecture and urban design, quality public open space, social equality and feelings of fairness and security, all impact on a city's ability to attract and retain skilled people. They may influence a firm's long-term economic decisions and performance.

Many non-capital major cities experienced increases in the proportion of their populations with a vocational or higher education qualification. For example, in Newcastle it rose by 11.5 percentage points from 52.5 per cent in 2001 to 64.0 per cent in 2011. In Launceston over this period it increased by a similar number of percentage points to reach 58.8 per cent.

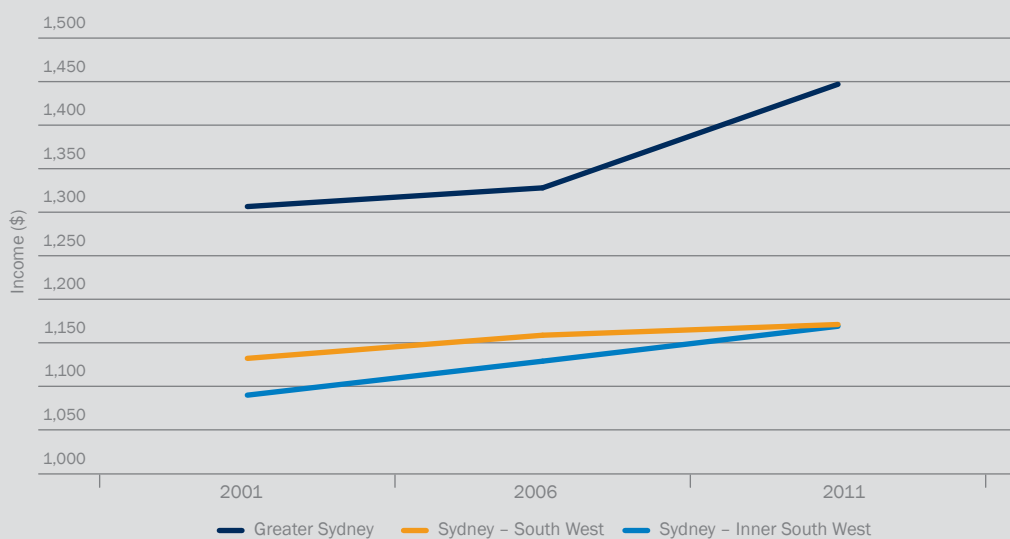
Case study: Progress in cities

The data contained in the *Progress in Australian Regions – Yearbook 2014* gives us an opportunity to record socio-economic progress within cities.

As shown in this report, some parts of cities have progressed at different rates and it is illustrative to directly compare some of those parts of cities progressing more slowly against the city average. This report does not seek to address the causes of these differences, but notes that the measurement of progress in Australian cities should consider all aspects of progress including lower baselines.

As shown at Figure 5.11, progress within cities on measures such as real weekly household income varies and is related to where you live. While the Inner South West started lower than South-West Sydney, it has progressed, as has the rest of the city, whereas the South West has not shown the same rate of progress.

Figure 5.11 Selected real median weekly household incomes, Sydney

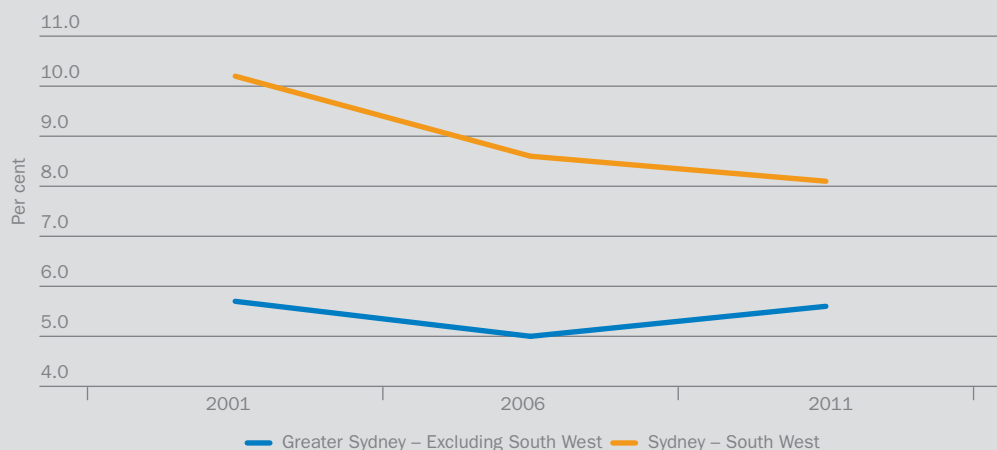


Source: DIRD 2014

Below is a series of direct comparisons of the progress for South-West Sydney against selected Progress in Australian Regions – Yearbook 2014 progress indicators when compared with the balance of Greater Sydney. The region, 'Greater Sydney' is based on the Greater Capital City Statistical Area (covering people who regularly socialise, shop or work within the city, including those that live in small towns and rural areas surrounding the city) while 'South-West Sydney' is based on the Statistical Area Level 4 (SA4s).

As shown in Figure 5.12, the unemployment rate for South-West Sydney is higher than that of Greater Sydney. Over the ten year period 2001 to 2011 the unemployment rate in South-West Sydney actually fell by over 2 percentage points, the largest decrease in all Sydney regions, but remains significantly higher than Greater Sydney.

Figure 5.12 Unemployment rate for South-West Sydney and Greater Sydney (excluding South-West Sydney), 2001–2011

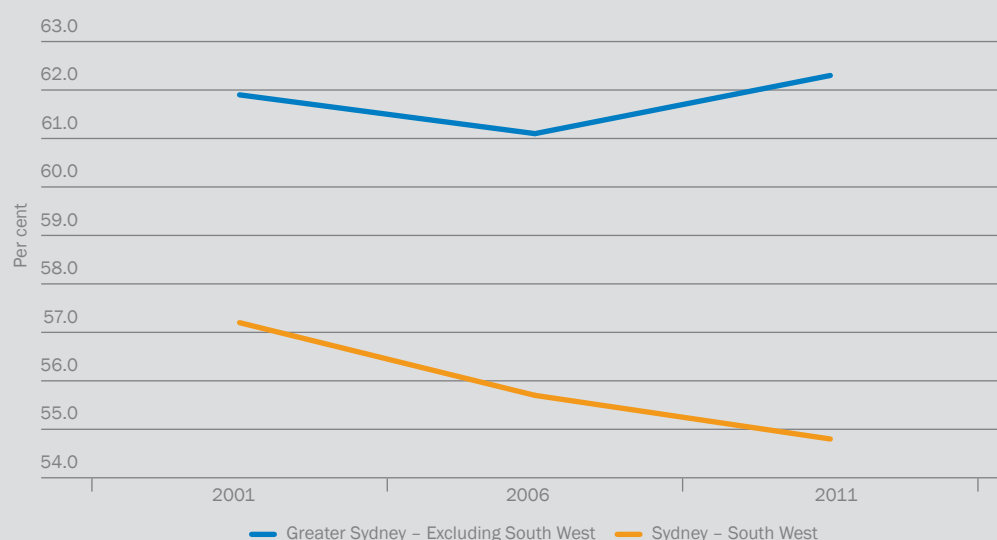


Source: DIRD 2014

This would at first seem to demonstrate a very positive outcome and significant progress for South-West Sydney. However, unemployment statistics measure those people who are looking for work but cannot find it.

It is important to therefore consider the rate of workforce participation alongside unemployment statistics, as a drop in unemployment rates may include components of people who have stopped actively seeking employment. The labour force participation rate in South-West Sydney started at a much lower level than the city as a whole and shows a steady downturn. Over the decade shown in Figure 5.13, the labour force participation rate in South-West Sydney fell 2.4 percentage points to 54.8 per cent, the lowest in Sydney and well below that of Greater Sydney with 62.3 per cent. So, while unemployment rates have fallen, it appears that this has been almost entirely due to people ceasing participation, rather than increases in the proportion of people actually in work.

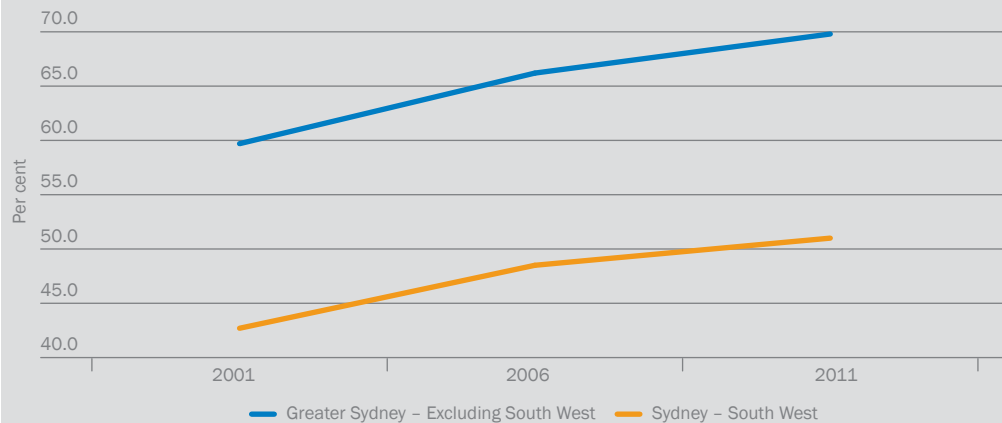
Figure 5.13 Labour force participation rates South-West Sydney and Greater Sydney (excluding South-West Sydney), 2001–2011



Source: DIRD 2014

As discussed in this Chapter, a measure of progress in cities is the Human Capital of its workers. Education of the population is a driver of productivity and measurement of qualified people or those with a vocational or higher education qualification shows South-West Sydney is again falling behind Greater Sydney (Figure 5.14).

Figure 5.14 *Proportion with a vocational or higher education qualification for South-West Sydney and Greater Sydney (excluding South-West Sydney), 2001–2011*



Source: DIRD 2014

The percentage of people in the South West with a vocational or higher education qualification grew by over 8 percentage points to 51 per cent between 2001 and 2011, but remains the lowest in Sydney and well behind Greater Sydney's 69.8 per cent.

Against some progress indicators, South-West Sydney is progressing. However, these direct comparisons give an example of where, despite recording progress, people living in some parts of our cities remain at a disadvantage.

Conclusion

Labour mobility and voluntary migration for economic gain are part of agglomeration. Educated workers gain from being in close proximity to others, so human capital flows to where it is abundant, not where it is scarce. People who invest in education and skills are more likely to migrate to economically leading places, where they can find high-value jobs in order to maximise the return on their investment. This process also works to boost the productivity of cities, as skilled people are more economically productive when they work alongside other skilled people, fostering economic innovation (Ross-Larson (ed.) 2009).

As more knowledgeable and skillful workers join the workforce, the overall productive capacity of labour is enhanced. A highly skilled, creative and motivated workforce will drive up labour force participation rates, address skills shortages in an economy and boost productivity (Department of Industry 2013).

Human capital can be expanded through investments (by either individuals, their employers or governments), such as formal education or on-the-job training and experience. These investments improve worker skill and subsequently increase their productive capacity and through cities, the productive capacity of the nation.

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Chapter 6

Infrastructure and Transport



The dynamics of Australia's cities, outlined in previous chapters, have increased demand for a diverse range of transport infrastructure and services to the point where, in total and across most modes, demand is at record levels.

While transport for many is a necessity of daily life and can of course always be improved, the true value of transport only becomes fully apparent when transport networks fail, become congested, incur delays, or are unsafe or unaffordable. The objective of transport planning and investment should be to maintain transport networks as enablers, globally and locally, rather than barriers to increased personal and business mobility. This chapter focuses on transport infrastructure not only because of the rapid increase in demand but also because transport infrastructure plays a crucial role in shaping cities, their economies and, ultimately, our urban lifestyles.

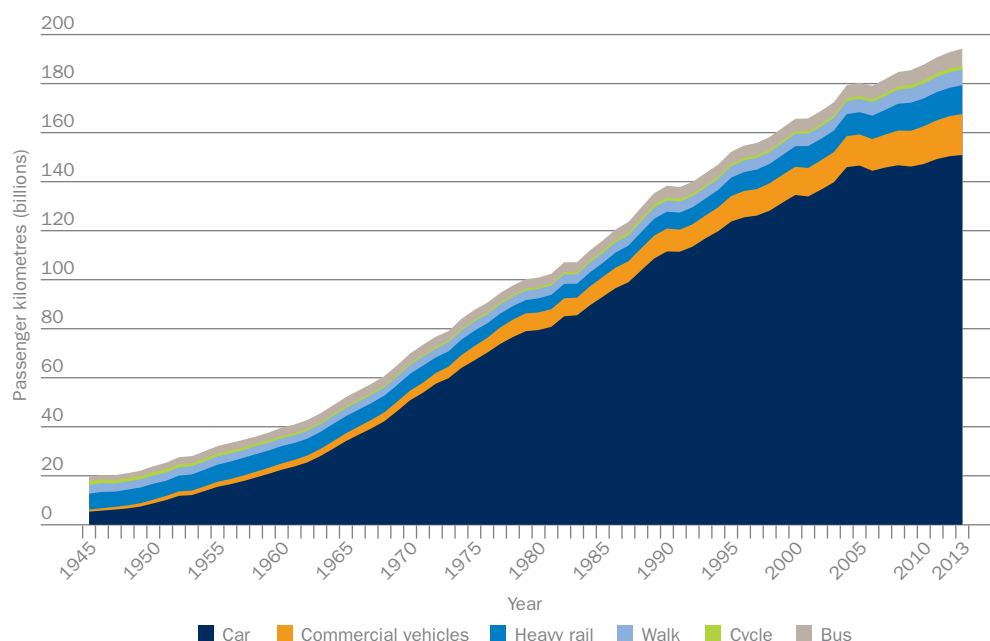
Australian authors Wellman and Spiller (2012) divide infrastructure investments into follower and leader types. The provision of essential infrastructure such as electricity and water, is at least as important as transport for productivity; but is generally a follower of urban development. By contrast, certain transport infrastructure investments can determine the physical shape of cities, leading population and employment patterns over long periods and evolving in patterns that can be difficult or costly to reverse.

Australia has made substantial transport infrastructure investments in cities over the past 20 years, and there are numerous plans to increase infrastructure investments significantly in the coming years. The impact of these investments will have long lasting impacts on Australia's cities. This chapter considers key issues and tensions that can help inform decisions on when, where and how to make smart transport infrastructure investments.

Heightened demand

Roads, public transport, freight, active transport and air travel are all experiencing increasing levels of activity in Australian cities (Figure 6.1). The increase in demand for transport reflects both steady increases in population and the evolution of Australia's cities and their economies.

Figure 6.1 Total urban passenger task for Australia, (selected modes) 1945–2013



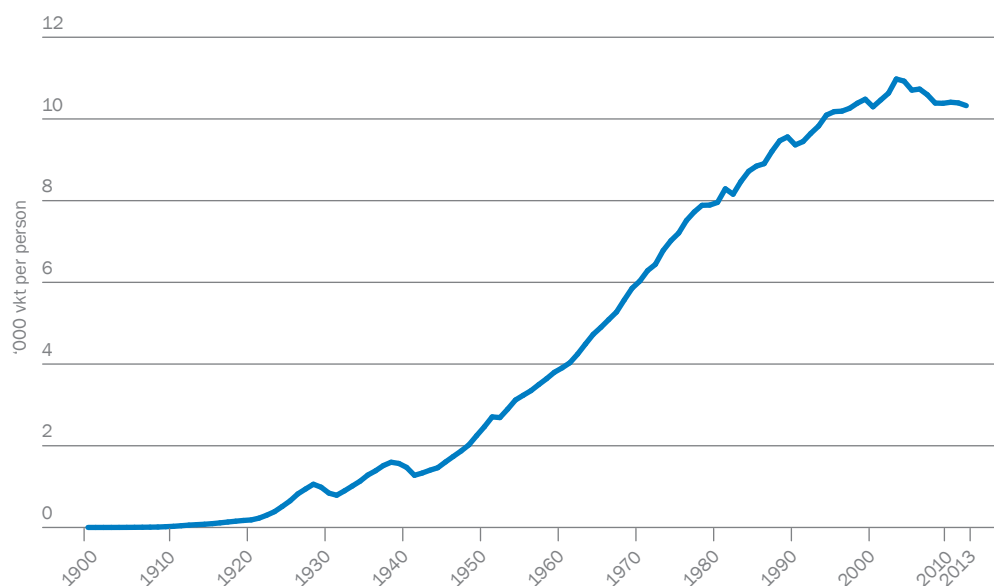
Source: BITRE 2014b.

Note: 'Commercial vehicles' shows data for non-freight use of such vehicles (primarily due to travel by light commercial vehicles such as utilities and panel vans).

Successful cities facilitate interaction between residents and permit the smooth movement of goods, so it is therefore normal for total distance travelled to increase as cities grow and as societies become wealthier and are able to participate in the range of activities across the city. As BITRE research has shown, as income levels increase, typically allowing broader travel options, the general tendency is for per capita travel to also increase, until approaching eventual 'saturation' levels, when the relevant amount of daily travel starts taking up as much time as people are willing to commit. The research shows that people are spending as much time on daily travel as they are willing to commit, and are loath to spend any more of their limited time budgets on yet more travel, even if incomes do happen to rise further (BITRE 2014b, 2014d).

Therefore, future increases in urban passenger-kilometres travelled come to depend more directly on the rate of population increase, and less on increases in general prosperity levels. The predicted traffic growth until 2020 is going to be due mainly to population growth (BITRE 2014b, 2014d) and as shown in the **Settlement** chapter, that population growth is occurring in the inner cities and outer fringes.

As shown in Figure 6.2, the total kilometres travelled per person have risen steadily and dramatically since the 1950s. A recent downturn can be attributed to rising fuel charges and road congestion as well as population density increases in inner cities. The total travel kilometres growth followed population increases and rising wealth and that trend is expected to continue.

Figure 6.2 Vehicle kilometres travelled per person for Australia, 1900–2013

Source: BITRE 2012.

The rise in kilometres travelled are not evenly spread, with some people travelling more and some people travelling less. It is well understood that commuters make up a large proportion of kilometres travelled, with 77 per cent of commuters travelling to work via private vehicle (ABS 2012) but the variations by age of traveller is less well understood. Within the task of tracking travel behavior, the demand on transport by people over 65 years of age is problematic.

Whilst there is state and Territory based data on reasons for travel, national data collected through the census only records 'mode of journey to work' data. Nationally, more than a quarter of a million people aged over 65 are in the work force, 21 per cent of whom work at home. The travel behaviour of this age group outside the workforce is not well known, but as shown in Table 6.1 using Sydney as an example, people over 50 are heavily reliant on motor vehicles over other modes of transport. By comparison, for the age group 21-30 in Sydney, 45.5 per cent travel by vehicle as a driver but nearly 20 per cent catch a train or bus (BTS 2013).

Table 6.1 Mode share by age of travellers (average weekday), Sydney 2011-12

Age group	Vehicle driver	Vehicle passenger	Train	Bus	Walk only	Other
51-60	64.0%	9.6%	4.2%	3.2%	17.5%	1.5%
61-70	59.2%	13.1%	3.5%	3.8%	18.6%	1.7%
70 +	43.4%	16.3%	2.9%	8.2%	25.5%	3.7%

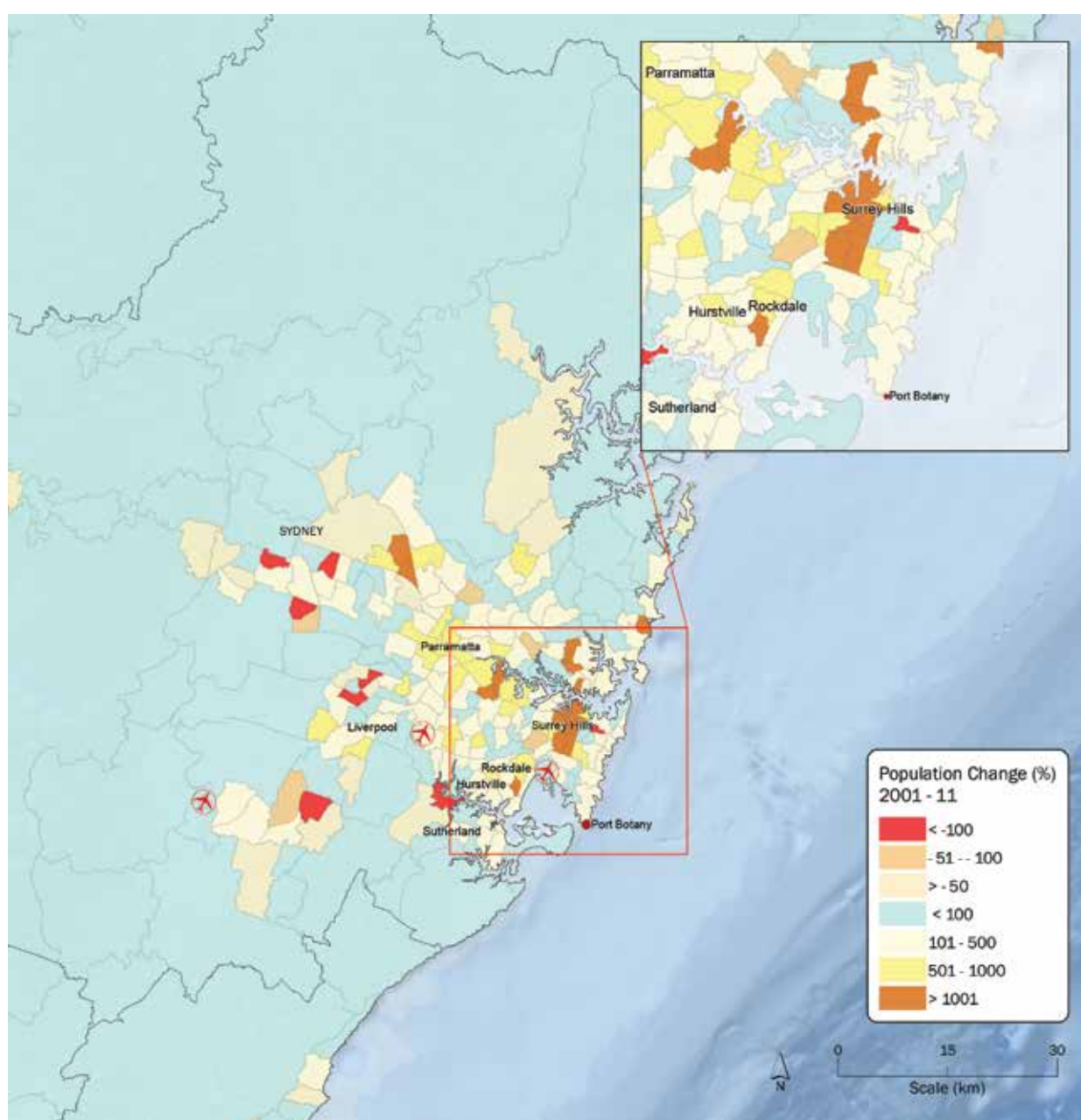
Source: BTS 2013

Conflicts, trade-offs and transport mode shares

Record levels of transport demand are at times causing conflict between different transport modes, especially in Australia's largest cities. More cars than ever before are on the roads, sharing the space with buses that move people as well as greater numbers of trucks moving freight.

In some parts of the transport system, the same road or railway might be in demand to move freight as well as people at the same time. Such competition for space creates other challenges for our transport networks as well. In some of our largest cities, the high levels of population growth near the city centre (examined in the **Settlement** chapter) has occurred in close proximity to important transport infrastructure; including ports and airports and their access routes.

Map 6.1 Population Density Change, Sydney 2001–2011



Source: ABS 2012.

There is a need to find a suitable balance between moving freight and moving people in our cities. Optimal solutions will minimise the conflict within and between different modes of transport by utilising infrastructure in an efficient way across space and time of day. Cities will always play host to a range of transport modes, because using different modes to achieve different transport tasks may be the most efficient use of congested space.

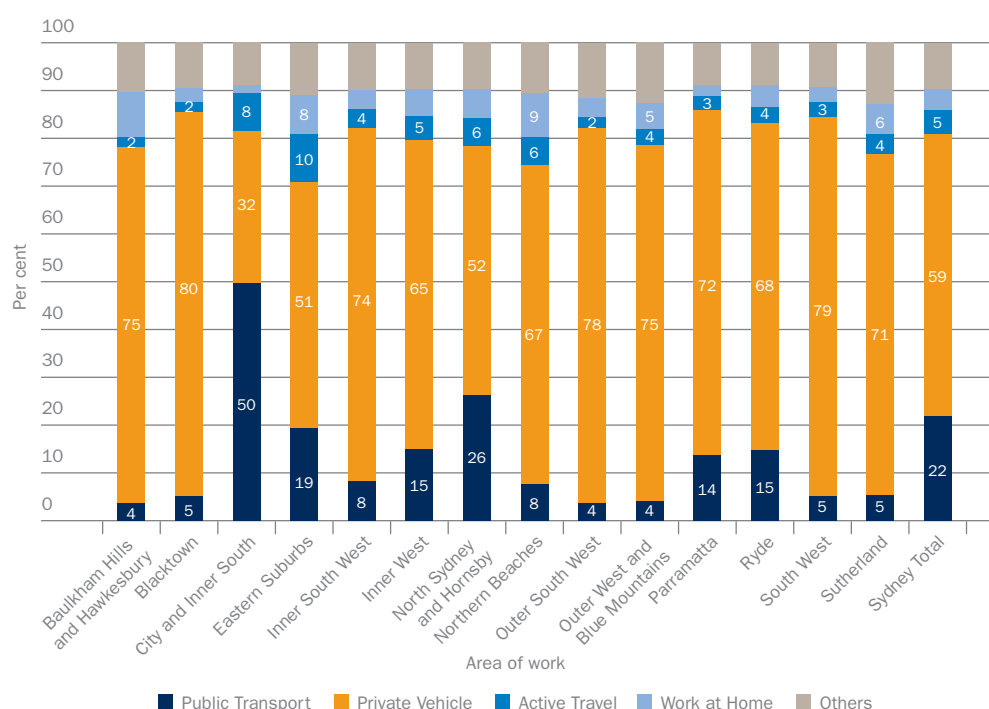
There is also significant community debate about whether different modes of travel should be preferred in the planning and funding of infrastructure.

With population growth happening largely in the centre and outer suburbs of our largest cities, there are significant impacts on demand for transport. People travel in different ways depending on which part of a city they live in, particularly in commuting to work. By analyzing journey to work data from the ABS Census of Population and Housing 2011 it is possible to clarify the relationship between settlement pattern and travel demand.

Mode shares of commuting to a place of work in Sydney (ABS Statistical Area 4 – SA4) are highlighted in Figure 6.3a. In 2011, the share of Sydney residents who used public transport to commute to the City and Inner South area and the North Sydney and Hornsby area were 50 per cent and 26 per cent respectively, indicating better public transport access to these workplaces and reflecting limited and costly parking options in those areas.

The rest of Sydney, particularly in the outer suburbs such as Blacktown and South West areas, had the largest share of commuters by private vehicle (up to 80 per cent). In Parramatta, out of over 183,600 people working there, 72 per cent of workers commuted by private vehicle.

Figure 6.3a Mode share of commuting, by area of work, Sydney, 2011

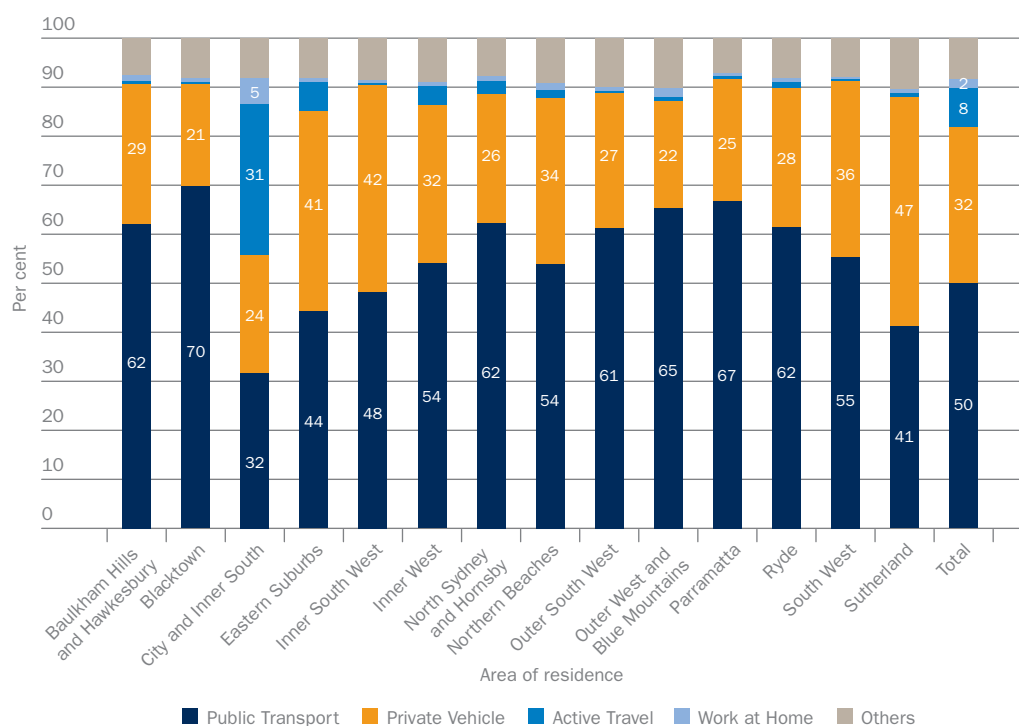


Source: ABS 2012.

Note: The 'Other' category includes 'other modes of commuting', 'did not go to work' and 'not stated'.

As shown in the **Economy** chapter, high value and high productivity jobs are increasingly moving to central city locations. These inner areas, in and around the city have recorded significant jobs growth and are important drivers of the economy. For Sydney commuters working in the City and Inner South, Figure 6.3b shows around half commuted by public transport, 32 per cent commuted by private vehicle, 8 per cent commuted by active travel and 2 per cent worked at home.

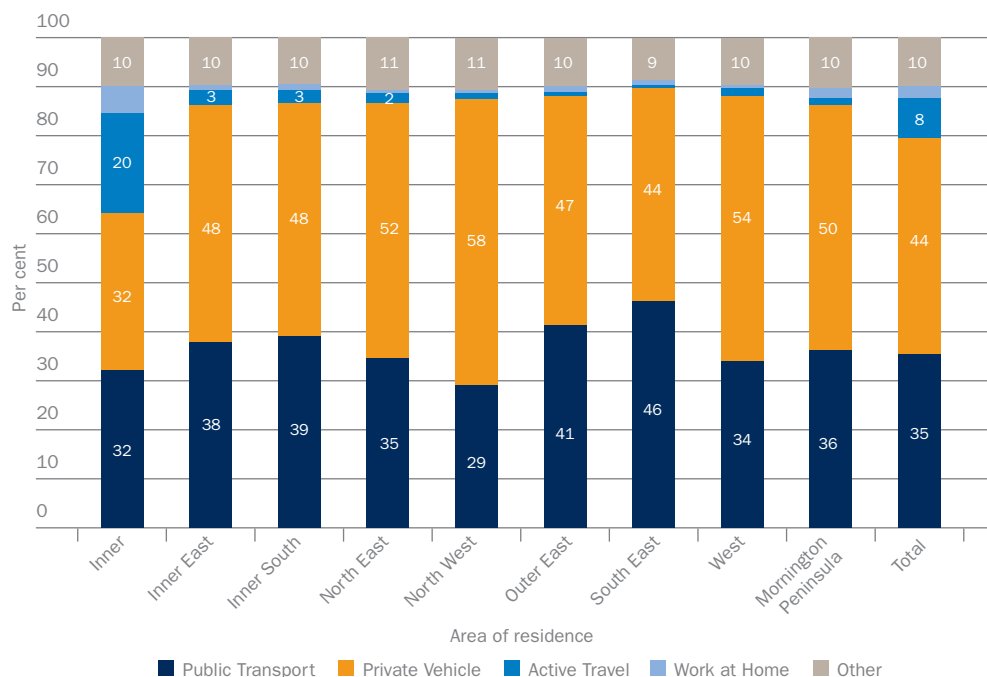
Figure 6.3b Mode share of commuting by area of residence to City and Inner South area of work, Sydney, 2011



Source: ABS 2011.

Note: The 'Other' category includes 'other modes of commuting', 'did not go to work', and 'not stated'.

One of the notable features of Figure 6.3b is the high share of active travel, including cycling and walking (31 per cent), along with a similar share to the public transport mode (32 per cent) for residents of the City and Inner South who also work in the area. Public transport commuting shares to the City and Inner South work areas varied, ranging from 41 per cent for Sutherland residents to 70 per cent for Blacktown residents. Private vehicle commuting share tended to be lower when the corresponding public transport share was relatively high. The private vehicle shares were between 21 per cent for Blacktown commuters and 47 per cent for Sutherland commuters.

Figure 6.4 Mode share of commuting by area of residence to Inner area of work, Melbourne, 2011

Source: ABS 2011.

Note: The 'Other' category includes 'other modes of commuting', 'did not go to work' and 'not stated'.

This pattern is repeated in Melbourne Statistical Area 4 (comprising inner city Melbourne), with comparatively higher shares than other geographic areas of active travel (20 per cent) for residents of the inner suburbs who also work in the area but a much lower proportion of people (when compared to Sydney), using public transport to access the city and inner suburbs for work (only 35 per cent compared with 50 per cent).

These figures provide an important insight into the diverse demand for road and land space in our city centres. Many residents from different parts of our cities are making their way to work in the city centre, with many of them travelling at the same time of day. For Sydney, 15 per cent of employed people, or over 466,000 commuters, work in the City and Inner South areas.

Brisbane has strong similarities with Sydney's commuting mode share whilst Perth, even with significant growth in mass transit use for inner, middle and outer suburbs in the past decade; has public transport usage that is well below the 3 biggest capital cities mode distribution (BITRE 2010a).

Residents of the inner parts of our 3 largest cities would observe large numbers of fellow residents walking to work. By comparison, city centre workers residing in outer suburbs – whose numbers are also growing – would either be part of a large group driving to work by car or be amongst the large numbers on trains or buses.

Generally speaking, in non-capital major cities most journeys to work are undertaken by private vehicle, for example in Geelong in 2011 it was predominantly private (85.1 per cent), followed by public (6.5 per cent), then active (4.7 per cent).

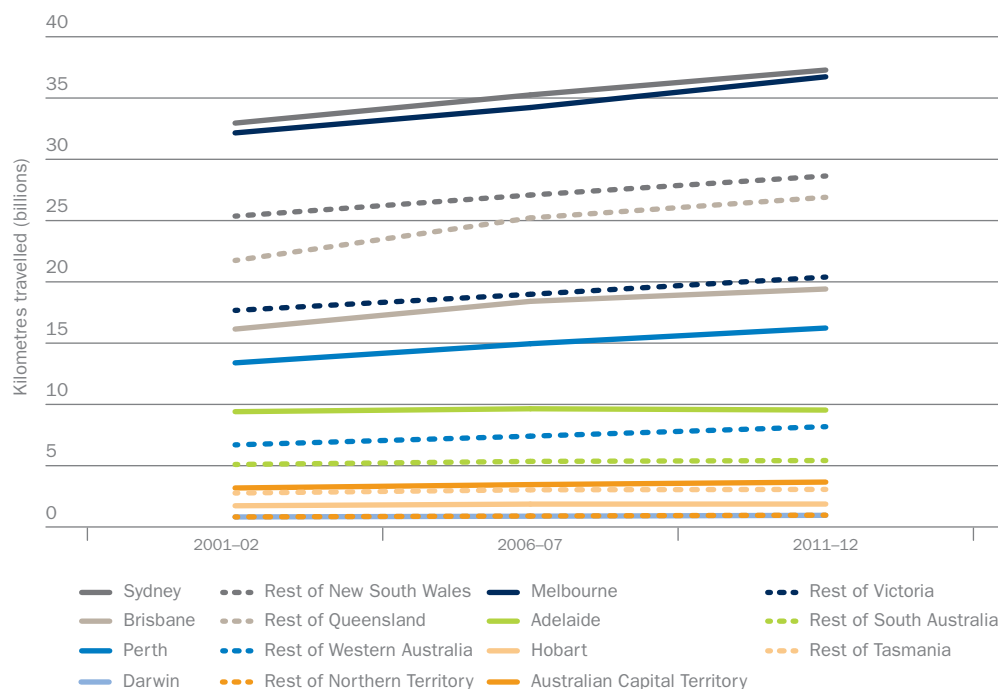
Individuals are most likely to notice congestion on their part of the transport network and are likely to find that many in their travel community share their concerns regarding the performance of their transport system.

These shared experiences are likely to contribute to differing views across the city on the suitability of investments in pedestrian or cycling infrastructure, or the building of more motorways and railways. All of these would ideally be built, but funding for all (particularly at the same time) is unlikely to be available.

Car travel

The increase in road travel across Australian cities, seen in Figure 6.5, is largely a result of population growth, patterns of urban development and changes in economic structure.

Figure 6.5 Total kilometres travelled by car, 2001-02 to 2011-12



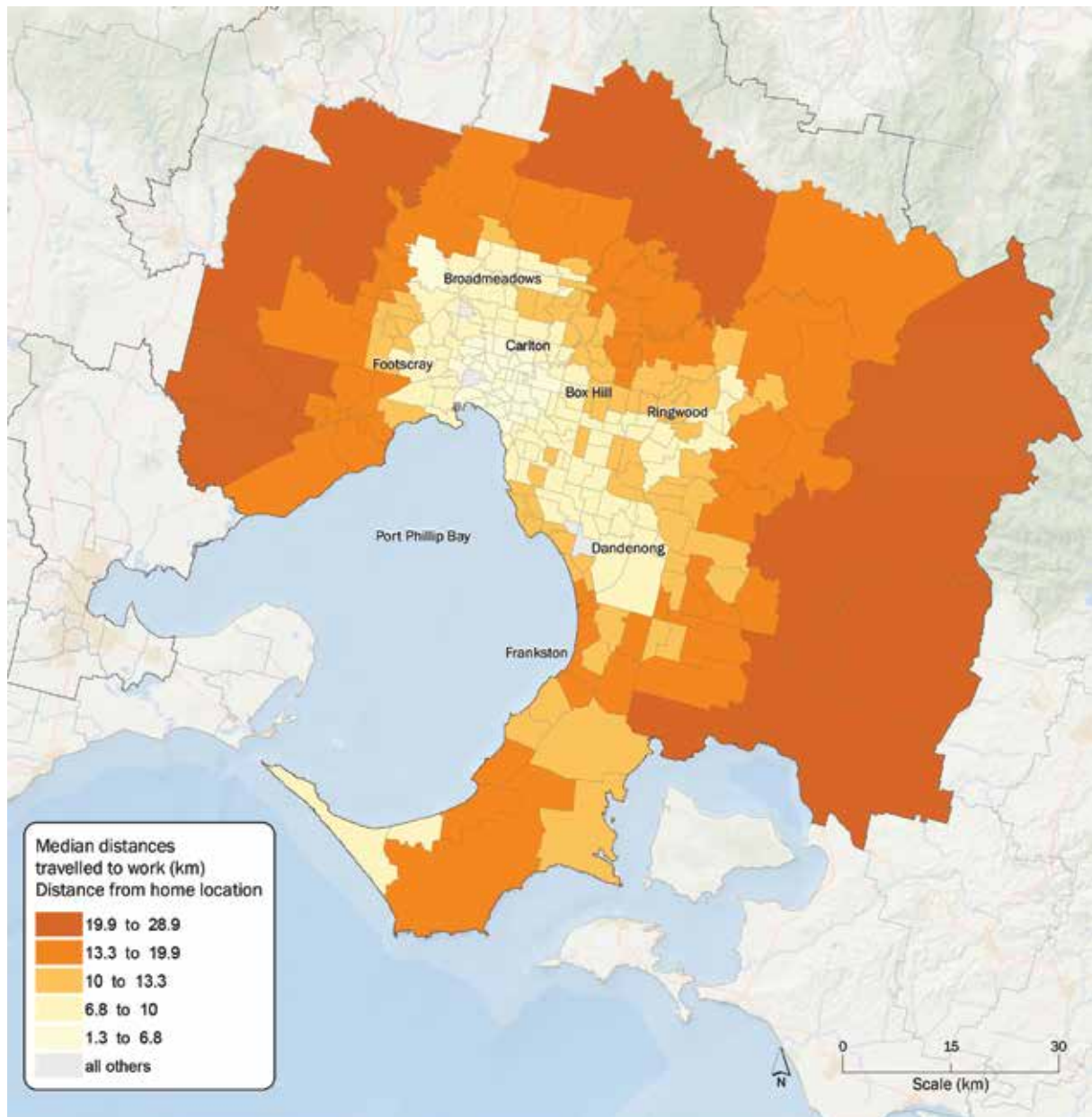
Source: DIRD 2014.

The **Population** and **Settlement** chapters of this report discussed the ways in which Australia's growing population has been accommodated within cities. While there has been considerable high-density development in inner city locations, the development of new suburbs on city fringes has also continued.

New 'greenfield' suburbs tend to be constructed at relatively low densities, where distances between all urban services and activities are on average longer (NSW BTS 2012). This compels more travel and, with such a dispersed set of trip origins and destinations, this travel is frequently undertaken by car. New suburbs also tend to exhibit lower employment densities, suggesting that residents have to travel further to jobs, as seen in Map 6.2.

This helps explain the increase in vehicle kilometres travelled. In Map 6.2 it can be seen that the longer travel to jobs for Melbourne's outer suburban residents is evident all around its periphery.

Map 6.2 Median distance travelled to work, Melbourne, 2011



Source: ABS 2011

Newly settled low-density areas on the urban fringe are not the sole reason for increases in vehicle kilometres travelled. The **Economy** chapter illustrated how changing global economics has restructured the relationship of industry location in Australian cities, forcing earlier inner urban structures into the service of new modes of production.

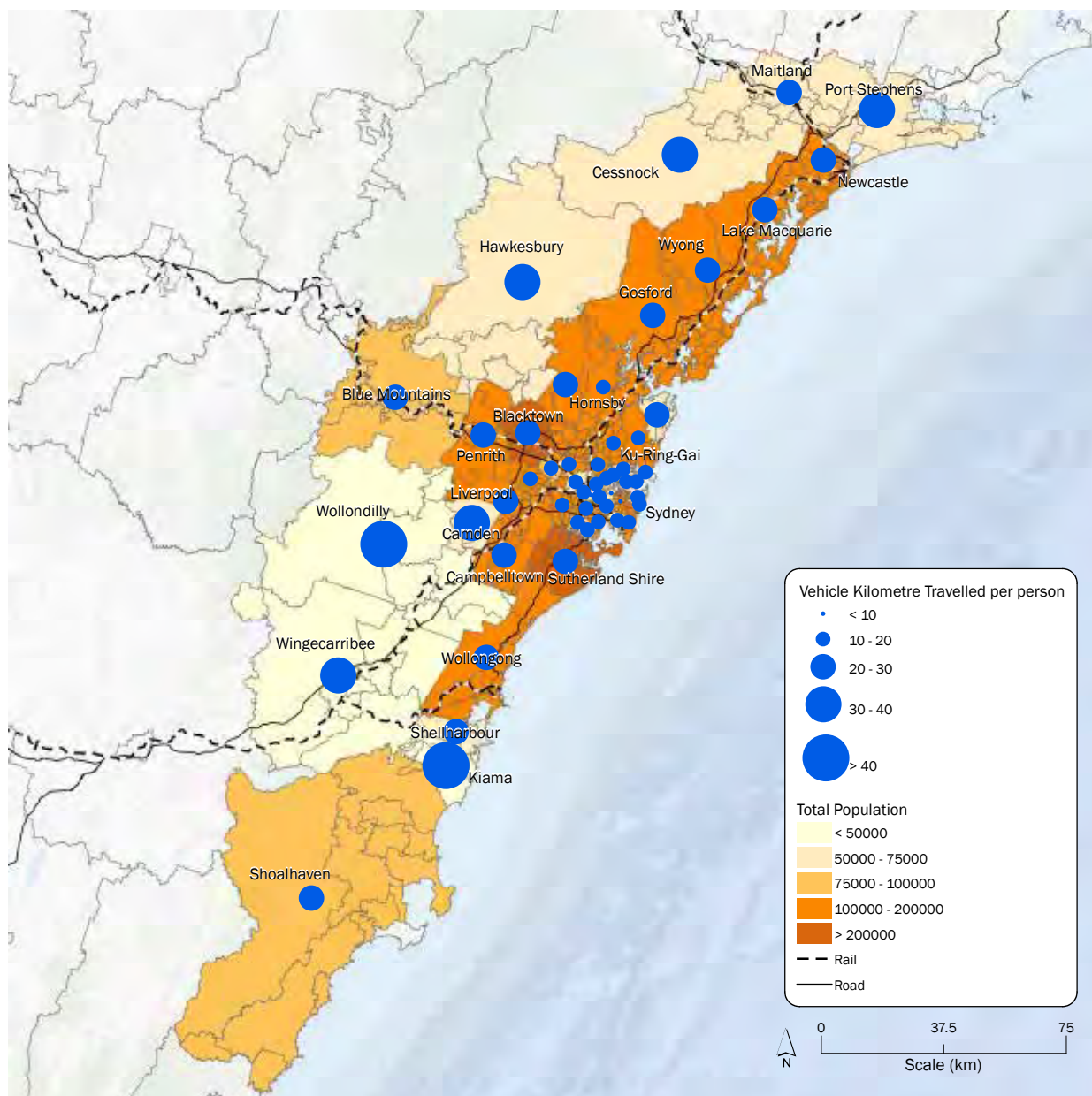
For example, the era during which manufacturing industries were pre-eminent saw strong development of outer, (now middle) suburbs of Australia's cities, paralleled by suburban jobs growth in well-paid and secure manufacturing employment.

However, with the reduction in employment in the manufacturing industry and Australia's economic transition into a service economy centered on central business districts (CBDs), the middle suburbs lost the bulk of their high-paying jobs. This has resulted in many residents in outer and middle ring suburbs having to travel much further for employment and high-paying jobs.

The length of an average metropolitan trip across Australia's 4 largest cities climbed from around 2.5 kilometres at the start of the twentieth century (when urban passenger transport was still dominated by non-motorised travel) to a current level of close to 7.5 kilometres per trip (BITRE 2014b).

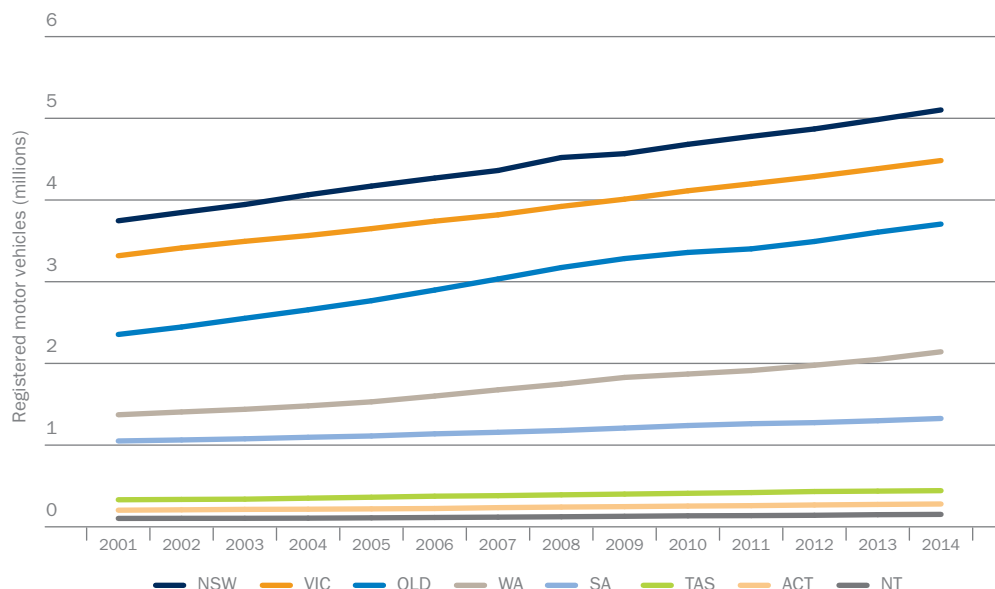
To illustrate, Map 6.3 shows a distinct cluster of between 10 and 20 vehicle kilometres travelled (vkt) per day around Sydney City, and in general increasing vkt further out – although not all these trips would be travel into the centre of Sydney.

Map 6.3 Vehicle Kilometres Travelled – Sydney 2011



Source BITRE 2014b

The growth of Australia's cities has coincided with record levels of car ownership. Every state or territory registered record numbers of motor vehicles in 2013–2014, as seen in Figure 6.6.

Figure 6.6 Stock of registered motor vehicles, 2001–02 to 2013–14

Source: ABS 2014.

Given the structure of large parts of Australia's cities, motor vehicle travel is essential if city residents are to be able to access jobs and services. However, such travel also comes at a cost. Rising congestion and environmental costs are borne by all with private costs, largely the costs of owning and operating a motor vehicle, having also risen. These rising costs are increasingly becoming a strain for the functioning of our cities and their economies and they place considerable burden on those residents who have few transport alternatives and are required to travel long distances. Without investment in additional capacity or demand management innovations for current infrastructure, the economic extent of congestion costs in our capital cities has been estimated to grow from \$13.7 billion in 2011 to around \$ 53.3 billion in 2031 (Infrastructure Australia 2015).

Public transport

Public transport performs many critical functions in Australia's cities. As a minimum, public transport provides a base level of mobility essential to everyday life for many who cannot or choose not to own or drive a car for certain trips.

Beyond this important social equity function, public transport plays a critical role in delivering the cities' residents to their workplaces, as evidenced in the journey to work transport mode shares graphs (Figures 6.3a, 6.3b and 6.4). As explored in the **Economy** chapter, agglomeration economics mean that across Australia's cities a high proportion of jobs are clustered in central city CBD locations or other employment clusters.

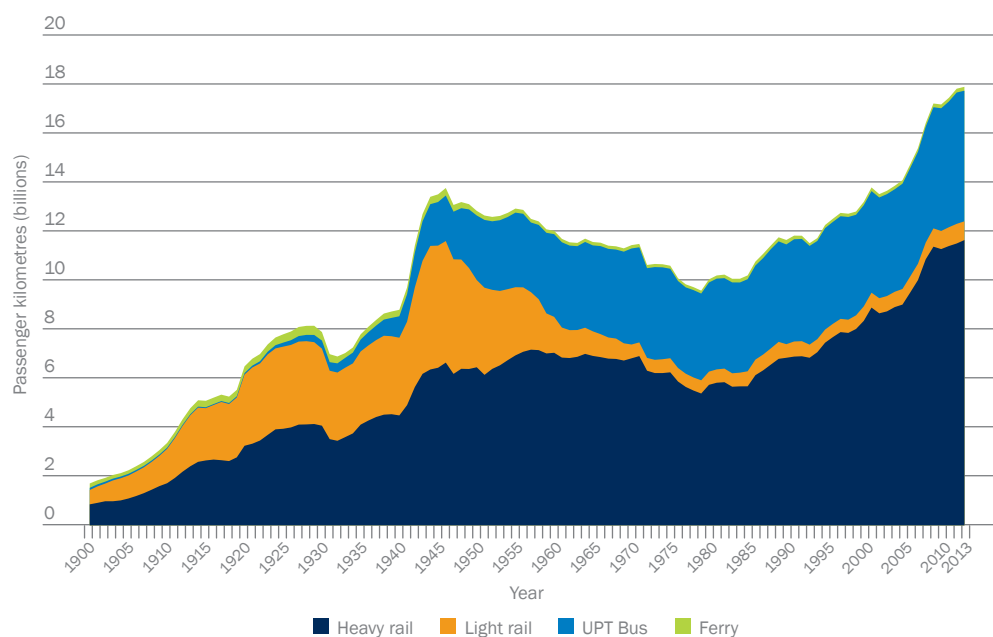
As economies increasingly become more knowledge intensive, this clustering intensifies, driving intense patterns of demand for travel into inner cities and city CBDs.

With such inward-focused travel demand and with space in city centres at a premium, leaving less for parking or for roads, the travel needs of many city centre workers can only be met by mass public transport. As Australia's urban economies have transitioned and more jobs are located in city centres, patronage on public transport has grown significantly. In the past decade, the rate of average annual growth of public transport patronage (2.4 per cent) surpassed the rate of population growth in capital cities (1.8 per cent).

Additionally, the presence of public transport infrastructure attracts higher-density development, with corridors of higher density housing and commercial premises locating along transit routes. This is an increasingly common urban form change in Australian cities.

Public transport kilometres travelled in Australia's cities, as shown in Figure 6.7, have grown by more than 4 billion passenger kilometres since the late 1940s, when over half of all metropolitan trips were taken using public transport. The bulk of these kilometres travelled are carried on the heavy rail lines of Australia's cities, reflecting both growth in patronage due to population growth as well as longer trips being undertaken from extending outer areas.

Figure 6.7 Public transport passenger kilometres, metropolitan Australia



Source: BITRE 2014b.

Increased public transport usage has in part, been achieved by investing in additions to public transport networks, especially in Perth and Brisbane, where new rail and bus infrastructure has been built in recent years.

As observed in the **Settlement** chapter (see Figure 3.2), rail passenger journeys have seen a sharp growth in Melbourne and Sydney. But in Melbourne and Sydney, the increase in passenger kilometres has come about despite investment in the network remaining largely static, with patronage growing significantly and overcrowding beginning to occur.

In these cities the rail networks are designed in a hub and spoke fashion, optimised for serving the city centre, and the increase in patronage is a result of job growth in the high-productivity city centres and rising road congestion that results from travel to those centres.

Active transport

It is no surprise that rising congestion has also led to an increase in active transport (walking and cycling) in Australian cities. Before the introduction of the tram and train, and later the car to Australian cities, walking was the dominant mode of urban travel, greatly limiting the spread of the cities. With the introduction of motorised modes of transport, cities have spread. However, with increasing traffic jams and crowded public transport, residents are returning to walking and cycling where they can.

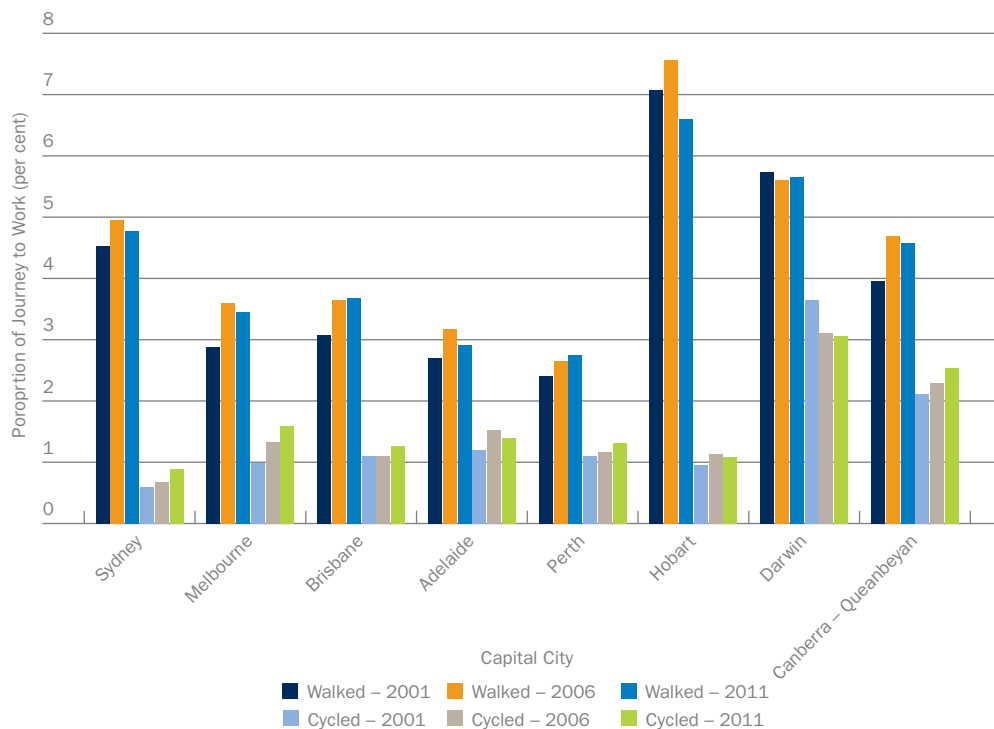
Whether someone is able to walk or cycle to work depends heavily on the distance between their home and workplace and the pedestrian, cycling or shared path infrastructure that supports and promotes active travel.

As a result, the majority of commuters using active transport are those who live and work in the older and higher density inner areas of Australia's cities.

In these inner urban areas, the number of people who are walking and cycling has been rising considerably in recent years, although it started from a low base of the overall transport mode shares. Cycling has increased its transport mode share over the 2001–2011 period in most capital cities (with the exception of Darwin).

The number of people cycling to work in Melbourne has grown by 38 per cent, rising from 20,598 people in 2006 to 28,606 people in 2011. In the same period the number of those in Sydney cycling to work increased by 47 per cent, up to 17,838. Given the small proportion that cycling and walking constitutes of overall mode share, these rises are well beyond what might be expected through population growth over the time, which would be in the order of a 17 per cent increase in total numbers.

Figure 6.8 *Share of active transport by commuting mode, 2001–2011*



Source: BITRE (unpublished) analysis of Journey to Work (active transport).

Active travel offers a number of benefits to cities, especially by reducing demand on other congested modes of transport. It also offers health benefits to those people who opt to walk or cycle, reduces greenhouse gas emissions and provides more human-scale activity on city streets. Additionally, in contrast to road and public transport infrastructure, improvements to active transport networks are relatively cheap and can be made comparatively quickly.

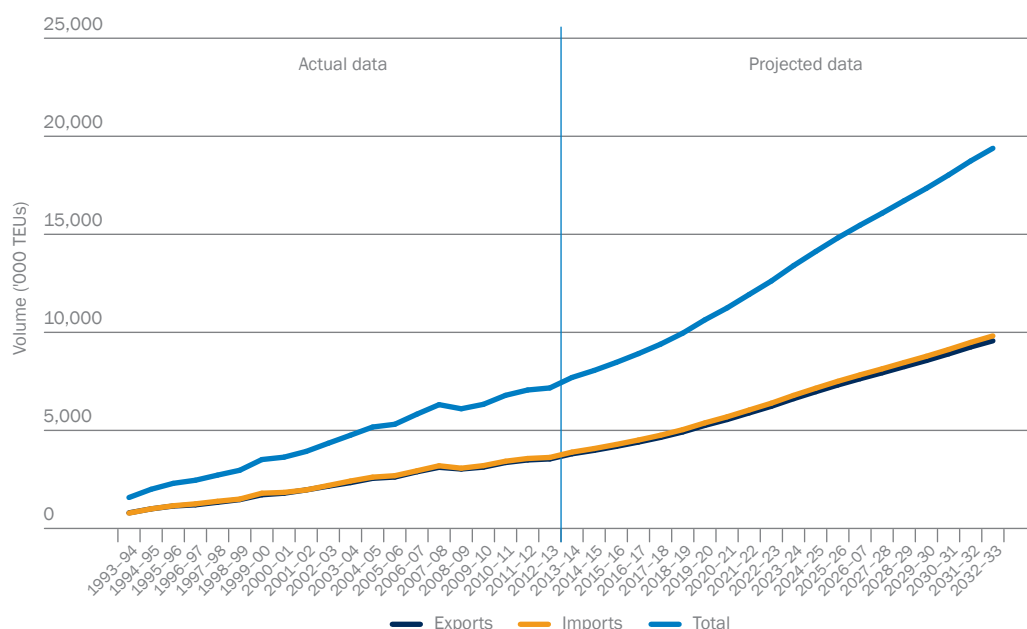
Ports

This chapter has so far considered the rising pressure on transport infrastructure caused by passenger travel. But transport of freight is also a significant contributor to the total transport task and to congestion, especially on urban roads during peak periods.

The **Economy** chapter illustrated the growing role of global trade in the Australian economy. The dramatic increase in the amount and value of freight that moves through Australia's ports (especially containerised freight through capital city ports) is a major driver of increased demand for transport infrastructure.

Freight is moving through ports at record levels, as identified in Figure 6.9, and is projected to increase further. This growth in container movements through Australia's urban ports has substantial implications for cities with road and rail congestion, land shortages and development and competing land use tensions around ports and distribution hubs set to escalate further.

Figure 6.9 Australian containerised imports and exports for all ports, 1993–94 to 2032–33



Source: BITRE 2014e.

OECD research points to the impacts of economic growth especially where ports are located in central cities, as is the case with Australia's largest container ports, in Sydney and Melbourne.

"Port-cities benefit from part of the economic impacts of ports. Most of the direct port-related value-added is still created in port-cities. Port-cities also benefit from the effects of clustering industries in a port area, and the possible economies of scale and knowledge transfer related to it. Several resource-intensive industries continue to be attracted by port areas, as location in a port limits their transportation costs." (OECD 2013).

Case Study: Port of Melbourne

The Port of Melbourne in particular plays a critical role in a much larger regional and national freight and logistics network. The port is Australia's busiest container port, handling over one-third of Australia's total container trade.

While much of this trade originates in or is destined for the city of Melbourne, the Port of Melbourne is also the primary trade gateway to the global market for South-East Australian products. The port is geographically located at the hub of Australia's national distribution network. Around 50 million tonnes of general freight is moved between Victoria and the rest of Australia each year, which means that Victoria is moving significantly more than any other state. Freight that is being moved includes:

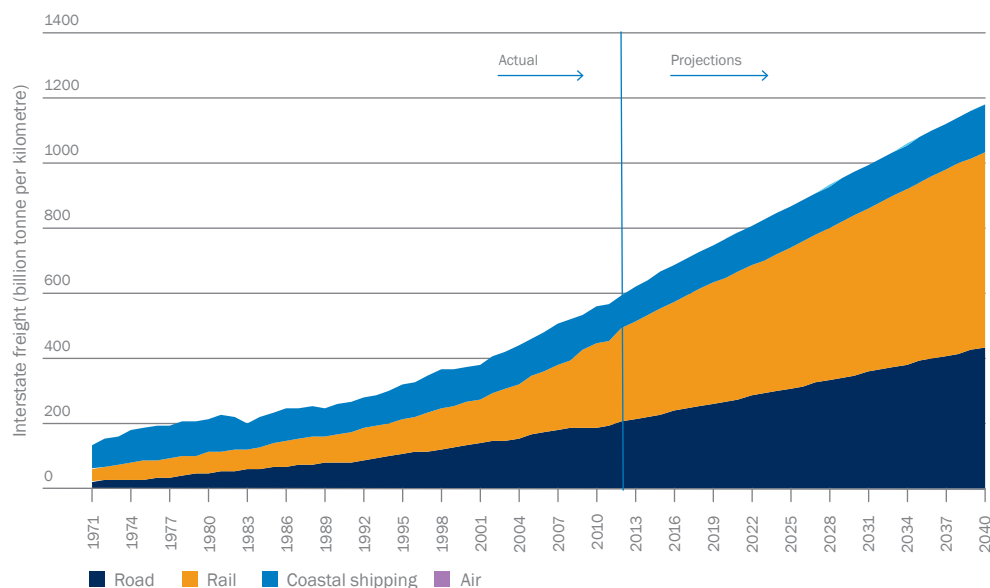
- domestically manufactured goods and products moving from point of production to interstate and international markets
- containerised imported goods taken from the Port of Melbourne to distribution centres then repacked for interstate destinations
- a smaller but significant volume of goods being land-bridged directly between the Port of Melbourne and interstate destinations (principally to South Australia and Western Australia) to avoid the need for vessels to call at those ports.

As the dominant international port in the region, the Port of Melbourne receives export goods from South Australia, New South Wales, Victoria, Tasmania and New Zealand before sending them on to markets across the world. Just over half of all container exports that depart from the Port of Melbourne originate from within metropolitan Melbourne, with 23 per cent from regional Victoria and 23 per cent from interstate (GHD 2010a).

The Port of Melbourne also plays a critical role as the first point of entry for imported products that enter Australia and are then distributed across the city, Victoria and interstate. The efficiency of the port and the transport infrastructure that links it to various markets is important in keeping import costs down. Of the containerised imports that arrive at the port, 9 out of 10 (87 per cent) are unpacked within the Melbourne metropolitan region, highlighting the important role that the port plays in the city's wider distribution network (GHD 2010b).

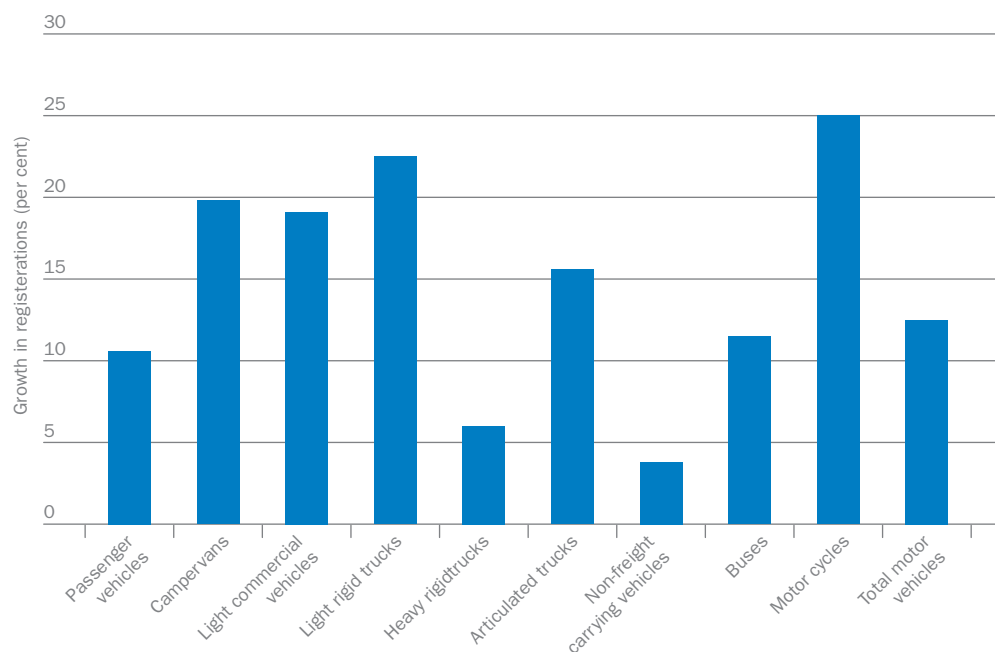
However, the freight task associated with moving international and interstate cargo has implications far beyond Australia's ports. The increase in port volumes directly affects increases in freight volumes across all national freight modes, as seen in Figure 6.10.

The volume of freight through Cairns port increased by 0.5 million tonnes in 2008-09 to 1.2 million tonnes in 2012-13. The volume of freight through Geelong port increased to 12.8 million tonnes in 2012-13. Launceston had a large decrease in the value of international freight between 2006-07 and 2012-13, with international freight down by \$913 million.

Figure 6.10 Total interstate freight estimates and forecast by mode, 1971–2040

Source: (BITRE) 2014, Freightline 1 – Australian freight transport overview, BITRE, Canberra (Figure 8).

The increasing importance of road freight movement to the economy has seen a boom in the registration of trucks, with the growth in truck registrations outstripping passenger vehicle registrations over the past 5 years.

Figure 6.11 Growth in number of vehicle registrations, 2009–2014

Source: ABS 2014.

The trends outlined above are projected to continue, with an increase in the number of jobs in the logistics sector and increased stress on the road networks, especially on the already crowded main roads of Australia's capital cities.

Key freight route maps

Anticipated continued growth in freight volumes will give rise to a range of increasingly complex challenges for the Australian community. In recognition of this, all levels of government and industry have agreed on the need to apply a national focus and effort to deliver a streamlined, integrated and multimodal transport and logistics system, capable of efficiently moving freight throughout Australia.

A focus for government, as agreed by Commonwealth, State and Territory Transport Ministers in 2013, was the need to identify Australia's nationally significant places for freight and to map the road and rail links connecting them. Governments also agreed on the need to reflect the maps in state-based strategic freight plans.

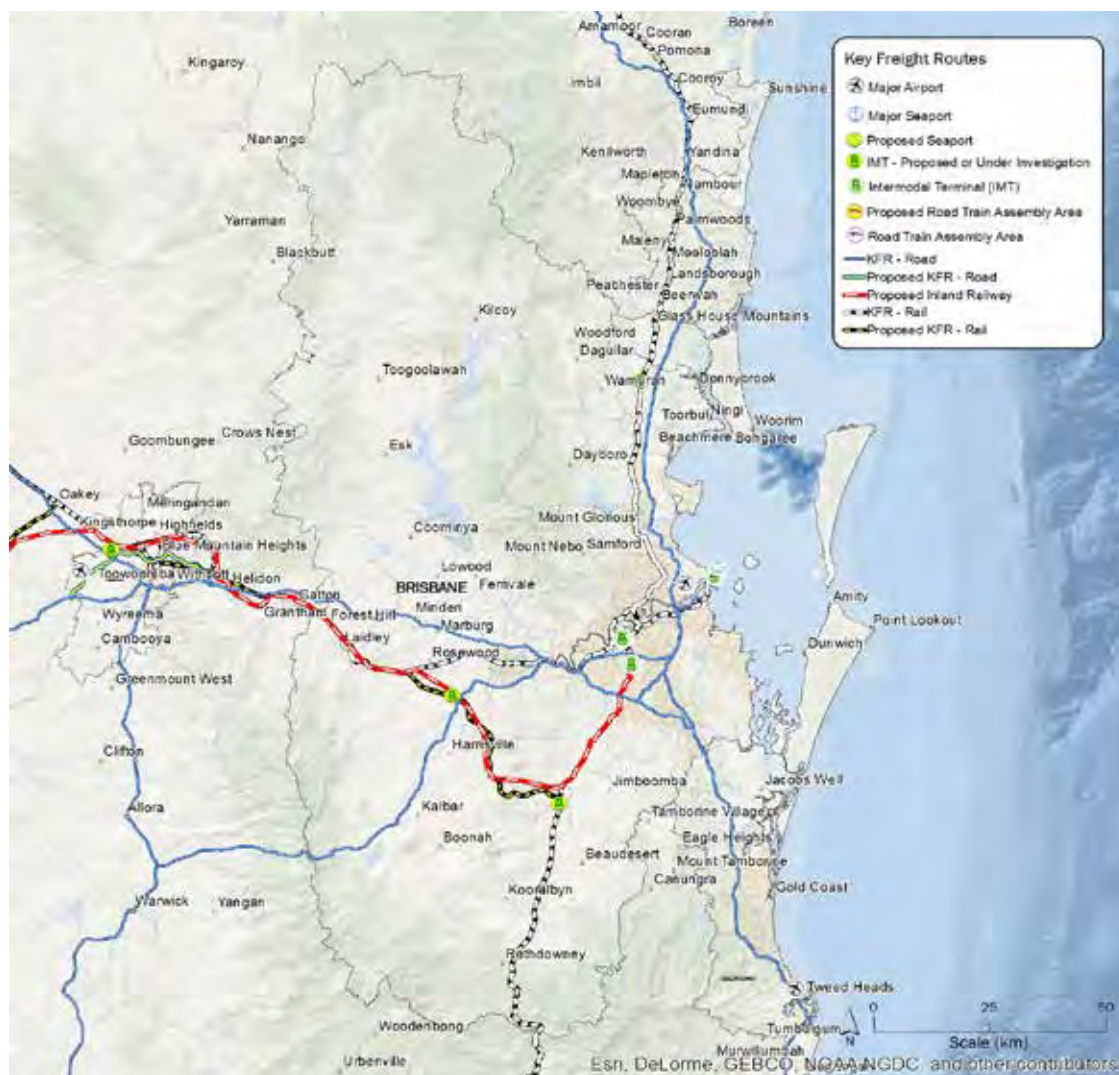
Map 6.4 Map of key freight routes, Sydney, 2014



Source: Department of Infrastructure and Regional Development 2014.

Commonwealth, state and territory governments are also collaborating on developing maps illustrating Australia's key freight routes. This will serve as a strategic tool that can inform strategic planning, operational and investment decisions relating to the Australian freight network.

Map 6.5 Map of key freight routes, Brisbane, 2014



Source: Department of Infrastructure and Regional Development 2014.

A key challenge in developing these maps has been identifying the routes connecting Australia's key places for freight on a consistent basis that takes into account current and future expected flows and policy commitments across all states and territories.

The maps are publicly available on the Transport and Infrastructure Council website.
<http://www.transportinfrastructurecouncil.gov.au/publications/>

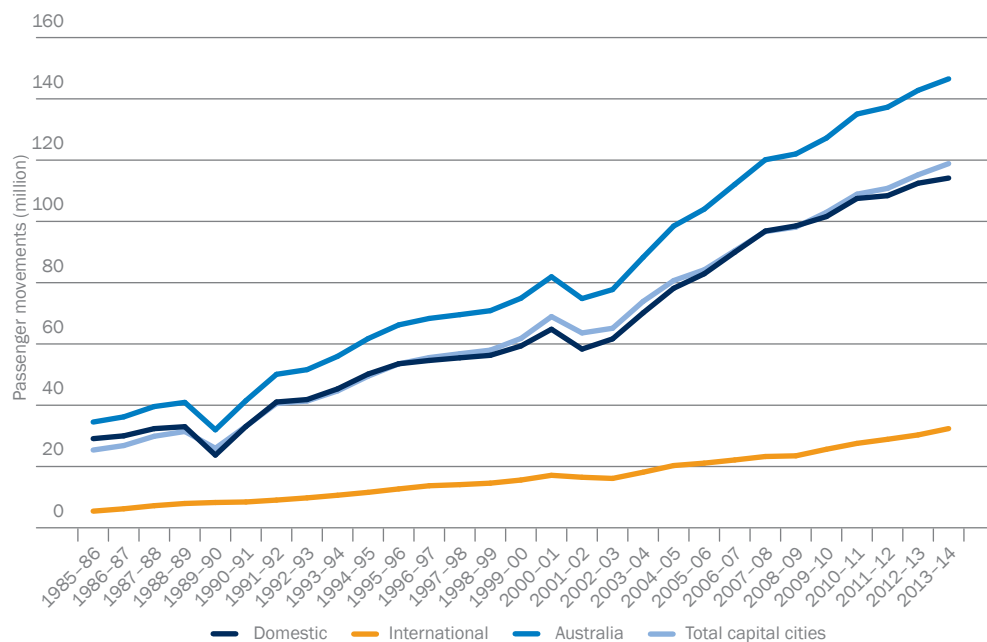
Airports

Airports provide a disproportionate amount of economic value to the Australian economy given the volume of freight moving through them, with international air freight representing less than 0.1 per cent of Australia's total merchandise trade by volume, but making up over 21 per cent of total trade by value (worth over \$110 billion in 2011–12) (BITRE 2014c). Airports offer great benefits to city economies, both directly and indirectly. The pattern of increasing demand observed in all other transport modes is also seen in airports.

The **Human Capital and Labour** chapter described the way that a growing knowledge economy permits firms and workers to specialise. Once a worker has a combination of specific skills, they may be called upon to travel to use those skills.

When firms are specialised they may in turn need to call upon specialised services that are not available locally. Globally integrated cities tend to have airports that accommodate a lot of business travel. Given the increasing economic importance of the knowledge economy to Australia's cities in addition to the rising numbers of ordinary Australians undertaking air travel, it is no surprise that airport demand is at record levels.

Figure 6.12 Air passenger movements through all Australian airports, 1985–86 to 2013–14



Source: BITRE 2014.

The transport demand caused by increased passenger movements in airports is felt in the surface transport infrastructure of cities as passengers travel to and from airports.

Infrastructure planning

Longer commuting times for those not using active travel can potentially diminish the connectivity that makes cities valuable. The **Population** chapter of this report noted the significant additional population forecast for our major cities in coming decades. Past population growth has been accompanied by large increases in our cities' transport activity and higher costs to provide infrastructure, and increases in some measures to mitigate congestion.

Growing demand for transport and increasing calls for infrastructure investments in Australian cities has sparked intensive research on these issues. Research on city development consistently emphasises the importance of integrated planning, particularly integrating transport and land use planning. A recent report from Infrastructure Australia also argues against fragmentation in urban transport planning:

“Urban transport has not been viewed as an integrated system dealing with both people and freight flows. Key issues include: integrating transport systems; integrating long-term infrastructure planning and land-use planning; the impact of urban transport systems on productivity; the importance of urban access and equity; coherent and consistent funding and financing; consistent measurement and reporting of results.” (Infrastructure Australia 2013)

There is a growing consensus that broad-scale, multimodal, high-level planning systems are needed.

One concept that has received research attention and shows promise is a focus on the metric of 'accessibility' (Curtis et al. 2013, Levine 2011 and Litman 2014).

This metric measures the ability of citizens to access the services they require and thus shows benefits if, for example, land use planning allows population and services to be located nearer to one another; traditional point-to-point travel time metrics would not capture this.

Traditional 'predict and provide' models of transport planning can work at small scales and over short timeframes. They may prove less satisfactory when they advocate for infrastructure that shapes a city in a way that is, in the long run, unsupportable. Transport infrastructure investments that encourage population clusters at a distance from jobs could fall into this category. Such infrastructure investments can necessitate further expensive investments at later times.

Integrated planning outcomes will recognise that different parts of the city have different transport tasks and different infrastructure needs. Bicycle paths and light rail may be more important in the inner parts of cities, and feeder buses and private vehicle commuter flows more important in outer parts of cities.

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Co-locating jobs and housing

One often-discussed solution to conflicts caused by increased transport demand is to manage the number of people competing for finite space by relocating jobs away from the city centre, either to alternative centres or to suburbs where people reside. This is seen as a way to manage transport demand and ensure ongoing viability for communities.

As discussed in the **Economy** chapter strong jobs growth has occurred near the airports of Australia's major cities. The case study below explores the potential impacts on employment opportunities and the spatial skills mismatch around a developing airport.

Case study: Badgerys Creek Airport

The international evidence on airport employment shows that airports can be significant sources of employment, providing jobs for both skilled and unskilled workers. As well as direct employment, airports also contribute to employment in upstream industries that supply goods and services to airports. Airports may also provide significant employment benefits to the local area; however, as an example, in 2006 only 20 per cent of employees at Sydney airport lived within a 30-minutes commute of the airport.

The Bureau of Infrastructure, Transport and Regional Economics (BITRE) has developed a skill/occupation/industry mismatch index that can provide insight into which areas of Sydney are compatible with the expected demand for jobs, in terms of the skill mix, occupation mix and industry mix, at the new airport at Badgerys Creek.

It found that, for an early stage of the airport operation, suburban fringe locations in Western Sydney tend to provide a better match to the airport skills and occupation mix than many of the more established parts of Western Sydney. Statistical Area Level 2 (SA2) areas such as Rosemeadow – Glen Alpine, Bradbury–Wedderburn and Leumeah – Minto Heights (all in Campbelltown) were very compatible with the occupation mix at an early stage of airport development involving up to 4 million passengers.

Based on the 2011 Census, around 100,300 Western Sydney residents work in manufacturing, 91,000 work in retail and 90,400 work in health care industries, while 55,700 work in transport, postal and warehousing and 51,600 work in public administration and safety.

At the 5 major capital city airports, about half of all on-site employment is in the transport, postal and warehousing industry and an early stages airport requires a significantly higher proportional representation of community and personal service workers (which includes police, firefighters, travel advisors and hospitality workers) and technicians and trade workers.

With the full operation of the new airport, the European 'rule-of-thumb' for airport employment is considered to be generally around 1,000 direct on-site jobs per million passengers per annum. Recent evidence for Australian airports shows a lower figure – around 600 jobs per million passengers per annum.

Source: BITRE 2013a and 2013b.

Policy attention has also been given to seeking ways to improve the co-location of jobs and people in response to changed industry structures.

Often, such discussions consider what is described as the self-sufficiency of parts of cities. This measure is the ratio between the jobs in an area and the employed people resident in that area.

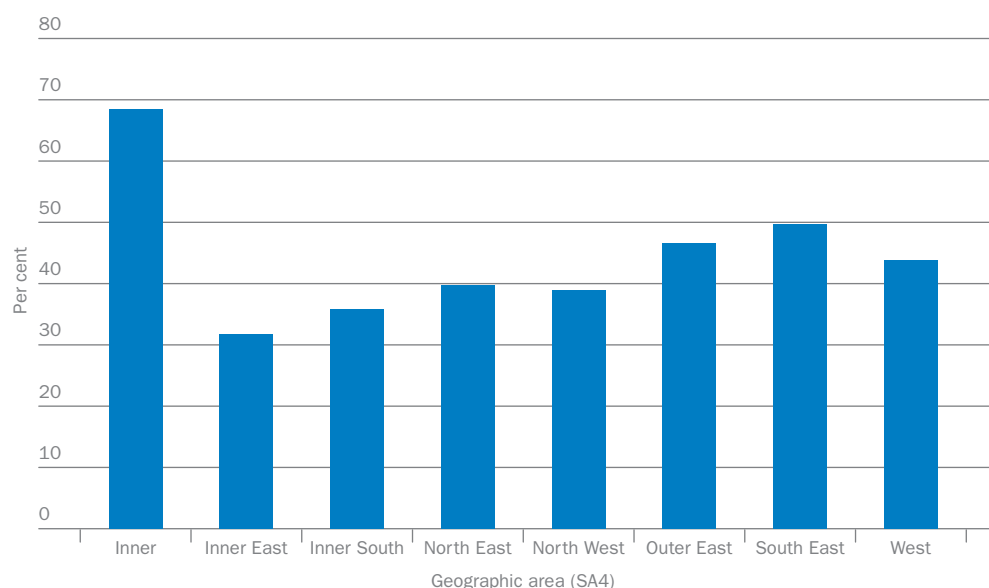
Such a measure can be important. It can highlight where population is increasing – for example, through significant residential development – in the absence of suitable industries to create jobs for new residents or it can show the impacts where reductions in employment occur. It is also the case that the self-sufficiency rate can be the same in 2 different areas, but because of age and employment demographics be producing quite different results in the number of residents working locally – which is often of greater interest when discussing the co-location of people and jobs.

The self-sufficiency rate illustrates the gap that would exist if every worker in an area sought a local job. It is important to note that this measure does not consider the extent to which the employed people in the area work in the area rather than elsewhere. In addition, the self-sufficient rate cannot show, for example, if high paying, high productivity jobs are being replaced by low paying, low productivity jobs or show where full time work is replaced by casual and part time work.

The proportion of employed people residing in an area whose employment is also in that area is called 'self-containment'. This measure is important, as it directly impacts transport demand – both distance and type of travel – and because it reminds policy makers that simply creating jobs in an area is not necessarily sufficient to increase the employment of residents of that area. These jobs could be filled by people travelling from elsewhere, particularly if the jobs require qualifications or skills not held by local residents (in much the same way that many resources sector jobs are filled by people resident in other locations).

The areas of cities with the highest number of jobs – especially inner – tend to exhibit the highest degree of self-containment. These areas are also well served by transport infrastructure and have higher dwelling prices.

Figure 6.13 Self-containment rates for selected geographic areas surrounding Melbourne, 2011

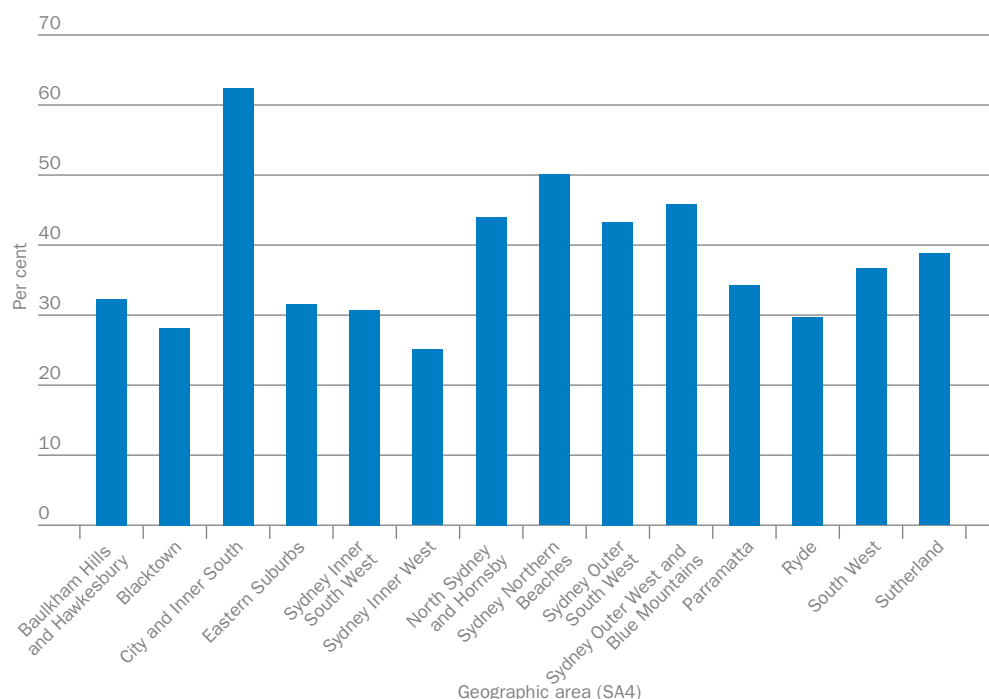


Source: ABS 2012.

Note: These proportions exclude the Place of Work Not Applicable and Not Stated categories.

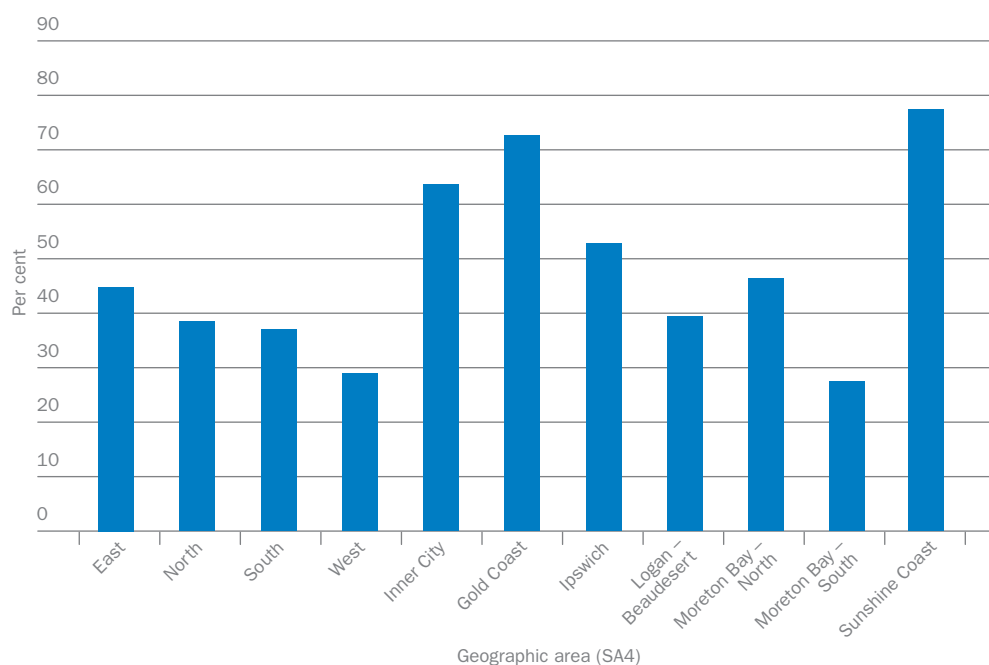
Figures 6.13 to 6.15 indicate that not only are there high job concentrations for inner city business districts, but in Melbourne, Sydney and Brisbane a substantial number of jobs are evenly distributed out to the periphery. Relatively close to Brisbane, the Sunshine Coast and the Gold Coast have noticeably high levels of self-containment.

This is in the range of 30-45 per cent, reflecting the compliment of necessary population serving industries required to maintain high quality urban living such as schools, education and municipal services.

Figure 6.14 Self-containment rates for selected geographic areas surrounding Sydney, 2011

Source: ABS 2012.

Note: These proportions exclude the Place of Work Not Applicable and Not Stated categories.

Figure 6.15 Self-containment rates for selected geographic areas surrounding Brisbane, 2011

Source: ABS 2011.

Note: These proportions exclude the Place of Work Not Applicable and Not Stated categories.

Relocating jobs

A theme common to several submissions to the recent Productivity Commission Inquiry into Public Infrastructure was that of promoting decentralisation of Australia's population in order to reduce the burden on existing urban infrastructure. Often that idea was accompanied by a suggestion that jobs should be relocated to rural or regional areas, where unemployment is relatively high. As the Productivity Commission notes in its recent report on public infrastructure, there are a variety of factors that impact on where businesses choose to locate – and historical evidence shows that it is particularly difficult to convince businesses to move away from cities, which are rich with customers, suppliers and deep pools of skilled labour.

In addition, moving jobs (either out of cities or within them) can sometimes add to demand for transport infrastructure rather than reduce it. Given the costs associated with changing residence, employment and education needs of family members and links to existing communities, individuals may choose to retain their existing residence rather than relocate to the new location of their job, particularly if infrastructure is provided that allows them to do so at a reasonable cost. Australia's recent experience with fly-in fly-out (FIFO) workers, particularly in the resources sector, shows that a number of people, where transport systems allow, will prefer to reside in major cities.

As noted in the **Economy** chapter, there is evidence that a doubling of city size is associated with an extra increase in productivity of between 2 and 5 per cent (OECD 2013).

The challenges associated with increasing productivity will continue. There are no simple levers to affect geographic labour mobility. Evidence shows that policies that aim to influence where people live and work in regional and remote areas have limited effectiveness. A combination of personal and locational factors relating to housing, employment and local infrastructure will influence an individual's decision to relocate (PC 2014b).

Future population increases are likely to challenge policy makers to find ways to minimise the impacts on transport demand, on costs associated with new infrastructure and on the overall success of Australian cities.

Infrastructure's city shaping role

In increasing the capacity of cities, consideration must be given to the role that transport infrastructure can play in shaping cities. With the changing spatial distribution of employment (discussed previously in the **Economy** chapter), many jobs (in particular, higher-skill, higher-paying jobs) are centralising in Australia's major cities.

At the same time, as illustrated in the **Settlement** chapter of this report, much of the population growth across Australian cities continues to occur on the urban fringes. The result is that an increasing number of people are living further away from city centres and the jobs they provide, leading to a growing need to effectively connect homes and workplaces (Ahrend 2013; Kelly et al. 2013; Fensham 2013).

The development history of Australia's cities clearly illustrates the vital city-shaping role of transport infrastructure. In recent times an investigation of completed large-scale investments in Melbourne's transport network revealed the extent of the long-run economic and land use impacts brought about by major investments. Melbourne's

City Loop, CityLink and Western Ring Road projects each had, and continue to have, a profound and long-lasting influence on the economic and physical growth of Melbourne in addition to the transportation functions they were designed to (SGS Economics & Planning 2013).

For example, SGS Economics & Planning (2012) have estimated that CityLink (completed in 2000) improved the accessibility of large sections of Melbourne by linking the north and south-east of Melbourne with the central core of the city. The project facilitated the establishment of an estimated further 70,300 jobs in Melbourne with a corresponding extra 58,200 households, resulting in employment growth and productivity improvements that

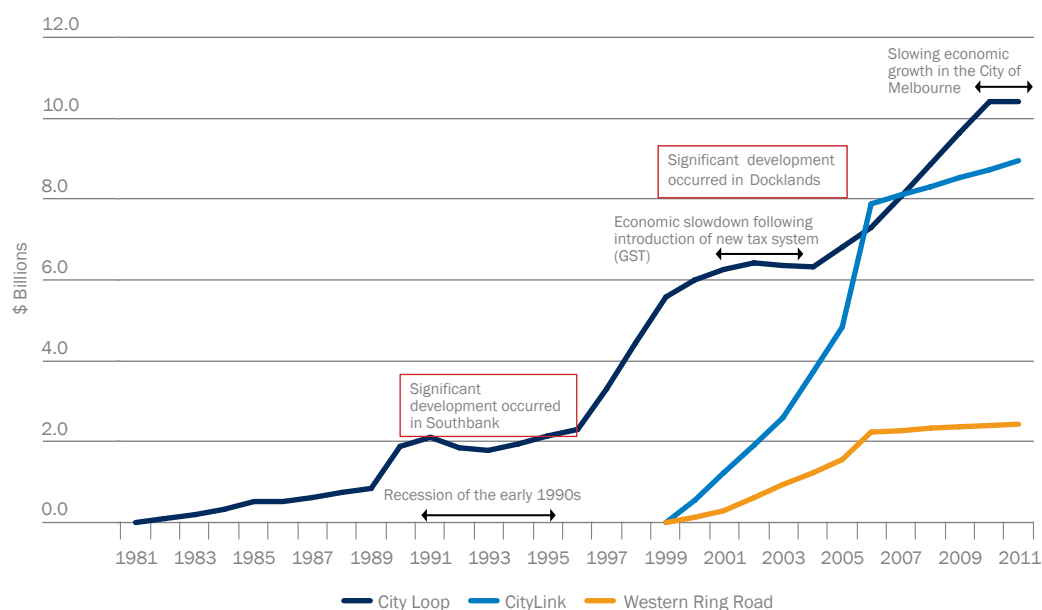
added an estimated \$9 billion to the Melbourne economy in 2010–11 (see Figure 6.16). Similarly, Melbourne's City Loop (completed in 1985) added an estimated \$10.4 billion to the Melbourne economy in 2011, largely through clustering an estimated additional 74,000 jobs in central Melbourne. Many of these jobs were more productive than they would have been if they were located elsewhere (SGS Economics & Planning 2012). Table 6.2 illustrates the often long lead time between project conceptualisation and project completion.

Table 6.2 Estimate summary of benefits to metropolitan Melbourne, 2011

	CityLink (\$ billion)	Western Ring Road (\$ billion)	City Loop (\$ billion)
Project conceptualisation	1969	1954	1929
Project completed	2000	1999	1985
Productivity improvements	\$1.4	\$0.2	\$1.2
Move to more productive jobs	\$7.5	\$2.2	\$9.2
Total GVA Uplift	\$9.0	\$2.6	\$10.4
New jobs	70,300	24,900	74,000
New households	58,200	17,400	n.a.
Freight improvements	\$0.08	\$0.15	n.a.

Source: ABS 2012.

The estimated benefit streams of these respective major transport projects over time are illustrated in Figure 6.16. Notable is the slow ramp-up but consistently compounding benefits associated with the City Loop compared with the much more immediate, but soon slowing, benefits resulting from construction of CityLink and the Western Ring Road.

Figure 6.16 Benefit stream across time of selected Melbourne transport projects (\$ billions), 1981–2011

Source: SGS Economics & Planning (2012).

Conclusion

There can be no doubt that there is increased demand for transport and increasing calls for infrastructure investments in Australian cities. Increased population, greater employment and increased education outcomes bring with them challenges, particularly the need to effectively manage competing demands for space. Nowhere is this more apparent than on our transport networks, which are critical to the movement of ever-increasing numbers of people and goods.

Projections of population growth and transport demand are driving policy thinking at all levels of government. It is vital for policy makers to consider the importance of integrated planning, particularly integrating transport and land use planning. By adopting these approaches, it is recognised that different parts of a city have different transport tasks and different infrastructure needs.

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