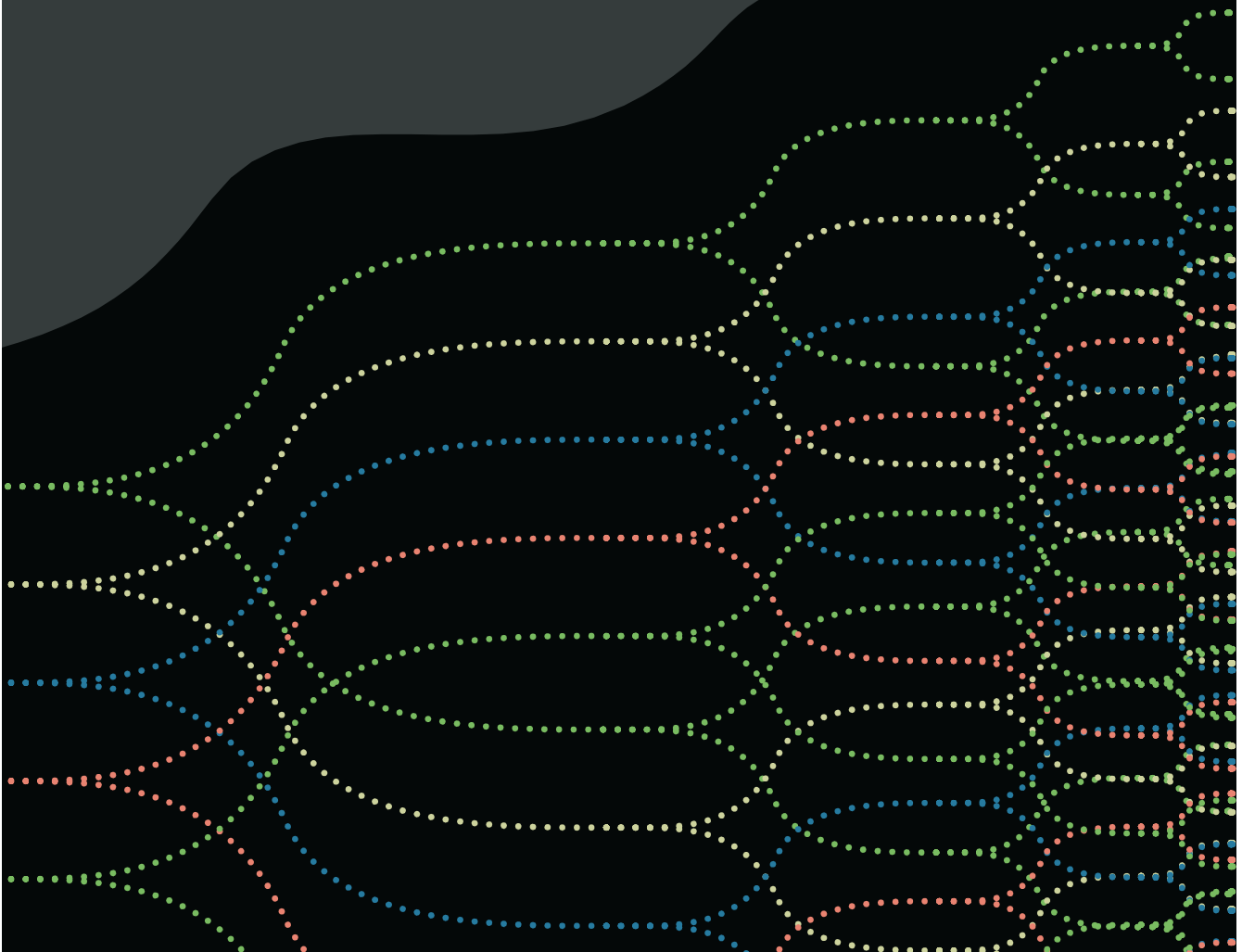**Australian Government**

Intergenerational
Report 2023

Australia's future to 2063

Australian Government

Intergenerational Report 2023

Australia's future to 2063

Contents

Treasurer's foreword

The Albanese Government's first Intergenerational Report provides a big picture view of the forces that will shape our economy and fiscal position over the next 40 years as we work to create prosperity, expand opportunity, and build a stronger, more sustainable and more inclusive nation.

Digitalisation and the adoption of new technologies, shifts in our industrial base, the energy transformation, demographic change, and serious geopolitical uncertainty are already changing the shape of our economy and this will continue over the coming decades.

This Intergenerational Report shows that Australia's success will come down to how we manage and maximise these big shifts that are underway. The decisions that we make in this defining decade will go a long way to ensuring our country has its best years ahead of it.

That's why we're acting now – to repair the budget, build the skills and capabilities of our workforce, foster a more dynamic, productive and resilient economy, broaden economic opportunity and address disadvantage, strengthen national security and regional stability, embrace the opportunities of the net zero transformation and digitalisation, and invest in the care and support economy.

We've made an important start, but this Intergenerational Report shows there is much more to be done to shape the future on our terms. This Report will help guide that work. I thank my ministerial colleagues for their input, and the dedicated Treasury team and officials from across the Government who have done an outstanding job putting it together.

The Hon Jim Chalmers MP

Treasurer

Executive summary

Overview

Powerful forces will continue to shape Australia's economy over the coming decades including population ageing, expanded use of digital and data technology, climate change and the net zero transformation, rising demand for care and support services, and increased geopolitical risk and fragmentation. These forces will influence the future path and structure of our economy and change how Australians live, work, and engage with the world.

By 2062–63, the economy is projected to be around two and a half times larger and incomes 50 per cent higher in real terms. However, like other advanced economies, Australia's economic growth is projected to be slower than in the past 40 years. This is driven by lower projected population growth and reduced participation due to ageing, along with an assumption of slower long-run productivity growth. The economy is projected to grow by an average of 2.2 per cent per year in real terms over the next 40 years compared to 3.1 per cent over the past 40 years.

Slower economic growth will place pressure on the tax base at a time of rising costs, creating a long-term fiscal challenge. Despite recent improvements in Australia's fiscal position, debt-to-GDP remains high by historical standards. Long-term spending pressures are also rising across health, aged care, the National Disability Insurance Scheme (NDIS), defence and interest on government debt. Gross debt is projected to decline from historical highs before rising again from the late 2040s to reach 32.1 per cent of gross domestic product (GDP) by 2062–63.

Australia's ability to meet challenges while seizing future opportunities depends on choices today. The Government is repairing the budget, while also making the critical investments and productivity reforms necessary to grow the economy. This will position Australia to take maximum advantage of emerging technologies and the transformation to net zero. The Government is also investing in people, sustainably providing essential care and support services, expanding opportunity and addressing disadvantage, and continuing to position the nation's diplomatic and defence capability for regional security.

2023 Intergenerational Report

Forces shaping the Australian economy

The Australian economy has prospered over the past 40 years, through profound economic and social shifts. Australia became more open to global trade and international investment. The economy and workforce were transformed by rising women's participation (Chapter 3) and the shift away from primary production and manufacturing towards services. These shifts have led to rising prosperity, higher-paid jobs, and a more open economy with access to a wider range of goods and services from around the world. The changes have also put Australia in a stronger position to weather major global economic crises, including the recent COVID-19 pandemic.

Australia's future path of economic growth and the composition of the economy will continue to be shaped by powerful domestic and global forces over the next 40 years. The Intergenerational Report (IGR) considers five of these major forces: population ageing, technological and digital transformation, climate change and the net zero transformation, rising demand for care and support services, and geopolitical risk and fragmentation.

Population ageing

Australians are living longer with more years in full health and more time using government-funded services. Increased longevity, alongside low fertility rates, means the population will continue to age over the next 40 years. The number of people aged 65 and over will more than double and the number aged 85 and over will more than triple. Population ageing will be an ongoing economic and fiscal challenge (Chapter 2).

Technological and digital transformation

Technological change has driven unprecedented economic growth and rises in living standards over the past 40 years. Workers became more productive, working conditions improved and wages rose. Technology, and, in particular, the ongoing digital transformation, is expected to continue to raise incomes and quality of life over the next 40 years. Technological advancements hold the potential for new life-saving drugs and surgical procedures, machines that perform dangerous, complex and arduous tasks, and locally generated green power.[1] Transitions and risks will need to be carefully managed through the change.

Climate change and the net zero transformation

Climate change and the net zero transformation will have a significant impact on the structure of the economy and the choices Australian consumers and businesses make over the coming decades. While the global net zero transformation is expected to drive changes in the structure of Australia's economy that will be challenging, it will also create growth opportunities in some occupations and existing and new industries. Australia is in

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1   Green power generation produces little to no greenhouse gas emissions.

a strong position to benefit with some of the world's largest reserves of critical minerals such as lithium, cobalt and rare earth elements, which are key inputs to clean energy technologies. With abundant wind, sun and open spaces Australia also has the potential to generate green energy more cheaply than many countries

Rising demand for care and support services

Demand for quality care and support services is rising, particularly as Australia's population ages. Governments have expanded access to formal care arrangements for children, older Australians and people with disability. Standards of care and support have also improved. Skills, training and wages that reflect the value of care work will be critical to attracting and retaining the workforce for the needed expansion in the sector.

Geopolitical risk and fragmentation

Australia has benefitted from open international markets built on a trusted, rules based, global trading system. Opening our economy to the world has increased the flow of goods, services, capital, labour and technology, supporting decades of economic growth. Australia has also faced economic shocks as highlighted by recent trade disputes, extreme weather events, the COVID-19 pandemic and military conflicts overseas. Looking ahead, Australia's prosperity will continue to be influenced by the evolving geopolitical environment. Australia must safeguard our national security and access to international markets while deepening regional partnerships to reduce supply chain vulnerabilities and increase economic resilience.

Australia's changing industrial base

Australia's industrial base has slowly shifted towards the delivery and consumption of services over the past 40 years, consistent with the trend in other advanced economies. The global response to climate change is already transforming Australia, and may be the most profound driver of change over the longer term. Other drivers such as the ageing population and digital technology uptake are likely to reinforce the existing trend towards services delivery and the increasing demand for higher-skilled workers.

The care and support, manufacturing and mining sectors, in particular, are expected to experience significant change. The care sector is large and growing and will create new and meaningful jobs over the coming decades. Australia's mining sector will continue to be shaped by global demand and the increase in demand for low emissions-intensive commodities as part of the global transformation to net zero. Australia's manufacturing base will likely continue to become more specialised and high skilled, in line with Australia's comparative advantage and the opportunities afforded by the net zero transformation.

2023 Intergenerational Report

Economic projections over the next 40 years

The Australian economy, like other advanced economies, is projected to grow at a slower pace over the next 40 years than in the past 40 years. Real GDP is projected to grow at an average annual pace of 2.2 per cent – 0.9 percentage points lower than the average of the past. This mainly reflects slower projected population growth and declining participation as the population ages consistent with trends in the 2021 IGR, as well as an assumption of slower long-run productivity growth. Slower economic growth increases pressure on the budget (Figure 1).

While the pace of growth is projected to slow, the Australian economy is nevertheless projected to be around two and a half times larger in 2062–63 in real terms. The long-term projections for real GDP growth are lower than presented in the 2021 IGR. This primarily reflects the adoption of a more prudent long-term productivity growth assumption.

Productivity

Growth in productivity since the mid-2000s has slowed in Australia and most advanced economies. The 2023 IGR productivity growth assumption is 1.2 per cent, consistent with the 20-year average. This compares to the 2021 IGR assumption of 15 per cent, consistent with the 30-year average at that time.

This is a technical assumption that does not capture the impact of future policy changes, or shifts in the global and domestic economy, such as the expanded use of digital technology, the changing climate and net zero transformation or changes in industry composition.

Figure 1   The 3Ps framework
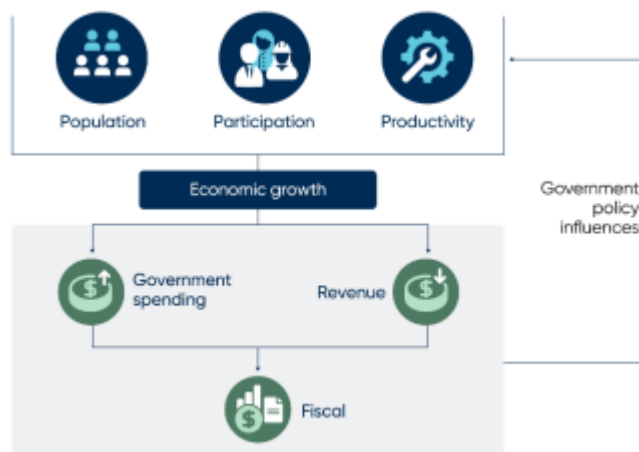
Source: Treasury.

Population

Australians are expected to continue living longer and remain healthier to an older age, while having fewer children. This is leading to an ageing and a slower-growing population. The average annual population growth rate is projected to slow to 1.1 per cent over the next 40 years, compared to 1.4 per cent for the past 40 years. This is a similar population growth rate to the 2021 IGR projection. Australia's population is projected to reach 40.5 million in 2062–63 (Chapter 2).

Participation

More people are participating in paid work than ever before. The labour force participation rate remains near record highs. The increase in participation over the past 40 years has largely been driven by women entering the workforce. Employed people are, however, working fewer hours on average. This reflects an increase in part-time work, especially for women and older Australians. As the population ages, the participation rate is expected to gradually decline from 66.6 per cent in 2022–23 to 63.8 per cent by 2062–63. This is slightly higher than the 2021 IGR projection. Average hours worked per employed person is also expected to decline slightly from around 32 to around 31 hours per week as the share of part-time workers increases (Chapter 3).

Incomes and the terms of trade

Real gross national income (GNI) per person – the average amount earned by each Australian – is projected to increase by around 50 per cent over the next 40 years. However, the average annual growth rate in real GNI per person is projected to grow by 1 per cent, compared to 2.1 per cent over the past 40 years (Chart 1). The slowdown is driven by smaller contributions from changes in relative international prices, as well as the projected changes in population, participation and productivity.

In recent decades, real GNI per person has been boosted by significant increases in prices for Australia's key commodities, which have taken the terms of trade to record highs. Commodity prices and the terms of trade are assumed to decline and then stabilise at a lower long-term level so they cease to contribute to growth in real GNI per person, which grows in line with real GDP per person (Chart 1).

2023 Intergenerational Report

Chart 1   Components of real income growth per capita
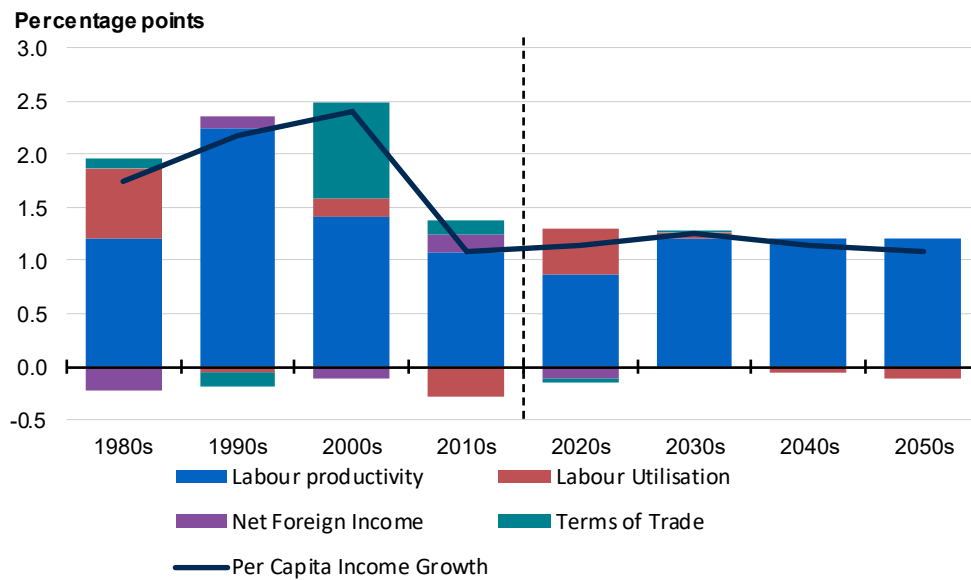
Percentage points

Note: Real income is defined as Real Gross National Income. Labour utilisation refers to total hours worked per capita.

Source: Australian Bureau of Statistics (ABS) Australian National Accounts: Income, Expenditure and Product; Labour Force Survey; unpublished ABS data; and Treasury.

The budget over the next 40 years

Fiscal sustainability is critical for delivering essential public services, providing fiscal buffers for economic downturns and maintaining macroeconomic stability.

Notwithstanding recent actions that have improved the near-term fiscal position, Australian Government debt-to-GDP remains high by historical standards, long-term spending pressures are growing, and the revenue base is narrowing as the population ages.

The underlying cash balance is expected to be in surplus in 2022–23 for the first time since 2007–08. However, deficits are projected to remain over the long-term. Budget deficits narrow initially, but then widen from the 2040s due to growing spending pressures (Chart 2). Gross debt-to-GDP is projected to decline from a peak of 39.3 per cent in 2020–21 to 22.5 per cent by 2048–49, before rising again to reach 32.1 per cent of GDP by 2062–63.

Chart 2   Underlying cash balance
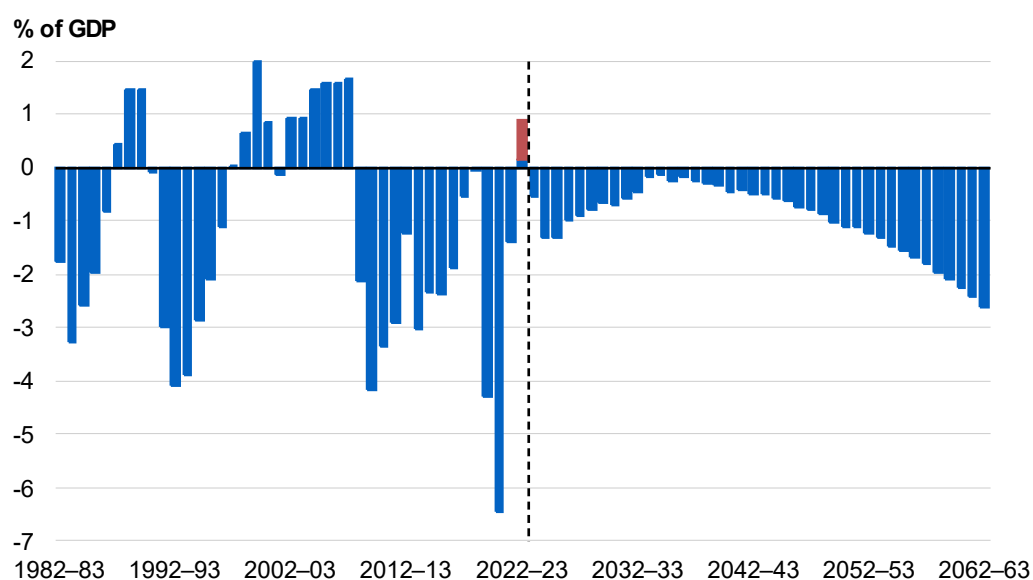
Note: The red bar represents the preliminary estimate of 2022–23 underlying cash balance, which will be finalised and published in the 2022–23 Final Budget Outcome.

Source: Treasury.

Recent actions to improve the budget position have assisted in rebuilding fiscal buffers after the COVID-19 pandemic and contributed to an improved long-term fiscal outlook since the 2021 IGR. Smaller deficits and lower gross debt are projected to 2060-61 (Chart 3). This reflects a faster-than-expected economic recovery from the COVID-19 pandemic, combined with disciplined fiscal policy, including the Government's action to direct the majority of tax upgrades to budget repair.

Lower debt today means a lower interest burden in the future, providing governments with more flexibility to sustain essential services, invest in emerging priorities and respond to economic shocks. Cumulatively, interest payments are projected to be 30 per cent lower over the projection period than in the 2021 IGR. In 2060-61, gross debt-to-GDP is projected to be 11.3 percentage points lower than in the 2021 IGR.

Chart 3   Gross debt
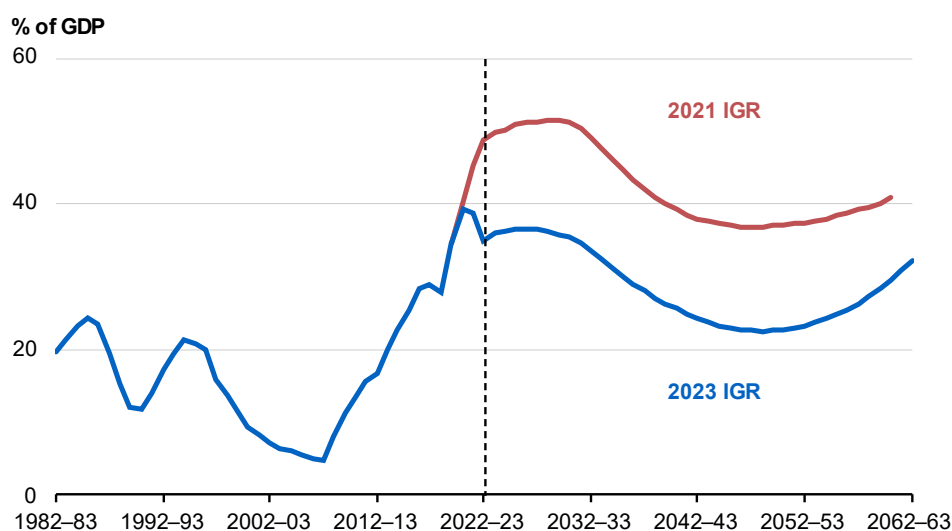
% of GDP

Source: Treasury.

Government payments

Over the next 40 years, total Australian Government payments are projected to rise as a share of GDP as the population grows and ages. New technologies and treatments are improving the quality of care, but also contributing to cost pressures.

Payments are projected to increase by 3.8 percentage points, from 24.8 to 28.6 per cent of GDP in 2062–63. The five fastest-growing payments are health, aged care, the NDIS, interest on government debt, and defence (Chart 4). Combined, these payment categories increase from around one third of total government payments today to around one half by 2062–63. Consistent with the 2021 IGR, total income support payments to individuals and families, and education payments, grow in real per capita terms, but decline as a share of GDP. This largely reflects demographic ageing, with the share of the population studying, caring for children and seeking work declining.

Superannuation is expected to play a greater role in funding retirement, meaning spending on age and service pensions is projected to fall as a share of GDP by 2062–63. However, the cost of superannuation concessions will increase, driven by earnings on the larger superannuation balances held by Australians.

Chart 4   Increase in payments across the five main spending pressures (2022–23 to 2062–63)
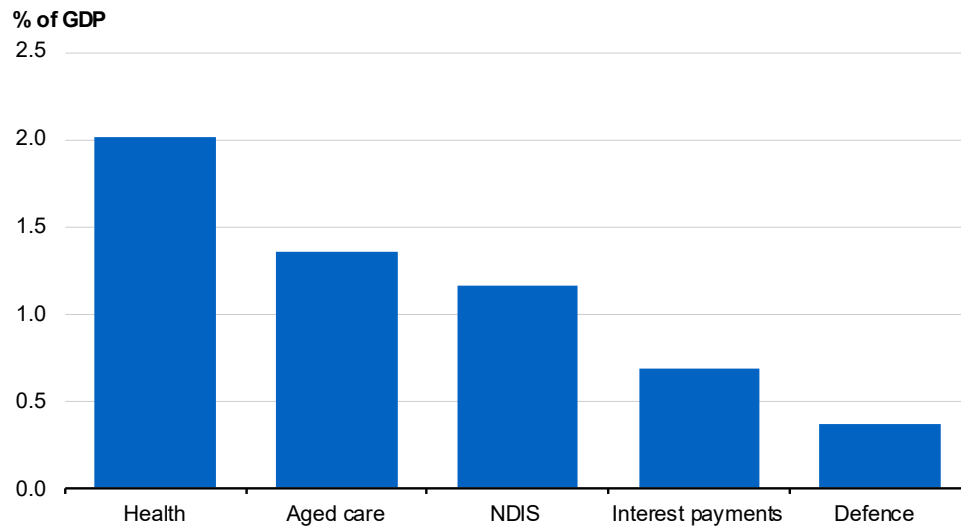
% of GDP

Note: 'NDIS' refers to Australian Government participant payments, excluding state contributions. 'Interest payments' are interest payments on Australian Government securities.

Source: Treasury.

Receipts

Total receipts (tax and non-tax) are projected to rise to be 26.3 per cent of GDP in 203334, consistent with the projections in the 2023–24 Budget, before gradually declining to 26.0 per cent by 2062–63.

Record low unemployment, a pickup in wage growth and strong commodity prices have seen tax receipts recover strongly after the COVID-19 pandemic. Tax receipts are projected to grow to 24.4 per cent of GDP over the medium term to 2033–34, consistent with the projections in the 2023–24 Budget. Tax-to-GDP is then assumed to remain at this level over the remainder of the IGR projection period to 2062–63.

Structural changes to the economy are projected to put pressure on the revenue base over the coming decades. Indirect sources of revenue are expected to decline as the decarbonisation of the transport industry and changing consumer preferences erode fuel and tobacco excise bases. Company tax, goods and services tax (GST), and other taxes are projected to broadly track economic growth. Personal income taxes are projected to increase as a share of GDP, reflecting rising incomes and wages and continued population growth but are limited by the technical assumption for the tax-to-GDP ratio.

2023 Intergenerational Report

Planning and investing for Australia's future

Australia's ability to meet challenges and seize future opportunities depends on today's choices. The Australian Government is repairing the budget, fostering a productive, resilient and dynamic economy that maximises opportunities from new digital technologies, building the skills of our workforce, transforming the economy towards net zero emissions, sustainably meeting Australians' care needs, expanding economic opportunity, and positioning our defence capability.

- *Repairing the budget*: The Government's Economic and Fiscal Strategy is making government finances stronger and more resilient, rebuilding fiscal buffers, and reducing the debt burden on future generations. This is being supported by disciplined spending, directing the majority of tax receipt upgrades to budget repair and policy decisions that address structural budget pressures. This includes the NDIS Financial Sustainability Framework and reforms to increase the fairness, integrity and sustainability of the tax base.

- *Fostering a dynamic, resilient and growing economy*: Raising productivity and economic growth will be vital to future living standards. The Government is investing in infrastructure and our education and training systems, encouraging more housing supply, de-risking supply chains, and positioning Australia to benefit from the growth opportunities of the net zero transformation. The Government is also creating conditions that support increased adoption of digital technologies This includes increasing access to high-speed internet, particularly in regional, rural and remote Australia, helping businesses adopt new digital technologies, and investing in cyber security. The Government has also announced that Treasury will review competition settings.

- *Growing the workforce and building skills*: Responsive skills and training systems and a well targeted migration program can help ensure Australia is well positioned for future structural changes. The Employment White Paper will provide a roadmap for Australia to ensure our education, training, migration and labour market systems support a productive workforce, boost living standards and expand labour market opportunities. The Government is reinvigorating foundation skills programs and improving access to tertiary education, including establishing a Universities Accord, putting in place more fee-free TAFE places and establishing a National Skills Agreement. The Government is also working on future reforms to the migration system to ensure it is well targeted, serves the national interest, and complements the skills and capabilities of Australian workers.

- *Transforming the economy to net zero emissions*: The Government is focused on realising the economic opportunities associated with renewable energy and the global effort to reduce emissions. The Government has legislated its commitments to reduce emissions by 43 per cent below 2005 levels by 2030 and achieve net zero emissions by 2050. By transitioning the electricity sector to renewable energy and investing in the resilience and adaptability of key sectors and regions, the Government is supporting industries to decarbonise and realise clean energy growth opportunities. The Net Zero Authority, Powering the Regions Fund, the National Reconstruction Fund, the Hydrogen Headstart and broader clean energy investments will support Australia to take advantage of growth opportunities from advanced manufacturing and the clean energy transformation.

- *Sustainably meeting Australians' care and support needs*: Demand for high-quality care services is growing along with associated costs. Investing to attract, train and retain workers and skills will be crucial, supported by better use of technology and data. The Government is committed to a sustainable and productive care and support economy that delivers quality care. This has been reflected through reforms to strengthen Medicare, funding better pay for aged care workers and introducing stronger standards for care. The Government is also delivering the National Care and Support Economy Strategy and established the NDIS Review.

- *Expanding opportunity and addressing disadvantage*: The Government is working to broaden opportunity and address inequality and entrenched disadvantage This includes investments in more affordable early childhood education and care and the expansion of Paid Parental Leave, to make it easier for parents who want to work to do so. The Government is also making significant investments in addressing women's safety and security, implementing the Secure Jobs, Better Pay and Respect@Work reforms, establishing an integrated approach to addressing entrenched community disadvantage, supporting more affordable housing, and closing the gap between life outcomes for First Nations Australians and the broader community.

- *Positioning our defence capability for regional security*: The Government is making major investments in military capabilities and deepening engagement with the region. AUKUS will strengthen national security and Australian industry, supporting exports and jobs in sectors like technology and advanced manufacturing.

Part I: The economy over the next 40 years

1   Economy

Overview

Major forces will shape the economy in coming years, including population ageing; rising demand for care and support services; climate change and the net zero transformation; technology and digital adaptation; and geopolitical risk and fragmentation. These forces will change the structure of our economy and how Australians live, work and engage with the world.

The ageing population will likely reinforce the trend towards a services-based economy, while digital technology uptake will favour a higher skilled workforce. The net zero transformation will see some global demand for traditional exports decline while new markets and industries emerge and grow. The care and support, manufacturing and mining sectors are expected to undergo profound change.

How governments, businesses and communities respond to these changes will influence the nation's prospects over coming decades and beyond. Australia's future prosperity depends on continued improvements to productivity and greater opportunities for labour force participation. Government has a role in providing a stable and flexible policy environment while investing to support people, communities and businesses through these changes. Australia must also maintain our national security and access to open international markets. It will be important to deepen regional partnerships to reduce supply chain vulnerabilities and foster economic resilience.

The real economy is projected to be around two and a half times larger than today, and real incomes around 50 per cent higher, by 2062–63. However, like other countries, Australia's economic growth is projected to be slower than in the past 40 years. This is being driven by lower projected population growth and reduced participation as the population ages, along with an assumption of slower long-run productivity growth. The economy is projected to grow by an average of 2.2 per cent per year in real terms over the next 40 years compared to 3.1 per cent over the past 40 years.

Australia's economy over the next 40 years

The Australian economy has prospered over the past 40 years, despite profound economic and social shifts and numerous economic shocks. Australia became more open to global trade and international investment. The economy and workforce saw a shift away from primary production and manufacturing towards services. A significant increase in women's labour force participation unlocked greater economic potential. These structural shifts have resulted in rising prosperity, higher-paid jobs, and a more open economy with access to a wider range of goods and services from around the world.

Australia can expect to face equally profound change over the next 40 years and the impacts will be uneven across industries. Three sectors likely to experience significant change are the care and support, manufacturing and mining sectors.

- The care and support sector – including health, aged and disability care – is expected to continue to grow, driven by population ageing, new health technologies and treatments, a maturing National Disability Insurance Scheme (NDIS) and other factors. Meeting the demand for care will require ongoing investment and improvements in delivery.

- The mining sector is expected to evolve as the world transitions to net zero and reduces its reliance on the fossil fuels and emissions-intensive commodities Australia exports. Australia's critical minerals and other resources could potentially become key exports for the global net zero transformation.

- The manufacturing sector is expected to continue to move into more specialised products and processes consistent with Australia's comparative advantage. If these trends continue, an increasing share of the manufacturing sector's workers will be higher skilled. The net zero transformation may also create new manufacturing opportunities.

The 2023 Intergenerational Report (the IGR) considers the changes expected to affect Australia's economy over the next 40 years, and how they will impact the Australian Government's fiscal position. A strong economy and fiscal sustainability are critical to supporting the quality of life for all Australians and the sustained provision of government services.

Traditional economic indicators are vital for measuring progress, but they are not the whole story. The Government's Measuring What Matters Statement (Box 1.1) outlines a framework of economic, social and environmental indicators for a deeper understanding of how Australians are faring. It will support more informed discussions about what needs to be done to improve people's lives and may help to inform policy development across all levels of government.

Box 1.1 Measuring What Matters

The Measuring What Matters Framework is being developed to identify the best available indicators to measure Australians' wellbeing. The Framework has five wellbeing themes.

- **Healthy:** A society in which people feel well and are in good physical and mental health, can access the services when needed and have the information they require to take action to improve their health.

- **Secure:** A society where people live peacefully, feel safe, have financial security and access to housing.

- **Sustainable:** A society that sustainably uses natural and financial resources, protects and repairs the environment and builds resilience to combat challenges.

- **Cohesive:** A society that supports connections with family, friends and the community, values diversity, and promotes belonging and culture.

- **Prosperous:** A society that has a dynamic, strong economy, invests in people's skills and education, and provides broad opportunities for employment and well-paid, secure jobs.

Consultation underscored the importance of inclusion, equity and fairness across all five themes. The themes are supported by 12 dimensions and 50 key indicators to monitor and track progress. Indicators have been disaggregated by age, gender, ethnicity (including for Aboriginal and Torres Strait Islander people), where reliable data that highlights distributional differences is available.

The indicators will deepen understanding of how Australians are faring, and inform decisions by all levels of government about what needs to be done to improve Australians' lives.

Australia's economic transformation

Over the next 40 years, Australia's economy will continue to face profound shifts. Many forces that will shape the economy and society are not yet conceived or remain subject to great uncertainty. However, some key trends are likely to continue. This Report focuses on the impact of five of the significant forces expected to reshape Australia's economy in coming decades:

- population ageing
- rising demand for care and support services
- climate change and the net zero transformation
- technological and digital transformation, and
- geopolitical risk and fragmentation.

These forces are interconnected. Technological innovation will be key to supporting the net zero transformation. Geopolitical tensions and the global energy transition will accentuate the need to strengthen economic resilience in key areas such as renewable energy. The ageing population will interact with increasing demand for government services, and greater demand on the aged care sector. Part of this demand may be met by data and digital technologies increasing productivity and enabling more Australians to participate in work.

Population ageing

Australians are living longer, with more years in full health and more time using government-funded services. Over the next 40 years, life expectancy at birth is projected to continue to increase, from 81.3 years for men and 85.2 years for women in 2022–23, to 87.0 years for men and 89.5 years for women by 2062–63.

A range of societal, cultural and economic factors have led to women delaying having children and having fewer children than previous generations. Australia's total fertility rate, in line with most advanced economies, fell significantly during the second half of the twentieth century. It has been below the replacement rate of 2.1 babies per woman since the 1970s, and is expected to remain low in coming decades.[2]

Australia's population is ageing as a result of longer life expectancies and low fertility rates. The median age is expected to increase by 4.6 years between 2022–23 and 2062–63, to reach 43.1 years. In the same period, the number of people aged 65 and older will more than double. The number aged 85 and older will more than triple. Chapter 2 provides more information about the impacts of population ageing on Australia's economy and fiscal position.

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2   The replacement rate of fertility is the level required for a generation to replace itself, assuming no net overseas migration and no mortality improvement.

Migration adds to Australia's overall population, its working-age population and skills base. Young migrants can slow and partially offset Australia's population ageing, but migrants themselves age and tend to have slightly lower fertility rates than those born in Australia.

The size of the workforce relative to the dependent population will also fall as the population ages. Chapter 3 looks in more detail at the impact of population ageing on the labour force participation rate. It considers how increasing employment opportunities for people from historically underrepresented groups, women, and older Australians who may wish to work more may help offset the effects of ageing on labour force participation.

Technological and digital transformation

Technological change has driven phenomenal economic growth and lifted living standards over the past century. It has progressively raised workers into more highly skilled, more productive and higher wage jobs.

The share of knowledge-based or cognitive jobs is increasing as demand for real-world problem solving and interpersonal skills rises. New technologies are changing how we work and have made it possible to automate repetitive physical tasks. This is supporting workers to be more productive and making workplaces safer, while the digital transformation is changing the types of skills required and the nature of work. In future, Generative AI may improve the productivity of knowledge-based tasks.[i]

Technology will continue to raise incomes and quality of life. New drugs and surgical procedures will boost health outcomes. Widespread uptake of renewables will lower greenhouse gas emissions. Technology will transform consumption and leisure patterns. It will also provide new opportunities to address key challenges such as climate change. Chapter 3 looks in more detail at the implications of technological change for the skills required in the modern labour market. Chapter 4 looks at the potential impact of the data and digital transformation on future productivity.

Climate change and the net zero transformation

Climate change and the net zero transformation will have a significant impact on the structure of the economy and the choices Australian consumers and businesses make over the coming decades.

Australia is in a strong position to benefit from the global transition to net zero. Lower energy costs relative to other countries can provide a foundation for developing industries, particularly those where energy makes up a large proportion of input costs. With abundant wind, sun and open spaces Australia can generate energy more cheaply than many countries. Technological developments are reducing the cost of renewable energy. Additional technological development could lead to exports of energy-intensive green metals, and electricity through undersea cables and hydrogen.[3]

Global demand for Australian thermal coal exports are expected to decline as our trading partners move toward net zero emissions. However, Australia has some of the world's largest reserves of critical minerals such as lithium, cobalt and rare earth elements.[ii] These, in combination with traditional strengths such as iron and aluminium are some of the essential ingredients in global emissions reduction as inputs for electric vehicles, batteries and renewable energy generation technologies.

Australia will need to adapt to the physical effects of climate change including more frequent and extreme weather events that will impact ecosystems, infrastructure and the built environment, food production, health and global security. Timely investment in climate change adaptation will build resilience and reduce the economic and fiscal costs of climate change in coming decades.

Chapter 5 considers some of the economic challenges and opportunities of climate change and the energy transformation.

Rising demand for care and support services

Demand for care and support services is expected to rise over the next 40 years as the population ages, particularly the growing population of over 85-year-olds. Currently, people aged 65 or older currently account for around 40 per cent of total Australian health expenditure, despite being about 16 per cent of the population.[iii]

Governments have expanded access to formal care arrangements for children, the aged and people with disability. Standards of care and support have also improved with the shift to consumer-centric models of service provision, stronger regulations, and better pay and conditions for workers.

A care and support workforce twice the size it was in 2020–21 could be needed to meet demand in 2049–50.[iv] This presents strong future job opportunities, but is a workforce planning challenge. Appropriate skills and training pathways, plus wages that reflect the value of care work appropriately, will be critical to encourage workers to join and stay in the care and support sector. Chapter 7 looks at future demand for health care, aged care and the NDIS.

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3   Green metals are produced with little to no greenhouse gas emissions.

Geopolitical risk and fragmentation

Australia's economy has benefitted from open international markets built on a trusted, rules-based, global trading system. By reducing barriers to trade, flows of goods, services, capital, labour, and technology have increased, supporting decades of economic growth and higher living standards.

As an open economy, our prosperity in coming decades will be influenced by the evolving geopolitical environment and how we ensure our economy and supply chains remain resilient to future shocks (Box 1.2).

Box 1.2   Navigating geopolitical risk and fragmentation

Australia has prospered from open markets, international trade and investment. Two-way trade exceeded $1 trillion in 2021–22, supporting one-in-four jobs.[v] Securing further gains from global integration is increasingly complicated by geopolitical challenges, including the increased use of trade, investment, and industrial policy as tools of statecraft, climate change mitigation, and military conflict. Financial shocks, extreme weather events, the pandemic, malicious cyber activity, and intensifying competition for resources such as food, water and critical minerals have further highlighted the importance of security and resilience for economic prosperity. Geo-strategic competition in the Indo-Pacific is rising – a major conflict would have far-reaching consequences for the Australian and global economy.

These events require unprecedented coordination between domestic and foreign policy and between economic and security settings to keep Australians safe and ensure our economic strength. Many countries are trying to strengthen resilience by reorganising supply chains and onshoring production, while not losing the benefits of open trade and investment. Economic ties are being strengthened with partners interested in maintaining a secure, peaceful and prosperous region. Through the Indo-Pacific Economic Framework and the Quadrilateral Security Dialogue (the Quad), Australia is pursuing more diverse and resilient supply chains and coordinated crisis preparation and response. Deepening ties with Southeast Asian and Pacific neighbours is a priority.

These challenges also reinforce the importance of improving productivity by seizing economic opportunities from new technologies, the clean energy transition, digitisation, and deepening and diversifying supply chain links with emerging Asian economies. It will be critical to protect and strengthen the rules-based global trading system and the role of multilateral institutions to address global challenges. Investing in diplomatic and strategic partnerships will continue to safeguard regional security.

Measures to make supply chains and the economy more resilient will need to be targeted and proportionate. The costs of a more fragmented global economy could be large – the International Monetary Fund estimates global output could be up to 7 per cent smaller in the long run.[vi] Fragmentation could also complicate climate change mitigation and result in rival trading blocs, more trade and investment restrictions, and weaker international economic governance.

Australia's economic resilience is underpinned by an open, flexible and market-based economy. Strengthening national economic resilience in a fragmented and fragile global environment will mean investing more in renewable energy, education and training. It could require diversifying supply chains and export markets, and boosting research and development in critical and emerging technologies. This would bolster national security and provide further opportunities for domestic jobs and growth in coming decades. The Government is investing in defence, diplomacy, international development, and humanitarian assistance to help manage these risks.

Australia's changing industrial base

Australia has shifted towards the delivery and consumption of services over the past 40 years. Industry is evolving to meet these new demands. Services output has risen almost five-fold over the last 40 years, increasing from around 70 per cent of GDP in 1982 to around 80 per cent today (Chart 1.1 and Chart 1.2).[4] Goods output – encompassing mining, agriculture and manufacturing– has increased three-fold in absolute terms, but its share of the economy and employment has declined(Box 1.3). Over the past five years, the long-term trend decline in the share of goods output has paused, largely reflecting increases in the value of mining output due to steep rises in commodity prices and the COVID-19 related shift in demand from services to goods.

Chart 1.1   Services GDP share
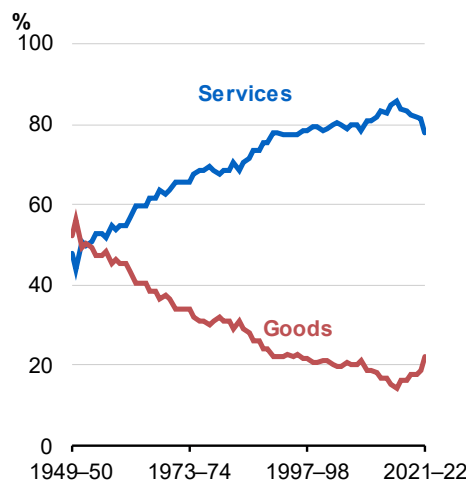
Source: Treasury, Australian National Accounts: National Income, Expenditure and Product Accounts (ABS) 2011 to 2022, Butlin et al.[vii]

Chart 1.2   Services employment
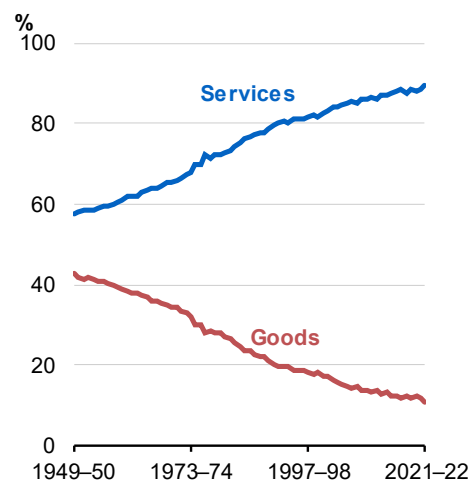
Source: Treasury, ABS Labour Force and Connolly and Lewis (2010).

Advanced economies have shifted away from goods production because of global competition while productivity gains reduced the number of workers.[viii] Increased international trade has been facilitated by technological and transport revolutions, which have lowered costs and provided access to near real-time information.[ix] Australia's comparative advantage has also shifted to sectors that require a significant share of

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4   This IGR defines the services sector as the distribution, business, personal, utilities and construction and non-market industries. Goods includes agriculture, mining and manufacturing.

non-routine work.[x] The share of workers in non-routine jobs has increased and the skill levels of Australian workers have risen (Box 1.3). Workers have, on average, benefitted from higher wages.

Box 1.3   Australia is a service-based economy

Services have become a larger share of the Australian economy over the past 40 years. In 1982–83, 26 per cent of jobs were in agriculture, manufacturing and mining and 74 per cent were in services. Around 90 per cent of jobs are now in services.

The services sector ranges from online retail platforms to neurosurgery. Social services and business services have increased by around 16 percentage points as a share of employment since the 1980s to around 50 per cent today.[xi xii] The shift reflects:

- **Global competition:** Over the last 40 years, trade competition has increased as barriers have declined.[xiii] Technology has improved access/transport.[xiv xv xvi] Developing economies, notably China, have engaged more in global markets.[xvii] Australia has shifted into comparative strengths, such as human capital-intensive services (including education exports) and natural resources (such as commodities). Goods have been easier to trade between countries, increasing producer exposure to global competition, globalising supply chains and increasing specialisation.[xviii]

- **Technological change and productivity:** Goods sectors have enjoyed greater measured productivity gains from technology, capital deepening and innovation. This partly reflects international competition and technological advancements making the production of goods more efficient.[xix xx] This has freed up labour for the expanding services sector where measured productivity gains have been lower− especially non-market services (Chapter 4). [xxi xxii] There are likely further opportunities for gains. Non-mining businesses in Australia have been slower to adopt cutting edge technologies than firms overseas, and there is scope to catch up to the productivity frontier.[xxiii xxiv]

- **Services as inputs:** Services are an increasingly important production input as firms become more efficient and specialised.[xxv] Professional business services have become an increasing input into global supply chains.[xxvi xxvii] Within industries, the skill level has increased and the skill mix has changed.[xxviii xxix] This has increased demand for education and training services to reskill and upskill. Workers are increasingly using services such as child care to facilitate work, supporting women's labour force participation (Chapter 3).

- **Consumer demand:** As income grows, demand increases for publicly provided or funded services such as care and support services, as well as tourism, leisure, and time-saving services. As the population ages this also shifts demand to aged care and health care.[xxx][xxxi] The shift towards services is consistent with other advanced economies (Chart 1.3).[xxxii]

Chart 1.3   Services share of GDP and real GDP per capita
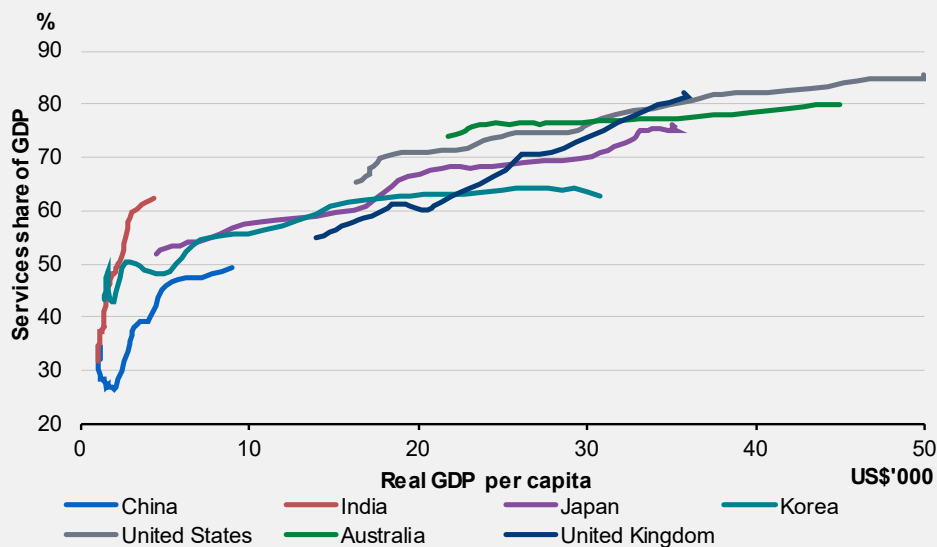
Note: Chart shows five-year rolling averages of service share of GDP and real GDP per capita over time; various start dates between the mid-1950s and mid-1970s; data ends in 2011.

Source: Australian National Accounts: National Income, Expenditure and Product and Maddison Project Database.

Australian industry will continue to evolve over the next 40 years

The Australian economy will continue to transform in response to changing global trade, technology and consumption patterns over the next 40 years. Three sectors are likely to experience significant change: care and support, manufacturing and mining.

The global response to climate change is already transforming Australia, and this will continue in the coming decades. The global net zero transformation may be the most profound driver of change in the economy. Box 1.5 discusses the impact of climate change and the net zero transformation on Australia's future labour market.

Other drivers such as the ageing population and digital technology uptake, are likely to reinforce the existing trend towards services delivery and the increasing demand for higher-skilled workers. Technological advancements will continue to shape Australia's future.

The care and support sector

The care and support sector is large and growing.[5] Over the past 40 years the sector has grown strongly as a share of the economy and labour force(Chart 1.4).[xxxiii xxxiv xxxv] Growth in care services reflects:

- expansion of health care services, technology and treatment options

- expansion of aged care services driven by an ageing population and rising demand for improved quality in residential and home care

- the establishment of the NDIS for people with significant and permanent disability.

Chart 1.4   Care and support sector employment
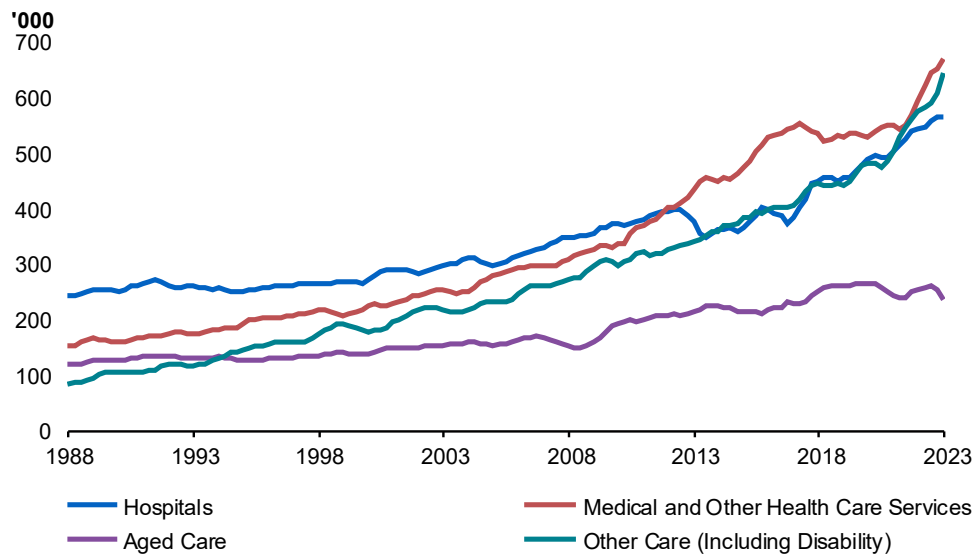
Note: Employment groupings based on the ANZSIC subdivisions for the Health Care and Social Assistance division. Annual moving average applied to quarterly data.

Source: Treasury, Labour Force, Australia, Detailed (ABS) and Australian System of National Accounts.

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5   The care and support sector is defined in accordance with the Australian and New Zealand Standard Industrial Classification of Health Care and Social Assistance. This includes the delivery of health, aged, disability and other categories of care.

Gradually, care work has shifted from informal to formal care.[6] While informal care remains an important aspect of care provision, more options for formal care have helped reduce barriers to women's labour force participation (Box 3.1). Increased participation has improved women's economic security and financial independence.[xxxvi] Government funding has increased as Australians sought more and higher-quality care services.

The care and support sector is expected to continue growing. The Australian population will require more care services as it ages, with the number of people aged 85 years and over tripling over the next 40 years. The trend towards increased women's labour force participation means more formal care will be required. The NDIS is also expected to continue to grow faster than GDP until the Scheme matures.

Australian Government payments for health care, aged care and the NDIS are projected to increase as a share of GDP from 6.2 per cent in 2022–23 to 10.7 per cent in 2062–63 (Chapter 7). Other levels of government will also continue to contribute to the care economy. This will contribute to a growing care and support sector (Box 1.4). Continued strong growth in the care and support sector is reflected in expectations of employment growth. For example, Jobs and Skills Australia projects the number of health care and social assistance workers to grow by 15.8 per cent from 2021 to 2026.[xxxvii] The former National Skills Commission also projected that the demand for care and support workers is expected to double by 2050.[xxxviii]

The care and support sector will create new and meaningful jobs over the coming decades. The policy challenge is to meet increased demand while ensuring the sustainable delivery of quality care. Funding and securing the necessary workforce will require a significant investment and productivity improvements will be critical. Improvement could come from better preventive health outcomes, data and digital technology advances, productive allocation of the health workforce and reducing barriers for entering and staying in the health workforce.

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6   Formal care refers to paid care services in the market. Informal care refers to unpaid care provided by family, close relatives, friends, and neighbours.

Box 1.4   The growing care and support sector

The following illustrates the potential size of the care and support sector over the next 40 years. Under simplified assumptions, the sector would be projected to increase from around 8 per cent of GDP today to around 15 per cent in 2062–63. This assumes current projections for Australian Government spending in this Report and an assumption that other levels of governments and the private sector maintain their share of spending on care and support (Chart 1.5). Were employment to grow in line with the sector's GDP share then this would continue strong growth in care employment, with the number of care workers having more than doubled over the last 20 years, and estimated to double again over the next 40 years (Chart 1.6).

Chart 1.5   Care GDP share

% of GDP
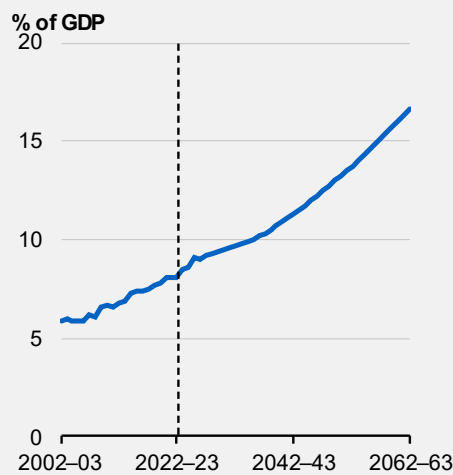
Chart 1.6   Care employment

'000
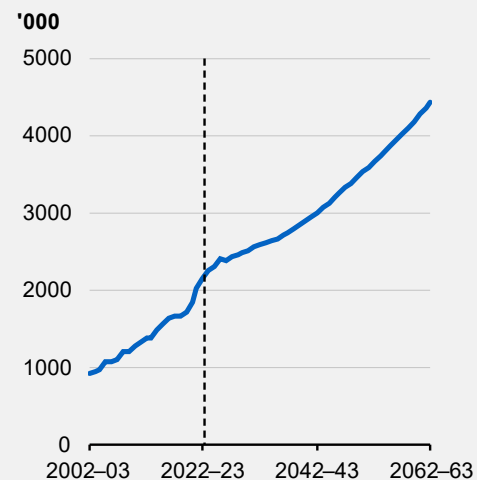
Note: Methodology and assumptions are presented in Appendix A3. The analysis is based on the ABS ANZSIC Health Care and Social Assistance Division.

Source: Treasury, ABS, AIHW, Productivity Commission Report on Government Services.

These estimates consider the care and support sector in isolation from the rest of the economy and assume that supply is available to respond to increased demand. Possible technological advancements are not reflected in the estimates. The analysis is based on the ABS definition of the Health Care and Social Assistance Industry Division. Using other definitions would provide a different result for output and employment, but projections of growth would be similar.

The mining and resources sectors

Australia is one of the world's largest exporters of coal, iron ore and natural gas, with substantial, high quality resource deposits expected to last for many more decades.[xxxix][xl] Australia's mining sector has been and will continue to be shaped by global developments. The sector has historically experienced large volatility in export demand and prices.[xli]

China's rapid growth in the early 2000s contributed to a four-fold increase in commodity prices, spurring a mining investment boom.[xlii]

More recently, tight global supply conditions, Russia's invasion of Ukraine and uncertainty over the global transformation to clean energy has generated significant volatility in prices. During this cycle, investment plans have focused on maintaining production capacity across the sector.

Over the coming decades, demand for Australia's commodities will be influenced by growth transitions in some of our key trading partners, the global transition to net zero, and technological changes.

Demand for commodities from some of Australia's key trading partners is expected to slow as their economies mature and shift from investment-led development models to consumption and services-based economies.[xliii]

The net zero transformation will impact global energy and resources markets as global demand for low-emission commodities increases. While the transition to renewables will boost demand for many of the minerals mined in Australia, creating new growth opportunities, global demand for fossil fuels is projected to decrease over time as global trading partners act to reduce emissions.[xliv]

Global demand of critical minerals will need to increase by around 350 per cent by 2040 for the world to reach net zero emissions by 2050[xlv] Lithium, cobalt, manganese and rare earth elements are crucial to battery manufacturing. Rare earth elements are also essential for permanent magnets used in wind turbines and electric vehicle motors.[xlvi] In addition to significant known reserves, Australia has potential for more undiscovered minerals, with around 80 per cent of land mass largely under-explored. [xlvii]

Substantial growth is projected in minerals, including critical minerals, that are essential to the net zero transformation, such as lithium, nickel, copper, zinc and bauxite (Chart 1.7 and Chart 1.8). Australia is already the world's largest producer of lithium (spodumene concentrate) and is well place to meet future global demand of lithium.[7] Australia's export volumes of spodumene concentrate are projected to double over the next five years from 2022 while nickel export volumes are projected to grow by 50 per cent.[8][xlviii]

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7   Refined lithium can either be extracted directly from lithium brine or from lithium minerals such as spodumene concentrate.

8   This reflects the volume of spodumene concentrate exported plus the volume of spodumene concentrate used to produce lithium hydroxide for export.

Chart 1.7   Australian production of selected commodities
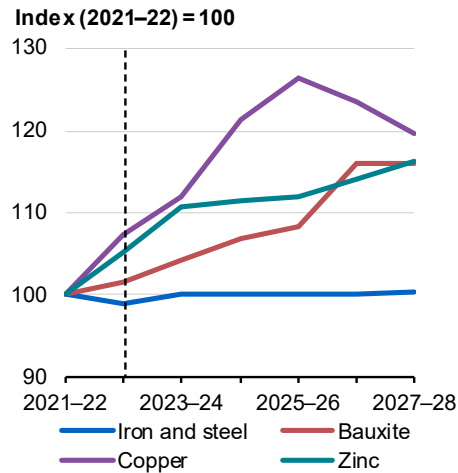
Chart 1.8   Australian lithium and nickel production
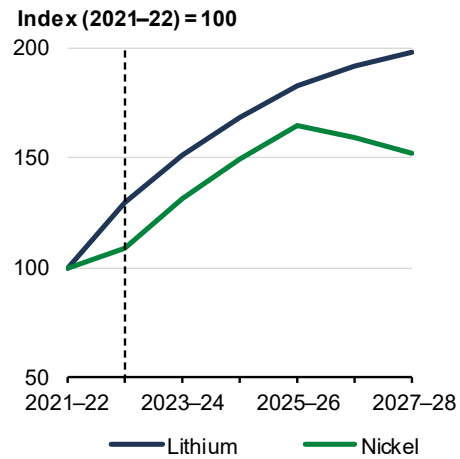
Note: Forecasts and projections from 2022–23.

Source: Department of Industry, Science and Resources – Resources and Energy Quarterly, March 2023.

Technological advancements will also determine the scope for capital deepening and further productivity improvements. Mining technology is already a strength. Automation, robotics, artificial intelligence, and remote operations will continue to be areas of emerging potential.

The manufacturing sector

Australia's manufacturing is diverse comprising food and beverage, machinery and equipment, petroleum, coal and chemicals, metal products, and other manufacturing. Over the past 40 years, real manufacturing sector output has increased around 40 per cent, but has been declining as a share of the economy. Employment in the manufacturing sector has declined, leaving fewer but higher-skilled and higher-paid workers.[xlix][l] These changes largely reflect the shift in Australia and other advanced economies towards services and away from more trade-exposed goods producing sectors.[li][lii]

Australia's manufacturing base has become more export-focused and moved into specialised, high-skilled and higher value-added production.[liii] Firms have capitalised on Australia's higher skilled workforce, productivity improvements, and access to global supply chains to outsource some activities.[liv][lv][lvi][lvii] Investment growth in manufacturing

has been highest in IT and software, computers, and research and development (Chart 1.9).

Chart 1.9   Australian manufacturing investment
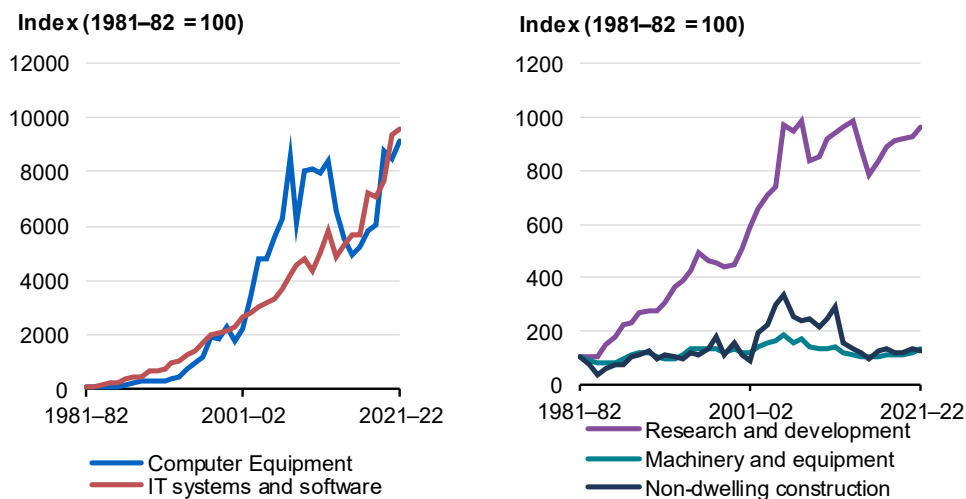
Note: Investment data is in real terms.

Source: Treasury, Australian System of National Accounts (ABS).

The manufacturing sector will continue to evolve over the next 40 years, adapting to global supply chains, technological advances and climate change. Manufacturing will likely continue to focus on high-skill, high value-add areas consistent with Australia's comparative advantage.[lviii] These could include research and development and design, intellectual property ownership and marketing. The effect of new technologies such as artificial intelligence and 3D printing also have the potential to transform the sector.

The Australian economy has benefited significantly from the integration of global supply chains. This includes manufacturing firms that have leveraged their comparative advantage in global value chains.[lix] [lx] Supply chains can, however, be vulnerable to geopolitical, environmental, economic, societal, and infrastructure related risks. Disruptions during COVID-19 highlighted these risks and made businesses and governments more conscious of the need to manage market-wide supply chain risks for essential goods or services.[lxi]

Climate change and the transformation to net zero could have significant impacts on manufacturing. Manufacturing will need to reduce emissions in the transition to net zero, particularly for emissions-intensive forms of manufacturing like aluminium. Energy costs will continue to be a major differentiator in the competitiveness of countries' energy-intensive industry sectors.[lxii] With abundant wind, sun and open spaces Australia

has the potential to generate energy more cheaply than many countries as the world transitions to net zero.

Australia's natural advantages provide potential to export renewable energy in forms such as green hydrogen or electricity via undersea cables. Expanding Australian industry's capacity further along battery mineral value chains is also possible, through businesses building capabilities in downstream refining, manufacturing, and battery integration and services. There is also further work to be done to explore possibilities for Australia to shift existing manufacturing to low emissions technologies[lxiii] Chapter 5 discusses Australia's climate transformation.

Box 1.5   Climate change and the labour market

The structural shifts required to decarbonise will promote the expansion of some industries, while the physical impacts of a warming climate will affect working conditions and labour supply for certain occupations.

The net zero transformation is expected to create job opportunities in some occupations and industries. According to the former National Skills Commission, almost half of industry groups are already involved in a green value chain.[lxiv] Renewable energy employment in Australia increased 120 per cent between 2009–10 and 2018–19, with rooftop solar PV systems comprising nearly half of 2018–19 employment.[lxv]

Well-designed emissions reduction and adaptation measures can support growth areas and smooth the transition of workers from emissions-intensive industries. Advertised green jobs such as those in wind energy have higher remuneration compared to non-green jobs in the same occupation and location. The diffusion of innovation that is expected to accompany the deployment of new abatement technology has further potential to increase productivity and create growth over the long term.

The physical impacts of climate change present a different set of potential consequences for the labour market. Certain occupations and regions will face greater risk of heat stress and, therefore, reduced labour productivity because of rising temperatures (Chapter 5). In the absence of changes to the way people now work, this will affect hours worked and the ability of employers to recruit workers.[lxvi] These pressures are expected to persist over the next 40 years as national and global temperatures continue to rise. Well-targeted investment in adaptation measures will help reduce this risk to Australia's labour markets.

Economic projections

Australia's economy

The Australian economy will grow at a slower pace than in past decades, like other advanced economies. Over the next 40 years, Australia's real GDP is projected to grow at an average annual pace of 2.2 per cent from 2022–23 to 2062–63. That is 0.9 percentage points lower than the average growth of the past 40 years (Chart 1.10). Similar to the projections in past IGRs, this reflects lower projected population growth and reduced participation as the population ages, along with an assumption of slower longrun productivity growth. While the pace of growth is projected to slow, the Australian economy is expected to be around two and a half times larger in 2062–63 than in 2022–23, in real terms.

The long-term projections for real GDP growth are lower than presented in the 2021 IGR. This largely reflects the adoption of a more prudent long-term productivity growth assumption to the 20-year average of around 1.2 per cent per year, compared with the 30-year average of around 1.5 per cent per year in the last IGR (Box 1.6). The updated assumption means the level of real GDP is projected to be around 10 per cent smaller in 2060–61 than projected in the 2021 IGR.

Chart 1.10 Growth of the Australian economy
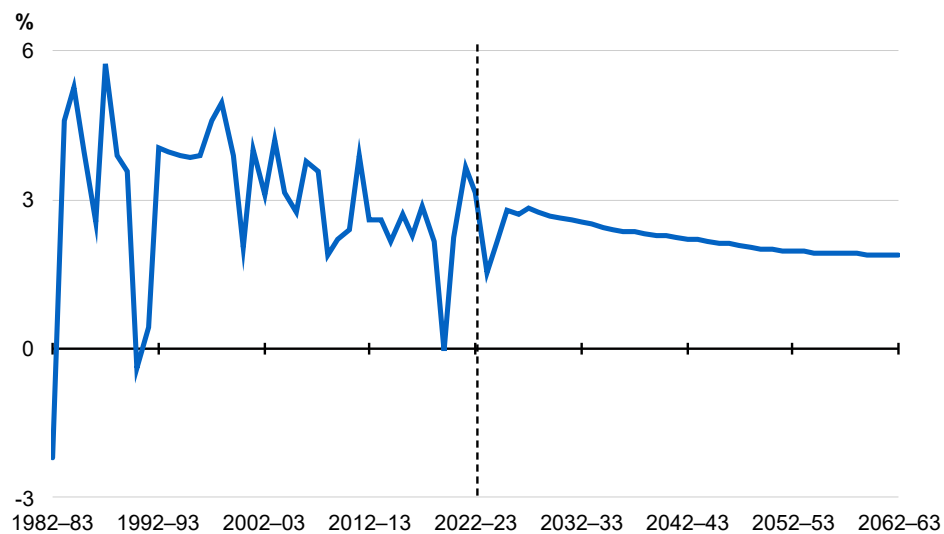
Source: ABS Australian National Accounts: National Income, Expenditure and Product, and Treasury.

The economy has been impacted by multiple large shocks over the past 40 years, including the COVID-19 pandemic, and Russia's invasion of Ukraine and associated global energy price shock. Although the COVID-19 pandemic has subsided, the global economy has experienced elevated inflation since the last IGR. These projections assume the economy operates at its potential. However, in practice, the economy will experience temporary shocks and fluctuations in the business cycle.

Box 1.6   Revised long-term productivity assumption

Australia's labour productivity growth has slowed since the mid-2000s. The slowdown is broad based across industries and advanced economies, suggesting shared factors such as competition, technology adoption, growth of the service sector, and human capital accumulation.

Canada, New Zealand and the United Kingdom have all revised down productivity projections. The United States Congressional Budget Office now weights recent years more heavily, while the OECD uses the 10-year average. The Government moved from a 30-year to a 20-year average in the October 2022 Budget and the 2023–24 Budget. This Report continues with this 20-year average assumption, however, this is a technical assumption. It does not incorporate the impact of future policy changes – or significant shifts in the global and domestic economy – on long-term productivity.

The productivity assumption has large effects on economic and fiscal projections. If this Report had used the 2021 IGR's 1.5 per cent productivity growth assumption, real GDP would have been around 9.5 per cent higher in 2062–63 and the underlying cash balance (UCB) would have been 1.6 percentage points of GDP higher (Chart 1.11).

If the 2021 IGR had used this Report's 1.2 per cent productivity growth assumption, real GDP would have been around 9.5 per cent lower in 2060–61 and the UCB would have been 2.2 percentage points of GDP lower (Chart 1.12).

Chart 1.11 2023 IGR UCB   **Chart 1.12 2021 IGR UCB**
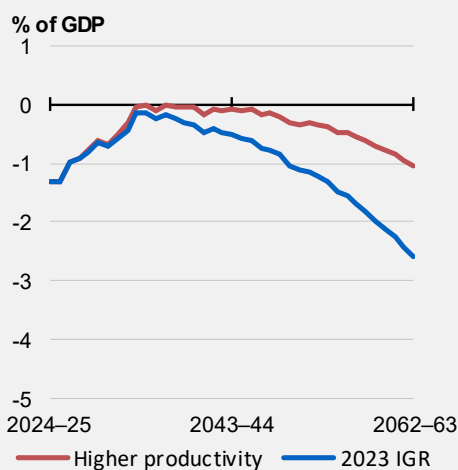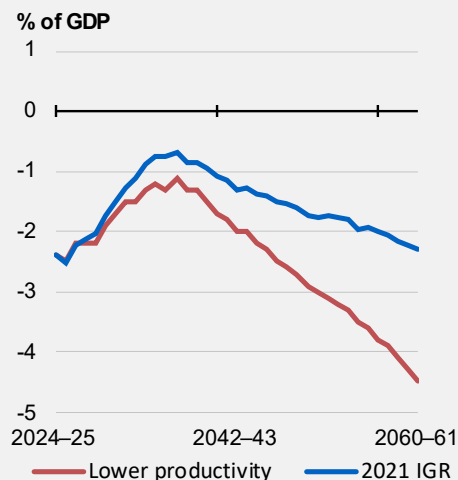
Source: Treasury.

Real GDP per person is projected to grow at an average annual rate of 1.1 per cent compared to 1.8 per cent over the past 40 years (Chart 1.13). This is projected to result in the level of real GDP per person being around 57 per cent larger in 40 years, than it is today.

Chart 1.13 Average growth rates
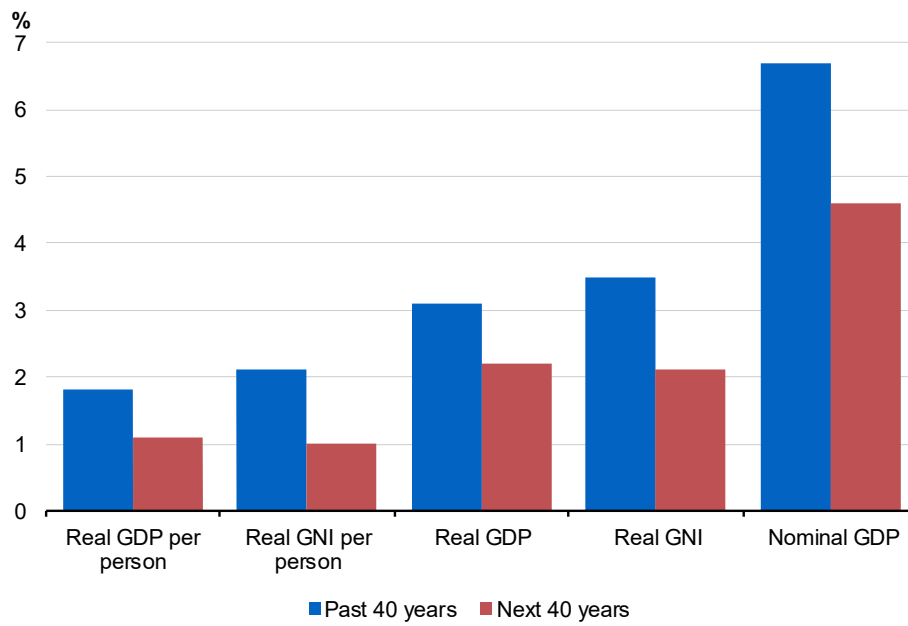
Source: ABS Australian National Accounts: National Income, Expenditure and Product, and Treasury.

The primary driver of growth in real GDP per person is growth in labour productivity per hour worked (Chart 1.14), similar to the past 40 years. While increased labour force participation along with a lower non-accelerating inflation rate of unemployment (NAIRU) can provide some contribution to growth in real GDP per person, significant and ongoing gains require further productivity increases.

Chart 1.14 Drivers of real GDP per person growth
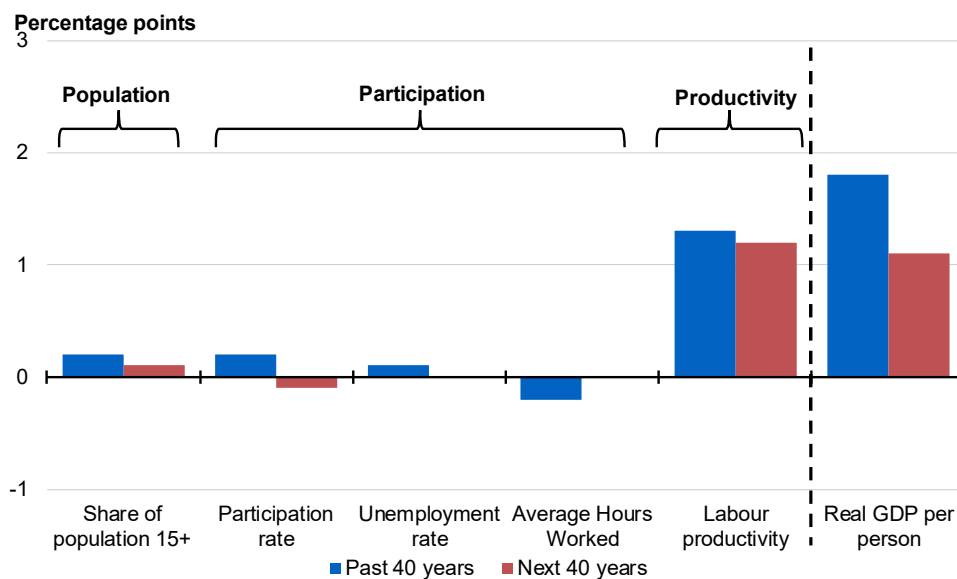
Source: ABS Australian National Accounts: National Income, Expenditure and Product; ABS Labour Force Survey; ABS National, state and territory population; and Treasury.

Living standards and income will continue to rise, but at a slower pace

Real gross national income (GNI) per person – the average amount earned by each Australian domestically and overseas – is projected to increase by around 50 per cent over the next 40 years. However, the average annual growth rate in GNI per person is projected to be 1 per cent over the next 40 years, compared to 2.1 per cent over the past 40 years (Chart 1.15). This is a similar trend to the projections in the 2021 IGR, with the main difference being the adoption of the more prudent assumption for long term productivity growth.

National income is primarily driven by real GDP per person, but is also affected by relative international prices, measured by the terms of trade, and by international income flows between Australia and the rest of the world. In recent decades, significant increases in key commodity prices have seen the terms of trade rise to record highs, which has boosted

real GNI per person. However, key commodity prices and the terms of trade are assumed to decline and then remain stable over the long term, resulting in a much smaller contribution to real GNI growth than in the past (Appendix A3). As a result, real GNI per person is projected to grow broadly in line with real GDP per person.

Chart 1.15 Contributions to real GNI per person growth
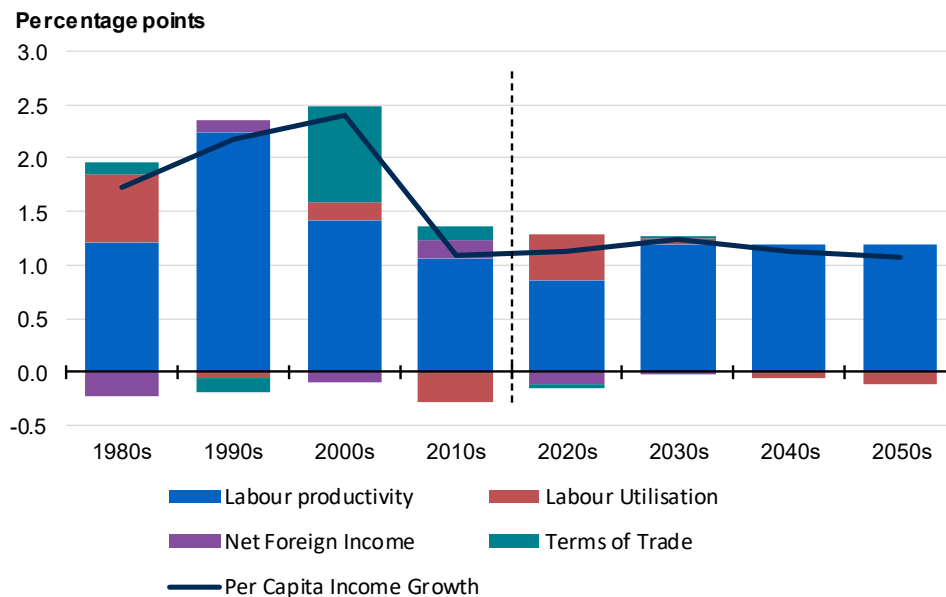
Percentage points

Note: Real income is defined as Real Gross National Income. Labour utilisation refers to total hours worked per capita.

Source: ABS Australian National Accounts: Income, Expenditure and Product; Labour Force Survey; unpublished ABS data; and Treasury.

Nominal GDP growth is projected to slow

Nominal GDP measures the total value of the output produced in Australia, by combining real GDP and prices (Appendix A3). It is the main determinant of the tax base because taxes are levied on nominal incomes and expenditures and so determines the Government's capacity to fund services. Over the past 40 years, nominal GDP grew at an average of 6.7 per cent per year. Nominal GDP growth is projected to grow at 4.6 per cent per year over the next 40 years (Chart 1.16).

By the end of the IGR projections, the level of nominal GDP is around the same as the 2021 IGR. This reflects two offsetting factors. The lower assumption for long-term labour productivity growth reduces both the level of real GDP and nominal GDP, while stronger

commodity export price assumptions and a higher domestic price level increase the level of nominal GDP.

Chart 1.16 Nominal GDP growth
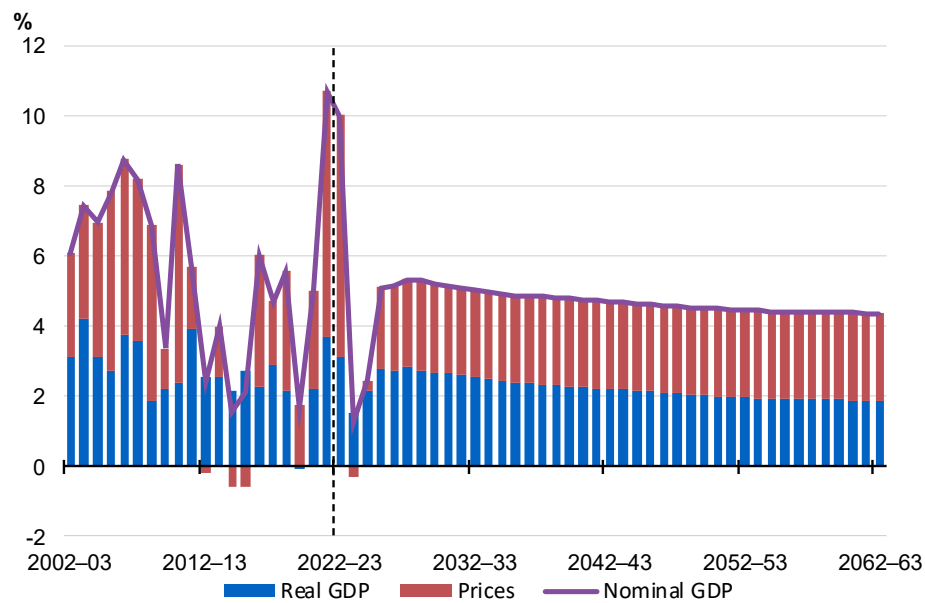
Source: ABS Australian National Accounts: National Income, Expenditure and Product, and Treasury.

3Ps framework

Economic growth is determined over the longer term by expansion of supply in the economy. More people working, because of higher population or increased labour force participation, means a larger workforce is available to produce goods and services. Technological improvements that make workers more efficient enable more to be produced.

The three key drivers of growth are:

- population – change in the number of people in the working-age population
- participation – change in the proportion of those who work and their working hours, and
- labour productivity – change in the amount of output produced per hour worked.

The modelling framework considers the impact of these three drivers on aggregate GDP and does not capture changes in industry composition or the physical impacts of climate change in the baseline projections. Box 1.7 describes how these drivers are modelled.

Box 1.7   Modelling the 3Ps framework

The IGR extends the economic and fiscal projections of the 2023–24 Budget to 2062–63 using the 3Ps framework (Figure 1.1). The 3Ps – productivity, population and participation – determine the potential quantity of goods and services the economy can produce (potential GDP). The IGR projects the economy to operate at potential over the long term. While demand fluctuates over the business cycle in the short term, this is less important over a 40-year period. Policy choices that grow the 3Ps will increase potential GDP, as will people and firms' choices to invest in education or businesses.

3Ps projections are based on demographic/economic assumptions.

- Future average productivity is assumed to reflect historical experience.

- Assumptions about fertility, mortality and migration affect the number of people of working age (population) and the population's age and gender composition.

- Different age-sex cohorts have different patterns of participation and hours worked which inform participation projections for the economy.

A macroeconometric model of the Australian economy combines the projected trajectories of the 3Ps and trend inputs to generate projections for real and nominal GDP, which are used to inform the assessment of the Government's long-term fiscal position. Appendix A3 sets out the methodology and assumptions of the IGR.

The 3Ps framework has some limitations – economic projections assume the long-run composition of the economy is stable. Structural changes in response to long-run trends, such as climate change, could have impacts not captured in the framework.

Figure 1.1   The 3Ps framework
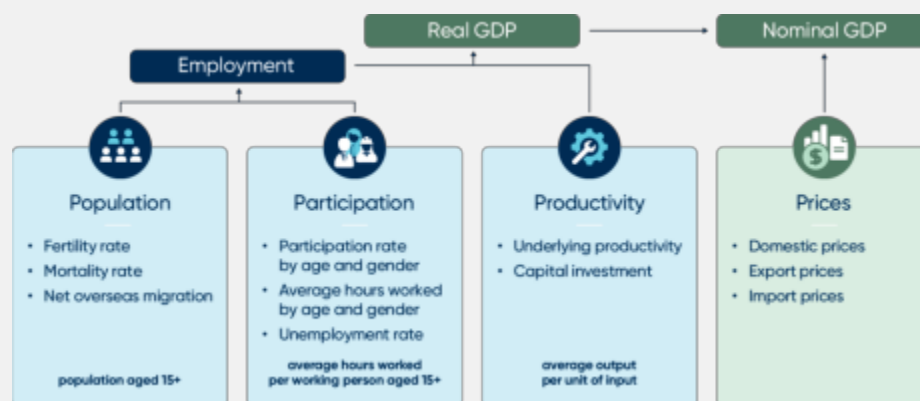
Source: Treasury.

Population, participation and productivity growth is slowing

Australia's population and productivity are projected to grow more slowly over the next 40 years, leading to slower economic growth compared to the past 40 years.

Population ageing is a key challenge, caused by low fertility rates and increasing life expectancies. The participation rate is projected to decline with the ageing population Average hours worked per worker is also expected to decline. Labour productivity growth is assumed to slow to 1.2 per cent – around the average annual labour productivity growth over the past 20 years – compared to the 30-year average of 1.5 per cent used in the 2021 IGR. Similar trends have been observed in comparable advanced economies (Box 1.8).

Chapters 2, 3 and 4 provide further details on trends for population, participation and productivity.

Box 1.8   3Ps comparison across G7 economies

Growth in Australia's productivity, population and participation rates in recent decades has compared favourably with many other advanced economies.

Chart 1.17 shows that, relative to the G7 economies, Australia's average productivity growth (measured by GDP per hour worked) has been higher over the past 20years than all G7 economies except the United States. Australia's population growth has also been higher than the G7 economies over the past 20 years, due to Australia's higher migration. This is likely to continue in the future. Chart 1.18 shows that the increase in Australia's participation rate over the past 20 years has also been larger than most G7 economies.

However, in common with other advanced economies, Australia's productivity growth has slowed and is assumed to be slower than in the past. In Australia and many other economies, population growth from natural increase, is also set to slow. Australia's participation rate is expected to decline over coming decades as the population ages.

Chart 1.17 Productivity and population growth in Australia and the G7, 20-year averages to 2021
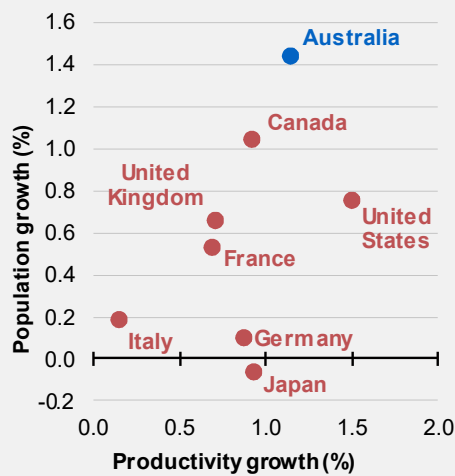
Chart 1.18 Change in participation rate, 20 years to 2021
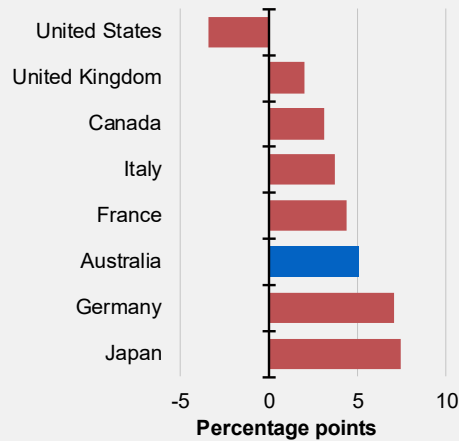
Note: Participation rates cover ages 15 to 64.

Source: Organisation for Economic Co-operation and Development (OECD).

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2   Population

Overview

Australians are expected to live longer and remain healthier to an older age, while Australia's population is projected to grow more slowly over the next 40 years.

Australia's population growth is projected to slow to an average of 1.1 per cent per year over the next 40 years, compared to 1.4 per cent per year for the past 40 years, and similar to the 2021 Intergenerational Report (IGR) projections. Australia's population is projected to reach 40.5 million in 2062–63.

Population ageing is one of the major forces shaping Australia's future. The median age is expected to continue to rise as fertility rates remain low and life expectancy increases. Australia's total fertility rate has declined since the 1960s due to a range of societal, cultural and economic factors. At the same time, Australians have been living longer with more years in full health. Healthier older Australians have better wellbeing, can lead fuller lives, and can choose to participate in the labour market and other activities if they wish.

Overseas migration is expected to continue to support population growth, offsetting demographic challenges to some extent. The arrival of young migrants lowers the median age of the population and adds to Australia's working age population and skill base. While this can slow Australia's population ageing, migrants themselves age and tend to have slightly lower fertility rates than the Australian-born population.

An ageing population presents long-term economic and fiscal challenges, with fewer people of working age relative to the number of older Australians and growing demand for quality care and support services.

Well-planned and well-managed population growth, including through targeted migration, will help to deliver better outcomes on infrastructure, housing, service delivery, and the environment and can support rising living standards over time.

Australia's population growth is slowing

Australia's population growth slowed to its lowest rate (0.1 per cent) in more than 100 years in 2020–21, mostly due to international border restrictions limiting overseas migration. Overseas migration has quickly recovered with the easing of border restrictions, as has been the case in other countries such as the United Kingdom and Canada. This is driving the recovery in Australia's population growth, which is expected to have increased to 2.0 per cent in 2022–23.

Population growth is projected to decrease over the next 40 years to 0.8 per cent in 2062–63 (Chart 2.1). The average annual population growth rate over the next 40 years is projected to be 1.1 per cent, lower than the average annual growth of 1.4 per cent between 1982–83 and 2022–23.

Population growth will continue to be supported by overseas migration and natural increase, but both are expected to fall relative to the size of the population. The level of net overseas migration is assumed to remain fixed at 235,000 persons over the long term. Natural increase is projected to fall as the population ages, with deaths projected to increase faster than births.

Chart 2.1   Population growth
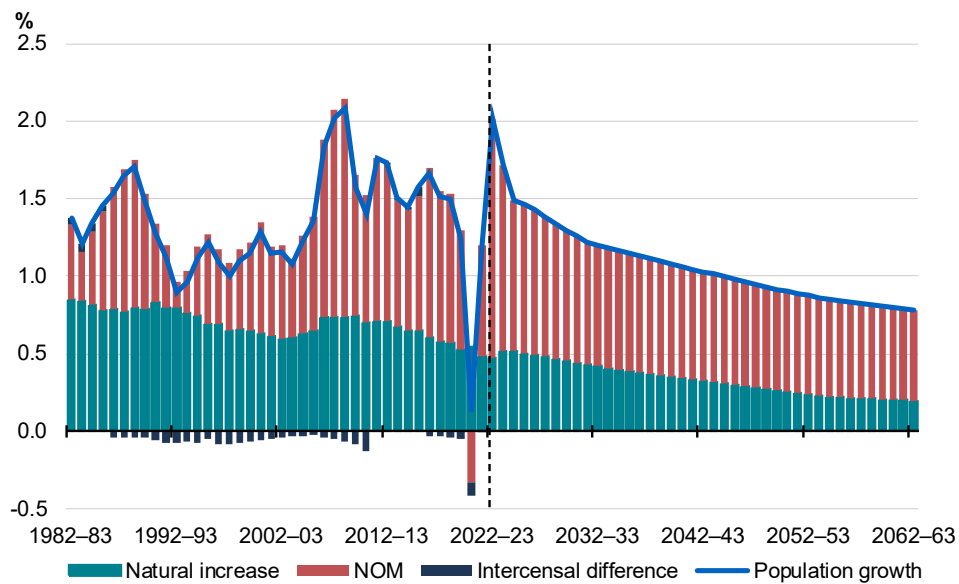
Source: Australian Bureau of Statistics (ABS), National, state and territory population, September 2022, 2023; and Treasury.

Australia's population is projected to grow from 26.5 million in 2022–23 to 40.5 million in 2062–63 (Chart 2.2). Population projections are similar to those in IGRs since 2010, which reflect a continuation of migration settings over the past 20 years that have supported population growth, despite the declining total fertility rate observed during this period (Chart 2.8).[i]

Chart 2.2   Population level projections across IGRs
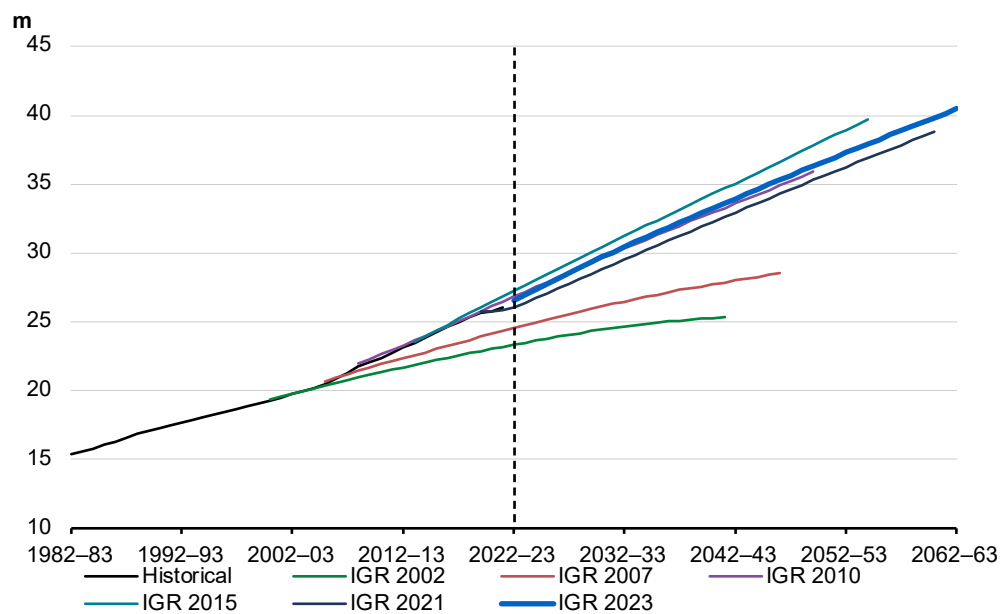
Source: ABS, National, state and territory population, September 2022, 2023; and Treasury.

Migration is assumed to be constant in the long run, and to fall as a share of the population

Migration will continue to be an important driver of population growth. Migration has historically fluctuated with the economic and policy landscape of the time. Migration levels were at a low during the recession of the early 1990s as fewer people entered the country. They then recovered by the late 2000s as the permanent Migration Program was increased and pathways from temporary residency to permanent residency were established.[ii] Net overseas migration accounted for over 60 per cent of Australia's population growth over the past decade

Net overseas migration dropped to a net outflow of 85,000 people in 2020–21 because of international travel restrictions introduced to slow the spread of the COVID-19 pandemic.

This was the first net outflow of overseas migrants from Australia since the end of the Second World War. By the time border restrictions were relaxed at the end of 2021, net overseas migration was cumulatively almost 500,000 lower than expected prior to the pandemic.

The 2023–24 Budget forecast that net overseas migration will recover in the near term due to the temporary catch-up from the pandemic. It is expected to largely return to normal patterns from 2024–25 (Chart 2.3). Even with the near-term recovery, on current forecasts, cumulative net overseas migration would not catch up to pre-pandemic levels until 2029–30.

Chart 2.3   Net overseas migration
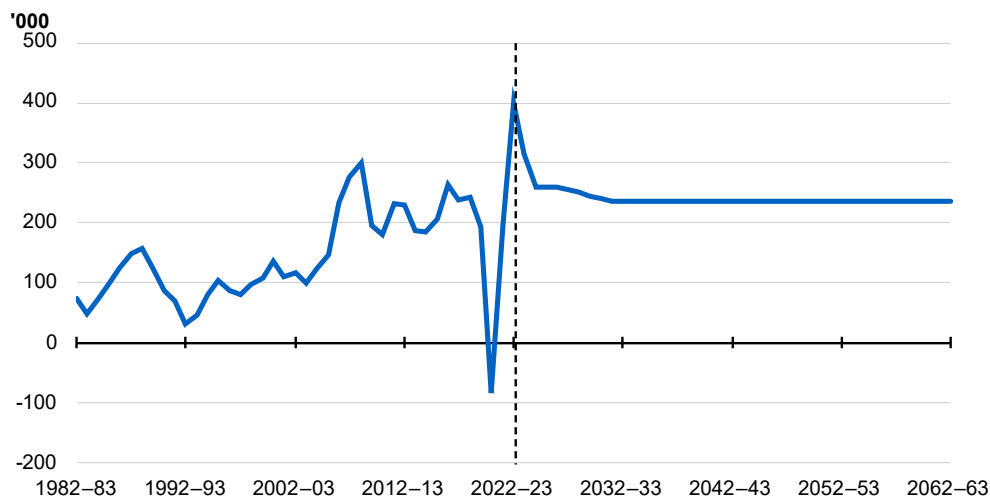
Source: ABS, National, state and territory population, September 2022, 2023; and Treasury.

Once this temporary catch-up subsides, net overseas migration is expected to fall to 235,000 per year, which is the long-run assumption. Actual net overseas migration outcomes over coming decades will depend on several factors, including future migration policy settings and future economic conditions. A sensitivity analysis in Appendix A4 illustrates the impacts of different net overseas migration assumptions, as well as different fertility assumptions.

The migration rebound after the pandemic eased has not been unique to Australia. Net international migration to Canada[iii] and the United Kingdom[iv] in 2022 was more than double the levels in 2019. Like Australia, these increases were primarily driven by non-permanent residents, especially international students and temporary workers. Unlike Australia, the United Kingdom has experienced a significant increase in humanitarian migrants, especially from Ukraine. Canada has experienced a significant increase in permanent visa holders, reflecting major policy changes.

Over the next 40 years, net overseas migration is expected to account for 0.7 percentage points of Australia's average annual population growth, falling from 1.0 percentage points in 2024–25 to 0.6 percentage points by 2062–63. The average growth rate over the next 40 years is the same average rate that was experienced over the past 40 years, although higher than the contribution in the 1990s (0.4 percentage points) and lower than in the 2010s (0.9 percentage points).

Natural increase will continue to slow

Natural increase – births minus deaths in a given year – will also continue to support population growth but will decline from 123,000 in 2022–23 to 80,000 in 2062–63 (Chart 2.4). Births are projected to continue to increase, despite fertility being below the replacement rate. This is due to Australia having a relatively large cohort of women in their 20s and 30s, including the adult children of the baby boomer generation, and overseas migrants. As the population ages, deaths are projected to grow faster than births, leading to a lower level of natural increase.

The contribution of natural increase to population growth will become smaller but remain positive. It accounted for 0.7 percentage points of annual population growth in the 1990s and 0.6 percentage points in the 2010s. It is expected to contribute an average of 0.3 percentage points to population growth over the next 40 years (Chart 2.1).

Chart 2.4   Australia's natural increase and components
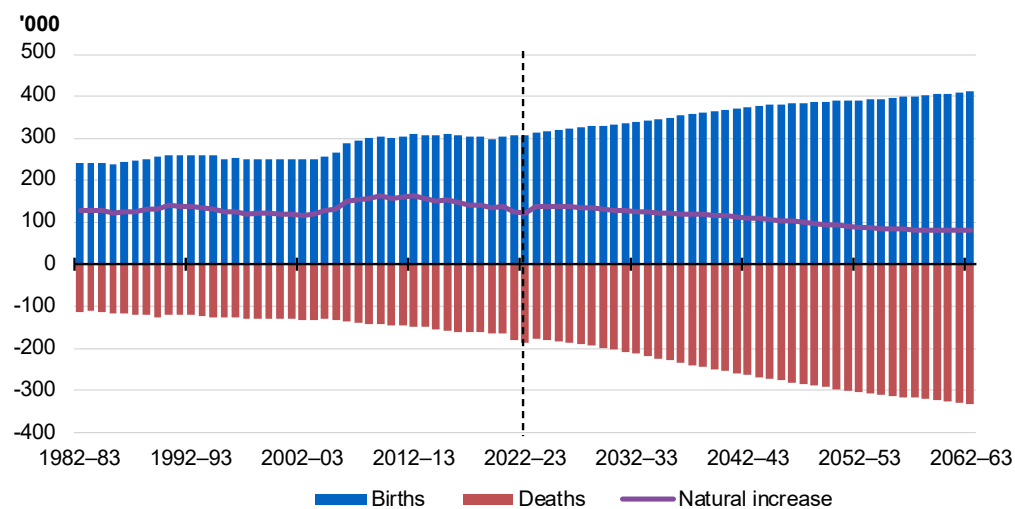
Source: ABS, National, state and territory population, September 2022, 2023; and Treasury.

2023 Intergenerational Report | Part I: The economy over the next 40 years

Australians will live longer and spend more years in full health

Life expectancies in Australia have been improving over time and are among the highest in the world (Chart 2.5).[v] Australians are enjoying more years of full health, allowing older Australians to have better wellbeing, lead fuller lives and continue participating in the labour market and other activities if they choose.

Life expectancies will continue to rise, but the rate of increase is projected to slow. Life expectancies at birth are 81.3 years for men and 85.2 years for women in 2022–23 and are expected to be 87.0 years for men and 89.5 years for women by 2062–63. Life expectancy at age 65 – the average number of additional years that a person at age 65 can be expected to live – is expected to continue increasing from 20.1 years for men and 22.7 years for women in 2022–23, to 24.7 years for men and 26.2 years for women by 2062–63.

The increase in deaths due to COVID-19 and other causes in 2021–22 and 2022–23 resulted in a drop in life expectancy in these two years. The reduction is expected to be temporary.[vi] However, considerable uncertainty remains over the longer-term impacts of COVID-19 on mortality.

Chart 2.5   Life expectancy at birth
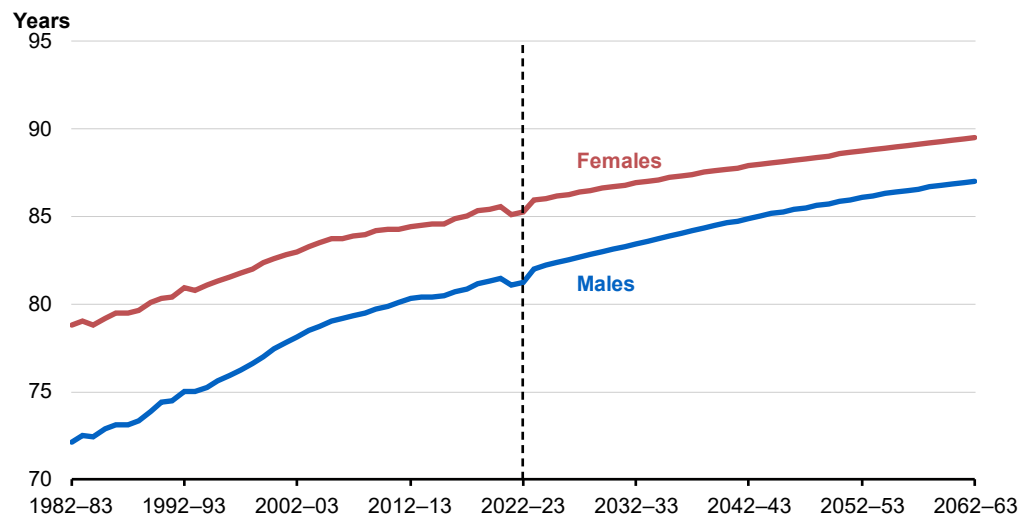
Source: ABS, Historical Population Statistics; ABS Life Tables: States, Territories and Australia, 2016–18; ABS Life Tables, 2017–19; ABS Life Tables, 2018–20; ABS Life Tables, 2019–21; and Treasury.

Some groups experience significantly lower life expectancies than the Australian average. In particular, life expectancies at birth for Aboriginal and Torres Strait Islander men and women were each around eight years lower than for men and women overall at the most recent measurement in the mid-2010s.[9] [vii]

On average, Australian men spend around 88 per cent of their lives in full health, while women spend around 87 per cent. These shares have not changed significantly over the past 20 years (Chart 2.6 and Chart 2.7).[viii] While Australians are spending more years in full health, the number of years lived in ill-health has also increased, which has contributed to demand and government spending for health and aged care services (Chapter 7).

Chart 2.6   Male health-adjusted life expectancy at birth
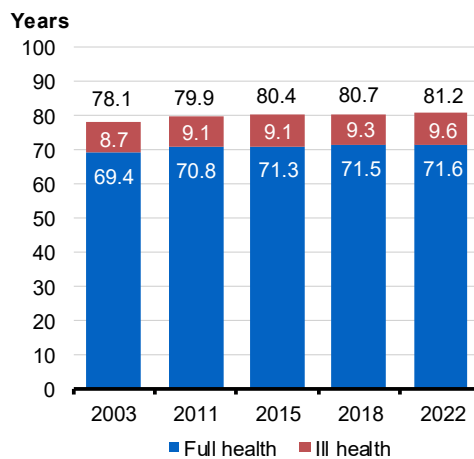
Chart 2.7   Female health-adjusted life expectancy at birth
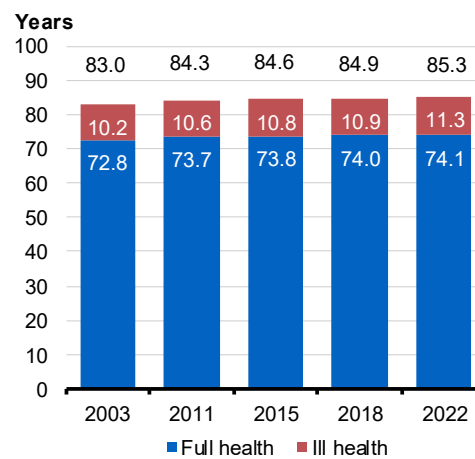
Source: Australian Institute of Health and Welfare, Australian Burden of Disease Study 2022.

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9   Life expectancy estimates for First Nations people are produced every five years, with the latest currently available for 2015–17. The next estimates will be released on 29 November 2023 (for the period 2020–22). This comparison adjusts for age structure differences between the First Nations and overall populations. Caution is required when interpreting First Nations life expectancy estimates over time, because of changing First Nations identification rates across data collections, including the Census.

Fertility rates are expected to remain below the replacement rate

Australia's total fertility rate has been below the replacement rate of 2.1 babies per woman since the 1970s.[10] It has declined from 1.93 babies per woman in 1982–83 to 1.69 babies per woman in 2021–22 (Chart 2.8). However, Australia's total fertility rate remains above most advanced economies and well above levels seen in Japan, Italy and South Korea.[ix]

Chart 2.8   Historical and assumed total fertility rate
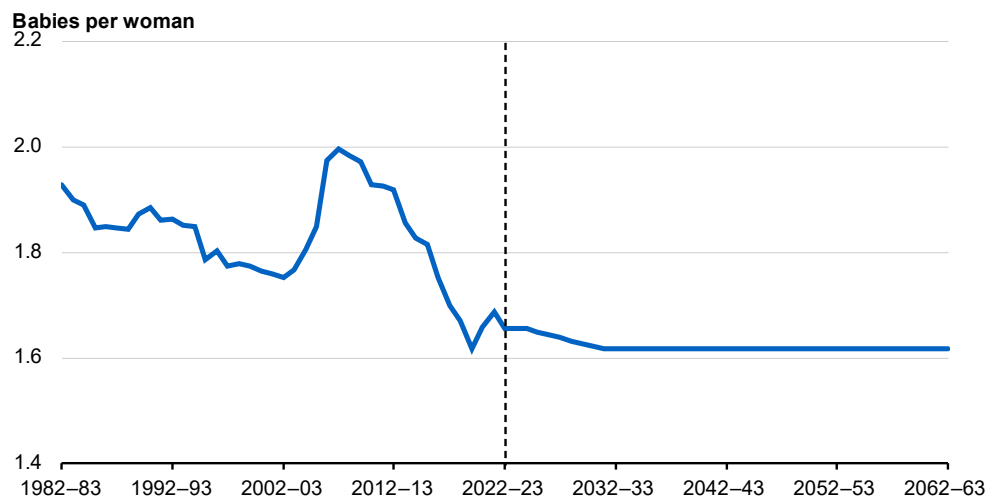
Source: ABS, National, state and territory population, September 2022, 2023; Peter McDonald, A Projection of Australia's Future Fertility Rates, 2020; and Treasury.

A range of societal, cultural and economic factors have contributed to people making different decisions about family formation. Women have more options to pursue education and participate in the workforce than previous generations, and many prefer to establish their careers and achieve economic stability prior to having children.[x][xi] In addition, it is mainly women that take time away from their careers to care for children and to take on other unpaid care work, which could factor into decisions about childbearing.[xii] These factors, along with health and technological improvements that allow women to have children later in life, have led women, on average, to delay having children and to have fewer children than previous generations.[xiii][xiv]

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10   The total fertility rate represents the number of children a woman would have during her lifetime if she experienced the current age-specific fertility rates at each age of her reproductive life. The replacement rate is the level required for a generation to replace itself, assuming no net overseas migration and no mortality improvement.

Other economic factors also affect childbearing intentions, with economic uncertainty and job insecurity considered major drivers of recent fertility declines in developed countries.[xv] Social trends, including changes to partnership patterns, increasing secularisation, and greater desires for self-fulfilment and autonomy may also be related to declining fertility trends.[xvi]

Australia's total fertility rate is expected to decline further from 1.66 babies per woman in 2022–23, before stabilising at 1.62 babies per woman from 2030–31. The fertility rate is then assumed to remain at this level until 2062–63.

Future fertility rates for teenagers and women in their 20s are expected to continue to fall before stabilising, while fertility rates for women in their late 30s appear to have already stabilised (Chart 2.9). Ongoing small increases in the fertility rates of women in their 40s are expected, due to improvements in technology and healthy living, which are helping to extend the age at which women can give birth.

Overall, the proportion of Australian women without children is not expected to increase significantly (from 16.3 per cent in 2021).[xvii] In several countries that are part of the Organisation for Economic Co-operation and Development (OECD), cultural, economic and policy differences have resulted in higher proportions (20 to 30 per cent) of women having no children, contributing to very low and declining fertility rates in those countries.[xviii]

Chart 2.9   Historical and assumed age-specific fertility rates
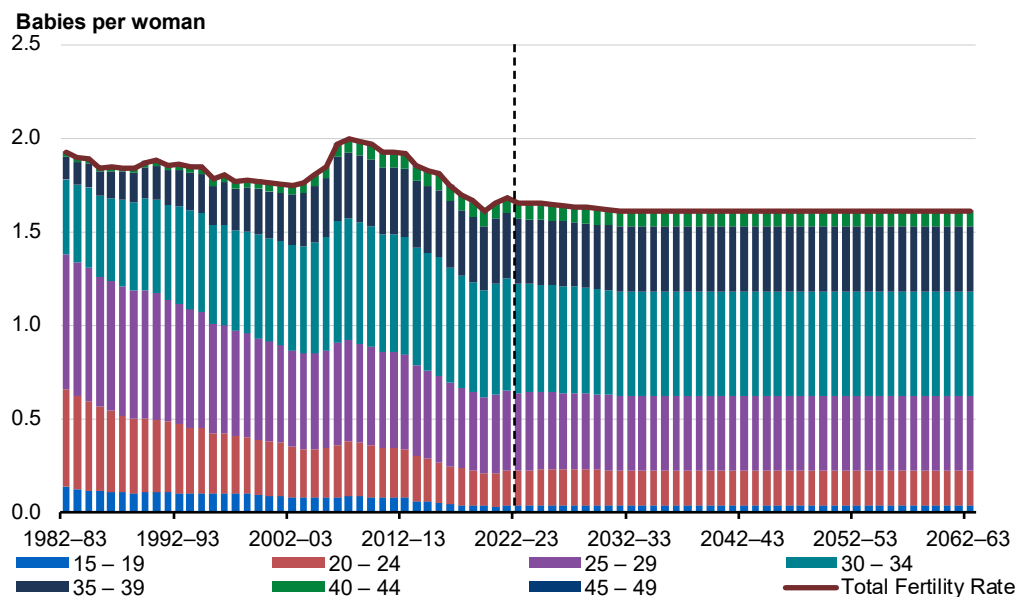
Source: ABS, National, state and territory population, September 2022, 2023; Peter McDonald, A Projection of Australia's Future Fertility Rates, 2020; and Treasury.

Major cities tend to have lower fertility rates, at 1.58 babies per woman, than the national average. Regional areas have fertility rates much closer to the replacement rate, at 1.91 in inner and outer regional areas and 2.01 in remote and very remote areas. There is also variation across states and territories, with the lowest fertility rate being in the Australian Capital Territory (1.46) and the highest in the Northern Territory (1.80).[11] [xix]

Higher fertility in the Northern Territory reflects the fact that First Nations women have much higher fertility rates (2.34 babies per woman in 2021) compared to the overall population (1.70). They also tend to have children at younger ages. The median age of First Nations women who gave birth was 26.5 in 2021, compared to 31.7 for all Australian women.[xx]

Overseas-born women, who tend to live in cities, have lower fertility rates than Australian-born women (1.59 babies per women compared to 1.67)[xxi]

Population ageing will continue over the long term

Population ageing is one of the major forces shaping Australia's future. It is an ongoing trend (Chart 2.10), driven by low fertility rates and increasing life expectancies. Between 1982–83 and 2022–23, the median age increased by 8.3 years to 38.5.[12] During the same period, the share of the population aged 15 to 64 decreased by 1.0 percentage point to 64.7 per cent and the share of the population aged 65 and over increased by 7.2 percentage points to 17.2 per cent.

The population is expected to continue to age over the next 40 years (Chart 2.10). The median age is expected to increase by 4.6 years to 43.1 in 2062–63. The share of the population aged 15 to 64 will fall by 3.5 percentage points to 61.2 per cent between 2022–23 and 2062–63. Over the same period, the share of the population aged 65 and over is expected to increase by 6.1 percentage points to reach 23.4 per cent. Despite these trends, Australia has a younger population than most other advanced economies and is projected to continue having one of the lowest median ages in the OECD over the next 40 years.[xxii]

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11   The sub-national fertility rates for major cities, regional areas and the state and territory level reflect the average fertility rate over the 3 years from 2019 to 2021.

12   Noting that 2022–23 is a forecast year.

Chart 2.10 Age structures, 1982–83, 2022–23 and 2062–63
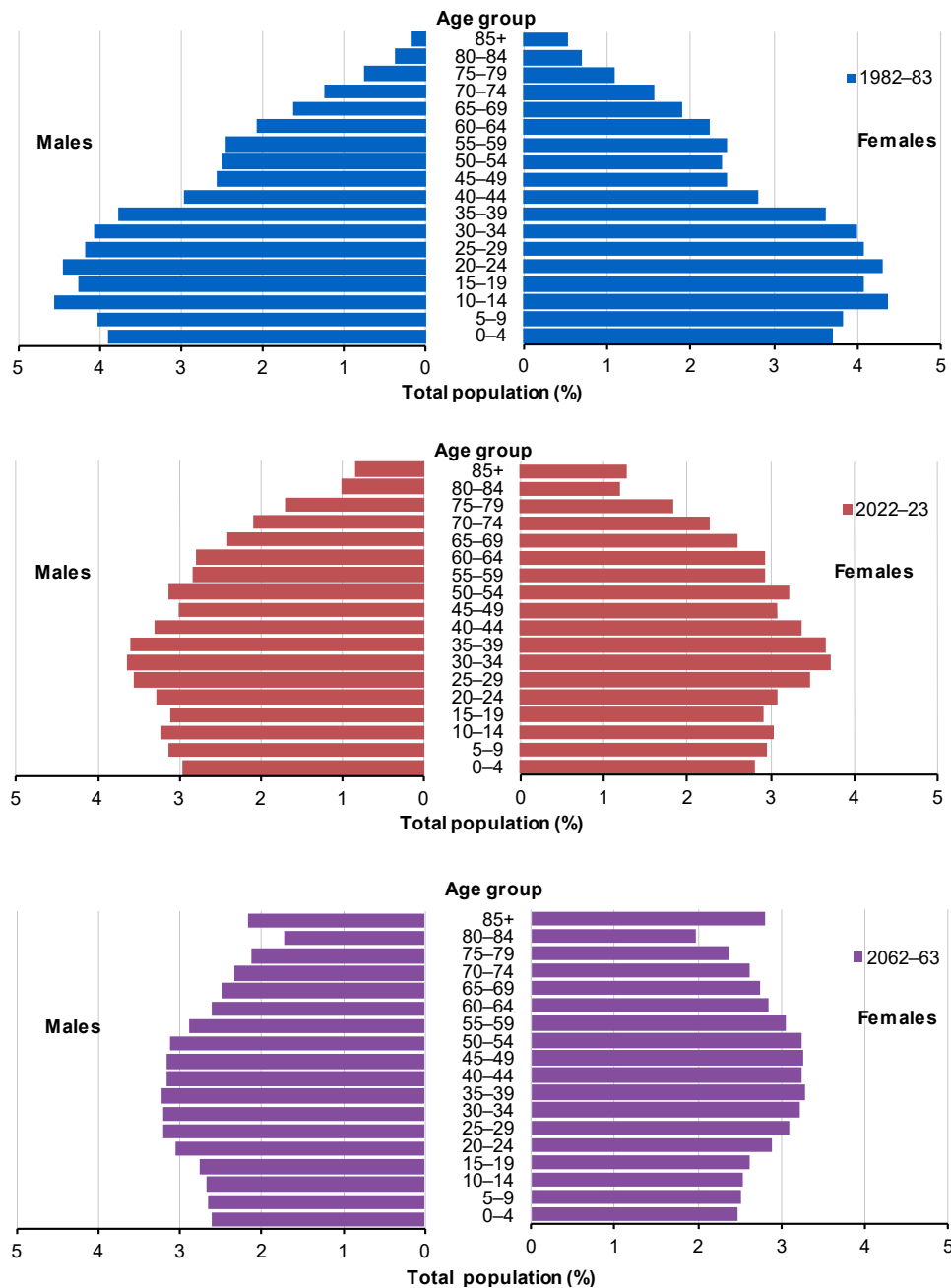
Source: ABS, National, state and territory population, September 2022, 2023; Treasury.

2023 Intergenerational Report | Part I: The economy over the next 40 years

The 'old-age dependency ratio' – which measures the number of people aged 65 and over for every 100 people of traditional working age (15to 64) – is projected to continue to rise (Chart 2.11 and Chart 2.12). Between 2022–23 and 2062–63, the old-age dependency ratio is expected to increase from 26.6 per cent to 38.2 per cent, reflecting the size of the population aged 65 and over growing faster than the working age population.

Chart 2.11 The old-age dependency ratio and economic dependency ratio

Chart 2.12 Change in the dependency ratio over 10 years
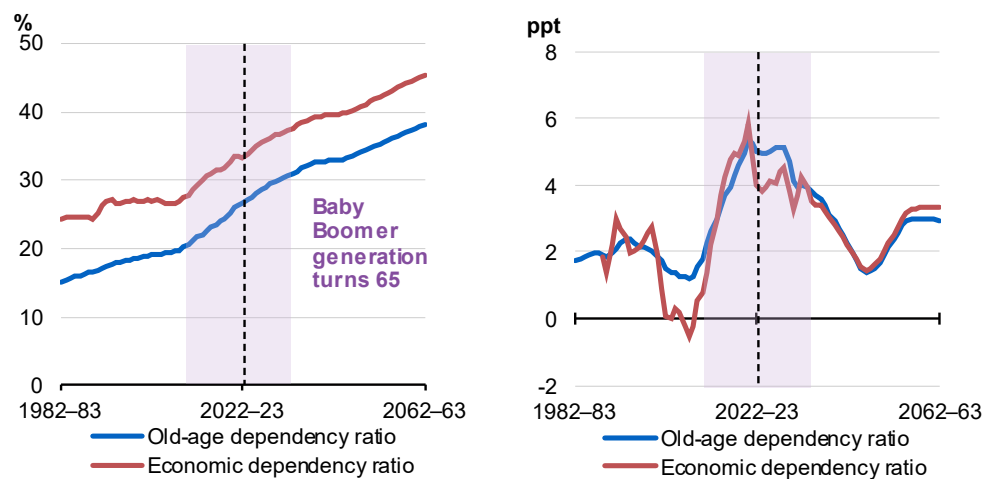
Note: The old-age dependency ratio figures included in the 2023 IGR are not directly comparable to those in the 2021 IGR, which calculated an inverse ratio. Total employment figures (including both full and part time employment) were used to determine the economic dependency ratio.

Source: ABS, National, state and territory population, September 2022, 2023; ABS Labour Force, January 2023, 2023; and Treasury.

Population ageing is a long-running trend, though its pace has varied based on demographic trends. The large size of the baby boomer generation, born between 1946 and the mid-1960s, led to Australia benefitting from the positive economic effects of a large workforce while this cohort was aged between 25 and 64 years old. However, as the baby boomer cohort started to reach the age of 65 in the early 2010s, there was a particularly rapid increase in the old-age dependency ratio. This increase in the old-age dependency ratio is expected to slow in the 2030s, before picking up again from the 2040s. This is due to the ageing of young people born during the brief 'baby boom' in the mid-2000s to mid-2010s, and the effect of higher levels of migration from around 2008. After this, the old-age dependency ratio is projected to continue increasing, but at a slower rate.

Changes to the age structure and the old-age dependency ratio have economic and fiscal implications for Australia. For example, there was higher demand for education when the baby boomer generation was young, while demand for health and aged care services increases as more people age past 65.

The 'economic dependency ratio' measures the number of people aged 65 and over relative to those of any age who are employed. This includes the increasing number of older Australians who are employed, reflecting better health outcomes and more job options (Chapter 3). Between 2022–23 and 2062–63, the economic dependency ratio is expected to increase from 33.2 per cent to 45.4 per cent. Because not all people of working age are employed, the number of dependents captured by this measure is higher than the old-age dependency ratio (Chart 2.11 and Chart 2.12). The difference between these ratios narrowed from the 1980s to the 2010s as the increase in the economic dependency ratio slowed, reflecting rising participation among women and older Australians.

First Nations people are significantly younger than the overall Australian population. The median age of First Nations people was 24 in 2021, which is much lower than the overall population.[13] Only 5.4 per cent were aged over 65 in 2021, compared to 16.8 per cent in the overall population. The old-age dependency ratio for First Nations people is also much lower at 8.8 in 2021.[xxiii xxiv]

Migration can help slow population ageing

New migrants to Australia tend to be younger than the existing population and most are of working age. In 2021–22, 76 per cent of new migrants were aged between 15 to 34. This compared to 27 per cent of the incumbent population.[xxv xxvi]

Many temporary migrants are young adults, such as international students and working holiday makers.[xxvii] Most reside in Australia for a few years and then leave.[xxviii] This creates a constant flow of young temporary migrants that does not add to population ageing.

Permanent migration also offsets population ageing, as the policy settings for much of the permanent Migration Program preference younger migrants. This offsets but does not resolve population ageing, because permanent migrants also age.

The effects of migration on population ageing were evident in 2020 and 2021, when international travel restrictions were instituted to slow the spread of COVID-19. This caused the median age in 2020–21 to be 0.9 years higher compared to the pre-pandemic projections released in the 2019–20 MYEFO. It also caused the working age population to decrease by 0.5 per cent in 2020–21, despite the overall population increasing by 0.1 per cent.[xxix]

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13   The ABS publishes median age estimates for the First Nations population to the nearest whole number. First Nations population estimates for 2021 are preliminary; final estimates will be released in August 2023. Caution should be taken with First Nations age data, in particular due to changing First Nations identification rates across data collections in the Census.

Population ageing will have economic, fiscal and social effects

Australians are living longer, which has positive lifestyle and social consequences. Australians living longer and with more years in full health can enjoy longer retirements as well as more choice to stay in the workforce if they want to. Older Australians tend to provide caring and other support to their families, including by assisting family members who work and by caring for grandchildren. Older Australians contribute to our society by providing mentorship to younger generations and dedicating time to volunteering activities. This can also contribute to social engagement for older Australians.

The falling share of the working-age population is expected to reduce the productive capacity of our economy on a per capita basis, although these effects may subside over time as the economy adjusts to an older population through capital investment[xxx] An older population could also have implications for industries currently reliant on younger workers, such as accommodation and food services.[xxxi]

There is no academic consensus on the relationship between population ageing and productivity. Older workers have more accumulated knowledge and experience, which can be lost when they exit the workforce. At the same time, more productive workers tend to stay in the workforce longer than less productive ones.[xxxii] However, some older workers may be less proficient in learning new skills and adopting new technologies than younger workers. Some studies indicate that population ageing will have little to no effect on productivity.[xxxiii xxxiv xxxv] More recent studies identify a negative impact.[xxxvi xxxvii xxxviii]

Population ageing will affect Australia's fiscal outlook. A smaller share of working-age Australians would result in lower tax revenues, assuming no policy change, than would be expected if the share of the working age population remained unchanged. At the same time, expenditure on age-related government services, such as health and aged care, the Age Pension, and end-of-life support, are expected to increase. Around 40 per cent of the projected increase in Australian Government expenditure from 2022–23 to 2062–63 is estimated to be due to demographic ageing (Chapter 7).

Planning for Australia's future population

Changes in our population – including its size, composition and geographical distribution – affect many aspects of our economy, budget, society and environment (Figure 2.1). The expected increase in Australia's total population over the next 40 years requires governments at all levels to consider how to leverage the benefits of population growth, while ensuring pressures on infrastructure, housing and services are well managed

Figure 2.1   Effects of population change
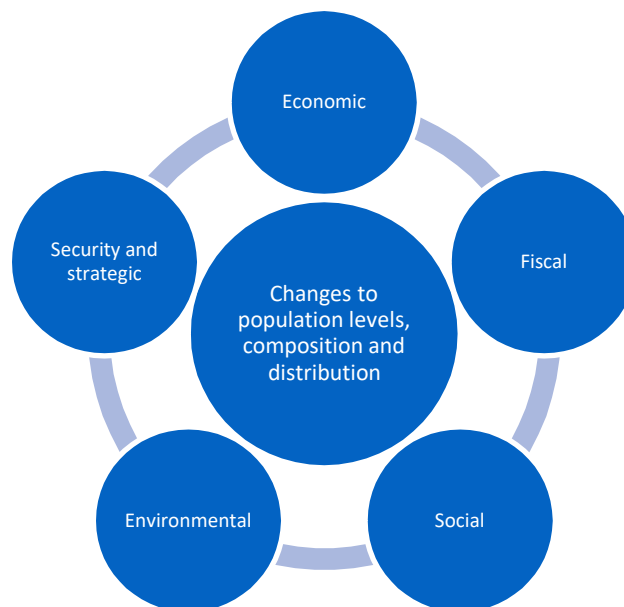
Source: Treasury.

Planning for targeted and sustainable population growth

Strategically managed population growth and migration can support Australia by offsetting population ageing, improving economic outcomes like productivity and living standards, supporting stronger fiscal outcomes, and enriching the social fabric of our communities.[xxxix][xl]

Migration planning is important to realise the broader benefits of population growth. Successful migration planning considers the composition and skill-level of migrant applicants in the temporary and permanent skilled intakes (Box 2.1). Permanent migrants selected via the Skill stream, deliver, on average, a higher economic and fiscal dividend than those arriving via the Family stream and Humanitarian Program.[xli] The Family stream

and Humanitarian Program deliver other important non-economic outcomes for Australia, such as supporting family reunion, and meeting humanitarian goals and Australia's international obligations.

Successful migration planning also considers how migrants contribute to productivity and labour markets (Box 2.1), the range of contributions of migrants and their children, and the benefits of sustainable population growth for Australia's security and strategic importance internationally.

Broader trends in global migration are also relevant to population and migration planning, as they affect the supply of migrants to Australia. Labour migration from youthful developing to older developed countries accounts for a large share of global migratory flows.[xlii] India, Nepal and the Philippines have large young cohorts and are important sources of migrants for Australia and other developed countries.[xliii] However, there is increased competition among ageing countries for migrants, which could make it harder for Australia's migration system to attract the most-skilled migrants. Climate change may also alter and accelerate migration flows within the Asia-Pacific region, including to Australia.[xliv]

The Government is working on future reforms to the migration system to ensure it serves the national interest and complements the skills and capabilities of Australian workers. Reforms will be guided by the Migration Strategy, and the Employment White Paper.

The Government is also working with state, territory and local governments to develop a national Population Plan. This Plan will detail how governments at all levels are working together to appropriately plan for future population change, including future needs for housing, infrastructure, and services in different cities and regions (Box 2.2). The Government is supporting the delivery of more social and affordable housing and has a long-term plan to boost housing supply working collaboratively with state, territory and local governments.

Box 2.1   Fiscal and economic effects of migrant composition

Treasury modelling estimates how the fiscal outcomes of migration vary by visa types. Permanent migrants who arrive younger and are highly skilled, such as those in Employer Sponsored and Skilled Independent visas, generally make a higher fiscal contribution during their time in Australia, compared with those migrants who arrive later in life or are lower skilled (Chart 2.13).

Chart 2.13 Lifetime fiscal impact on the Australian Government budget per permanent migrant, by tax and expenditure type (2018–19 cohort)
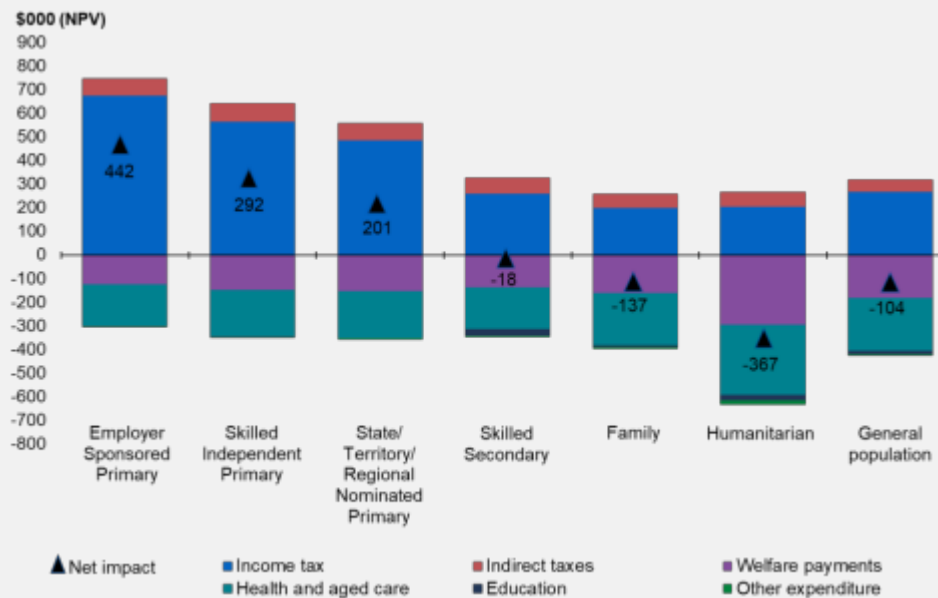
Note: This chart shows the net lifetime fiscal impact of different cohorts for a selection of key Commonwealth tax and expenditure types that can be attributed to individuals. Other expenditure includes Australian Government spending on infrastructure and settlement services. The results do not include all Australian Government revenue sources (such as corporate tax) or expenses (such as defence) or fiscal impacts at state and local government level. As estimates are sensitive to assumptions such as the discount rate, they are best interpreted as relativities rather than in absolute terms. Primary migrants are the main visa holders who satisfy the primary criteria for the grant of a visa. Secondary migrants are accompanying family of primary migrants, such as spouses and dependents. The Skilled Secondary category represents the average fiscal impact of secondaries across all skilled visas. NPV stands for net present value. For further information, see the Appendix A3.

Source: Treasury.

The Australian National University's Tax and Transfer Policy Institute studied how migrants' outcomes depend on a larger set of individual characteristics. This study found that migrants with higher levels of education received an earnings premium of 11 per cent for an undergraduate degree, 17 per cent for a master's degree and 41 per cent for a PhD relative to migrants with a high school degree.[xlv] This is similar to the outcomes for the Australian-born population.[xlvi]

Well-planned migration can lift productivity and support employment growth for the Australian population. A forthcoming OECD study found that, between 2011 and 2018, a 10 per cent increase in the share of the overseas-born population in an area increased the labour productivity of Australian-born workers in that area by 1.3 per cent.[xlvii] It also found that a one percentage point annual increase in the migrant inflow to an area relative to its population increased Australian-born employment in that area by 0.53 per cent.[xlviii] The e61 Institute found that migrant workers are more likely to work in lower productivity industries than non-migrant workers, and within industries migrants on targeted visas (Permanent and Temporary Skilled visas) are more likely to work in higher productivity firms than those on untargeted visas (Student and Working Holiday Maker), as well as non-migrants.[xlix]

In addition to these fiscal and economic outcomes, well-targeted skilled migration complements the skills of the existing workforce and supports the education and skills systems to deliver the workforce required to support Australia's long-term economic prosperity. Skills matching rates between education and occupation vary by visa class, highlighting the importance of ensuring the migration, education and training systems work well together to help lift productivity of the workforce and support per capita GDP growth.

Box 2.2   Population in Australia's capital cities and regions

Since 1994, Australia's capital cities have grown faster than rest-of-state areas. This trend reversed in 2020–21 due to lower overseas migration and increased net internal migration into regions driven by COVID-19 restrictions.

With the recovery in overseas and net internal migration, capital city growth is expected to overtake rest-of-state areas. The gap is expected to narrow but remain over the next 40 years (Chart 2.14).

Chart 2.14 Population growth in capital cities and rest-of-state areas
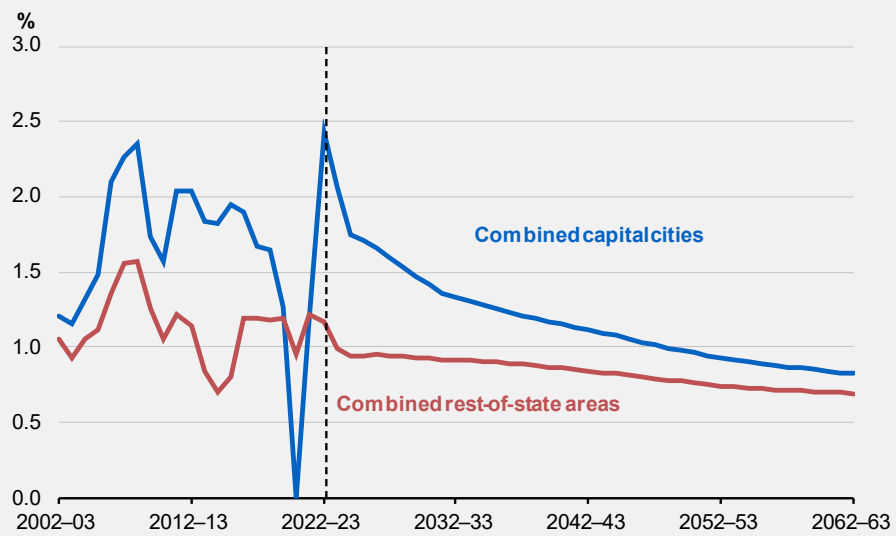
Note: This analysis is based on technical assumptions about future fertility, mortality and overseas migration consistent with the baseline contained in this report. A simplifying assumption has also been made for internal migration, which assumes a declining rate over the projection period.

Source: ABS, Regional Population 2021–22, 2023; and Treasury.

Planning for the needs of an older population

Reducing barriers to labour force participation for older people who may wish to work, women and historically underrepresented groups will make the workforce more inclusive and may help offset the effects of population ageing (Chapter 3). At the same time, policy settings can reduce barriers for families to have the number of children they would like to have.

Employers can make themselves more attractive to older workers by being more flexible about when and where they work, and providing training and development to ensure skillsets remain up to date.[l] This will help realise the potential older workers have to offer.

Existing infrastructure and services can be adapted to better meet the needs of older Australians. This could include adopting emerging technological developments such as automation, making public areas and public transport more accessible, and building new housing and adapting existing stocks to meet the needs of older people (including to support downsizing).[li]

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3   Participation

Overview

More people are participating in paid work than ever before. The labour force participation rate is near record highs. Employed people are, however, working fewer hours on average.

As the population continues to age over the next 40 years, the overall participation rate is projected to decline gradually, from 66.6 per cent in 2022–23 to 63.8 per cent by 2062–63. This reflects a growing population share of older Australians who tend to participate less in the labour force.

Among those working, average hours worked per week is expected to decline slightly from around 32 to 31 hours per week by 2062–63. Average hours worked per head of total population aged 15 years and over is also projected to decline slightly as the population ages, from around 20 hours to 19 hours per week by 2062–63.

Further increasing employment opportunities for people from historically underrepresented groups, women, and older Australians who may wish to work more, may help offset the effects of ageing on labour force participation.

Trends in labour force participation also reflect profound changes in the type of work Australians do. Population ageing, rising demand for care and support services, increased use of data and digital technology, and climate change and the net zero transformation will all influence the demand for various types of work. Responsive, effective education and training systems, forward-looking skills-based policy, and well-targeted migration will mean Australia is well positioned for these future structural forces.

2023 Intergenerational Report | Part I: The economy over the next 40 years

More Australians are participating in paid work

Labour force participation underpins people's living standards and Australia's economic prosperity. A paid job benefits people in many ways, including financial security, establishing and developing social connections, and contributing to a sense of purpose. A high rate of labour force participation is central to economic growth and sustaining revenues for government services.

The labour force participation rate has trended up over the past 40 years. Strong demand for labour over the past couple of years has seen the participation rate reach a record high (Chart 3.1). A strong labour market has also translated to a historically high employment rate and historically low unemployment rate.

The increase in labour force participation over the past 40 years has largely been driven by women. There has been a significant increase in women's participation across the age distribution, and the total participation rate for women has also reached a record high. The participation rate of older Australians has also increased over time. These trends have more than outweighed declining participation among men aged under 55 years.[i]

At the same time, people are investing more time in their education when young, working fewer hours when they do have jobs, and spending more time in retirement owing to increased life expectancy. The net effect of these trends has been relative stability over the past 40 years in average hours worked per head of total population aged 15 years and over, at around 20 hours per week (Chart 3.2).

Chart 3.1   Participation rates
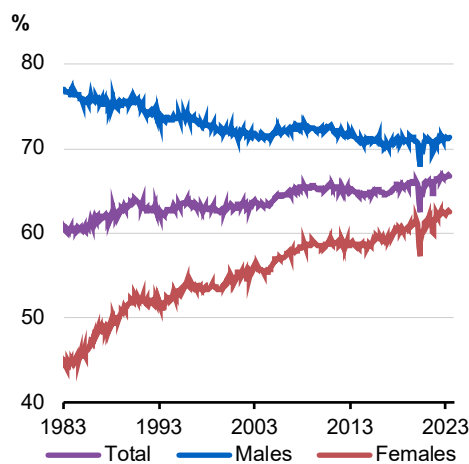
Chart 3.2   Average weekly hours worked per head of total population aged 15 years and over

Source: ABS Labour Force.
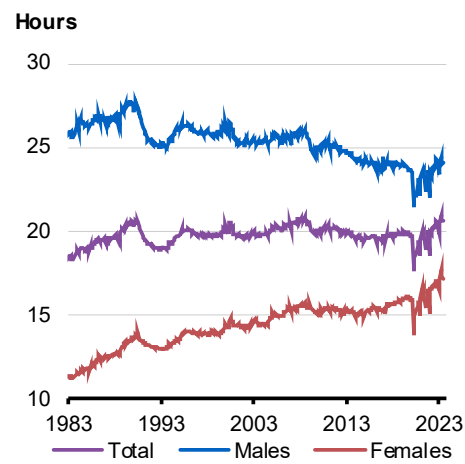
Source: ABS Labour Force.

The participation rate is projected to gradually decline

Australia's participation rate is projected to decline over the next 40 years from 66.6 per cent in 2022–23 to 63.8 per cent in 2062–63 (Chart 3.3). This decline reflects a growing share of older Australians, who tend to participate less in the labour force, and is only partly offset by higher participation of younger and future generations.

Chart 3.3   Projected participation rates across intergenerational reports
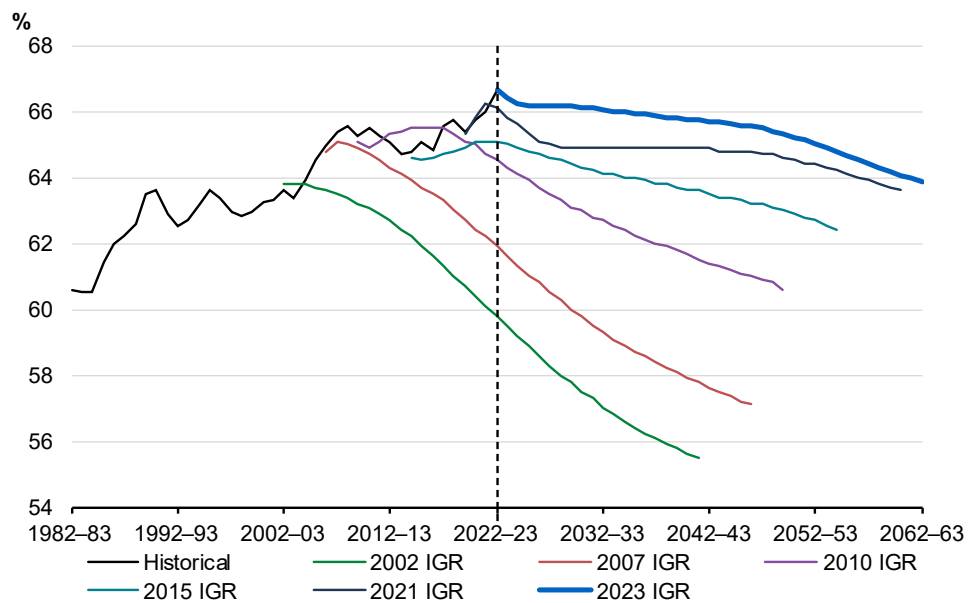
Source: ABS Labour Force and Treasury.

Similar to the 2021 Intergenerational Report, the projected decline in the participation rate is more moderate than in earlier reports. Recent strength in labour force participation reflects several long-running trends. These include gains in participation among women and older Australians, and a younger migrant intake lowering the age structure and boosting participation rates over their working life. These factors have seen actual participation consistently outperform previous projections, with the participation rate revised up in each report since 2002.

Another important dimension in assessing equality of economic opportunity through work is the unemployment rate – the share of people who are actively looking for work and are available to work but have not found employment. The 2023–24 Budget projected the unemployment rate would rise modestly from its current lows to 4½ per cent in 2024–25 but remain low by historical standards. The unemployment rate settles at Treasury's assumption for the non-accelerating inflation rate of unemployment (NAIRU) by 2026–27 and remains there over the rest of the projection period. The NAIRU represents the level of the unemployment rate associated with stable growth in wages and prices

Estimates of the level of the NAIRU are associated with significant uncertainty and can change over time as a result of policy or other factors. The NAIRU would be expected to decline as structural issues that cause unemployment are addressed, for example by improving employment services and education and training systems and increasing access to affordable childcare and housing. Consistent with the 2023–24 Budget, this report assumes the NAIRU to be 4¼ per cent, ½ a percentage point lower than the 4¾ per cent assumption in the 2021 Intergenerational Report.[ii] The decline in the NAIRU and the near record-high participation rate indicate the capacity of the economy has increased and that more Australians are able to sustainably participate in work.

Having an assumption about the NAIRU is a part of putting together long-term economic projections and is an important input for policymakers when considering current economic circumstances. It should not be confused with longer-term policy objectives.

The Employment White Paper, to be published in September, will discuss the Government's full employment objective and strategy for lowering barriers to employment in further detail.

An ageing population will place downward pressure on the participation rate

Over the course of a person's life, labour force participation tends to start low while completing education, peak in middle age, then taper off towards retirement. With longer life expectancies translating into more years of full health (Chapter 2), it has been easier for older Australians to participate in the labour force if they want to, while also enjoying longer retirements.[iii] Indeed, older Australians have seen the largest increases in participation rates over the past 40 years, particularly women in their 50s and early 60s (Chart 3.4 and Chart 3.5).

Chart 3.4   Female participation
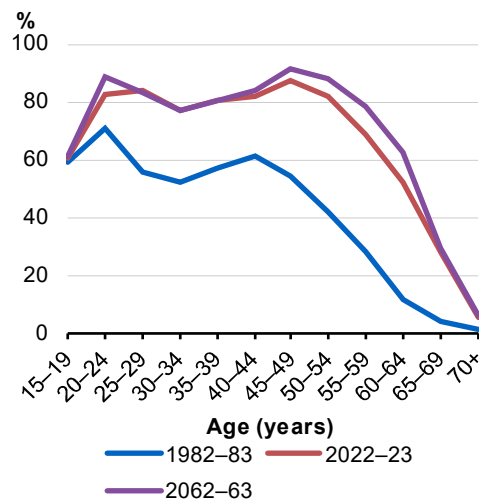
Source: ABS Labour Force and Treasury.

Chart 3.5   Male participation
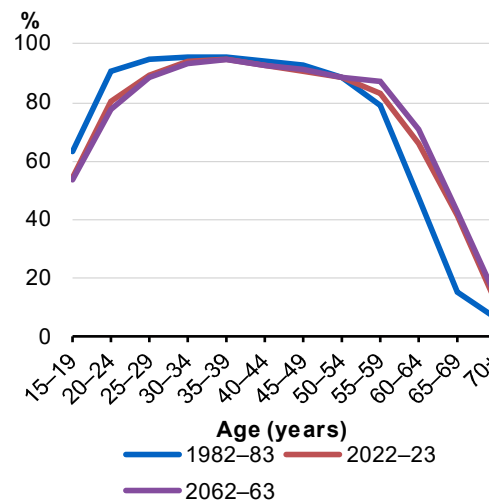
Source: ABS Labour Force and Treasury.

Older Australians have more options to participate in paid work should they wish to do so thanks to a combination of improved health and greater availability of less physically demanding jobs. Changes to Age Pension eligibility are also likely to have affected the participation decisions of older Australians.[iv] In addition, the rise in older women's participation reflects the changing mix of generations in the labour force, with younger generations of women more likely to participate and for longer. The continuation of these

trends is expected to further increase the participation rates of older Australians over the next 40 years, although by a smaller amount than in the past.

Increases in participation rates, including among older Australians, over the past 40 years have more than offset the effect of population ageing. Over the past 40 years, an older population has reduced the overall participation rate by around 5 percentage points, but this has been far outweighed by rising participation rates more generally, which have increased the overall participation rate by around 12 percentage points This positive effect of higher participation rates within cohorts has translated to around 2½ million additional people in the labour force.

Australia's migration policies over recent decades have also helped to partly offset the effects of population ageing (Chapter 2). Over the past 20 years, these policies have targeted young, skilled migrants, which has resulted in a population that is younger than it would have otherwise been.[v]

Looking forward, the share of the population aged 65 years and over is projected to increase from around 17 per cent in 2022–23 to 23 per cent in 2062–63, reflecting low fertility rates and increasing life expectancy (Chapter 2). As people aged 65 years and over have lower participation rates, a larger share of Australians in this age group will lower the overall participation rate, with the impact only partly moderated by further increases in participation rates within some age-sex cohorts. Ageing is expected to have a sizeable effect on the participation rate until 2029–30 as the baby boomer generation transitions to retirement, before its effect on participation slows somewhat through to 2062–63.

The gender gap in participation is expected to narrow

The participation rate of women has increased by more than 17 percentage points over the past 40 years, while the participation rate of men has declined by around 6 percentage points (Chart 3.6). This has narrowed the gender gap in participation significantly from over 32 percentage points in 1982–83 to around 9 percentage points in 2022–23. While considerable progress has been made, gender inequality continues to hold women back in the labour market.

Chart 3.6   Historic and projected participation rates by sex
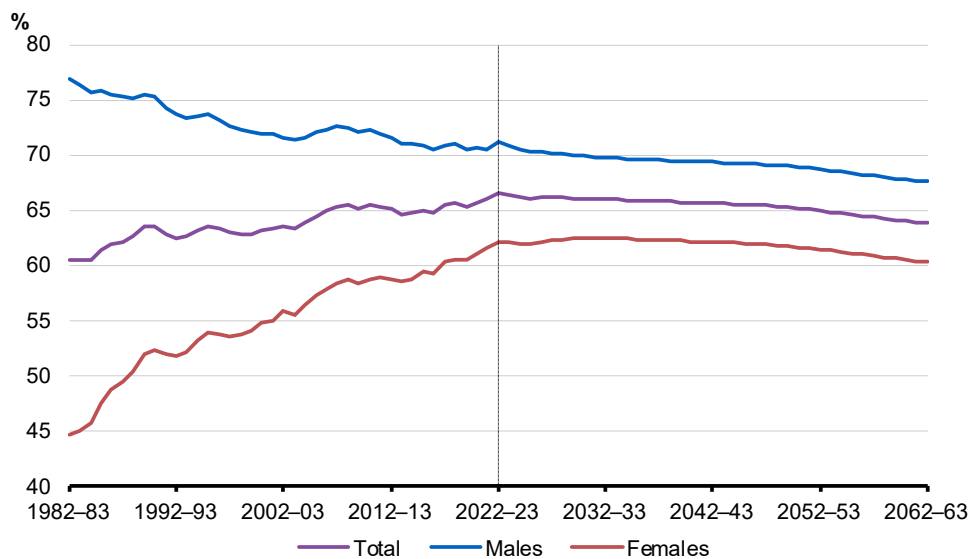
Source: ABS Labour Force and Treasury.

The narrowing of the participation gap has been underpinned by a range of economic, demographic and social factors.[14] The share of Australians with high levels of education has been rising, particularly for women.[vi] At the same time the economy has shifted to be more services-oriented (Chapter 1) and employment arrangements have become more varied. Combined with changes in legislation and social attitudes, this has encouraged more women to enter skilled professions over the past 40 years.[15][vii] Women on average are also having fewer children and having them later in life (Chapter 2), which tends to be associated with higher labour force participation.[viii]

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14   Many of these are discussed in the 2023–24 Women's Budget Statement and 2021 Intergenerational Report.
15   Despite these changes, industrial and occupational segregation has remained persistent in the Australian labour market and contributes to the gender pay gap.

Many women continue to face barriers to finding a job or working the hours they would prefer. A key barrier is unpaid work and caring responsibilities, particularly for women with young children (Box 3.1). Recent policy changes and reforms such as the significant investments in early childhood education and care, as well as expanded Australian Government-funded and private sector Paid Parental Leave schemes, will give families more choice in how they balance work and care Treasury estimates that the Government's Child Care Subsidy changes will increase hours worked by women with young children by up to 1.4 million hours per week, equivalent to an extra 37,000 full-time workers, in 2023–24.[ix]

The continuation of long-run economic, demographic and social trends is projected to see the participation gap between men and women narrow further to around 7 percentage points in 2062–63. Reducing barriers to women participating in the labour force will be crucial to further closing the gender participation gap and unlocking the full economic potential of women.

In addition to caring responsibilities and unpaid work, women's participation choices can be affected by a range of factors, including longstanding gender stereotypes in society, industrial and occupational segregation, and the prevalence of discrimination and harassment in some workplaces.[x] [xi] Family and domestic violence also significantly reduces women's economic participation and their lifetime earnings.[xii] Addressing these barriers will help ensure that workers' skills are utilised to their full potential, and all people who want to work can choose the career that best suits them

Box 3.1   Caring roles impact women's participation

The experiences of women in the labour market are varied, and many women continue to face barriers to finding jobs or working their preferred hours. One of the key barriers to women's participation is the unequal division of caring and other unpaid work. In 2020–21, women on average spent around 40 per cent more time on unpaid work each day than men.[xiii] The gap tends to be largest among parents of young children, but also exists in couples without children and where women are the higher earning partner.

The gap in labour force participation rates and hours worked between women and men is largest around prime child-rearing years (Chart 3.7 and Chart 3.8). A woman's likelihood of being employed drops by around 45 per cent in the year of their first child's arrival, with little recovery in the following five years, and hours in paid work are around 35 per cent lower on average in the first five years of parenthood.[xiv] In contrast, men's hours worked on average drop only in the first month of parenthood before returning to their previous levels.[xv]

Chart 3.7   Average weekly hours worked by sex and age
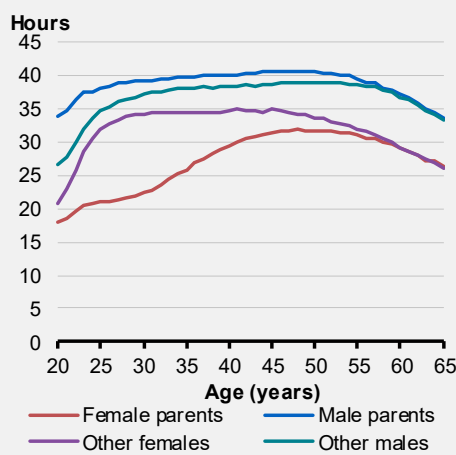
Note: Based on parents and children in the same family household on Census night.

Source: Treasury analysis of ABS Census, 2021.

Chart 3.8   Participation rates of parents with children under five years
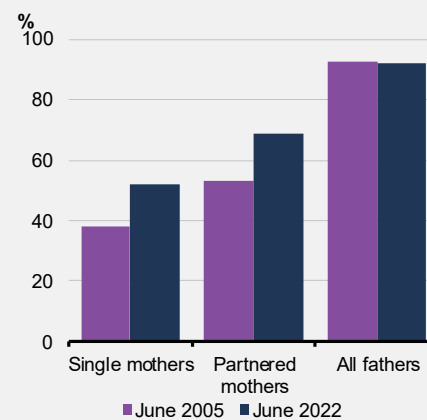
Source: Treasury analysis of ABS Labour Force Status of Families.

Well-designed paid parental leave and early childhood education and care policies can play an important role in encouraging parents to share unpaid care responsibilities and boost women's labour force participation.[xvi] Recent changes to the Government's Paid Parental Leave scheme have been designed to further support women's participation by encouraging greater use by fathers and partners. Evidence shows that when men are more active carers early in a child's life, parents share caring responsibilities more equally over the longer term, supporting women's participation in paid work.[xvii] The Government has recognised through their commitment to the Cheaper Child Care package and the Productivity Commission Inquiry into Early Childhood Education and Care that access to quality, affordable early childhood education and care supports parents to balance work and care responsibilities.

The challenge of balancing the provision of significant and essential care for children with paid employment falls hardest on single parents, over 80 per cent of whom are women. In June 2022, the participation rate of single mothers with children under five years was 17 percentage points lower than partnered mothers and 40 percentage points lower than all fathers. A number of recent policy changes will provide additional support to single parents, including expanded access to Paid Parental Leave and extension to the Parenting Payment (Single) from when their youngest child is aged from 8 to under 14 years old.

Average working hours are declining as work patterns change

Rising participation over the past 40 years has included a substantial increase in part-time work (Chart 3.9). As a result, average hours worked among those with jobs has declined from around 34 hours per week in 1982–83 to less than 32 hours per week in 2022–23 (Chart 3.10).

Chart 3.9   Part-time employment share by sex and age
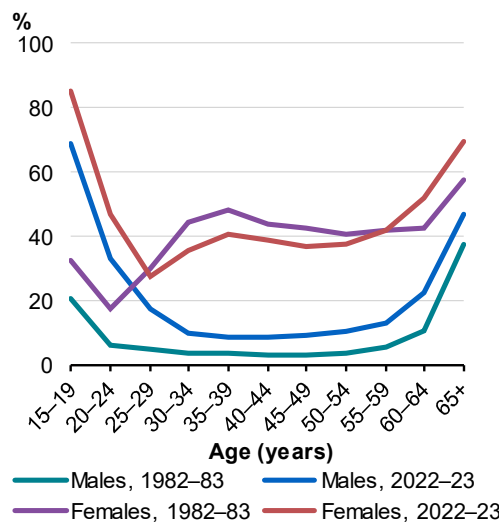
Chart 3.10 Average weekly hours worked per employed person

Source: Treasury analysis of ABS Labour Force.
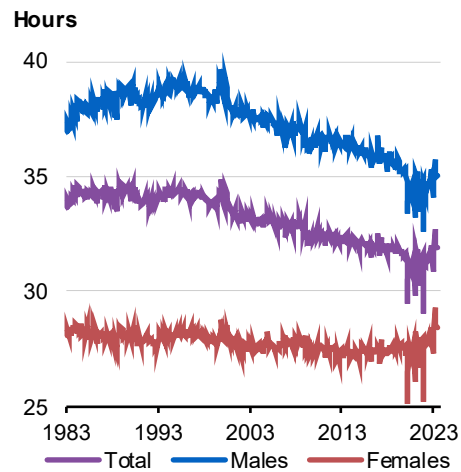
Source: ABS Labour Force.

The share of employed people working part time has risen from around 17 per cent in 1982–83 to 30 per cent in 2022–23. Part-time work has become more common across many advanced economies over recent decades, and Australia has comparatively high rates of part-time work for women and men.[16] [xviii]

Greater diversity in employment arrangements has provided some workers with more opportunities to balance employment with other responsibilties. Other part-time workers report having fewer hours than they would like. The share of workers holding multiple jobs has also increased, from around 5.6 per cent in 1995 to 6.4 per cent in 2022, which

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16   The Organisation for Economic Co-operation and Development uses a more restrictive definition of part-time employment (less than 30 hours per week in main job) than the ABS (less than 35 hours in all jobs).

can reflect the difficulty some people face in finding secure work with adequate hours.[xix] Women and younger workers more commonly hold multiple jobs.

Part-time work has typically been more common among women, although the share of men working part time has increased across the age distribution over the past 40 years. The reasons why it is more common for women to work part time than men are complex. Many women cite caring for children as the main reason for working part time, which can reflect individual preferences or difficulties finding adequate care Women are also more commonly underemployed, suggesting a larger share of women want and are available to work more hours.

Part-time work has also become more common among younger and older people. The share of employed young people working part time has risen sharply over the past 40 years, reflecting greater participation in tertiary education. The share of employed older people working part time has also increased. This may reflect preferences for part-time hours, and part-time work can act as a transition to retirement.[xx]

A larger share of women and older workers in employment, as well as greater take up of part-time work among men, is projected to see the part-time employment share increase further to around 33 per cent in 2062–63. As a result, average weekly hours per worker is projected to decrease slightly to 31 hours per week over this period. Taken together with the projected decline in the overall participation rate, average hours worked per head of total population aged 15 years and over is also projected to decline slightly, from around 20 hours per week in 2022–23 to 19 hours per week by 2062–63.

Participation of underrepresented and historically disadvantaged groups

While the participation rate is near its historic high, some groups still face barriers to finding work and are underrepresented in the labour force People from diverse backgrounds can also face compounding forms of disadvantage and barriers to participation. Reducing barriers to participation and lifting opportunities for these groups can increase overall participation, contribute to a more inclusive workforce that makes the most of diverse skills and experiences, and support more Australians to fulfil their potential.

The share of Aboriginal and Torres Strait Islander people in employment remains lower than for other Australians. Census data suggest that the gap in employment rates has narrowed slightly from 25 percentage points in 1991 to 22 percentage points in 2021 (Chart 3.11). The employment rate of First Nations people is lower in more rural and remote areas.

People with disability also have lower employment rates than people without disability. The latest data from the ABS Survey of Disability, Ageing and Carers suggest that the gap in employment rates between those with and without disability has widened from 27 percentage points in 1998 to 32 percentage points in 2018 (Chart 3.12). More recent data from the Census, which uses a narrower definition of disability, suggest this gap has persisted.[17]

Chart 3.11 Employment rates by First Nations status
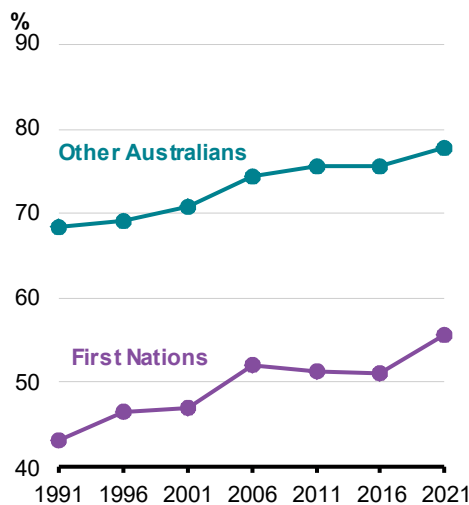
Note: Persons aged 25 to 64 years.

Source: ABS Census and Productivity Commission.

Chart 3.12 Employment rates by disability status
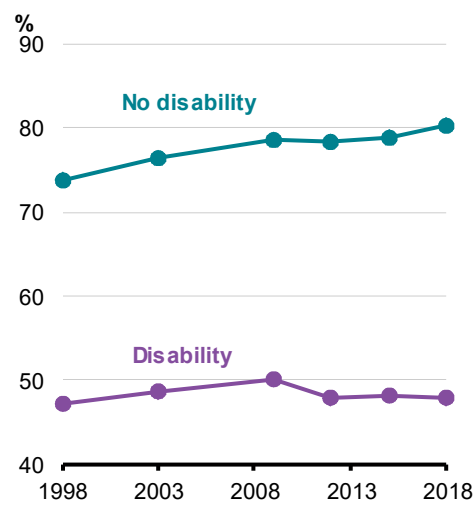
Note: Persons aged 15 to 64 years and living in households.

Source: ABS Survey of Disability, Ageing and Carers.

Young people can also face challenges when starting out in their careers. The strength of the local labour market they enter can have a lasting effect on their later life earnings and employment outcomes.[xxi] Rising housing costs have also posed additional challenges for many young Australians. Housing supply that is responsive to demand, and results in affordable housing where jobs are being created, is an important means of improving access to quality employment.

Many communities face complex and entrenched disadvantage that can be compounded across generations. Notwithstanding the benefits of labour mobility, around 70 per cent

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17   The Census defines disability as needing assistance with core activities. The ABS Survey of Disability, Ageing and Carers uses a broader definition, with new data for 2022 expected to be available in June 2024.

of young adults born in Australia live in the same local labour market that they grew up in, so it is also important to ensure Australians have more equal access to quality employment wherever they live.[xxii] This is a particular concern in regional areas, with many regions persistently reporting lower rates of labour force participation than their respective capital city.

Persistent disadvantage can also come from periods of long-term unemployment. Long periods of unemployment can have significant economic and social consequences for people, including the loss of skills and networks, social stigma, and financial insecurity.[xxiii]

Employment provides an important pathway to break the cycle of entrenched disadvantage. Strong labour market conditions in recent years have been widespread and benefited many communities. In 2022–23, the unemployment rate was at or below 4 per cent in over three-quarters of all regions, compared to around 10 per cent of regions in 2020–21. The long-term unemployment rate is also around its lowest level in over a decade.

A strong economy is important to provide opportunities for employment. Other policies that support full employment – such as education and training, job search, geographic mobility and inclusive workplaces can play an important role in boosting participation, making the most of people's talents and providing more equal access to quality employment.

The nature of work will continue to evolve

Trends in labour force participation over the next 40 years will also reflect changes in the type of work people do and how they do it. Technological change will require an increasingly skilled and adaptable workforce. These jobs have typically been in the services sector, which has grown significantly as a share of the economy over the past century and continues to grow (Chapter 1).[xxiv]

Continued innovation, particularly the adoption of and adaptation to new data and digital technologies, will reshape many industries and occupations at a global level.[xxv] These technologies have the potential to significantly improve productivity growth, but will also influence the types of occupations, skills and tasks demanded in the labour market as well as how people work (Chapter 4). The effects will not be isolated to the digital economy itself – the rapid uptake of QR codes, online sales and hybrid work arrangements over the COVID-19 pandemic is a reminder of the potential wide and rapid reach of new innovations in how businesses operate.

These ongoing trends in the nature of work will influence the occupational composition of the labour force. The share of jobs that currently require a bachelor's degree or above has grown from 20 per cent in 1966 to 34 per cent in 2021 (Chart 3.13). Some of these jobs have tertiary education requirements that were not required in the past.[xxvi] More broadly, the share of jobs requiring high levels of cognitive skills has increased from 40 per cent of employment in 1966 to 57 per cent in 2021 (Chart 3.14).

Chart 3.13 Employment by skill level
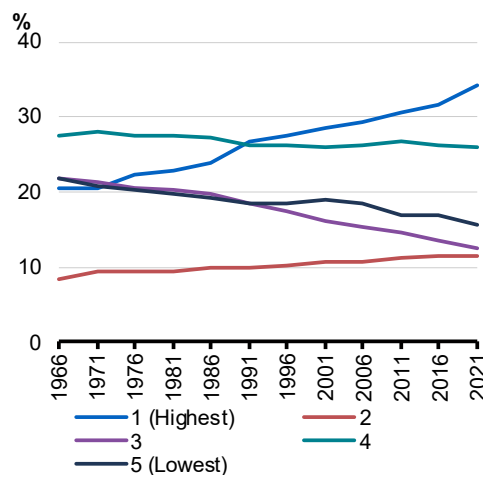
Source: Treasury analysis of ABS Census.

Chart 3.14 Employment by occupation category
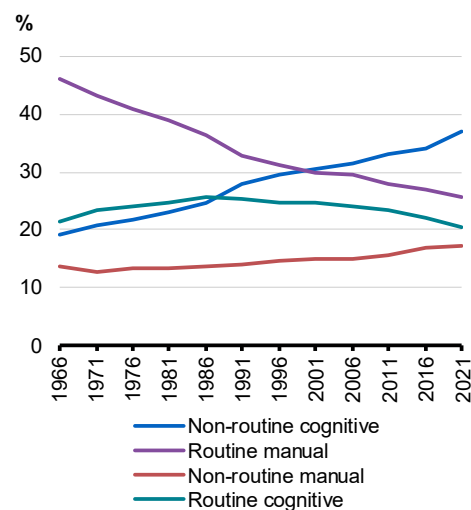
Note: Data and classifications from Australian and New Zealand Standard Classification of Occupations using Reserve Bank of Australia skills structure framework.

Source: Treasury analysis of ABS Census.

Employment projections from the former National Skills Commission (NSC) suggest these trends will continue, with most near-term growth in employment concentrated in higher skill level jobs and in services industries, including those requiring vocational education qualifications.[18][xxvii] The NSC projections have four service industries – health care and social assistance, professional, scientific and technical services, education and training and accommodation and food services – accounting for the majority of near-term employment growth, with more than 9 out of 10 newly created jobs requiring post-secondary qualifications.

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18   Projections were made from November 2021 to November 2026.

The shift towards higher skilled service jobs will likely provide women and older Australians with more options to participate in paid work should they wish to, as it has done in the past (Chapter 1). For example, many higher skilled jobs tend to be less physically demanding.[xxviii] A growing care and support sector will also support labour force participation for people with caring responsibilities by providing more formal care options.[xxix]

Alongside rising demand for skills, new technologies have made it possible to automate some of the more routine aspects of work. Automation allows workers to produce more with less, freeing up time for workers to focus on more complex tasks. In the decade leading up to the COVID-19 pandemic, most of the changes in the tasks performed by Australian workers were driven by changes within each occupation category, rather than by the movement between occupations.[19] For example, the continued automation of routine tasks has allowed workers to focus more on communication, interpersonal skills and problem solving. Automation also tends to be associated with safer and higher paid jobs, by replacing more dangerous, repetitive and lower value tasks[xxx]

Despite these significant shifts in the composition of jobs and tasks in the economy, the total amount of work available has not decreased[xxxi] Average hours worked per head of total population aged 15 years and over has also remained at around 20 hours per week over the past 40 years and is projected to decline only slightly over the next 40 years

Looking forward, the modern labour market will continue to demand skills that are complementary to existing and new technologies. Proficiency in digital skills is already required in many occupations and will grow in importance as new technologies evolve and become commonplace.[xxxii] References to a range of emerging technologies in Australian job advertisements almost doubled between 2012 and 2020[xxxiii] However, frontier technologies such as machine learning and artificial intelligence remain less prevalent than in the United States. Existing foundational skills, such as communication, problem solving and teamwork, are also increasingly valued in the labour market and needed by firms to capitalise on new technologies.[xxxiv xxxv] More generally, skills that can be transferred between occupations will be particularly important to help workers navigate a changing industry mix (Chapter 1). As these changes take place, continued focus will be needed on ensuring the benefits are shared equally.

Workforce needs will continue to change in profound ways. Structural forces including population ageing, rising demand for care and support services, technological and digital transformation, and climate change and the net zero transformation will shape labour force needs over the next 40 years.[xxxvi] Policy will play an important role in helping people, businesses and communities adapt and prosper in the face of ongoing changes to the nature of work. This includes supporting adaptable and high-functioning skills, training and education systems, including foundational skills and lifelong learning, promoting geographic mobility, and responsive and well-targeted migration.

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19   Based on analysis of O*NET and ABS Labour Force data.

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4   Productivity

Overview

Productivity is the key driver of economic growth and rising living standards. Growth in productivity since the mid-2000s has slowed in Australia and most advanced economies. This has contributed to slower real wage growth over the past decade.

Future productivity growth will be influenced by key forces in Australia and globally. These include adoption of, and adaptation to, new data and digital technologies, the changing climate and net zero transformation, an ageing population, and continued changes in industry composition.

This Intergenerational Report (IGR) assumes long-term labour productivity growth around the 20-year average of 1.2 per cent per year. This is revised down from 1.5 per cent per year in the 2021 IGR, which was based on a 30-year average. If this Report had used the 2021 IGR's 1.5 per cent productivity growth assumption, real GDP would have been around 9.5 per cent higher in 2062–63 (Box 1.6). Placing more weight on recent history better reflects recent headwinds to productivity growth. This is a technical assumption and the future path for productivity will be influenced by government policies, decisions taken by businesses and investors, and significant shifts in the global and domestic economy.

Policy can support productivity by promoting investment in people, capital and innovation. It can facilitate the diffusion of new technologies and ideas, and provide efficient infrastructure. Competition-enhancing policies can help underpin this, bolstering business incentives to invest and enabling the most productive businesses to grow.

Realising the productivity potential of the significant opportunities that will occur over the next 40 years will have substantial benefits for living standards. This will be important in the context of the ageing population and continued headwinds to productivity growth, but also to make the most of the net zero transformation and new data and digital technologies.

Productivity growth is key to long-term prosperity

Productivity is the efficiency with which inputs are transformed into outputs using capital, labour, and other resources. Productivity growth occurs when an economy can produce more output for a given level of input, maintain a level of output using fewer inputs, or a combination of both. It is the main source of per capita income growth in the long term and helps to improve real wages, living standards and national wellbeing.

Improved productivity enables higher incomes and gives people more choice. This could mean working fewer hours and spending more time with family. It could be consuming more or higher quality goods and services. These choices have implications for the structure of the economy as well. For example, rising incomes in Australia and other advanced economies have seen the services sector grow as a share of the economy, including rising demand for high quality care and support (Chapter 1).

Productivity can be estimated for individual inputs such as capital or labour or for a combination of inputs. Policymakers typically focus on labour productivity as a key driver of real wages and national income growth. Labour productivity is defined as the value of output of goods and services produced per hour of work.[20]

Productivity growth has delivered substantial benefits, enabling Australians to enjoy a higher standard of living. Over the past 30 years, real wages have grown by almost 48 per cent, and labour productivity has accounted for around 70 per cent of the growth in Australia's real gross national income.[21] Continuing to improve productivity will be important to realising future economic opportunities and ensuring continued strong growth in living standards.

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20   Unless stated otherwise, the discussion of productivity in this chapter refers to labour productivity.

21   Consistent with the 2023–24 Budget, this IGR frames productivity discussion using 30-year and 20-year averages.

Productivity growth has been slowing

Australia's labour productivity growth has slowed since the mid-2000s (Chart 4.1). Average productivity growth over the decade to 2020 was the slowest in 60 years.[22] [i] While the observed productivity slowdown may have been influenced by productivity measurement issues in some industries (Box 4.1), it has also been driven by changes in the structure of the real economy.

Chart 4.1   Australia's labour productivity growth
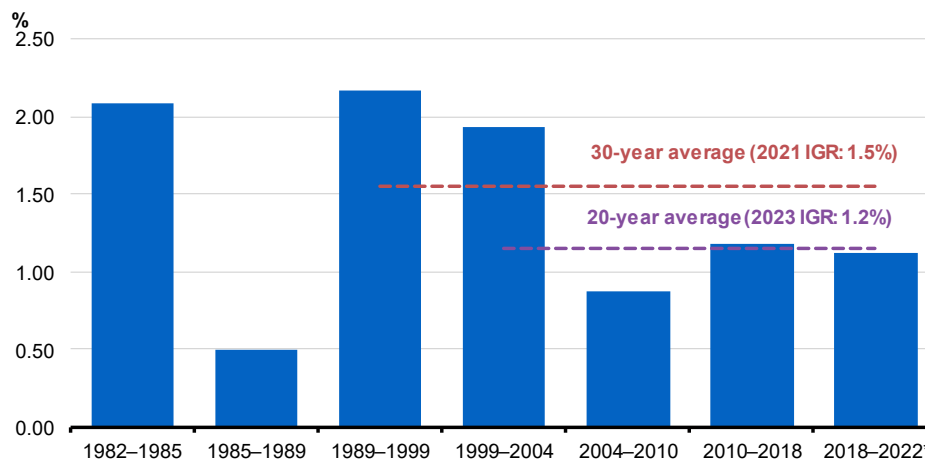
Note: Productivity cycles determined by the ABS. 2018–2022 is not a complete productivity cycle. The dashed lines represent 20-year and 30-year productivity growth averages to 2021–22.

Source: Treasury analysis of ABS 2022 Australian System of National Accounts.

In line with the 2023–24 Budget this IGR adopts a prudent assumption for long-run productivity growth that better accounts for Australia's recent productivity experience. The productivity growth assumption has been lowered from its 30-year average of around 1.5 per cent to the recent 20-year average of around 1.2 per cent. Placing more weight on recent history better reflects headwinds to productivity growth, such as continued structural change towards service industries, the costs of climate change, and diminishing returns from past reforms. This downgrade is consistent with forecasts in other advanced economies such as Canada, New Zealand, the United Kingdom, and the United States.

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22   More recent quarterly productivity growth figures in 2022 and 2023 have been particularly low. This has been influenced by fluctuations in hours worked and labour allocation during and after the COVID-19 pandemic. It too soon to determine whether COVID-19 has influenced the long-term outlook for productivity. Furthermore, year-to-year productivity growth is volatile, making it preferable to focus on longer term averages.

Labour productivity growth can be decomposed into capital deepening and multifactor productivity (MFP).[23] Capital deepening measures increases in capital per hour worked, while MFP captures how efficiently labour and capital are used together. It captures all other changes to GDP not explained by changes in capital and labour inputs. The recent slowdown in Australia's total productivity growth can largely be attributed to a reduction in MFP growth. Average MFP growth in the market sector was 1.0 per cent per year over the last 30 years, but fell to 0.4 per cent per year over the past 20 years. Capital deepening growth in the market sector only fell from 1.3 to 1.2 per cent per year in the same time frame. This suggests that a combination of different factors is responsible for Australia's productivity slowdown, including changes in the pace of technological advancements, lower economic dynamism, and capital investment.

Box 4.1 Productivity measurement: care and support, technology, and net zero case studies

Measuring productivity can be hard, particularly when there are important changes in input and output quality over time.[ii] Measurement challenges also arise when important considerations such as the cost of pollution or emissions efficiency are not captured or quantified in productivity statistics. This box discusses these challenges in the context of the growing care and support economy, new data and digital technologies and the net zero transformation. While measurement challenges are unlikely to explain a large proportion of the observed productivity slowdown to date, understanding them is likely to become more important in future decades.[iii] [iv]

Current productivity measures provide an incomplete picture of the care and support sector's performance. This is because of challenges in fully capturing the value of these services to those benefiting from them. Productivity is currently measured based on hard-to-quantify outputs of the care and support system that do not include important outcomes such as patient satisfaction or care outcomes. Quality adjusted measures of care and support could play a bigger role in measuring productivity improvements over time and provide a fuller understanding of care sector advancements.[v]

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23 While the use of MFP and capital deepening is a common way of thinking about labour productivity, the long-term projections in this report disaggregate labour productivity slightly differently. For further information, see Appendix A3.

Data and digital technologies pose several challenges to productivity measurement. Investment in transformative ideas, processes, and brands are difficult to account for initially because they are treated as expenses rather than additions to the capital stock – unlike investments in more traditional capital like plant and machinery. Newer technologies like artificial intelligence and large language models may also require complementary intangible investments such as business reorganisation and building of organisational knowledge – investments which are not always captured in balance sheets – and whose benefits take a long time to manifest. This can lead to an underestimation of productivity in the early years of these technologies, with a productivity surge later when the technologies and complementary investments reach maturity. The challenge of productivity measurement has also increased because of the difficulty of valuing increasingly prevalent fee-free services and platforms – often based offshore – as well as new and accessible data. As such, the full benefits (and at times costs) of new technologies are unlikely to be captured in national productivity statistics.

Conventional productivity measures do not adjust for changes in the emissions intensity of production. As such, they underestimate benefits from technological and other improvements to production that increase the carbon emissions efficiency of production. Incorporating these and other relevant considerations in productivity estimates can provide a fuller assessment and inform the net zero transformation. Recent research from the United Kingdom offers some initial guidance for incorporating these considerations, for example, by assessing the energy productivity of industries with more granularity. The cost of greenhouse gas emissions and other pollutants on both the input and output side of production could also be considered. Finally, the United Kingdom research suggests incorporating environmental protection as a desired input in production by treating the economic value of environmental protection expenditure as capital investment.[vi]

2023 Intergenerational Report | Part I: The economy over the next 40 years

Australia's productivity slowdown has been broad-based and is not unique.[24] Advanced economies have experienced decreases in long-run productivity growth. Like Australia, all G7 members and New Zealand have had lower 10 and 20-year productivity growth averages compared to their 30-year average (Chart 4.2).

Chart 4.2   International comparisons of labour productivity growth rates
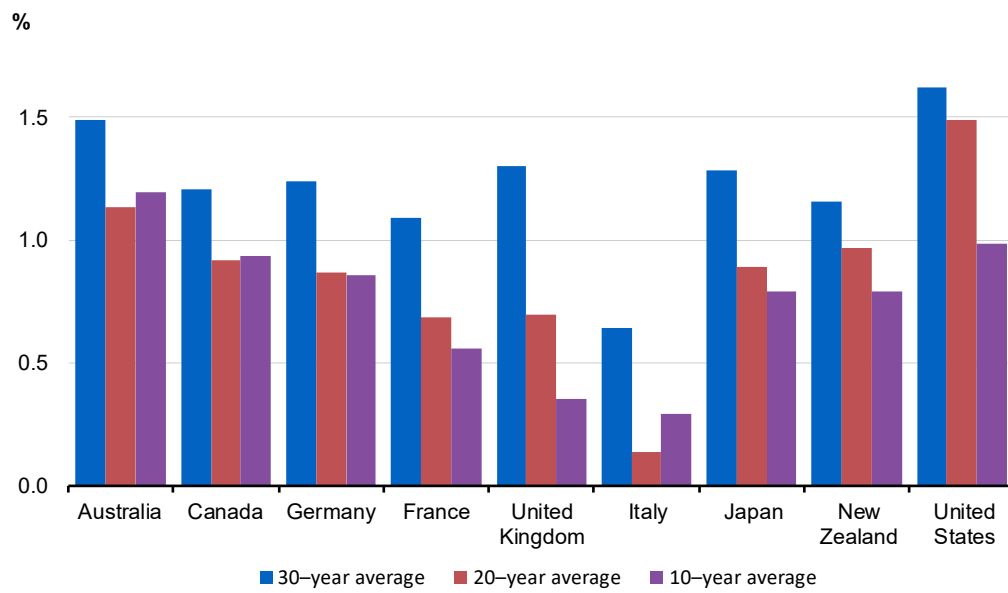
Note: Averages calculated to 2021.

Source: Treasury analysis of OECD data.

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24   Declines in productivity growth have been observed across most industries and it is falling productivity growth within industries rather than a structural shift towards lower productivity growth industries that has driven recent declines.

Comparable productivity trends in other advanced economies suggests there are some shared reasons for the productivity slowdown. Many measures of dynamism, such as firm entry, exit and job-switching rates, have declined in Australia (Chart 4.3) and overseas.[vii] Similarly, measures of market power, such as concentration rates and markups, have increased in Australia and overseas.[viii] [ix] This has lowered business incentives to innovate and reallocate resources to more productive uses.[x] Furthermore, many of the gains from past innovations and trade expansion, such as cheaper production and specialisation, have already been realised.[xi]

Chart 4.3   Decline in dynamism – Australia
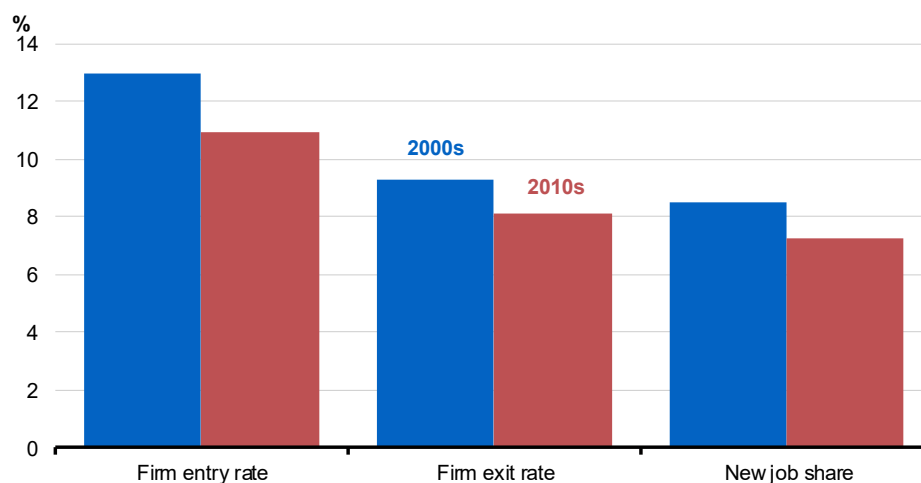
Note: Entry and exit rates are for employing firms.

Source: Treasury analysis of ABS Counts of Australian Businesses data and ABS Labour Force microdata.

Some of the factors that lie behind the global productivity slowdown in recent decades could continue or intensify over the next 40 years, while others will wane as the economy evolves. For example, the growing size of the care economy has weighed on aggregate productivity growth, as productivity growth is typically lower in the services sector than goods.[xii] This headwind is expected to continue, increasing the importance of finding ways to improve productivity growth in the care economy and better measure quality improvements (Box 4.1). Some headwinds such as geopolitical risk and fragmentation (Chapter 1) and increasing physical damages associated with climate change disruptions (Box 4.2) pose increasing challenges for the future productivity outlook. There are other areas, such as increasing adoption of digital technologies, which could provide improved contributions to productivity growth in the coming decades.

Areas of opportunity for Australia to lift productivity growth

There is little that is inevitable about the productivity outlook. There are opportunities in the Australian economy, and some changes already underway, with the potential to underpin the next era of productivity growth.

Realising economic dynamism potential

The experience of the COVID-19 pandemic highlighted the ability of Australian businesses to rapidly adopt new technologies when conditions demanded it. There are now further opportunities to lift the transfer of innovative processes and technologies from the most productive in any given industry – frontier firms – to the rest of the economy. Most Australian businesses adopt innovations created by others, underscoring the importance of settings that facilitate the diffusion of new technologies and ideas throughout the economy. Tellingly, despite the global slowdown in aggregate productivity, growth has remained relatively robust among frontier firms, highlighting the importance of these firms and their innovations to future growth.[xiii]

A dynamic and competitive economy can amplify the benefits of new technologies. Competitive pressures accelerate the flow of good ideas and resources between firms and foster continued innovation, adoption, and improvement.

Reforms that reduce entry and exit barriers for firms can lead to greater dynamism and competition in the economy. Encouraging worker mobility can also support dynamism and productivity by better matching workers with a broader spectrum of emerging employment opportunities.

New frontiers for innovation and investment

Emerging data and digital innovations, such as cloud computing, machine learning and artificial intelligence, have the potential to transform the future of work by automating more routine tasks and improving worker capability (Chapter 3). There is growing global demand for such technologies and related skills. The share of job advertisements referencing cloud computing, machine learning and artificial intelligence has increased strongly over recent years, although Australia still lags the United States in this regard (Chart 4.4 and Chart 4.5).[xiv] Given the gap between Australian firms and the global productivity frontier, there are significant opportunities for supporting a dynamic and competitive business environment that incentivises firms to adopt new innovations.[xv]

Chart 4.4   Share of cloud computing job ads
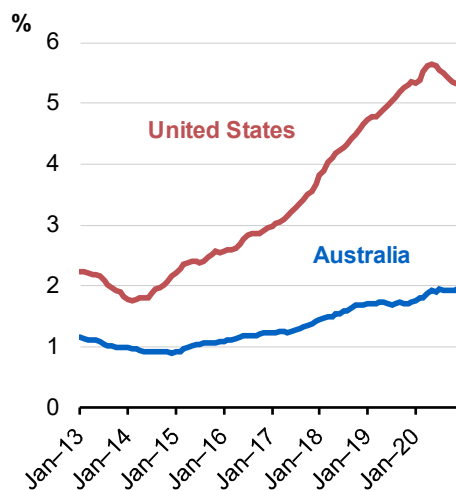
Chart 4.5   Share of artificial intelligence/machine learning job ads
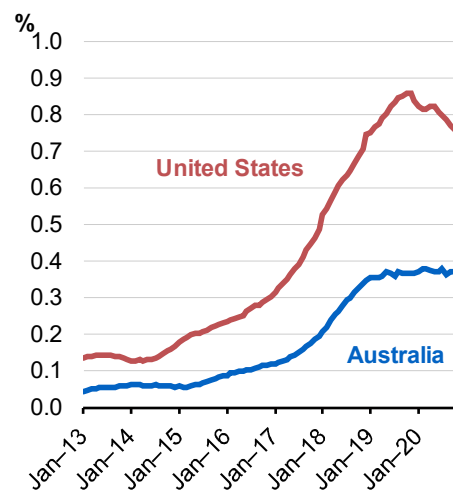
Note: 12-month rolling average of monthly share of job ads that require each technology skill. Cloud Computing also includes Cloud Storage and Cloud Solutions.

Source: Treasury analysis of Lightcast data.

Investing in data and digital technology and complementary infrastructure, skills, policies and processes would benefit the whole economy. This includes ensuring accessible, secure, and inclusive digital platforms. Current and emerging data and digital opportunities can support more informed choices by consumers, enhanced manufacturing by businesses, and the delivery of quality care and other services by government.

Continued growth in human capital

Past technological change has seen our workforce progressively transition into higher skilled and higher paying jobs – this trend is expected to continue, as discussed in Chapter 3. The jobs of the future will require increasingly specialised skillsets and there is potential to support Australians at all stages of their human capital development. Promotion of foundational skills – such as in literacy and numeracy – at an early age will facilitate participation in the expanding knowledge economy over the next 40 years. By supporting lifelong learning and better pathways to and from the tertiary education system there is an opportunity to enable more flexible and frequent human capital development.

While targeted use of our skilled migration program will continue to play a facilitating role, there is an opportunity to further support Australians who continue to face barriers to participation in education and employment. To ensure Australia captures these opportunities, the Employment White Paper will provide a roadmap for our education, training, migration and labour market systems to support all Australians in achieving their full potential.

Broader opportunities for productivity growth

Changes in Australia's industry mix also provide opportunities for improved productivity growth. In particular, the net zero transformation is creating new markets, disrupting trade patterns, and introducing opportunities to lower electricity costs. Rising temperatures also present a range of challenges to productivity growth, which increases the importance of planning and investing in adaptability and resilience (Box 4.2). Amidst these structural changes Australia also has opportunities to increase economic diversity and grow the share of higher productivity industries.

Box 4.2   Climate change and productivity

The net zero transformation presents an opportunity to bolster Australia's productivity and economic growth over the next 40 years and beyond. This will require well-targeted investment in technology, mitigation and adaptation, and policies to strengthen economic resilience and position Australian industries to take advantage of the many emerging opportunities. Without this, climate change will challenge Australia's long-term prosperity as changes in temperature, precipitation and natural hazards weigh on productivity growth (Chapter 5).

Investments in the net zero transformation that contribute to firm innovation and increase the pace of technology diffusion will support productivity growth. Examples in the agriculture sector include climate-smart agricultural goods with genetic improvements and the use of technology to develop crop traits such as drought tolerance.[xvi][xvii] The emergence of new green industries, such as green metals, clean energy exports, and critical minerals also present opportunities for Australia's economy to leverage productivity gains. Industry can adopt circular economy measures to reduce carbon emissions and improve efficiency. This could include modifications to goods design and production chain processes.[xviii] The Productivity Commission's (PC) five-year Productivity Inquiry also highlights adaptation measures that will support productivity growth as the climate changes.[xix]

Well-targeted investment in the net zero transformation could support competition and dynamism in new markets. While it is difficult to measure, government investment in programs that accelerate clean energy businesses could increase competition, support the diffusion of green technology, grow firms, and increase dynamism.[xx] This would support Australia's productivity growth over the next 40 years given the magnitude of the transition underway.

While there will be opportunities to increase Australia's productivity, there will also be headwinds due to the changing climate. Higher temperatures and changing rainfall will weigh on productivity in exposed industries such as agriculture, tourism, construction and manufacturing (Chapter 5). The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) climate-adjusted estimates of farm Total Factor Productivity show increases in farm productivity have offset the negative effects of climate over the last 30 years.[xxi]

Floods, bushfires and other extreme weather events are expected to increase in frequency and severity, causing major disruptions to local economic activity and ultimately hindering overall economic output. From 1960 to 2018, climate disasters reduced annual labour productivity in the year they occurred by about 0.5 per cent in advanced economies. However, for severe climate disasters labour productivity is estimated to be around 7 per cent lower after three years.[xxii] Effective investment in adaptation measures will help improve resilience to these extreme events and reduce their overall impact on productivity.

Policy, productivity and living standards

Productivity growth is central to ongoing growth in living standards. The PC has emphasised that there is no single 'productivity lever', and the greatest opportunities for productivity improvements evolve over time alongside the changing shape of our economy.[xxiii] Because of this, capitalising on future productivity enhancing opportunities will require a multifaceted approach by all levels of government, working with the private sector and broader community.

To enable a more skilled and productive workforce, the Australian Government is reinvigorating foundation skills programs and improving access to tertiary education, including putting in place more fee-free TAFE places, establishing a Universities Accord and a new National Skills Agreement. The Employment White Paper, to be released later in 2023, will provide a roadmap to ensure our education, training, migration and labour market systems support all Australians in achieving their full potential.

Data and digital technologies already pervade most areas of the economy and government services and will continue to grow in importance. The Government is investing in digital infrastructure and working to create better conditions that support increased adoption of digital technologies by businesses. This includes additional investments in the National Broadband Network, to increase access to high-speed internet, and improve mobile and broadband connectivity and resilience of regional Australia. The Government is also helping more businesses adopt new digital technologies and investing in cyber security. In addition, the expansion of the Consumer Data Right and Digital ID can boost competition and efficiency in the services sector.

More broadly, the Government is working with the states and territories to build a more sustainable infrastructure pipeline, expanding housing supply so people have access to affordable housing where jobs are being created, and to progress broad-based productivity enhancing reforms across the economy, including those associated with the net zero transformation. The Government has also announced that Treasury will review competition settings.

Through these efforts, the Government is responding to both recent headwinds to productivity growth and emerging opportunities to lift productivity associated with some of the major forces shaping the future economy.

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5   Climate change and energy

Overview

Climate change and global climate action will have profound impacts on the economy, reshaping Australia's industry mix and requiring effective mitigation and adaptation to manage the impacts of higher temperatures.

The renewable energy transformation is well underway. It has potential to drive down energy costs and help traditional and emerging industries compete internationally. Other sectors are also transforming as demand from domestic consumers and export destinations shifts to more sustainable products.

Opportunities are emerging in new industries. Australia's industrial response could harness mineral reserves and abundant sources of renewable energy to supply critical minerals, hydrogen and green metals needed for modern, sustainable economies and to materially affect global climate trajectories.[25] The actions taken by governments, businesses and individuals now and over the coming decades will affect Australia's prosperity and place in the global economy.

Inaction on climate also has significant economic costs. Better economic outcomes can be achieved through strong global action to limit temperature increases. The Australian Government has legislated Australia's emissions reduction targets and is committed to working with global partners through the Paris Agreement.

However, some costs related to the physical risks of climate change are already unavoidable. Sustained action across adaptation and emissions reduction will be required to maintain productivity and fiscal sustainability as well as achieve better social and environmental outcomes. Effective investments in resilience will also reduce costs to the economy in the long run.

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25   Green metals are metals produced with little to no greenhouse gas emissions.

The economy and climate change

Climate change will affect the shape of Australia's economy, where and how Australians live, work and travel, the health of the population, migration patterns, food and energy security, and the state of our environment. These effects, and the way households, businesses and governments respond to them, will drive innumerable changes in the size and structure of Australia's economy, presenting new opportunities and economic challenges. This all carries economic and fiscal implications.

International efforts to mitigate climate change will alter global export demand, impact Australia's industrial base and create new opportunities to develop competitive industries. While global demand shifts will cause some fossil fuel-intensive industries to decline, Australia is well positioned with renewable energy potential and abundant natural resources to capitalise on the net zero transformation and broaden and grow Australian industry.

The net zero transformation has the potential to support new green industries, such as hydrogen and other clean energy exports, critical minerals and green metals.[26] It is also likely to drive new, innovative ideas as businesses invest in and develop low emissions technologies, providing a source of future productivity growth in a more sustainable economy.[i ii iii] Australia's potential to generate renewable energy more cheaply than many countries could also reduce costs for both new and traditional sectors, relative to the costs faced by other countries.

Rising temperatures will also present new economic challenges, impacting labour productivity, capital investment, and demand for our exports. Effective adaptation and investment in resilience can reduce the impacts of some climate change related disruptions. However, the extent of economic disruption will increase significantly with greater temperature increases. This means mitigating further climate change through effective global action by way of decarbonisation has significant economic value to Australia.

The Intergovernmental Panel on Climate Change (IPCC) and the United Nations (UN) warn that average global warming is likely to exceed 1.5 degrees Celsius (°C) before 2100, potentially before 2040, and may exceed 2°C or 3°C unless international commitments and policies shift significantly (Chart 5.1).[iv v] As temperature increases approach 2°C, the risk of crossing thresholds which cause nonlinear tipping points in the Earth system, with potentially abrupt and not yet well understood impacts, also increases. Australia is part of global commitments under the Paris Agreement to hold increases in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the

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26   Green industries are those whose production produces little to no greenhouse gas emissions.

temperature increase to 1.5°C, and has legislated its commitment to emissions reduction (Chart 5.1).[vi]

Chart 5.1   Australia's average sea and air surface temperature change
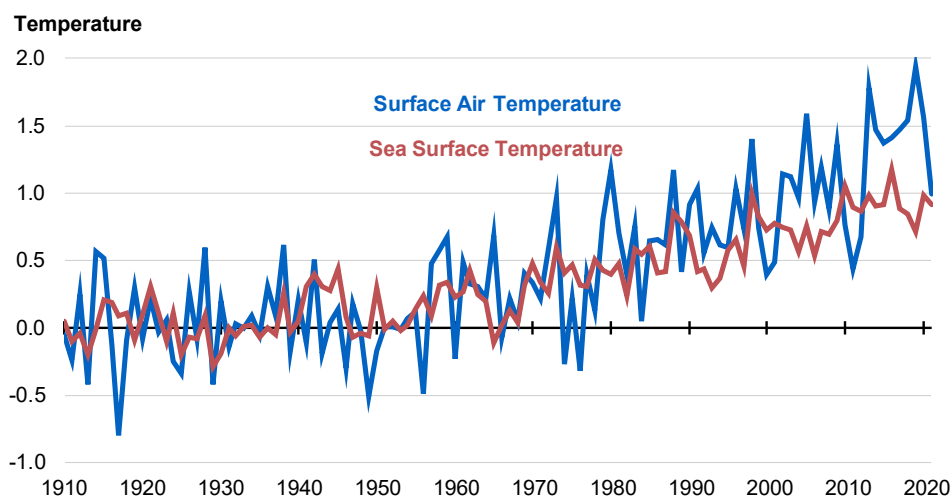
Note: The 1910–30 Baseline for Sea Surface Temperature is 21.9°C and the 1910–30 Baseline for Surface Air Temperatures is 21.3°C.

Source: Bureau of Meteorology, Australian climate variability and change – Time series graphs, n.d.

By anticipating and planning for the economic and fiscal impacts of climate change, Australia can position itself to take advantage of the opportunities emerging from the global net zero transformation. This will require proactively transitioning the energy system, investing in new industry growth opportunities, adapting to warmer temperatures and strengthening the resilience of our communities, businesses and infrastructure.

Australia is committed to mitigating further climate change

The world needs to reduce emissions and reach net zero to limit the impacts of climate change. The latest findings of the IPCC make clear that deep, rapid, and immediate greenhouse gas reductions are needed to limit warming to 1.5 to 2°C.[vii] Under the 2015 Paris Agreement, countries agreed to put forward and maintain commitments to address emissions through Nationally Determined Contributions (NDCs). Over 170 countries have lodged updated NDCs, with many having recently strengthened their commitments.

Australia has an important role in this historic global economic transformation. In 2022, Australia updated its NDC to include a strengthened commitment to reduce emissions by 43 per cent from 2005 levels, by 2030 and reaffirmed a commitment to net zero by 2050.[viii] Australia is also committed to playing a constructive leadership role to advance ambitious climate action in the region, including by supporting its partners to adapt to the impacts of climate change and to carry out their own orderly energy transitions.

Well-designed emissions mitigation measures can support opportunities in growth areas and reduce the likelihood that workers impacted by the net zero transformation move to occupations with lower hours or mismatched skill levels or exit from the labour force. Jobs and Skills Australia is completing a Clean Energy Capacity Study to provide evidence and insights to support the workforce transition as the clean energy sector expands.[ix] The Australian Government will also establish a new national Net Zero Authority with responsibility for promoting the orderly and positive economic transformation associated with achieving net zero emissions.[x]

However, even with effective global efforts to mitigate further temperature increases by achieving net zero emissions, temperature increases that have occurred to date will have an impact on Australia's economy.[xi] Ongoing analysis of the channels through which climate change poses risks to Australia will support effective planning and adaptation.

Higher temperatures will change how we work

Higher temperatures will impact labour productivity and require us to work differently.[xii] As temperatures rise, workers in exposed industries may need to reduce their exposure to heat or the physical intensity of their work. Higher temperatures will also increase some occupational safety risks such as heat stress.[xiii] These factors present challenges for workers, businesses and labour productivity. The impact this will have on Australia's economy depends on global efforts to limit temperature increases, and how effectively industries innovate and adapt to the challenges higher temperatures present.

The impacts of temperature on labour productivity will vary across regions, occupations and industries. Analysis of the potential size of these impacts indicates the value of effective mitigation, and the extent of adaptation that would be required to mitigate productivity headwinds. However, it is partial analysis and does not reflect other physical climate impacts, potential outcomes after investments in adaptation, or broader economic adjustment to these changes.[27]

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27   The physical impacts of climate change are many and include both acute and chronic impacts. Selected impacts have been examined in this analysis and represent only a partial assessment of the physical impacts of climate change that could occur under different climate scenarios. Other physical climate impacts include health impacts, biodiversity loss, storm surge and sea level rise, amongst many others.

Differences across regions

Over the next 40 years, under a scenario where global temperatures increase by up to 3°C by 2100, [28] Australia's national average temperature is projected to increase by 1.7°C. [29] All regions of Australia will experience higher temperatures over this time period, but some are more exposed than others (Figure 5.1). For example, the average temperature in parts of central and northern Western Australia is projected to increase by 1.8°C, whereas the average temperature in Tasmania is projected to increase by just 1.3°C. [30] [xiv] This suggests Western Australia could be more directly affected by the labour productivity impacts of higher temperatures than some other Australian states and territories. Similarly, some regional and remote communities, including Aboriginal and Torres Strait Islander communities, are expected to be particularly exposed to higher temperatures. This highlights the need for effective mitigation of further temperature increases and targeted investment in adaptation.

Figure 5.1   Changes in temperature across Australia between 2023–2063 under a sub 2°C (left) and sub 3°C (right) climate scenario
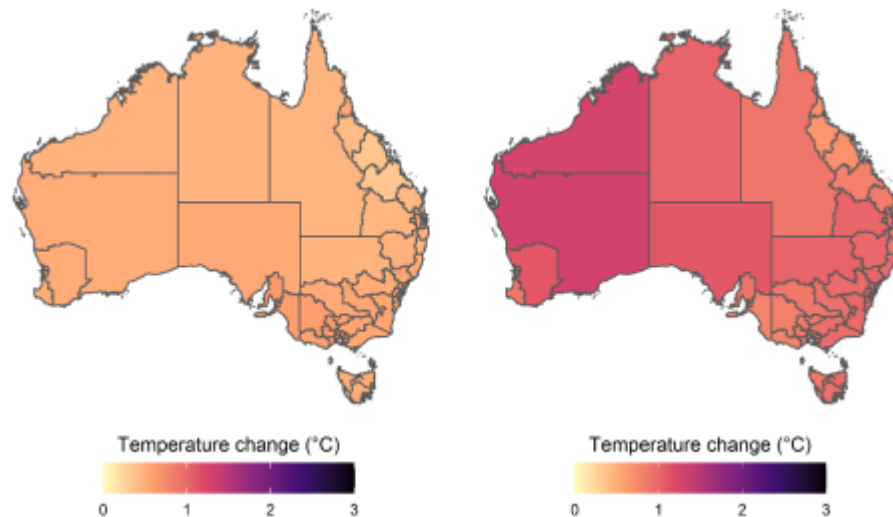
Note: Maps show the change in the 10-year moving average temperature in each Statistical Area 4 (SA4) region between 2023 and 2063, averaged across select Global Circulation Models for each climate scenario.
Source: Bureau of Meteorology, provided data, 2023.

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28   Projected temperature increase is relative to 1850–1900 'pre-industrial' levels.
29   Projected temperature increase is relative to the IPCC reference period 1986–2005. Calculated using data from select CMIP5 Global Circulation Models provided by the Bureau of Meteorology.
30   Projected temperature increases are relative to the IPCC reference period 1986–2005.

Differences across occupations

The labour productivity of some regions will also be more impacted than others by temperature increases due to the nature of economic activities in those areas as labour productivity impacts from rising temperatures will differ across occupations and sectors. Occupations that are labour-intensive, where outdoor daytime work is common, and which rely heavily on physical effort, such as labourers, technical and trades workers, and machinery operators are likely to be more heavily impacted, relative to other occupations (Chart 5.2). These roles are common in sectors such as construction, agriculture, tourism and recreation.

Chart 5.2   Extent of physical intensity (left) and heat exposure (right) across occupations
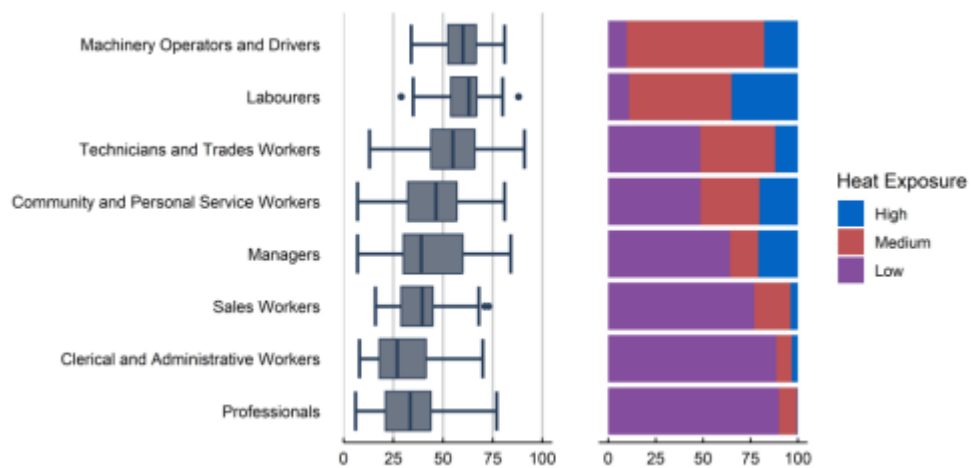
Note: The left chart is a boxplot of physical intensity across occupations, where physical intensity is measured as a score from 0 to 100, with a higher score indicating higher physical intensity. The heat exposure chart (right) shows the share of occupations under each heat exposure category. Heat exposure is defined as exposure to outside temperatures and therefore excludes exposure to other sources of heat.

Source: ABS, Australian and New Zealand Standard Classification of Occupations (ANZSCO), 2022; O*NET, O*Net Database, 2023; Jobs and Skills Australia, ANZSCO to O*NET–SOC correspondence, 2019; Treasury.

The direct impacts of higher temperatures on how we work are just one of the channels through which climate change will impact labour productivity, but one which could be significant. If global temperatures were to increase by up to 3°C or over 4°C, without adaptive changes to current ways of working, Australia's aggregate labour productivity levels could decrease by 0.2 to 0.8 per cent by 2063.[31]

This is a significant economic cost, reducing economic output over this period by between $135 billion and $423 billion in today's dollars, through the direct impacts of higher temperatures on labour productivity. If global action limits temperature increases to 2°C, Australia could benefit from up to an additional $155 billion in GDP in today's dollars, relative to a scenario where temperatures increase up to 3°C. This is equivalent to 26 to 41 million more hours of work in 2063, underscoring the value of timely action to reduce emissions. Investing in targeted adaptation measures to limit worker heat exposure, such as strategic planting of trees or altering building designs to enhance passive cooling, can also mitigate the labour productivity impacts of higher temperatures to some degree.[xv]

Differences across industries

Australia's industries will experience different labour productivity impacts due to rising temperatures, reflecting their reliance on labour for production and occupations that are physically intense and undertaken outdoors, or both. Certain sectors will require more investment in different forms of adaptation and resilience measures to support continued growth.

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31 Appendix A5 details the methodology. Given the uncertainty inherent in predicting long-term climatic conditions, these estimates should not be considered a forecast of future outcomes. Actual outcomes will vary depending on future global emissions and their effect on the climate, the availability of new technology, and how economic, political and social systems respond.

Reflecting their occupational and production make-up, the agriculture, construction, manufacturing and services sectors could be particularly exposed to labour productivity impacts (Chart 5.3). In the case of services, sector output could be up to 0.9 per cent lower by 2063, if global temperatures were to increase by over 4°C[32]

Chart 5.3 Potential change in output across sectors from direct labour productivity impacts of higher temperatures across climate scenarios, 2023 to 2063
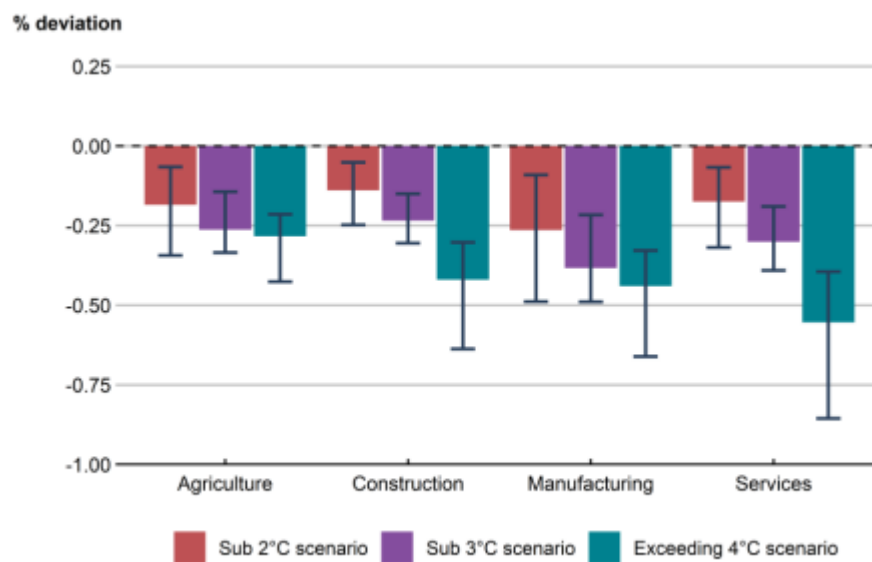
Note: Error bars indicate the variation in modelling output using temperature pathways from select Global Circulation Models. Global Circulation Models project the global climate system and potential future pathways for climatic variables such as temperature, rainfall and CO_2 concentration under different climate scenarios.

Source: Treasury.

The direct labour productivity impacts of higher temperatures presented in Chart 5.3 are not the only channel through which high temperatures may impact economic output. For example, the agriculture sector is expected to face additional exposure from other physical climate impacts because it is heavily dependent on natural resources and climatic

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32 Appendix A5 details the methodology. Given the uncertainty inherent in predicting long-term climatic conditions, these estimates should not be considered a forecast of future outcomes. Actual outcomes will vary depending on future global emissions and their effect on the climate, the availability of new technology, and how economic, political and social systems respond.

conditions.[33] This includes the effect of rising temperatures on crop cultivation (Figure 5.2).

Over the next 40 years, there is a risk that advances in agricultural output driven by innovation are outpaced by the impact of more frequent and severe natural disasters, more prolonged droughts and changes to rainfall patterns, localised changes in growing conditions, and heightened biosecurity risk from changing global pest pathways.[xvi xvii xviii xix] Research has shown broadacre cropping farms, on average, face heightened risk, particularly compared to livestock and mixed farms.[xx]

Figure 5.2   Share of agriculture-related labour across regions, 2021
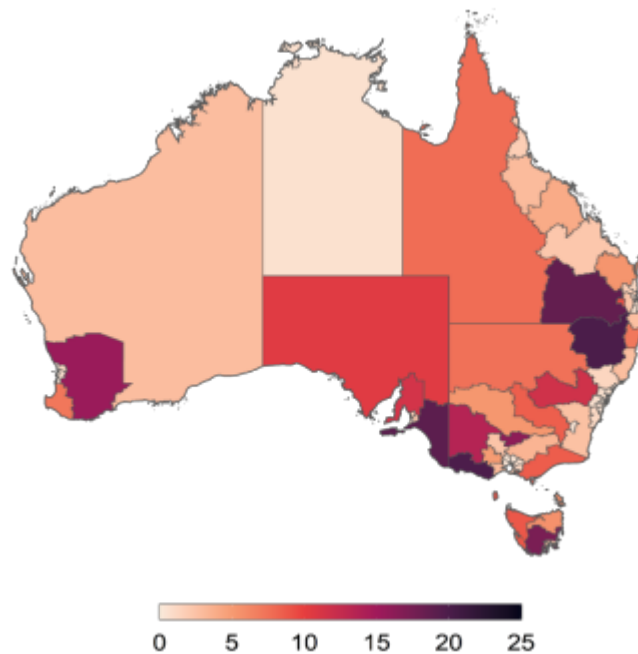
Note: Map shows share of employment across the Agriculture, Forestry and Fishing sector at the SA4 level across Australia.

Source: Australian Bureau of Statistics (ABS), 2021 Census, 2021.

Individual crop species are expected to respond differently to a warming climate. Some crops, such as wheat, are relatively resilient (Chart 5.4). However, modelling using crop-specific estimates of the relationship between yields and climate variables shows yields for most crops are projected to be negatively affected by higher temperatures by 2063,

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33   The physical impacts of climate change are many and include both acute and chronic impacts. Selected impacts have been examined in this analysis and represent only a partial assessment of the physical impacts of climate change that could occur under difference climate scenarios.

particularly under severe climate scenarios (Chart 5.4). As with labour productivity, this is a partial analysis and does not reflect other physical climate impacts, potential outcomes after investments in adaptation, or broader economic adjustment to these changes.

In the absence of adaptation measures, Australian crop yields could be up to 4 per cent lower by 2063 in a scenario where global mitigation does not keep temperature increases below 3°C this century.[34] These yield reductions could be largely avoided if global temperatures rise less than 2°C, demonstrating the significant cost of not taking action to reduce emissions.

Chart 5.4   Potential production-weighted impact on crop yields due to direct impacts of temperature rises and precipitation changes across climate scenarios, 2023 to 2063
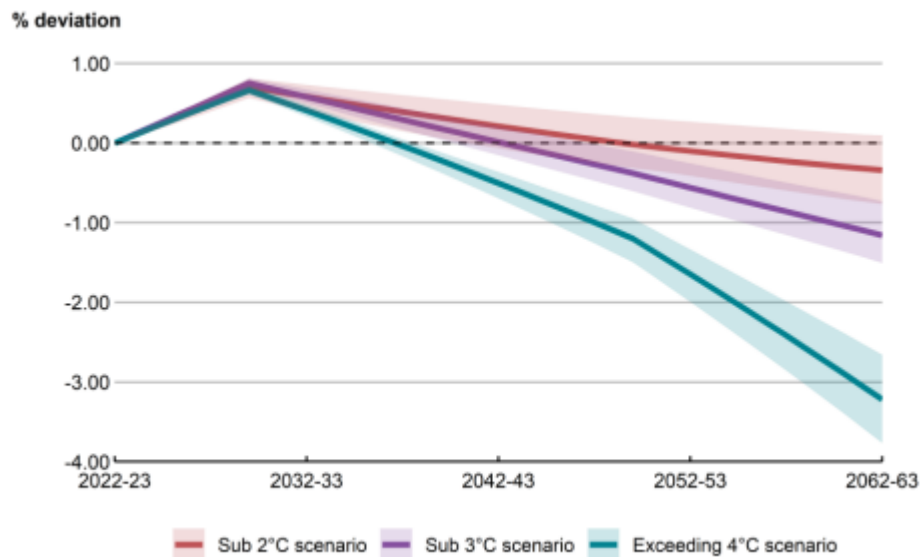
Note: Shaded bands indicate the variation in modelling output using temperature pathways from select Global Circulation Models. Global Circulation Models project the global climate system and potential future pathways for climatic variables such as temperature, rainfall and CO_2 concentration under different climate scenarios. This analysis does not account for changes in water availability beyond precipitation (commonly referred to as water stress) and subsequent impacts on irrigated crops, as well as extreme or compounding weather events (such as droughts or multiple successive hot days).

Source: Treasury.

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34   Appendix A5 details the methodology. Given the uncertainty inherent in predicting long-term climatic conditions, these estimates should not be considered a forecast of future outcomes. Actual outcomes will vary depending on future global emissions and their effect on the climate, the availability of new technology, and how economic, political and social systems respond.

Some impacts on crop yields could be mitigated through adaptation, like changing which crops are planted in particular regions. Increased innovation and investment, for example in improved water efficiency for irrigated cropping, could also play an important role.[xxi]

While there is significant uncertainty around these estimates, findings from global climate and agricultural models suggest other countries in our region may be even more affected than Australia.[xxii xxiii] This could result in heightened demand for Australian agricultural exports over time, assuming the sector is able to position itself – for example, through adjusting the types of crops grown in certain regions – to increase production.[xxiv]

The services sector will also experience additional changes caused by rising temperatures as tourists adjust where and when they decide to travel. Australia has a large number of natural attractions at risk of environmental degradation which may attract fewer tourists in a world of higher global temperatures.[xxv] At least 50 per cent of Australia's sandy coastline, a major drawcard for tourism, is under threat of erosion due to climate change.[xxvi]

Many of Australia's top attractions are also in regions likely to be increasingly susceptible to natural disasters, risking travel disruption and reputational harm.[xxvii] For example, in the immediate aftermath of the 2019–20 bushfires, an estimated 80,000 tourists cancelled or postponed activities.[xxviii]

Given the wide range of factors that impact tourism demand, there is significant uncertainty around the total impact on the sector. Limiting further global temperature rises is essential to reduce Australia's exposure to these risks. For example, the reduction in tourism demand associated with higher temperatures is projected to be half as big if warming can be limited to 2°C, compared to a 3°C scenario (Chart 5.5).[35]

Chart 5.5   Potential change in projected international tourism arrivals due to direct impacts of temperature rises across climate scenarios, 2023 to 2063
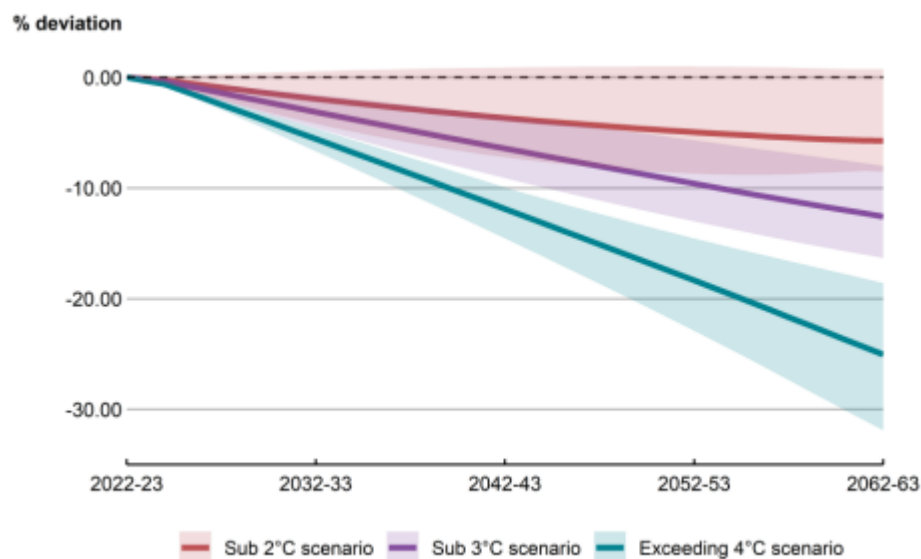
Note: Shaded bands indicate the variation in modelling output using temperature pathways from select Global Circulation Models. Global Circulation Models project the global climate system and potential future pathways for climatic variables such as temperature, rainfall and CO_2 concentration under different climate scenarios. This analysis does not account for the impacts of extreme weather events, degradation of tourism attractions, changes in tourist behaviour, structural changes in the tourism market, or changes in the costs of travel associated with the net zero transformation.

Source: Treasury.

There is a wide range of additional channels, including biodiversity loss, storm surge, sea level rise and health impacts, through which global temperature increases could impact

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35   Appendix A5 details the methodology. Given the uncertainty inherent in predicting long-term climatic conditions, these estimates should not be considered a forecast of future outcomes. Actual outcomes will vary depending on future global emissions and their effect on the climate, the availability of new technology, and how economic, political and social systems respond.

the Australian economy over the next 40 years and beyond These could present significant other costs, beyond those discussed above, for people, communities, businesses and the broader economy, especially under higher temperature increase scenarios.

Increasing natural disaster risk warrants investment in resilience

Climate change is exacerbating the frequency and severity of natural disaster risk from bushfires, flooding, storms, coastal inundation, erosion and landslip[xxix] Natural disasters pose a risk to the economy as they tend to reduce physical capital, decrease productivity, and disrupt economic activity and supply chains. Global action to reduce emissions and limit further temperature increases is critical to reduce Australia's exposure to the impacts of more frequent natural disasters.

One key economic impact of natural disasters is to reduce the longevity of physical infrastructure. In the absence of adaptation, this presents a headwind to productivity growth by reducing capital stock, decreasing the return on these investments and diverting capital and labour from other investments[xxx] Insurance Council of Australia data on insured losses over the past 40 years shows a steady increase in natural disaster related payouts, particularly since the turn of the century (Chart 5.6).[36] This is in addition to other significant costs to the community, including health, social and environmental impacts, and the unpaid labour typically deployed to support affected communities.

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36 The trend shown also represents increases in population and asset values, and therefore total value of assets insured, highlighting the difficulties in measuring total social and economic impacts of natural disasters.

Chart 5.6   Normalised value of insured losses caused by natural disasters, 1982–83 to 2022–23
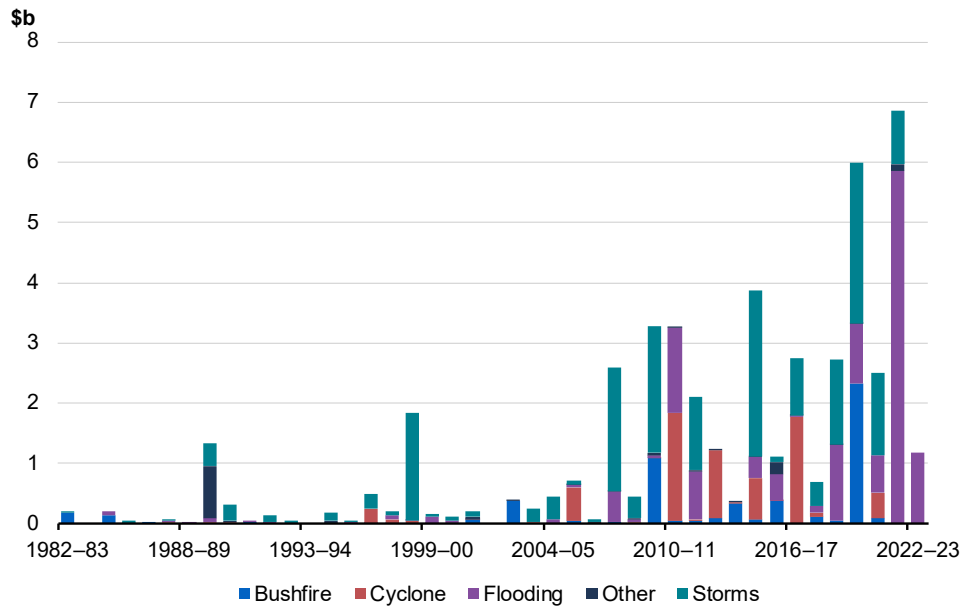
Note: This graph represents only insurance losses. Changes to insurance payout ratios, policy coverage and rates of insurance coverage also contribute to total insurance losses independent of natural disaster losses.

Source: Insurance Council of Australia, Historical Catastrophe Data – June 2023, 2023.

Natural disasters contribute to fiscal pressures across all levels of government, particularly through disaster assistance. For the Australian Government, disaster assistance is primarily provided through the Disaster Recovery Funding Arrangements (DRFA). This is a cost-sharing mechanism where the Government reimburses states and territories for eligible disaster relief and recovery expenditure. Beyond the DRFA, there are other fiscal impacts such as increased payments through social security and transfer programs and foregone tax revenue due to lost employment and economic opportunities.

Projections relative to the historic average of DRFA expenditure show the increased frequency and severity of natural disasters could increase the Government's DRFA expenditure between 3 to 3.6 times over the next 40 years (Chart 5.7). This equates approximately to a cumulative $130 billion of Government spending on DRFA, in today's dollars, assuming global action is only sufficient to limit temperature increases to 3°C. Under the DRFA, as a state's costs rise, so does the Government's share of expenditure.[37]

Chart 5.7   Australian Government expenditure on the DRFA, total percentage change
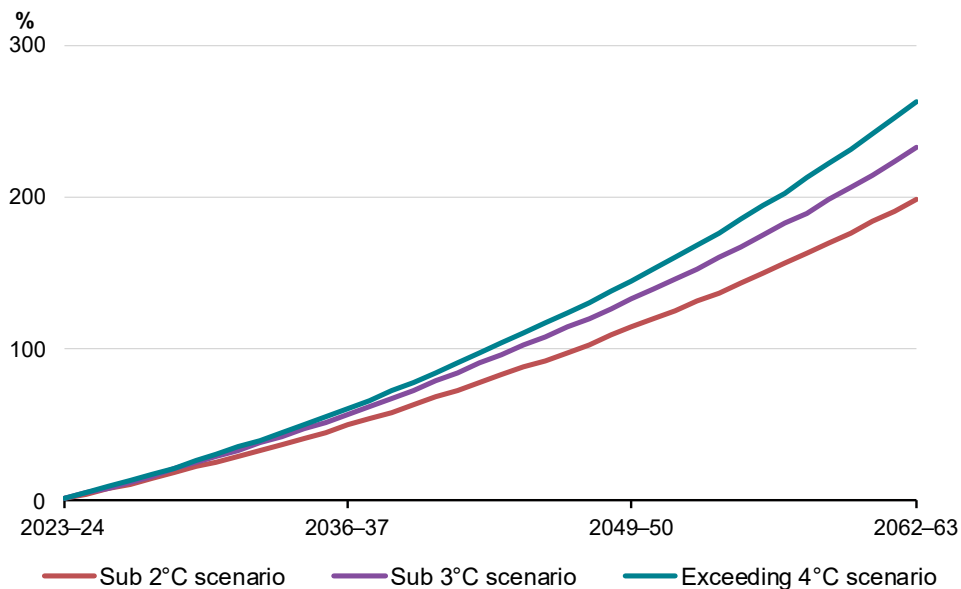
Note: The projected expenditure presented in the chart reflects the growth in costs under different climate scenarios. Actual costs in any given year are likely to vary significantly from projected costs. Appendix A5 provides further details.

Source: Treasury.

Australia's future social, economic and fiscal impacts of natural disasters will depend in large part on the extent of proactive and well-targeted investment in resilience. The Insurance Council of Australia has found that resilience funding could provide returns of $8.10 by 2050 for every $1 invested under a scenario where global temperatures remain at current levels.[xxxi] If global temperatures continue to rise, the returns on

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37   The DRFA currently embeds tiered reimbursement thresholds. For example, the Australian Government's reimbursement to the states and territories for reconstruction of essential public assets can be as low as zero and as high as 75 per cent, increasing with total state eligible expenditure.

resilience measures could be higher.[xxxii] Investments in disaster resilience and risk reductions such as the Government's new Disaster Ready Fund, which will provide up to $1 billion over the next five years, and the Second National Action Plan for Disaster Risk Reduction are an important part of this.

Energy sector transformation will strengthen Australia's competitive advantages

Increasing global temperatures will disrupt economic activities, requiring significant adaptation in order to mitigate potential impacts on productivity and economic growth. However, Australia's natural competitive advantages mean it is also positioned to benefit from important aspects of the global net zero transformation.

Australia is in a strong position to benefit from the global transition towards renewable energy. Renewable energy is already the cheapest form of new energy in Australia, with onshore wind and solar photovoltaic technologies having a lower cost of electricity, after accounting for integration costs, compared to gas, coal or nuclear electricity generation[38] [xxxiii] With abundant wind, sun and open spaces, Australia can generate renewable energy more cheaply than many countries and on a greater scale. Technological developments are further reducing the cost of renewable energy. Sufficiently low energy costs can provide a foundation for developing other industries – old and new – particularly those where energy makes up a large proportion of input costs.

Renewable energy can also improve energy security by reducing Australia's reliance on global fossil fuel markets, providing an additional buffer from global commodity price shocks and creating more resilient supply chains. This will involve large-scale transformation, but with cheaper, lower-carbon energy and greater certainty, traditional industries and newer ones can grow and compete in a decarbonising world.

The electricity sector is transforming with more renewable generation

Electricity generation is Australia's largest source of greenhouse gas emissions, producing one third of Australia's emissions.[xxxiv] The sector is crucial to Australia's climate commitments and is expected to drive emissions reductions.[xxxv] The electricity sector will also be a critical enabler of decarbonisation in other sectors of the economy through electrification.

The nation's electricity generation mix is changing. This will accelerate over coming decades as the share of renewable generation increases (Chart 5.8), providing a significant but variable supply of electricity.[xxxvi] The Government has set a target to transform to an 82 per cent renewable electricity grid by 2030, from a base of around a third today.

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38 Cost of electricity is measured using levelised cost of electricity, which is an electricity generation technology comparison metric. It represents the total unit costs a generator must recover to meet all its costs including a return on investment.

Chart 5.8   Generation Capacity, National Electricity Market, 2023–24 to 2050–51

GW Capacity

Fossil Fuels   Wind   Solar   Hydro   Storage
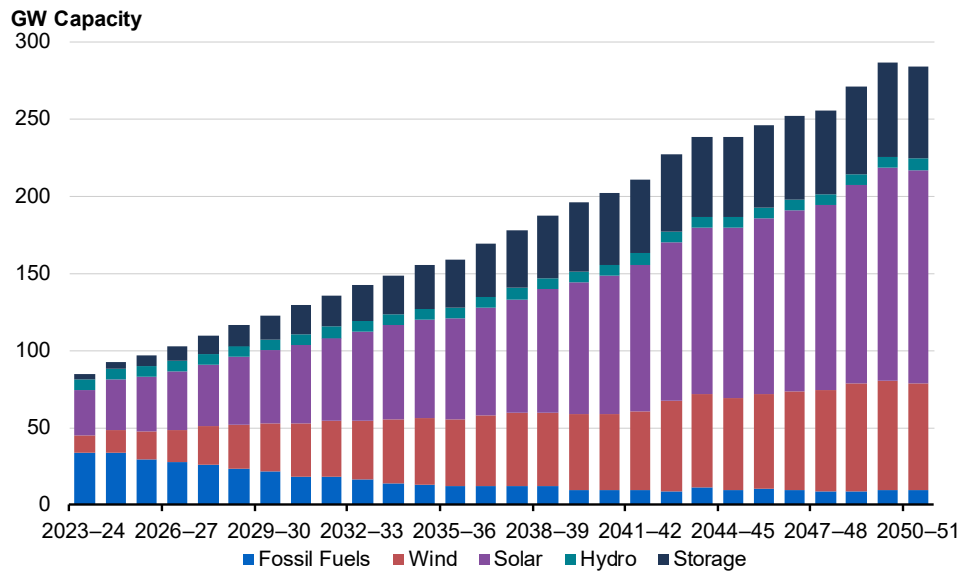
Note: The 2022 Integrated System Plan (ISP) models scenarios over the period to 2050. The National Electricity Market does not include Western Australia and Northern Territory.

Source: Australian Energy Market Operator, ISP Step Change scenario 2022, 2022.

The scale of electricity sector transformation is significant. For example, the Australian Energy Market Operator's (AEMO) 'step change' scenario suggests an additional 154 GW of generation capacity will be required.[xxxvii] AEMO also estimates a nine-fold increase in largescale wind and solar capacity, a tripling of firming capacity and a near five-fold increase in small-scale solar will be needed.[39] [xxxviii] This new infrastructure will be needed to support electrification and decarbonise the broader economy, including for transport, industry, offices and homes.

The energy transition, together with industrial decarbonisation, will require significant additional investment. For example, the Australian Industry Energy Transformations Initiative estimates that an additional $225 billion of investment may be required by 2050, above business-as-usual levels, to transition the energy system and decarbonise heavy industries (iron and steel, aluminium, other metals, chemicals, and liquefied natural gas (LNG)).[xxxix]

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39   Firming technologies – including battery storage, gas-fired generation, and pumped hydro – increase the ability to control and maintain output from intermittent sources, including variable renewables.

This level of investment is of a similar scale to that which occurred during the establishment of Australia's gas industry, where $305 billion was invested in LNG projects over a shorter period of 13 years.[xl]

Transitioning Australia's electricity grid to 82 per cent renewables by 2030 will require significant investments in enablers such as firming capacity, supply chains and clean energy workforce. For example, battery storage, peaking gas generation and other forms of firming technologies will need to be scaled alongside weather-dependent sources of renewable energy to ensure sufficient dispatchable capacity is in place. The materials and workers required to deliver large scale energy infrastructure are also in short supply. The Institute for Sustainable Futures has estimated that an additional 12,000 workers will be required by 2025 to support the transition for the National Electricity Market, from the current level of about 45,000.[xli]

To implement this transition, regulatory frameworks and grid technology will also need to evolve rapidly. For example, rooftop solar and other small-scale technologies that have the capability to consume and supply electricity bring increased flexibility to the energy system but also operate differently from the traditional operation and power flows in the grid.[40][xlii][xliii] The current electricity grid was not designed to facilitate two-way power flows. This raises the importance of designing regulatory and market settings that support efficient and secure integration of these technologies. It is also essential that engagement with communities and landholders is undertaken proactively, to ensure the best community outcomes are achieved.

Renewable energy will also create new industrial opportunities

Transitioning the economy towards cleaner, cheaper forms of energy will be structurally important to the global competitiveness of Australian businesses. Energy is an important input for many business activities, as well as to household living costs. This means the cost of Australia's energy supply has a substantial impact on the overall competitiveness of Australian businesses and the ability for output to grow. Reducing barriers to entry and investment will be essential to ensuring this period of change generates greater dynamism and competition within the economy, and to further enable emerging industries.

High levels of renewable energy generation will support creation of green industries through the decarbonisation of emissions-intensive sectors, including mining and manufacturing, through electrification and potentially fuel switching to green hydrogen.[41] Growing international demand for renewable energy and low-emissions products could also present significant trade opportunities for Australia, further supporting new jobs and economic growth.

Australia has historically been a secure and reliable energy trading partner in our region and is well positioned to become a key renewable energy trade partner to help meet

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40   Small-scale technologies include rooftop solar, stationary batteries and electric vehicles.
41   Green hydrogen is hydrogen produced using renewable energy.

growing international demand. Access to significant solar and wind resources, availability of land and low population density provides the basis for a potential competitive advantage to power new renewable export industries, including electricity through undersea cables and hydrogen.

New clean energy technologies could present significant opportunities for Australia. For example, Australia has potential to export energy in the form of green hydrogen or ammonia produced with renewable energy. Large-scale Australian hydrogen production for both domestic and export use could require nearly an eight-fold increase in the capacity of the grid, under AEMO's hydrogen superpower scenario.[xliv]

To realise this ambition, a number of technical challenges would need to be overcome. These include production costs of the energy-intensive process to produce hydrogen and the energy infrastructure roll-out required to support this, costs to store and transport hydrogen, and other technological challenges.

Similarly, there is potential for high-voltage undersea cables to help trading partners access Australia's secure, affordable low-emissions electricity. Challenges involved in this approach include the need for technological innovation, financing high upfront costs, workforce and materials supply constraints, and implementing changes to regulatory and market settings across multiple countries.

Electrification of facilities and potential development of hydrogen and other technologies can help reduce emissions and generate opportunities in sectors outside energy. Mining and manufacturing were collectively responsible for around 32 per cent of emissions in 2020.[xlv] These emissions come from the use of fuel in extraction and production processes and fugitive emissions from coal, oil and gas production.[42] Wind and solar capacity accompanied by relevant energy storage will help provide a reliable and low-cost electricity supply. Off the grid renewable energy may make it economically viable to mine additional remote deposits.

Emissions are also generated by energy intensive industrial processes such as the production of chemicals, steel, cement, and aluminium, which are critical to modern industrialised economies and are key inputs in the transition to sustainable energy generation. There is potential to decarbonise large amounts of our emission intensive industries through renewable energy, creating opportunities for a modern industrial base. Use of renewable energy can help Australian exports to compete in a decarbonising world and can establish comparative advantages in energy intensive manufacturing.

Australia is the world's largest iron ore producer. In 2020, global steelmaking, which uses iron ore and metallurgical coal to produce steel, represented between 7 per cent to 9 per cent of global emissions.[xlvi] With the presence of abundant renewable energy and

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42 Fugitive emissions are the emissions (typically natural gas, which contains methane) that are lost to the atmosphere or groundwater during coal, oil and gas mining activities.

green hydrogen, Australia has the opportunity to produce green iron ore, green iron and green steel, reducing global emissions.[43]

Australia is one of the few countries in the world that has all three key elements of the aluminium industry: bauxite mining, alumina refining, and aluminium smelter operations. Aluminium is an important input to a number of technologies critical to the energy transition. It features in electric vehicles, wind turbines, batteries and is a more sustainable building material due to its recyclable properties It is also a significant source of global emissions. It is responsible for around 3 per cent of the world's emissions in 2022.[xlvii] Our abundant reserves of all three key elements of the aluminium industry, along with technology advancement provide the potential to produce and export green aluminium.[44]

The Government has invested over $40 billion in measures to realise this pathway for an industrial future underpinned by renewable energy. This includes the Rewiring the Nation program to deliver priority transmission infrastructure at lower costs to consumers. It also includes the Capacity Investment Scheme, which will unlock investment in firmed generation and storage, and the Hydrogen Headstart program which will scale up development of Australia's renewable hydrogen industry.[xlviii] These initiatives are targeted at investment in priority energy infrastructure needed to support the rapid uptake of renewable energy.

The Government is also targeting improved energy performance and productivity through the Household Energy Upgrades Fund and the National Energy Performance Strategy.[xlix l] The National Energy Transformation Partnership will enable collaboration across Australian, state and territory governments to support Australia's energy transformation.[li]

Global factors will impact the pace of transformation in export-oriented sectors

The net zero transformation will impact global energy and resources markets as global demand for low-emission commodities increases. While the transition to renewables will boost demand for many of the minerals mined in Australia, global demand for fossil fuels is expected to decrease over time as nations act to reduce emissions.

The transition will be complex. For example, how countries decide to use LNG for electricity generation, including as a flexible peaking and firming fuel to support the expansion of renewables, will have a significant impact on global gas demand forecasts. While global demand for thermal coal will decline, demand for critical minerals which are required for renewable energy technologies are expected to increase significantly.

Overall, the mix of resources produced by Australia's mining sector is expected to change significantly. In these export-oriented sectors, the pace of change will be significantly

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43 Green iron ore, green iron and green steel are produced in a manner that uses renewable energy and generates little if any greenhouse gas emissions.

44 Green aluminium is produced in a manner that uses renewable energy and generates little if any greenhouse gas emissions.

influenced by the pace of emissions reduction and economic transformation undertaken by the rest of the world.[lii]

Australia's supply of critical minerals is crucial to global emissions reduction

The growth in global demand for renewable technologies presents opportunities for a broad array of Australian minerals, especially critical minerals. The IEA estimates that, for the world to reach net zero by 2050, global demand for critical minerals will need to increase by around 350 per cent between today and 2040.[liii]

The Australian critical minerals industry has the potential to scale up and meet a significant share of this anticipated demand. Australia has the scale of resources, established industry, technical expertise and track record as a stable, reliable and responsible supplier to support the scale of investment required. These factors, in addition to the potential for abundant renewable energy, could also support critical minerals downstream processing industries (Table 5.1).

Australia produces 9 of the 10 minerals used in lithium-ion battery and has projects seeking to develop refineries for the tenth (graphite)[liv][lv] It is a world leading producer of titanium and zirconium.[45][46][lvi][lvii]

Table 5.1   Global significance of Australian minerals

Mineral	Geological potential	World Ranking for Resources	World Ranking for Production
Lithium	High	2nd	1st (> half global production in 2021)
Rare earths	High	6th	4th
Cobalt	High	2nd	3rd
Graphite	Moderate	8th	No current Australian production.
Manganese	High	4th	3rd
Antimony	Moderate	6th	4th
Bauxite*	Moderate	3rd	1st
Vanadium	High	2nd	Negligible current Australian production.

*Note: Bauxite is not listed on Australia's Critical Minerals List. The European Union identifies bauxite (an ore of aluminium) as critical.

Source: Geoscience Australia, World Rankings, 2021; Department of Industry, Science and Resources, Australia's Critical Minerals List, 2023.

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45   Titanium is derived mainly from the minerals ilmenite and rutile.
46   Zirconium is derived from the mineral zircon.

Australian minerals are critical in defence, aerospace, automotive manufacturing, renewable energy, telecommunications and agricultural technology (agtech). Lithium, cobalt, manganese and rare earth elements are crucial to battery manufacturing. Rare earth elements are also essential for permanent magnets used in wind turbines and electric vehicle motors (Table 5.2).

Table 5.2   Key minerals required for clean energy technologies

	Electric vehicles and batteries	Electric network	Solar	Wind	Hydro	Bioenergy	Geothermal
Bauxite	🔴	🔴	🔴	🔵	🔵	🔵	🟢
Cobalt	🔴	🟢	🟢	🟢	🟢	🟢	🟢
Lithium	🔴	🟢	🟢	🟢	🟢	🟢	🟢
Rare Earth Elements	🔴	🟢	🟢	🔴	🟢	🟢	🟢

Note: Relative importance of critical mineral for a particular clean energy technology is indicated by red circles for high importance, blue circles for medium importance and green circles for low importance.

Note: Bauxite is not listed on Australia's Critical Minerals List. The European Union identifies bauxite (an ore of aluminium) as critical.

Source: IEA, the Role of Critical Minerals in Clean Energy Transitions, 2022; Department of Industry, Science and Resources, Australia's Critical Minerals List, 2023.

Making a 55 kWh battery and associated systems for a small electric car typically requires over 200 kg of minerals including copper, lithium, nickel, manganese, cobalt and graphite. This compares to 35 kg of copper for the powertrain of a comparable internal combustion engine vehicle.[lviii] Reflecting this, electric vehicles and static battery storage have already displaced consumer electronics as the largest consumers of lithium and are set to overtake stainless steel as the largest end use of nickel by 2040[lix] Global sales of electric cars exceeded 10 million in 2022, or 14 per cent of new car sales.[lx]

Australia is already the world's largest producer of lithium (spodumene concentrate), supplying almost 50 per cent of total global demand.[47] [lxi] Australia's export volumes of spodumene concentrate are projected to double over the next five years, from 2.2 million tonnes in 2022 to 4.5 million tonnes by 2028.[lxii] [48]

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47   Refined lithium can either be extracted directly from lithium brine or from lithium minerals such as spodumene concentrate.

48   This reflects the volume of spodumene concentrate exported plus the volume of spodumene concentrate used to produce lithium hydroxide for export.

Global demand for lithium is projected to increase significantly over the next forty years, significantly expanding Australia's potential export market (Chart 5.9). Even if global action is only sufficient to limit temperature increases to 3°C, global demand for lithium is projected to quadruple.[49] If global actions are consistent with limiting temperature increases to 1.5°C, global lithium demand could be more than eight-times larger than current levels by 2063.

Chart 5.9   Potential volume of global demand for refined lithium (Mt) under different global emissions reduction pathways
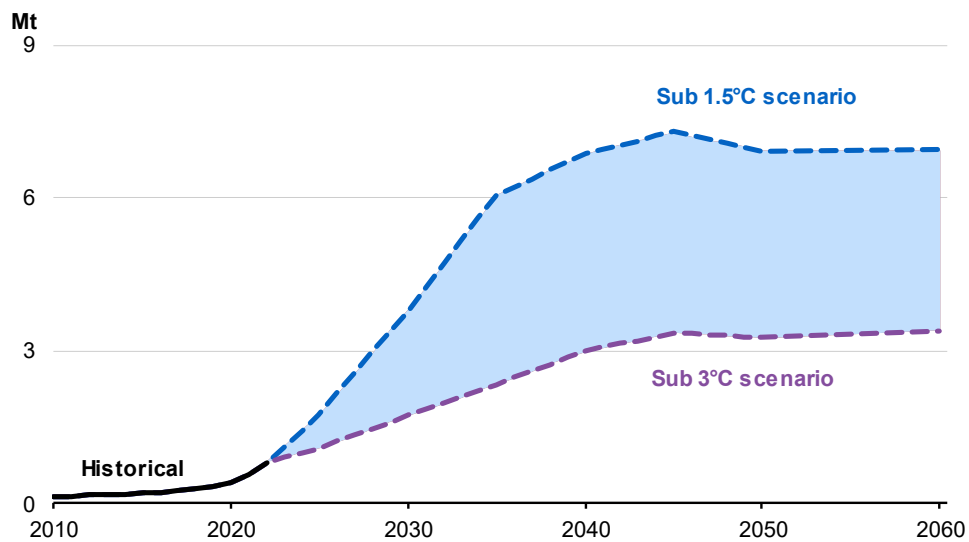
Source: Treasury calculations based on International Energy Agency global demand data, 2023.

China accounts for over half the world's lithium processing and refining capacity, consuming most of Australia's spodumene concentrate. However, over the next 40 years, there is scope for Australia to pursue other avenues such as precursor chemicals for cathodes, electrolyte production, battery anode plants, battery cell research, and battery manufacturing.[lxiii] By 2025, Australian investments in lithium refinement are projected to lead to a market share of 6.2 per cent.[lxiv] Australia's natural endowment of critical minerals also has potential to support the development of a domestic battery manufacturing industry.

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49   The infancy of the lithium market creates significant uncertainty around future scenarios as the industry is still exploring various sources and production processes. Actual outcomes resulting from the net zero transformation will depend on many factors.

Australia has moderate-to-high potential for more undiscovered critical minerals. Well-established mining regions cover just 20 per cent of Australia with the remaining 80 per cent largely under explored.[lxv] This could offer opportunities in regions across Australia (Figure 5.3).

Figure 5.3   Australian critical mineral deposits and operating mines as at 31 December 2022
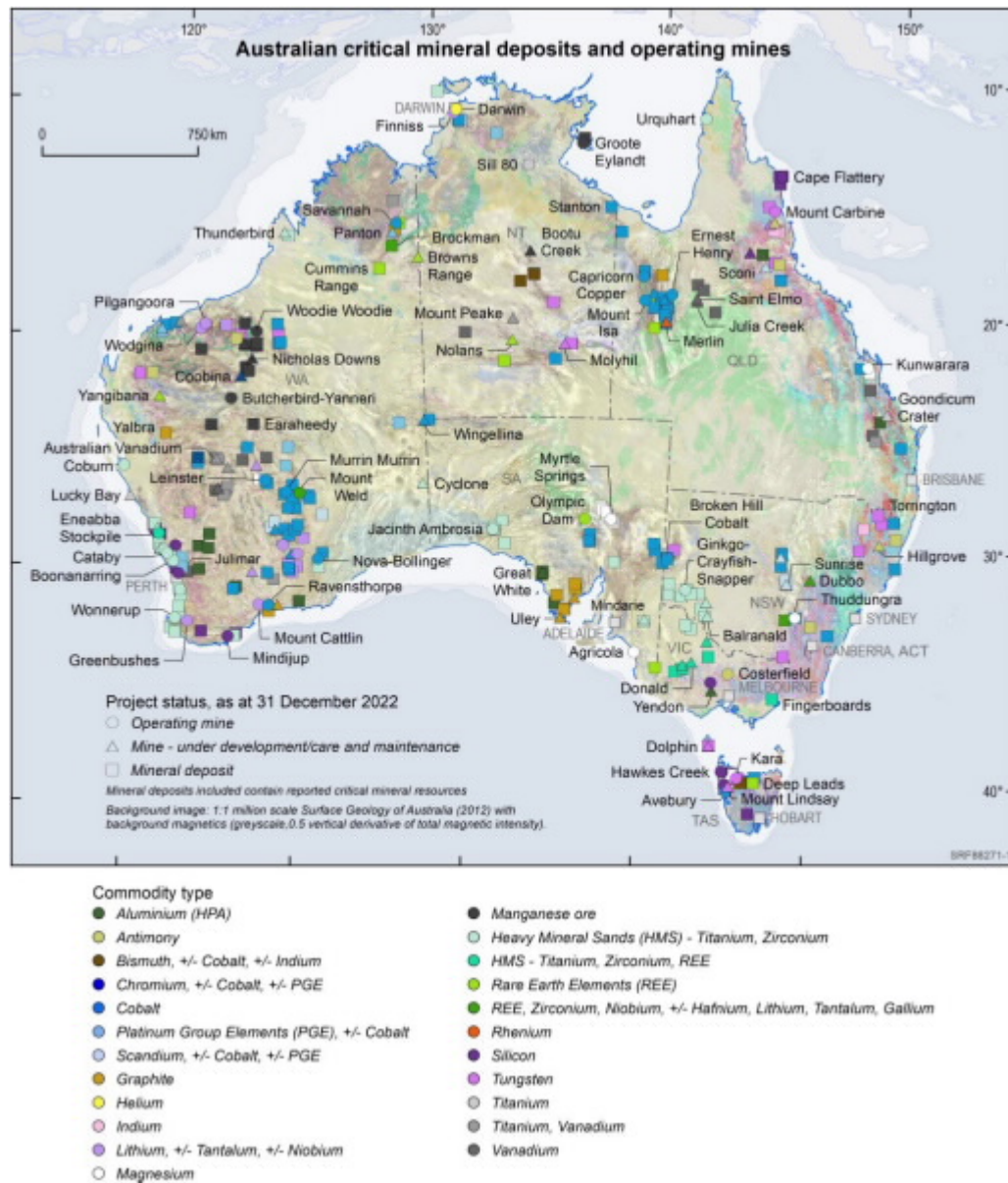
Source: Geoscience Australia, Critical minerals at Geoscience Australia, 2023.

The global shift towards low-emissions, renewable energy and clean energy industries will correspond to slowing demand for fossil fuel-intensive exports, such as thermal coal. The

pace and magnitude of this shift will be driven by developments in international markets, with approximately 80 per cent of Australia's thermal coal production exported in 2022.[lxvi]

Understanding the pace of these trends will help clean energy investors and impacted communities anticipate changes in industrial opportunities and manage regional transitions.

International think tanks and market analysts forecast that global demand and supply for thermal coal could vary significantly depending on global decarbonisation pathways.[50] Treasury has drawn on these international supply and demand forecasts to illustrate how these global trends could impact demand for Australia's thermal coal over the next 40 years (Chart 5.10).[51]

Under the Paris Agreement, 195 countries have committed to hold the increase in the global average temperature to well below 2°C above preindustrial levels and pursue efforts to limit the temperature increase to 1.5°C above preindustrial levels. If global action limits temperature increases to 1.5°C, the associated reductions in global demand for thermal coal could reduce Australia's exports to less than 1 per cent of current levels by 2063. Conversely, if global action limits temperature increases to 2°C this century, thermal coal exports are estimated to fall by 50 per cent by 2063. The decline in international demand for Australia's thermal coal would be expected to be slower in a scenario where global action fails to deliver on the Paris Agreement, resulting in warming above 2°C this century.

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50 Treasury analysis leverages IEA supply forecasts and Wood Mackenzie demand forecasts.
51 The analysis here represents a partial view of what might happen to thermal coal exports. Actual outcomes resulting from the net zero transformation will depend on many factors.

Chart 5.10 Potential demand for Australian seaborne thermal coal export volumes under different global emissions reduction pathways
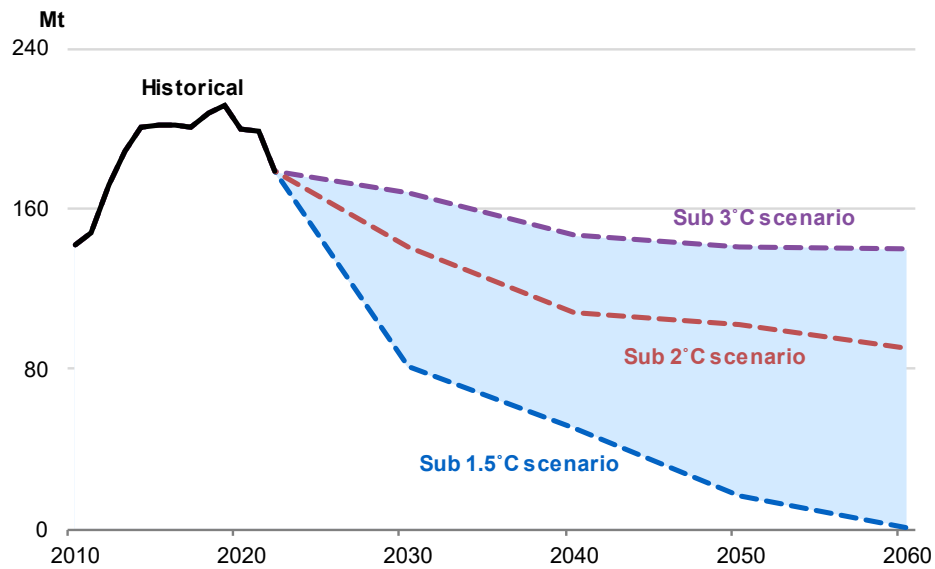
Source: Treasury calculations based on Wood Mackenzie and IEA global demand and supply data, 2023.

The shift in Australia's export structure and industrial base due to the global net zero transformation is likely to change the industry mix in some rural and regional economies over the next 40 years. By planning ahead, communities can position themselves to take advantage of opportunities and ensure those with emissions-intensive industries are ready for the transformation. The Government is establishing a national Net Zero Authority to help drive the transformation to a clean energy economy and ensure Australia's regions, workers and First Nations people benefit. It will include a focus on the regions, industries and workers that have traditionally powered Australia's economy.

As some traditional industries adapt and transition, the Net Zero Authority will help workers, communities and regions benefit from opportunities presented by the net zero economy. Jobs and Skills Australia and the Department of Climate Change, Energy, the Environment and Water are undertaking further capacity studies. The Powering the Regions Fund will help the net zero emissions transformation drive growth across regions that have traditionally powered Australia.

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Part II: The budget over the next 40 years

6   The budget

Overview

The Australian Government's fiscal position has improved since the 2021 Intergenerational Report (IGR), reflecting a faster-than-expected economic recovery from the COVID-19 pandemic and disciplined fiscal policy, including the Government's action to direct the majority of tax upgrades to budget repair. However, debt-to-GDP remains high by historical standards and long-term spending pressures are growing.

The underlying cash balance was in surplus in 2022–23 for the first time since 2007–08, but deficits are projected to remain over the long term.

After narrowing over the medium term, deficits are projected to increase from the 2040s. This reflects growing spending pressures in health and aged care, the National Disability Insurance Scheme (NDIS), defence and interest payments on Government debt. These spending areas combined are projected to grow from one-third of total spending to one-half by 2062–63.

Total Government spending is projected to increase by 3.8 percentage points of GDP between 2022–23 and 2062–63. Tax receipts are assumed to be constant as a share of GDP from the end of the medium term. By 2062–63, the underlying cash deficit is projected to reach 2.6 per cent of GDP.

Australian Government gross debt-to-GDP is below that of major advanced economies, but high by historical Australian standards. Gross debt-to-GDP is projected to decline from the peak of 39.3 per cent in 2020–21 to 22.5 per cent by 2048–49, before rising again to reach 32.1 per cent of GDP by 2062–63, as growing spending pressures lead to increasing deficits and borrowing.

Continued fiscal discipline and investments that build Australia's economic capacity will help to ensure governments have sufficient fiscal space to sustain the services that matter most to Australians and to withstand future economic shocks.

The Government's Economic and Fiscal Strategy focuses on investing in a more productive and inclusive economy, while reducing gross debt-to-GDP over time. Fiscal discipline, including directing the majority of tax upgrades to budget repair, has provided an ongoing benefit through lower interest payments and debt. This has supported a stronger fiscal outlook compared to the 2021 IGR, but there is more work to be done.

6.1 Budget balance projections

Fiscal sustainability is critical to delivering essential public services, ensuring macroeconomic stability and creating fiscal buffers to provide support in the event of economic downturns (Box 6.1). Australia's fiscal position has improved in the near term due to a faster-than-expected recovery following the pandemic and disciplined fiscal policy, including Government decisions to direct the majority of tax upgrades to budget repair. However, rising spending pressures are projected to weigh on the budget over the long term.

The underlying cash balance is expected to be in surplus in 2022–23 for the first time since 2007–08. However, the underlying cash balance is projected to return to deficit for the remainder of the projection period to 2062–63 (Chart 6.1). While the deficit remains below 1 per cent of GDP for most of the projection period, rising spending pressures mean the deficit is projected to widen from the 2040s, reaching 2.6 per cent of GDP in 2062–63.

Chart 6.1   Underlying cash balance
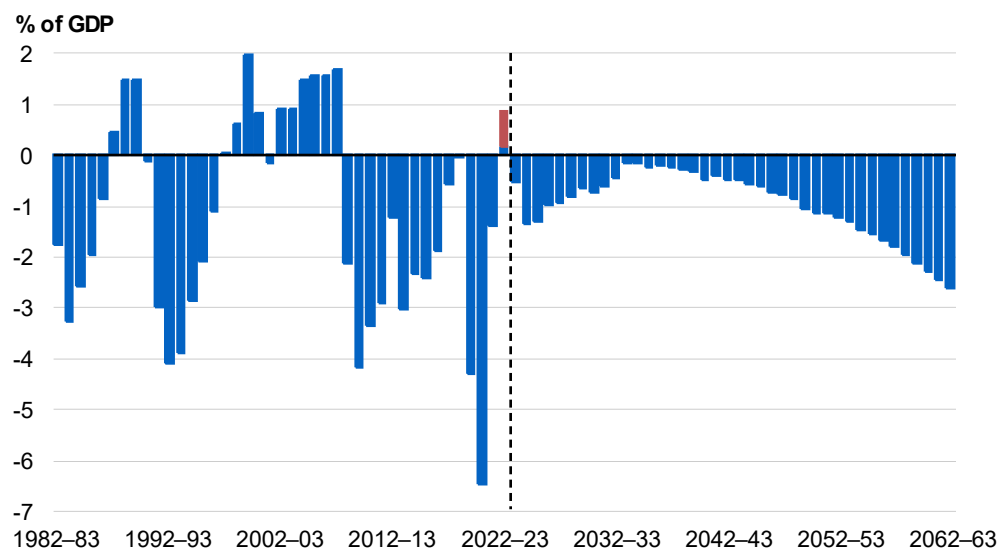
Note: The red bar represents the preliminary estimate of the 2022–23 underlying cash balance which will be finalised and published in the 2022–23 Final Budget Outcome.
Source: Treasury.

Total receipts are projected to increase from 25.0 per cent of GDP in 2022–23 to 26.3 per cent of GDP in 2033–34, before falling to 26.0 per cent of GDP by 2062–63 (Chart 6.2). Tax receipts grow over the period to 2033–34, consistent with the 2023–24 Budget projections, and are then assumed to remain stable at 24.4 per cent of GDP. A slight decline in total receipts as a share of GDP over time reflects decreasing non-tax receipts from 2034–35. Total payments are projected to grow over the projection period, from 24.8 per cent of GDP in 2022–23 to 28.6 per cent in 2062–63.

Chart 6.2   Payments and receipts
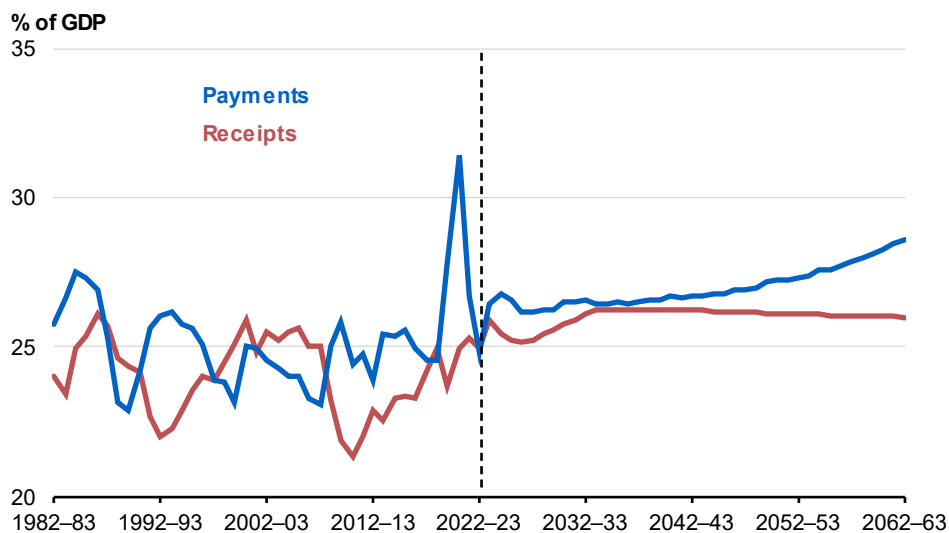
Source: Treasury.

These projections use the 2023–24 Budget medium-term projections as the baseline for the long-term projections. While the final budget outcome for 2022–23 is not yet finalised, the underlying cash surplus is expected to be around three quarters of one per cent of GDP higher than forecast. This will lower the level of debt as a share of GDP.

The primary cash balance adjusts the underlying cash balance by excluding interest payments and receipts (net interest payments). By excluding obligations on the stock of debt previously accrued, the primary cash balance can highlight imbalances between receipts and spending.

The primary cash balance was projected to be a surplus of 0.7 per cent of GDP in 2022–23 at the time of the 2023–24 Budget, with the final outcome expected to be higher. After returning to a deficit to 2028–29, the primary cash balance is projected to reach a surplus of 0.7 per cent of GDP in 2034–35 and remain in surplus until 2047–48. It then returns to a deficit of 1.4 per cent of GDP by 2062–63.

Box 6.1   The importance of fiscal sustainability

Fiscal sustainability is the Government's ability to manage its finances so it can meet its spending commitments, now and in the future, without large and sudden adjustments to policy settings. Fiscal sustainability is critical as it:

- *Ensures the ongoing delivery of essential services* by preventing the need for sudden adjustments to the level of government spending and reducing the risk of interest costs crowding out higher priorities.

- *Promotes macroeconomic stability* through the credibility of public finances and greater certainty of future policy settings. The low risk of large and forced increases in taxes makes Australia a more attractive place to invest.

- *Creates fiscal space* to provide economic support during economic downturns and crises. Countries with more fiscal space can deliver more active fiscal stimulus and experience less severe downturns.[i]

- *Supports intergenerational equity* by ensuring the burdens of taxation and the benefits from government services are fairly shared between generations.

When there is a perception that fiscal settings are unsustainable, there is a risk that private sector confidence falls and access to credit becomes more expensive and potentially constrained. In extreme cases, debt restructuring, austerity, liquidation of government assets and support from third parties may be required. These adjustments can undermine social and economic wellbeing.

A sustainable budget establishes the conditions that allow Government to meet its broader economic, social, and environmental objectives and prepare for future challenges – such as climate change, an ageing population and increasing demand for care and support services.

Reducing gross debt-to-GDP when economic conditions are sound, while allowing increases in debt during downturns, supports debt stability across economic cycles and supports fiscal sustainability. Growth-enhancing policy also contributes to fiscal sustainability by increasing the size of the economy.

Long-term spending pressures

The main five long-term spending pressures are health and aged care, the NDIS, defence, and interest payments on Government debt. Combined, these spending categories are projected to increase by 5.6 percentage points of GDP over the 40 years from 2022–23 to 2062–63. Consistent with the 2021 IGR, total income support payments to individuals and families, and total education payments are expected to grow in real per capita terms, but decline as a share of GDP as the population ages.

The Australian Government's contributions to the NDIS, aged care, interest payments, health and defence are projected to be the five fastest growing large payment categories over the next 40 years (Chart 6.3). NDIS and interest on Government debt are the fastest growing categories over the next decade, with health and aged care growing most quickly at the end of the projection period as the population ages.

While health spending is growing more slowly than NDIS, aged care or interest, it represents a larger share of total spending. As a result, health spending is expected to increase the most as a share of GDP over the next 40 years (Chart 6.4).

The projected growth in spending reflects growing cost pressures and demand for public services as the population ages as well as improvements in the quality of care, including from new health technologies and treatments.

Chapter 7 outlines different scenarios for future fiscal pressures under different growth paths for the NDIS.

Five main payment pressures

Chart 6.3   Average annual growth, 2022–23 to 2062–63
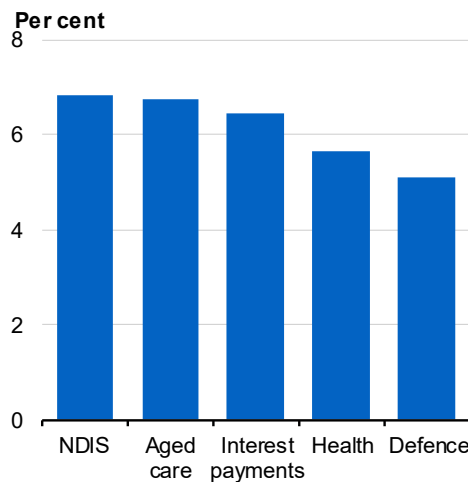
Chart 6.4   Change from 2022–23 to 2062–63
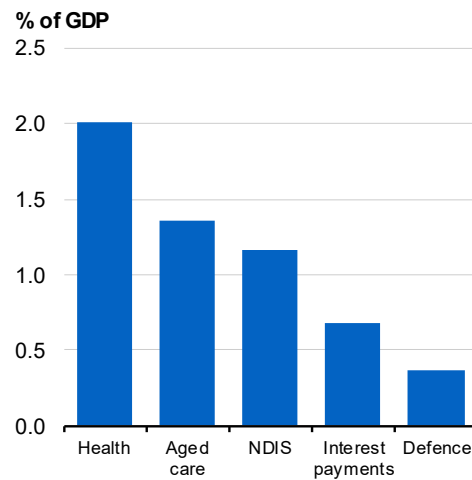
Note: 'NDIS' refers to Australian Government participant payments, excluding state contributions. 'Interest payments' are interest payments on Australian Government securities.

Source: Treasury.

Comparison to past IGRs

Over the past 20 years, the budget position has been weaker than was projected in the 2002 IGR. This largely reflects the negative impact of the Global Financial Crisis and COVID-19 pandemic, combined with lower-than-expected productivity growth. As a result, spending was higher-than-expected and tax receipts lower-than-expected as a share of GDP for much of the period (Appendix A6).

All intergenerational reports have projected an initial period of stable or improving budget balances before declining in the long term. The long-term underlying cash deficits in this IGR are smaller than most past intergenerational reports. This reflects higher revenues, as well as lower spending as a share of the economy on health and the Age Pension, in part due to rising superannuation balances reducing reliance on the Age Pension. Lower-than-anticipated interest rates on Government debt have also contributed.

The fiscal outlook has improved since the 2021 IGR, with smaller underlying cash deficits projected over the long term (Chart 6.5). This improvement reflects a stronger near-term fiscal outlook driving lower interest payments, and a higher level of revenue-to-GDP.

However, increased spending on the NDIS and aged care partially offset the improvement. From 2042–43, the underlying cash deficit grows at a consistently faster rate compared to the 2021 IGR, largely reflecting the lower productivity growth assumption, and converges to the same projection as the 2021 IGR in 2060–61 at around 2.3 per cent of GDP.

Chart 6.5   Underlying cash balance across IGRs
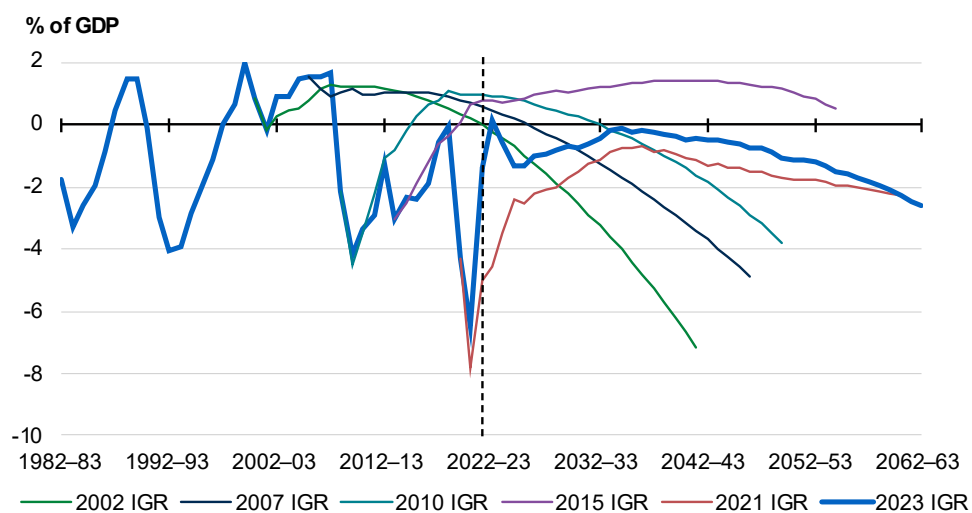
Source: Treasury.

6.2   Debt projections

Persistent deficits in the intervening years between the Global Financial Crisis and the COVID-19 pandemic increased gross debt from 4.7 per cent of GDP in 2007–08 to 39.3 per cent in 2020–21. This was the highest level of gross debt-to-GDP since just after the Second World War.

Australia is gradually rebuilding its fiscal buffers, with gross debt as a share of GDP projected to decline over the coming decades. However, growing structural spending pressures result in gross debt-to-GDP rising again from 2048–49. Gross debt is projected to decrease from 36.5 per cent of GDP in 2025–26 to 22.5 per cent in 2048–49, before rising to reach 32.1 per cent by 2062–63 (Chart 6.6).

Chart 6.6   Gross debt
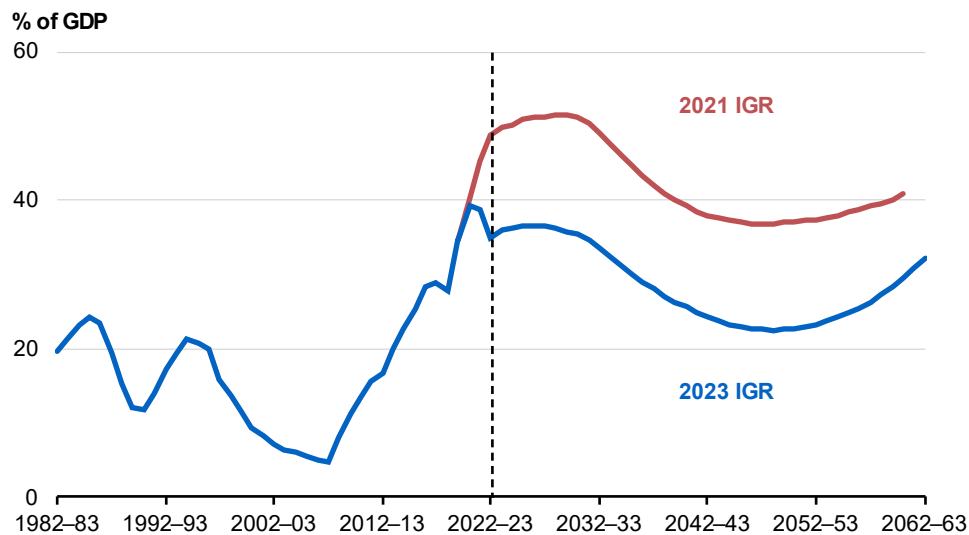
Source: Treasury.

The projections for Australian Government gross debt-to-GDP are lower than in the 2021 IGR. This partly reflects a stronger near-term fiscal position due to the faster-than-expected recovery from the COVID-19 pandemic, and disciplined fiscal policy including decisions in recent budgets to direct tax upgrades to budget repair.

Lower debt today means a lower interest burden in the future.Interest payments are projected to be 1.4 per cent of GDP in 2062–63. Cumulatively, interest payments are projected to be 30 per cent lower over the projection period than in the 2021 IGR (Chart 6.7). In 2060–61, gross debt-to-GDP is projected to be 11.3 percentage points lower than in the 2021 IGR.

Chart 6.7   Interest payments
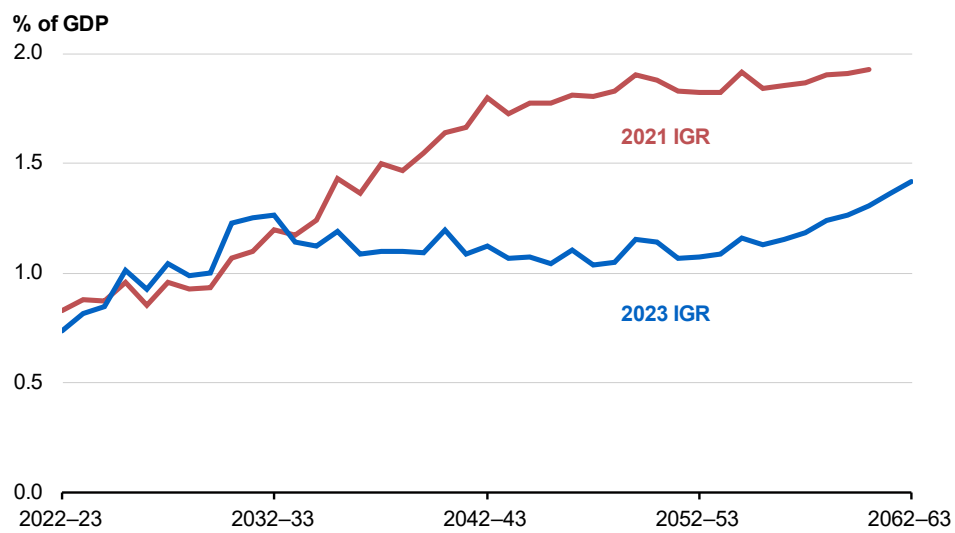
Note: Interest payments include interest on Australian Government Securities, as well as other interest payments.
Source: Treasury.

Net debt is lower than gross debt, but it follows a similar trajectory, falling to 13.4 per cent in 2046–47, before rising to 25.2 per cent of GDP in 2062–63.

Projections of debt as a share of the economy in previous intergenerational reports have also shown periods of reduction, followed by accumulation (Chart 6.8). However, the long-term increase in net debt is less rapid than in early intergenerational reports, reflecting smaller cumulative deficits.

Chart 6.8   Net debt across intergenerational reports
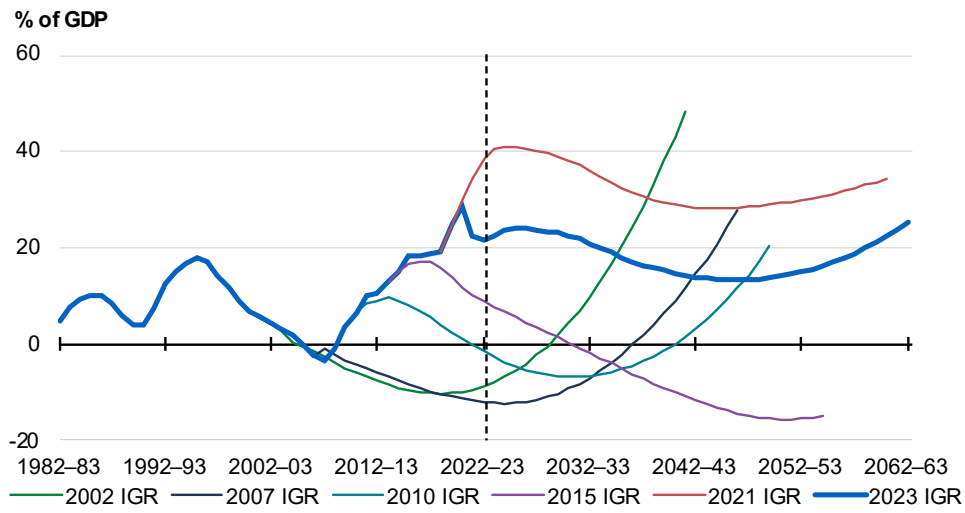
Source: Treasury.

While high by historical standards, debt across all levels of government remains low by international standards. Australia is one of only nine countries with a triple-A credit rating from all three major credit rating agencies and has a gross debt-to-GDP ratio below that of major advanced economies (Chart 6.9).

Chart 6.9   General government gross debt compared to G7 countries, 2023
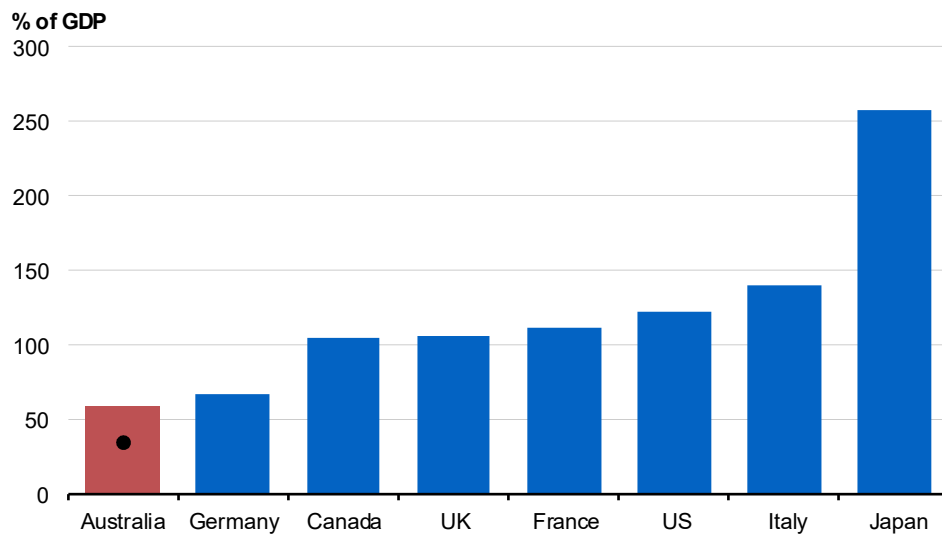
Note: IMF estimates for Australia include Australian Government, state and territory, and local governments, and include a wider range of liabilities than Australian Government budget documents. The black dot the 2023–24 Budget estimate of Australian Government gross debt as at 30 June 2023.

Source: IMF Fiscal Monitor April 2023; Treasury.

From 2029–30 to 2047–48, the primary balance is in surplus. Over the next 20years, interest payments are adding to debt more slowly than the economy is growing. Together, these support a reduction in gross debt as a share of the economy. However, as growing spending pressures drive the primary balance into deficit and borrowing costs increase, gross debt-to-GDP begins to increase (Chart 6.10).

Chart 6.10 Contributions to annual changes in gross debt
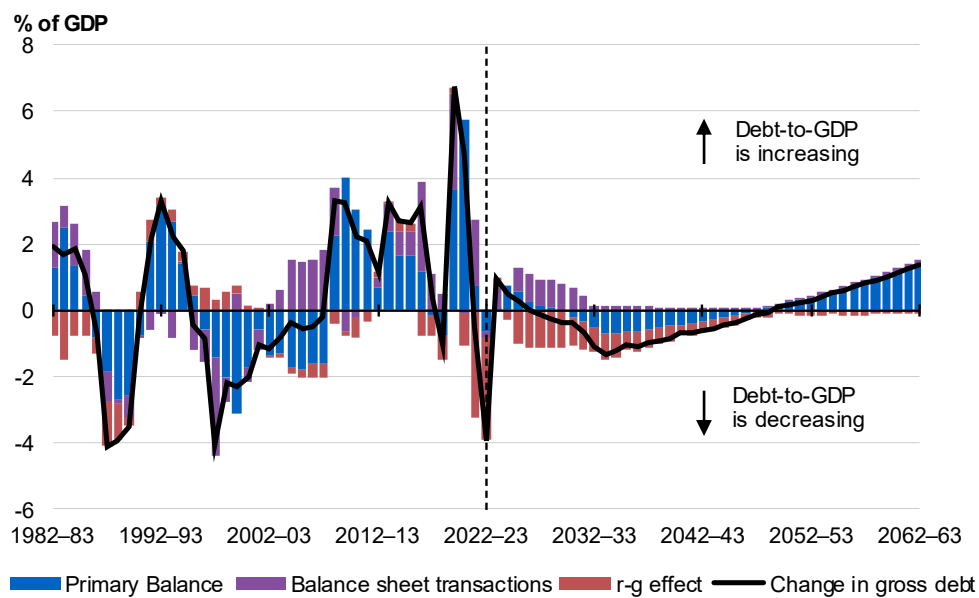
Note: The r-g effect refers to the difference between economic growth (g) and the average yield (r), which determines whether the relationship between interest payments and growth are putting upwards (r > g) or downwards (r < g) pressure on debt-to-GDP. Balance sheet transactions reflects the net impact of asset purchases/sales which respectively increase/reduce borrowing requirements.

Source: Treasury.

The build-up of debt before and during the COVID-19 pandemic has made the fiscal position increasingly sensitive to borrowing costs. If yields increase further than projected, improvements to the primary balancewould be necessary to keep debt-to-GDP on a similar path (Box 6.2).

Box 6.2   Sensitivity of the fiscal position to borrowing costs

While interest payments were 0.7 per cent of GDP in 2022–23 (Chart 6.11), this will rise as debt issued at low yields before and during the pandemic requires refinancing at higher prevailing market rates. Rising yields will be offset by a declining stock of debt as a share of the economy over the 2030s and 40s, resulting in total interest payments declining. However, gross debt rises again as a share of GDP from 2049–50, so interest payments increase, reaching 1.4 per cent of GDP by 2062–63.

This Report adopts the same bond yield assumption as the 2023–24 Budget over the budget forward estimates. It then assumes the 10-year bond yield rises linearly over 15 years from 2026–27 to equal nominal GDP growth – around 4.6 per cent on average over the long-term projection period.

Chart 6.11 Interest payments on Government debt
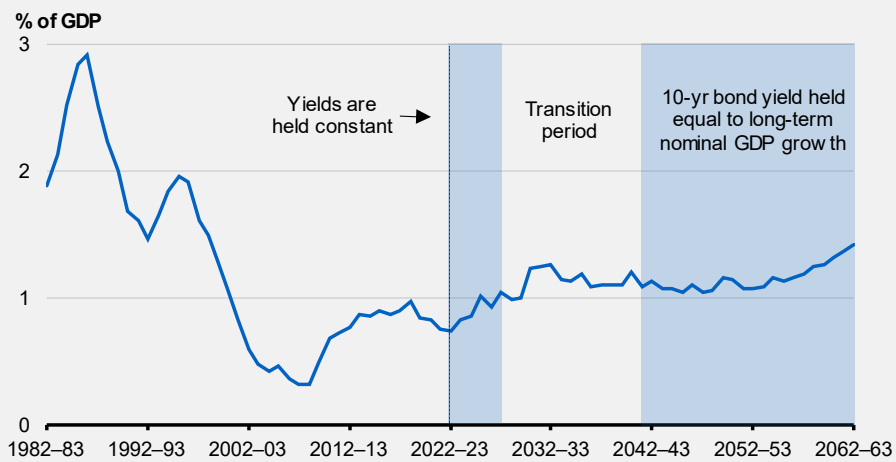
Note: Interest payments include interest on Australian Government Securities, as well as other interest payments.

Source: Treasury.

Chart 6.12 and Chart 6.13 illustrate the sensitivity of fiscal projections to higher and lower yields. The lower yield sensitivity assumes the 10-year bond yield converges to be 80 basis points below nominal GDP growth (the average differential over the past 30 years). The higher yield assumption assumes convergence to 80 basis points above nominal GDP.

As Government interest bearing liabilities exceed interest bearing assets, falls in yields improve the fiscal position. The lower yield sensitivity reduces the underlying cash deficit by 0.3 percentage points of GDP (Chart 6.12) and gross debt by 3.9 percentage points by 2062–63 (Chart 6.13). The higher yield sensitivity increases the underlying cash deficit by 0.4 percentage points and gross debt by 4.6 percentage points of GDP by 2062–63.

Chart 6.12   Impact on UCB   **Chart 6.13 Impact on gross debt**
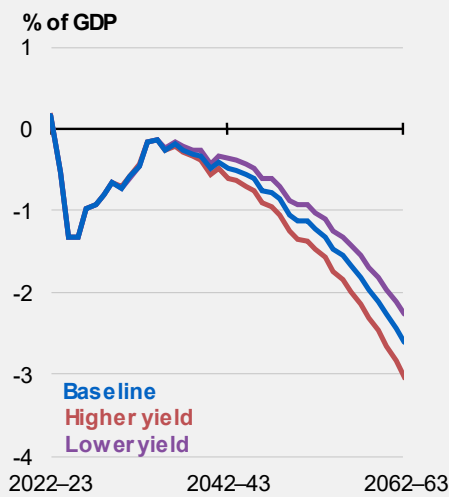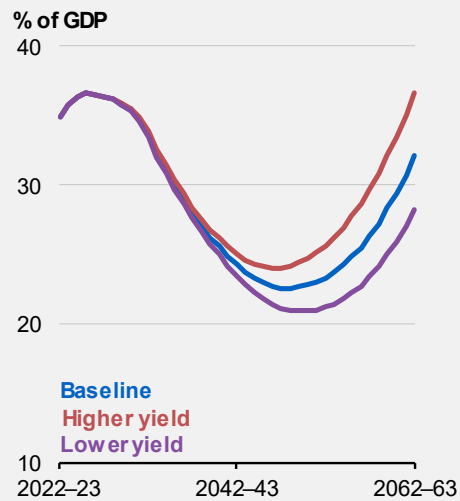
Source: Treasury.

6.3   Supporting a sustainable budget

The Government is focused on delivering a more sustainable budget and building a stronger, more resilient, and more inclusive economy.

Recent actions to improve the fiscal position have assisted in rebuilding fiscal buffers and are supporting an improved long-term fiscal outlook. This has been achieved through disciplined fiscal policy, including directing the majority of tax receipt upgrades to budget repair. These efforts delivered a budget surplus in 2022–23 and have supported lower levels of debt into the future, reducing the interest burden on future generations.

The Government is taking steps to address structural budget pressures, including by introducing the NDIS Financial Sustainability Framework to moderate growth in Scheme costs. The Government is also making measured improvements to the integrity and sustainability of the tax system. This includes better targeting of superannuation tax concessions and reforms to tax settings for offshore liquified natural gas projects and multinational companies.

Investments that grow the economy, strengthen resilience, and expand productive capacity also play a critical role in strengthening public finances, and are a key component of the Government's Economic and Fiscal Strategy. This includes:

- improving access to training opportunities to help Australians build their skills to attain secure and rewarding work and create a more productive workforce

- more affordable child care and expanded paid parental leave are expected to support increased workforce participation, and

- investments such as the National Reconstruction Fund and Rewiring the Nation will support Australia to take advantage of growth opportunities from advanced manufacturing and the clean energy transformation.

Rebuilding fiscal buffers and ensuring sustainable budget settings will help maintain Australia's triple-A credit rating and keep the risk premium on Government bond yields low. It also helps provide governments with more flexibility to sustain essential services, respond to economic shocks, meet future priorities and prepare for future challenges— such as climate change, the ageing population and the increasing demand for care and support services.

Delivery of public services relies on fiscal sustainability at all levels of government. State and territory governments' net debt-to-GDP has also increased following COVID-19, from 1.8 per cent in 2018–19 to 10.0 per cent in 2022–23. It is forecast to continue to increase to 14.2 per cent by 2025–26. The Australian Government will continue to work with state and territory governments to support sustainable funding for essential services.

Endnotes

i   Romer, C., & Romer, D., 'Why Some Times are Different: Macroeconomic Policy and the Aftermath of Financial Crises', *Economica*, 85/337 (2018), 1–40.

7   Government spending

Overview

The Australian Government funds the delivery of essential public services including health and aged care, pensions and education, supports individuals and families, and invests in infrastructure and national security. Government support can address entrenched disadvantage, improve environmental sustainability and expand the productive capacity of the economy.

Over the next 40 years, payments are projected to rise as a share of Gross Domestic Product (GDP) as cost pressures and demand for public services grow and the population ages. Total Government spending is projected to increase by 3.8 percentage points over the next 40 years, rising from 24.8 per cent of GDP today to 28.6 per cent in 2062–63.

Major spending pressures include health and aged care, the National Disability Insurance Scheme (NDIS), defence and interest payments on Government debt. These are projected to rise from 8.8 per cent of GDP today to around 14.4 per cent in 2062–63.

Demographic ageing alone is estimated to account for around 40 per cent of the increase in Government spending over the next 40 years. Ageing and a growing population are driving strong growth in health and aged care spending. Other factors, such as new technologies, treatments, and other improvements in care quality, are also projected to drive Government spending growth.

Spending on Age and Service Pensions is projected to fall from 2.3 per cent, to 2.0 per cent of GDP in 2062–63 despite the ageing population, with superannuation increasingly funding retirements. However, the cost of superannuation concessions will increase, driven by earnings on the larger superannuation balances held by Australians.

Consistent with the 2021 Intergenerational Report (IGR), total income support payments to individuals and families and education payments are expected to grow in real per capita terms, but decline as a share of GDP. This reflects recipient cohorts growing slower than the overall population and slower payment indexation than GDP growth.

Government spending that is well targeted and delivers higher-quality outcomes will help to ensure the resilience and sustainability of the Australian Government's budget for current and future generations.

Intergenerational Report 2023 | Part II: The budget over the next 40 years

Projections of total spending

The Government provides people with access to education, child care, health and aged care services, and supports families and vulnerable members of society. The Government invests in infrastructure and national security and promotes Australia's national interest. Government support can address entrenched disadvantage, improve environmental sustainability and expand the productive capacity of the economy.

Over the next 40 years, total spending is projected to increase by 3.8 percentage points of GDP, from 24.8 per cent of GDP in 2022–23 to 28.6 per cent of GDP by 2062–63. This reflects increased spending pressures in health, aged care, the NDIS, defence, and interest payments on Government debt (Chart 7.1 and Chart 7.2). Increased spending pressures are being driven by population ageing, increased demand in the health and care services, including new technologies and treatments, and geopolitical risk and fragmentation. Australians are living longer with more years in full health and more time using government-funded services. Around 40 per cent of the projected increase in Government expenditure from 2022–23 to 2062–63 is due to demographic ageing (Box 7.1).

Chart 7.1   Australian Government spending as a share of GDP

Chart 7.2   Real Australian Government spending per person
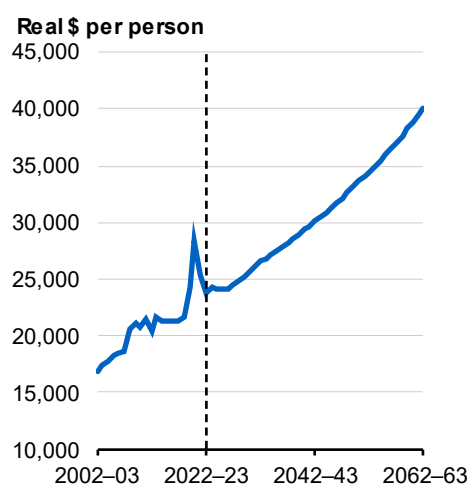
Note: Real dollars per person refers to 2022–23 prices.

Source: Treasury.

By 2062–63, spending as a share of the economy is projected to be lower than the end of the projection periods for the 2002 and 2007 IGRs, but higher than the 2010, 2015 and 2021 IGRs (Chart 7.3). While Australian Government payments are expected to remain fairly steady as a share of GDP over the next two decades, they begin to rise towards the end of the projection period.

Chart 7.3   Government spending across intergenerational reports
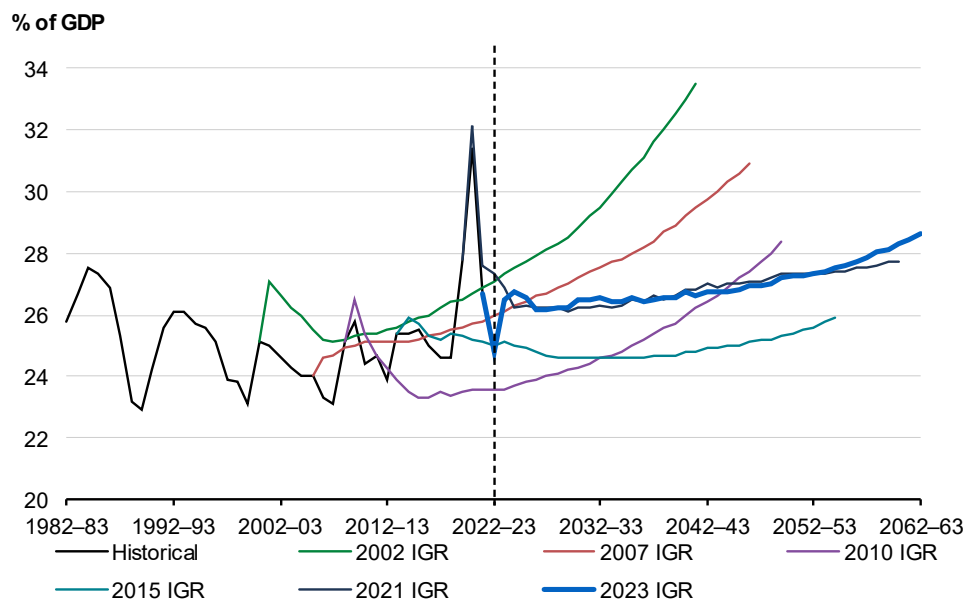
Source: Treasury.

Box 7.1   Impact of demographic ageing on spending

Demographic change is expected to affect major Government payments as the share of older people in the population increases. Many payments are directly related to age, such as payments to families and the Age Pension. Others indirectly relate to age, such as greater use of health and aged care services. To estimate the cost of demographic ageing alone, Treasury has modelled major payments under a hypothetical counterfactual assuming the age and gender distribution of Australia's population is unchanged over the projection period from June 2022 (Chart 7.4).

Chart 7.4   Change in major payments from ageing, 2062–63
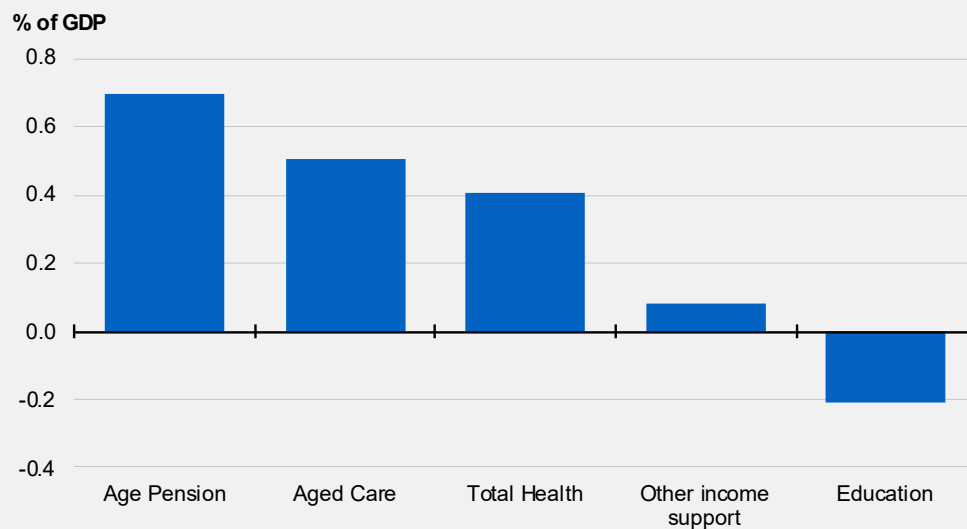
Note: This analysis isolates the impact of demographic ageing based on the growth in the population share of older people on specific major payments. This assumes that the age and gender distribution of Australia is fixed at June 2022 shares. Broader impacts of demographic ageing on revenue and the economy are excluded due to the tax-to-GDP cap (Chapter 8). The analysis excludes the impact of other factors contributing to payment growth (for example, population growth), which are discussed elsewhere in this chapter. More detail is at Appendix A3.

Source: Treasury analysis and projections.

Around 1.5 percentage points, or around 40 per cent, of the projected increase in Government expenditure from 24.8 per cent of GDP in 2022–23 to 28.6 per cent in 2062–63 is due to demographic ageing. The cost of demographic ageing for these major payments is around $45 billion in 2062–63 (2022–23 dollars).

Compositional shifts in spending

The five fastest growing Australian Government payments are health, aged care, the NDIS, defence and interest payments on Government debt. These payments are projected to increase as a share of GDP from 8.8 to 14.4 per cent over the next 40 years. These categories will grow from around one third to around half of Government expenditure in 2062–63 (Chart 7.5).

The remaining two-thirds of Australian Government spending, including income support payments, Age and Service Pensions, and education, is projected to fall as a group to around half of Government spending by 2062–63. This largely reflects the ageing population, with the share of the population studying, caring for children or receiving income support declining, as well as the indexation of payments that grow more slowly than the economy.

Chart 7.5   Australian Government payments by major category
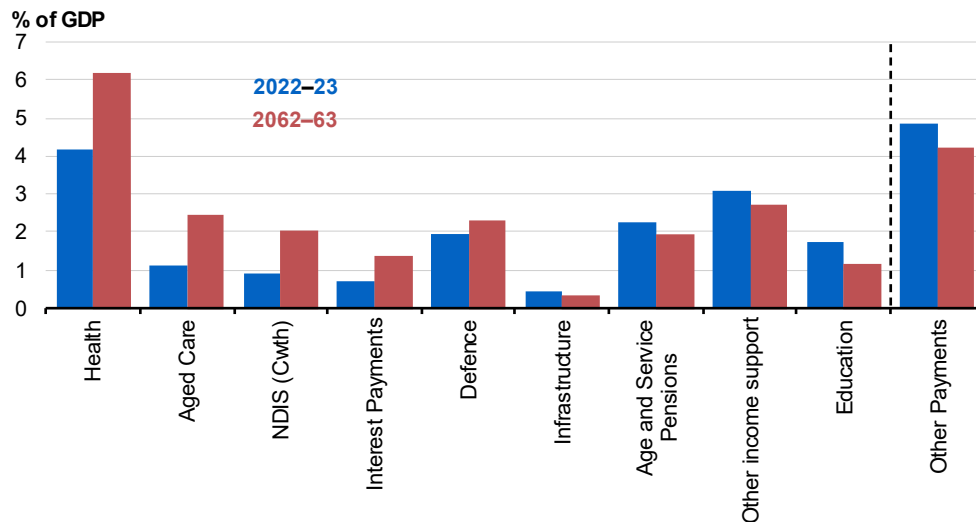
Note: Other income support includes Disability Support Pension, Parenting Payment, JobSeeker Payment, Youth Allowances, Austudy, Carer Payments, Family Tax Benefits, Child Care Subsidies, and Paid Parental Leave. Interest payments are interest payments on Australian Government Securities (AGS). 'Other payments' includes superannuation payments, Official Development Assistance, interest payments (excluding interest on AGS) and all other payments and excludes goods and services tax (GST) payments to states and NDIS payments other than the Commonwealth payments for participant costs.

Source: Treasury.

The timing of maturity of the NDIS is uncertain. The fiscal implications of different scenarios for Scheme maturity are outlined in Box 7.2. The projections in this report recognise National Cabinet's commitment to the NDIS Financial Sustainability Framework. The implications of the Framework are discussed in Box 7.3.

7.1   Health

Australian Government health spending is projected to grow from 42 per cent of GDP in 2022–23 to 6.2 per cent of GDP in 2062–63. A growing and older population, alongside other cost drivers such as increased demand for health services and the funding of new health technologies, are the main drivers of spending growth over this period.

Major health programs funded by the Australian Government include:

- the Medicare Benefits Schedule, a core component of Medicare – $28.2 billion in 2022–23, and

- the Pharmaceutical Benefits Scheme, under which the Government subsidises pharmaceuticals to provide patients with affordable access to medicines – $18.6 billion in 2022–23.

In addition, the Australian Government:

- makes a contribution to the funding of health and hospital services provided by state governments – $25.7 billion in 2022–23

- provides a rebate to subsidise the cost of private health insurance – $7.0 billion in 2022–23

- provides health care services to veterans via White and Gold Card arrangements – $2.6 billion in 2022–23

- is committed to closing the gap for Aboriginal and Torres Strait Islander people's health and wellbeing – $1.1 billion in 2022–23, and

- provides financial support in other areas, including through disbursements from the Medical Research Future Fund – $598.0 million in 2022–23.

Key trends and drivers

Australian Government spending on health care has been steadily rising as a share of GDP since the 2000s. A large part of the growth over this period was driven by non-demographic factors. This includes increased use of health services, tests and pharmaceuticals, and decisions to subsidise the introduction of new technologies or changes to the Pharmaceutical Benefits Scheme.

Over the next 40 years as the population ages more people will fall into the older age groups that are the most frequent users of the public health system. From 2022–23 to 2062–63, real total health spending on those aged over 65 years is expected to increase around six-fold. Over the same period, real total health spending on those over 85 years is expected to increase around nine-fold. People aged 65 or older currently account for around 40 per cent of health spending, despite being about 16 per cent of the population.[i] Combined with population growth, this will play a significant role in increasing future health costs (Chart 7.6). Demand for access to the highest standards of care and rapid technological innovation will also place pressure on the Government to increase expenditure.

Chart 7.6   Australian Government health expenditure
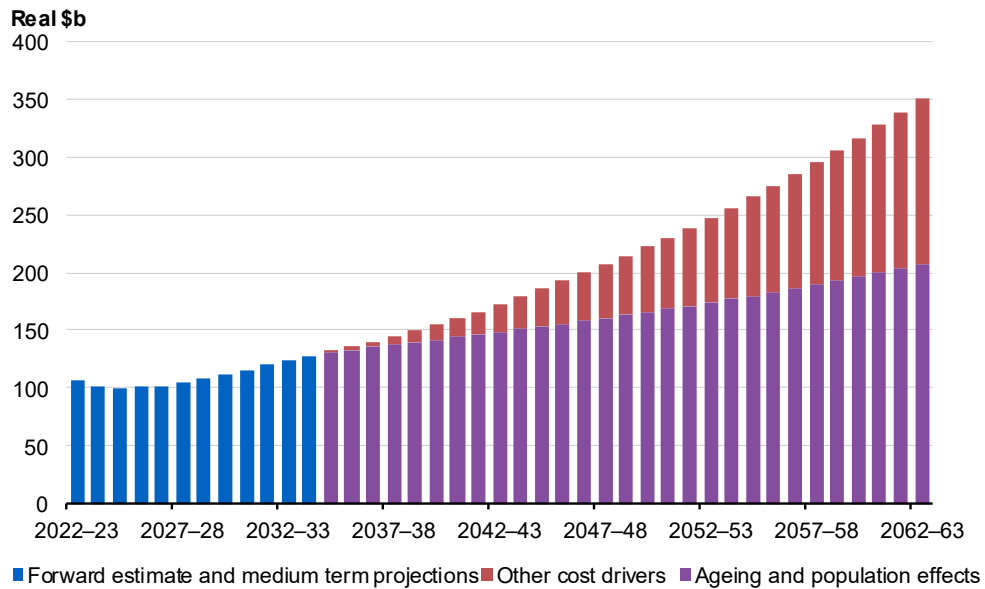
Note: Real dollars refers to 2022–23 prices.

Source: Treasury.

Projections

Australian Government spending on health is projected to increase as a proportion of GDP from 4.2 per cent in 2022–23 to 6.2 per cent in 2062–63 (Chart 7.7 and Chart 7.8). The projections assume that historical trends continue. Over the next 40 years, a growing and older population is expected to contribute around 40 per cent of the projected increase in health spending. Non-demographic factors such as the funding of new technologies account for the remaining 60 per cent. In 2062–63, population growth and the growing share of older people in the population account for around two-thirds of total real health spending, with the remainder attributable to other cost drivers.

Chart 7.7   Australian Government health spending as a share of GDP

Chart 7.8   Real Australian Government health spending per person
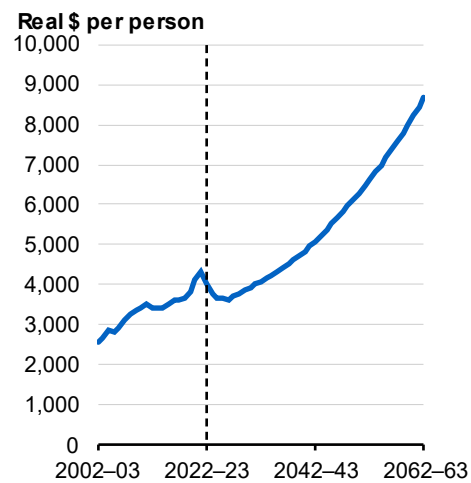
Note: Real dollars per person refers to 2022–23 prices.

Source: Treasury.

While there may be interactions between demographic and non-demographic forces, these are not modelled explicitly. Health spending will vary based on changes in these forces. These include the complexity and acuity of health conditions experienced by users of the public health system and how health system use may vary over the longer term relative to historical trends. Changes in any of these forces will affect the projections of health spending.

Health system components are projected individually over the medium term, out to 2033–34. From 2033–34 onwards, total health spending is projected using an aggregate model based on the more stable long-term trends in public health expenditure growth (Appendix A3). Over the medium term:

- hospital expenditure is the fastest growing component of Australian Government health expenditure, projected to increase from around $950 real per capita in 2022–23 to $1,300 real per capita in 2033–34 (an increase of around 35 per cent), and

- Medicare Benefits Schedule expenditure is also growing quickly, increasing from around $1,050 real per capita in 2022–23 to $1,300 real per capita in 2033–34 (an increase of around 25 per cent, of which around 3 percentage points reflect the tripling of the bulk billing incentive in the 2023□24 Budget).

Considering escalating health pressures, it will be important to ensure that the health system provides value for money. This requires a health system that innovates and prioritises funding a patient-centred and sustainable Australian healthcare system that delivers the best outcomes for communities. This will require funding arrangements that continue to effectively invest in preventive health and evidence-based health care spending.

The Strengthening Medicare Taskforce Report[ii] released by the Government on 3 February 2023 sets out a recommended pathway for significant reforms to strengthen Medicare and to rebuild primary care. In response to the report, the Government invested $5.7 billion in the 2023–24 Budget to support better access and more affordable care for patients.

7.2   National Disability Insurance Scheme

The NDIS provides critical supports that improve the quality of life of Australians with permanent and significant disability. This includes funding to build capacity, increase independence and promote social and economic participation.

The Australian, state and territory governments jointly fund the Scheme which is administered by the National Disability Insurance Agency (NDIA). The NDIS is funded under the terms of seven full Scheme bilateral agreements between the Australian and state governments. The Australian Government and Western Australia are discussing a bilateral full Scheme agreement to come into effect in 2023–24.

National Cabinet committed to an NDIS Financial Sustainability Framework (the Framework) in April 2023. While the NDIS remains demand driven, the Framework provides an annual growth target for NDIS participant expenses of no more than 8 per cent by 1 July 2026, with further moderation of growth as the Scheme matures. The Framework will ensure that every dollar goes to support those for whom the Scheme

was intended. The projections in this report recognise National Cabinet's commitment to the Framework.

An independent review of the NDIS is underway to improve the design, operations and sustainability of the Scheme. A final report will be provided to Disability Reform Ministers in October 2023.

At the 2023–24 Budget, total government spending by the Australian Government and states and territories on NDIS participant supports was projected to increase from 1.4 per cent of GDP in 2022–23 to 2.2 per cent of GDP at the end of the medium term. Australian Government spending on the NDIS is projected to increase from 0.9 per cent of GDP in 2022–23 to 1.8 per cent at the end of the medium term.

In this Report, the NDIS is assumed to reach program maturity in 2043–44, with Australian Government spending at 2.1 per cent of GDP and total government spending at 2.4 per cent of GDP. Beyond 2043–44, total spending is assumed to grow in line with GDP growth.

State and territory spending on the NDIS is projected to reduce from 0.5 per cent of GDP in 2022–23 to 0.4 per cent of GDP at the end of the long term. In this Report, state and territory contributions to the NDIS are assumed to grow at 4 per cent per year. This technical assumption extends the current growth rate in state contributions in bilateral agreements between the Australian and state and territory governments.

Key trends and drivers

The NDIS commenced 1 July 2013 and reached full national roll-out in 2020. As a demand-driven Scheme, growth in participant numbers and increases in support package prices and scope are the key drivers of growth.

The size and scope of the NDIS is larger than expected when the Scheme commenced. There were 610,502 participants in the Scheme as at 30 June 2023. This is 49 per cent more than the original Productivity Commission estimate of 411,000 participants at full roll-out in 2018–19. It is 33 per cent more than the updated estimate of around 460,000 participants in the 2013–14 Budget.

Part of this increase is due to higher-than-expected numbers of children joining the Scheme. There were 313,476 participants aged 18 years and under in the Scheme at 30 June 2023, representing over half of all Scheme participants. Children aged under seven years comprise 16 per cent of Scheme participants.

In recent years, average support package costs have also increased in price and scope. Between 2019–20 and 2022–23 average support package costs increased by 6 per cent per annum. These increases have exceeded economy-wide price and wage rises and reflect an increase in the breadth and volume of support received by NDIS participants over time.

Recent trends in the growth of both NDIS participants and average support package costs are a major contributor to changes in NDIS projections since the 2021 IGR. In 2023–24, the Scheme is currently projected to grow by 13.9 per cent – compared to 4.1 per cent growth – in the 2021 IGR. This growth means total NDIS expenditure in this Report is 0.3 percentage points of GDP higher than the 2021 IGR in 2023–24.

The 2023–24 Budget provided $732.9 million over four years to support the effective and sustainable operation of the Scheme. This funding will improve the operation of the Scheme. It will also help moderate growth over the forward estimates from 22.6 per cent in 2022–23 to 9.3 per cent in 2026–27. Additional moderation will be implemented under the Framework to achieve growth of no more than 8 per cent by 1 July 2026.

Projections

The fiscal projections extend the 2023∗24 Budget projections. Consistent with the Framework, the projections reflect annual growth for NDIS participant expenses of no more than 8 per cent by 1 July 2026 and assume moderation in growth as the Scheme matures.

The Scheme is assumed to reach maturity in 2043∗44. Implicit in Scheme maturity is that the processes of ageing in the Scheme by older Australians who joined before age 65 is largely complete, population-wide participation rates have stabilised and the breadth of supports provided in packages has stabilised. The timing of maturity is uncertain and the implications of this are discussed further in Box 7.2.

Once the Scheme reaches maturity, it is projected to grow in line with nominal GDP. Nominal GDP is the relevant projection benchmark for growth in a mature Scheme. At Scheme maturity, NDIS participants are expected to grow in line with overall population growth and average support package costs would rise in line with broad-based wage and price rises. These are the major components of nominal GDP, with an assumption that broad-based productivity growth will flow through to wages in this sector over time.

This approach is broadly consistent with the 2021 IGR, but with a later date of Scheme maturity. Scheme maturity is assumed around 10 years later and growth rates remain higher until 2042–43. Due to higher growth from 2021 to 2023 increasing the baseline and the assumed later date of Scheme maturity, Scheme expenditure remains above the 2021 IGR throughout the projection period.

Total Australian Government spending on the NDIS is projected to grow from 0.9 per cent of GDP in 2022–23 to 1.8 per cent by 2033–34. It is projected to be 2.1 per cent of GDP at maturity in 2043–44 and remain stable until 2062–63 (Chart 7.9).

State government contributions are projected to be 0.4 per cent of GDP from 2029–30. State contributions fall as a proportion of total Scheme costs from 32.9 per cent in 2022–23 to around 14.6 per cent in 2062–63. This reflects a technical assumption that state government contributions continue to grow at a fixed rate of 4 per cent per year. The Australian Government's share of spending is expected to grow from 67.1 per cent in 2022*23 to around 85.4 per cent in 2062*63 (Chart 7.9).

Box 7.2 describes scenarios for future NDIS projections with earlier and later dates of Scheme maturity.

Chart 7.9   Total government NDIS spending by Australian and state government contributions
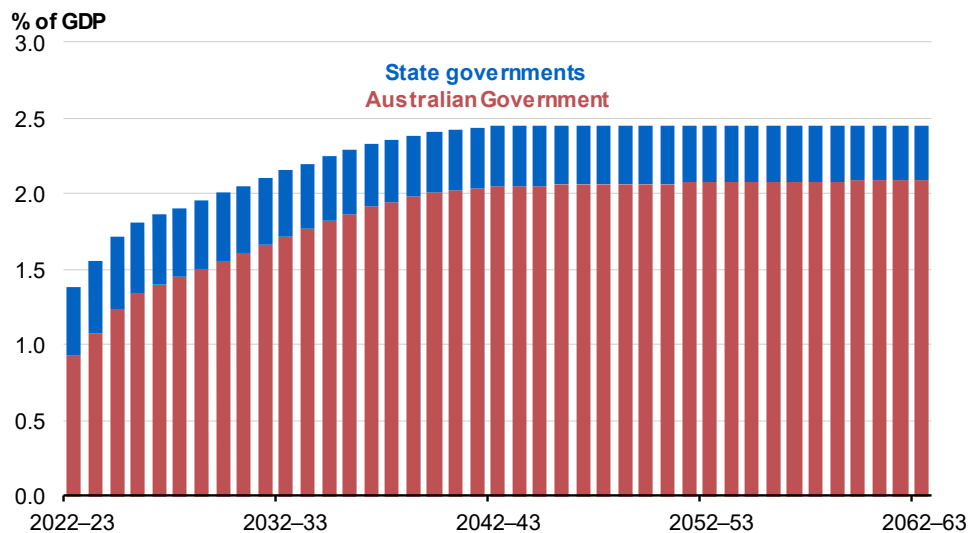
Note: Total government spending includes participant support costs for reasonable and necessary supports by the Australian Government and state and territory governments. NDIS spending is on a fiscal balance basis in this chart (consistent with the presentation in the Social Services Portfolio Budget Statement). The Australian Government and state and territory government contributions as a share of GDP may not add to total Scheme expenses because of rounding.

Source: Treasury.

Box 7.2   Trajectory to a mature NDIS

A sustainable growth trajectory for the NDIS ensures that support can continue to be provided to participants. The date of Scheme maturity and the size the Scheme will reach in coming decades is uncertain. These outcomes will depend on policy settings and factors such as Scheme take-up, the costs of each package of support, and changing support needs as participants age in the Scheme.

Chart 7.10 illustrates alternative scenarios for Scheme maturity and a comparison to the 2021 IGR. The scenarios show the impact of uncertainty in when and how quickly the Scheme matures on the potential size and scope of the NDIS over the projection period.

Chart 7.10 Total government NDIS expenditure as a share of GDP
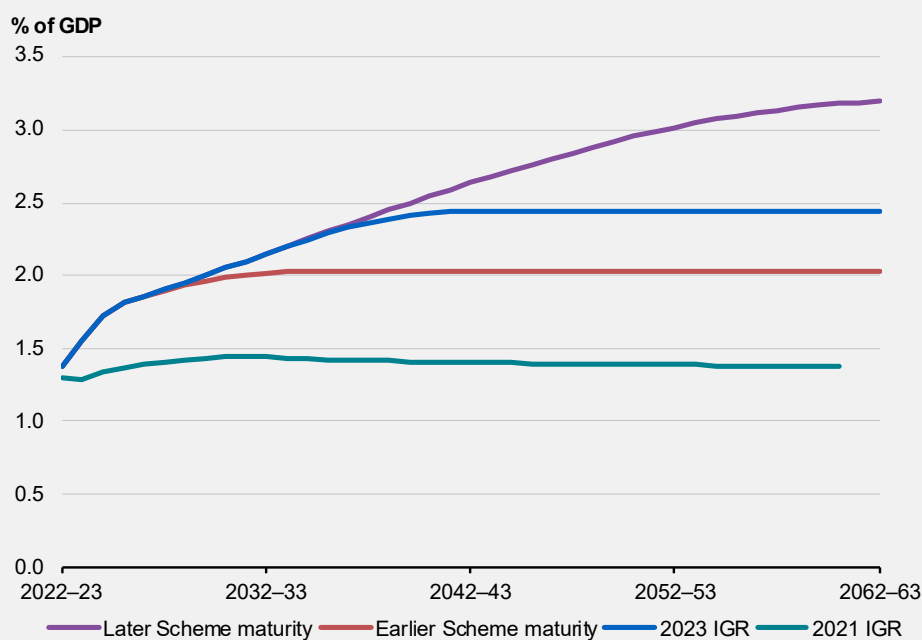
Note: Total government spending includes participant costs for reasonable and necessary supports by the Australian Government and state and territory governments. NDIS spending is on a fiscal balance basis (consistent with the presentation in the Social Services Portfolio Budget Statement).

Source: Treasury.

Total spending on the NDIS in the 2021 IGR was assumed to peak at 1.4 per cent of GDP. In the 2023 IGR, Scheme maturity is expected to occur later with growth remaining above nominal GDP through the medium term. Later Scheme maturity in this IGR means the Scheme is larger as a percent of GDP at maturity.

The earlier Scheme maturity scenario illustrates Scheme expenditure if growth moderates to nominal GDP from 2034–35, reflecting an earlier maturing of the Scheme relative to the baseline. In this scenario total NDIS expenditure increases and stabilises at 2.0 per cent of GDP compared with 2.4 per cent of GDP in the baseline. The Australian Government's contribution would reach 1.7 per cent of GDP. Under this scenario, debt would be around two-fifths lower in 2062–63 at 19 per cent of GDP (Chart 7.11 and Chart 7.12).

Chart 7.11 Impact on UCB
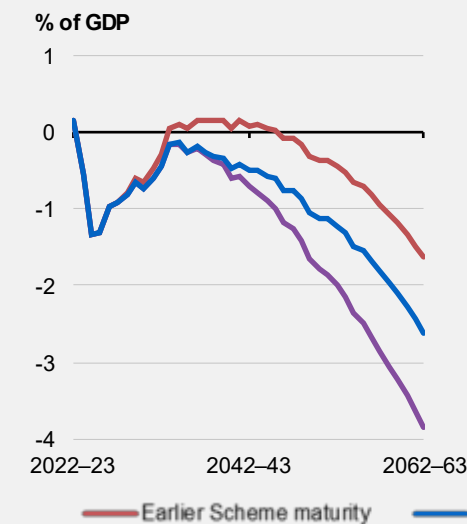
Chart 7.12 Impact on gross debt
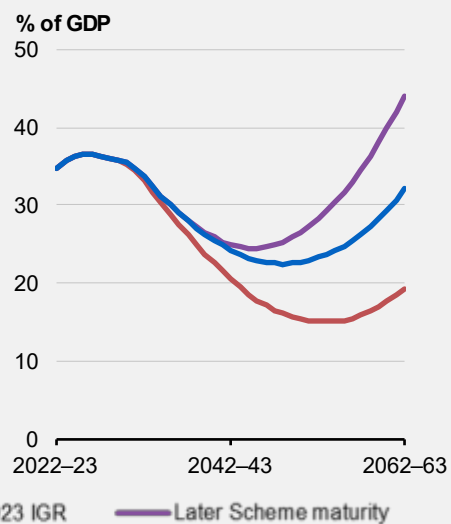
Source: Treasury.

The later Scheme maturity scenario illustrates expenditure if growth moderates more slowly, and the Scheme approaches maturity towards the end of the IGR projection period. In this scenario, it is assumed growth moderates at a rate of 0.1 percentage points per annum from 2029–30 to 2062–63. At this rate, Scheme growth remains above nominal GDP growth and reaches maturity just beyond the IGR projection period. In this scenario total NDIS expenditure reaches 3.2 per cent of GDP by 2062–63. The Australian Government's contribution would reach 2.8 per cent of GDP. Higher Australian Government expenditure means that debt would be around two-fifths higher in 2062–63 at 44 per cent of GDP.

Policy responses

A sustainable growth trajectory for the NDIS is critical for its long-term viability, so that it can continue to provide life-changing outcomes for current and future generations of people with disability. The Government will work with the disability community and states and territories to implement initiatives announced in the 2023–24 Budget, including the Framework for financial sustainability, and ensure every dollar goes to support those for whom the Scheme was intended. Box 7.3 illustrates NDIS Scheme growth in the absence of the Framework.

An independent review of the NDIS is underway to improve the design, operations and sustainability of the Scheme. A final report will be provided to Disability Reform Ministers in October 2023.

Australia's Disability Strategy outlines a more inclusive and accessible society where all people with disability can fulfil their potential as equal members of the community. The strategy endeavours to improve outcomes for people with disability. The Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability will report to the Government by September 2023. This report is expected to inform national disability policy and important services to people with disability.

Box 7.3   The NDIS Financial Sustainability Framework

NDIS projections in this Report incorporate the commitment of National Cabinet to the NDIS Financial Sustainability Framework. This Framework will ensure the NDIS continues to provide life-changing outcomes for current and future generations of Australians with disability and that every dollar goes to improving the lives of the participants the Scheme was established for.

The 2021 IGR projected Australian Government NDIS payments would be 1 per cent of GDP in 2060–61. In this report, the baseline projection for Australian Government NDIS payments is 1 percentage point of GDP higher in 2062–63. Under the later Scheme maturity scenario, projected payments would be a further 0.7 percentage points of GDP higher.

It is uncertain when Scheme growth would moderate without the Framework. Assuming no supply constraints, one projected scenario could be that Australian Government NDIS payments could be an additional 3.5 percentage points of GDP higher again in 2062–63. This illustrative scenario for no Framework could involve Australian Government NDIS payments growing to 6.3 per cent of GDP in 2062–63, higher than projections of Australian Government spending on health (Chart 7.13).

Chart 7.13 Comparison of major Australian Government payments 2062–63 with NDIS scenarios
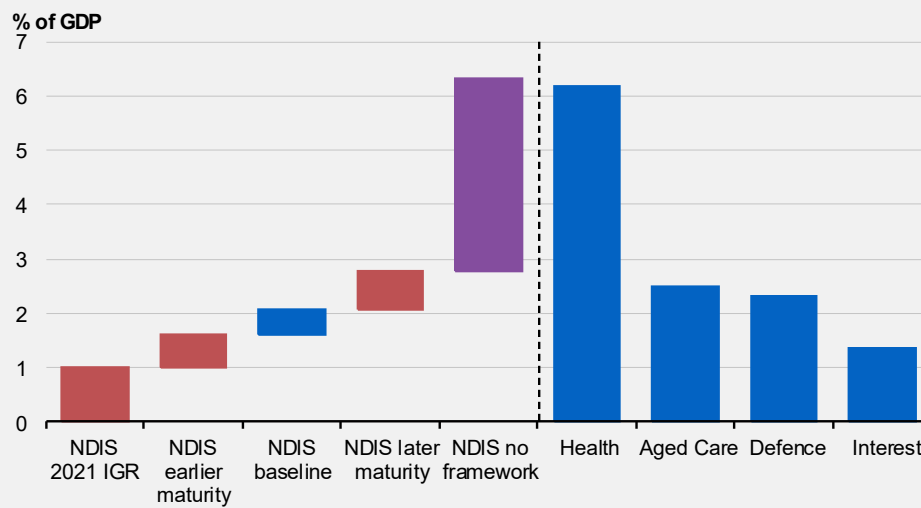
Note: NDIS payments are participant costs for reasonable and necessary supports by the Australian Government on an underlying cash balance basis and excludes the state and territory government contribution for comparison with other Australian Government payment categories. Australian Government NDIS payments in the 2021 IGR are for 2060∗61. NDIS No framework illustrates NDIS projections without the Financial Sustainability Framework committed to by National Cabinet. The scenario removes the reduction in spending growth of $60 billion between 2026–27 and 2033–34 announced in the 2023–24 Budget. It assumes growth in total participant expenses will moderate by 0.1 percentage points a year from 2034–35 to 2062∗63 and assumes no constraints in the supply of services.

Source: Treasury.

7.3   Aged care

The aged care system provides subsidised support and care to older Australians. Most Australians who reach old age will need aged care services. The Australian Government provides funding for residential aged care and a range of community care– including home care – services.

The major aged care services subsidised by the Australian Government include:

- entry-level home support services through the Commonwealth Home Support Programme

- comprehensive home-based care through Home Care Packages, and

- residential aged care services that provide 24-hour care and accommodation for older people who are unable to continue living in their own home.

Australian Government spending on aged care is projected to grow. Growth in spending on residential aged care is the main contributor to the increase, although spending on community care is also projected to rise significantly.

A growing and older population is the primary driver of aged care spending over the next 40 years. It accounts for around 70 per cent of the projected increase in real spending on aged care per person. Additional future demand for aged care will require funding approaches that support a fair and equitable aged care system.

Key trends and drivers

The key driver of Australian Government aged care spending is the number of people aged over 80. This age group is the major user of aged care services. The number of people aged 80 and over is expected to triple over the next 40 years, to more than 3.5 million people by 2062–63. This will exert considerable pressure on aged care spending.

Other factors that can impact future government aged care spending include:

- changes in the average cost of providing care, for example price or wage changes

- incidence of frailty, disease and disability within the population of care recipients

- changes in government policy, including the level and composition of subsidised services, regulatory settings, and the share of cost across governments and households, and

- changing preferences of older Australians, including ageing in the home rather than in residential care.

The projections of aged care spending are a function of the average real cost per person for a given time of care. For a given age cohort, the real cost is assumed to increase in line with non-demographic growth reflecting quality improvements, increasing frailty and wage pressures, counterbalanced by productivity improvements in the sector.

Projections

Australian Government spending on aged care is projected to increase as a proportion of GDP from 1.1 per cent in 2022–23 to around 2.5 per cent in 2062–63 (Chart 7.14). This is caused mainly by projected increases in spending on residential care, in line with the growth in the number of people aged 80 and over. The bulk of the growth in costs as a proportion of GDP and per person occurs in the latter part of the projection period, where the population ageing is most pronounced (Chart 7.15 and Chart 7.16).

The projections for aged care payments rely on a number of assumptions. These include the age distribution of the population, how many older Australians use home care and residential care, the ages people enter the aged care system and the period they spend using aged care services, and how costs may vary over the longer term relative to historical trends. Changes in any of these will affect the projection of aged care payments. More detail on the projections is included in Appendix A3.

Chart 7.14 Composition of Government aged care spending
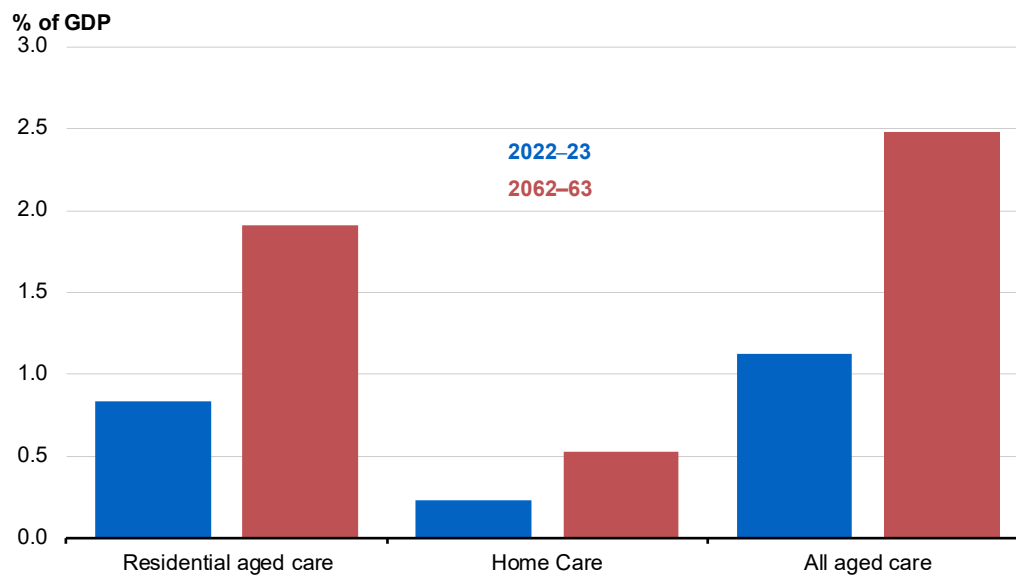
Note: Residential aged care and home care are projected over the longer term based on ratio estimates based on historical data.

Source: Treasury.

Chart 7.15 Australian Government aged care spending as a share of GDP
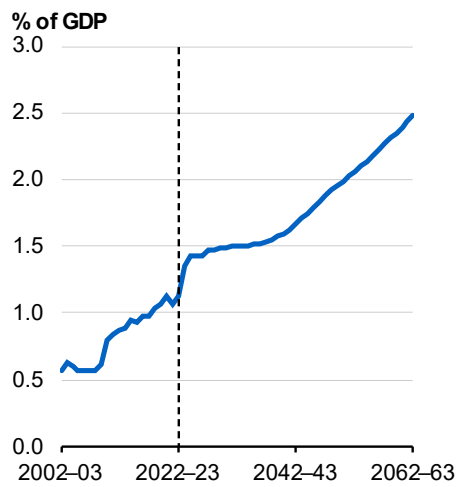
Chart 7.16 Real Australian Government aged care spending per person

% of GDP
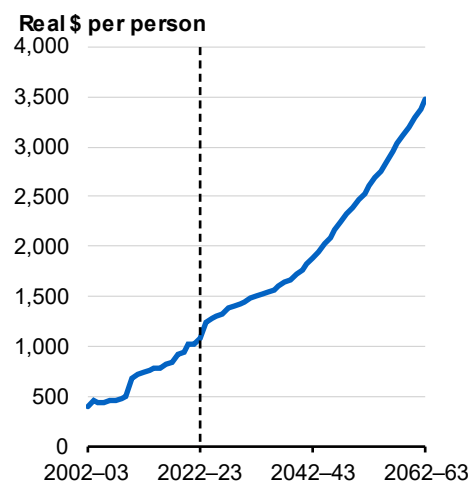
Real $ per person

Note: Real dollars per person refers to 2022–23 prices.

Source: Treasury.

7.4 National security and regional stability

As a relatively small and open economy, national security, regional stability, resilient supply chains and our international relationships, are critical for Australia's prosperity in times of increasing geopolitical uncertainty. The Australian Government is responsible for Australia's foreign policy, national security and contributing to stability in our region.

The Government is funding investment in our key relationships and our diplomacy, delivery of navy, army, air and intelligence capabilities; support for Australian military operations overseas; and strategic policy advice for the defence of Australia and its national interests. The Government is funding the Department of Foreign Affairs and Trade to better enable Australia's global network to shape the region and advance our interests, including by lifting the capability of our foreign service, and by countering disinformation. Funding for defence (excluding operations) in 2022–23 is expected to be 2.0 per cent of GDP, with pressure for national security funding expected to increase in the medium to long term. The Government is making investments to improve the resilience of supply chains, including through the National Reconstruction Fund and investments in strategic and critical sectors, while growing and diversifying Australia's industrial base.

Key trends and drivers

The global strategic environment has deteriorated sharply over the past decade. The Indo-Pacific faces a challenging strategic outlook, amid the largest military build-up in the post-war era. The use of coercive statecraft has become the centre of geostrategic competition. The international rules and norms that have underpinned Australia's security and prosperity are under increasing pressure. Russia's invasion of Ukraine, and rising geostrategic competition, has sharpened global tensions and disrupted the global economy.

Expenditure on diplomacy and defence across the region and globally is expected to trend upwards across major economies, with significant implications for the cost of military capability and the shape of national economies as they recover from COVID-19.

Australian national security funding pressures will rise in the medium to long term, consistent with the Government's commitment to increase defence funding above 2 per cent of GDP.

Funding for Australian statecraft – including diplomacy, development assistance, and economic engagement instruments– will help leverage opportunities, enhance relationships and promote regional stability across Southeast Asia and the Pacific.

Projections

The Government is investing more in our national security, with spending on defence (excluding operations) expected to increase from around 2.0 per cent of GDP in 2022–23 to around 2.3 per cent of GDP in 2032–33 (Chart 7.17), its highest share of GDP since around the end of the Cold War[iii]. This increase reflects the Government's commitment to implementing the Defence Strategic Review (DSR) to ensure Australia is positioned to respond under these complex strategic circumstances. Defence spending is then assumed to remain steady at 2.3 per cent of GDP from 2033–34 to the end of the projection period.

Chart 7.17 Defence spending as a share of GDP
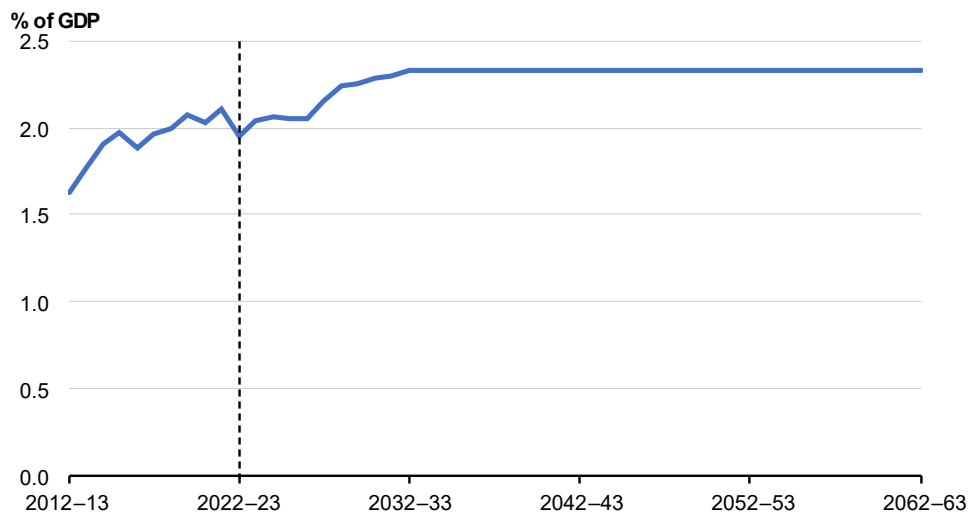
Source: Treasury.

Defence for an uncertain future

The window of opportunity to deal with potential threats is narrowing as the pace of military modernisation in the Indo-Pacific region accelerates.

In a fiscally constrained environment, the Government will need to prioritise which national security measures best meet security needs to effectively respond in these challenging strategic circumstances.

The DSR outlined an ambitious reform agenda for the Australian Defence Force's posture and structure to strengthen national security and ensure readiness for future challenges.

Deepening Australia's relationships with trusted partners and enhancing defence capabilities to better work with our allies requires substantial Government investment.

AUKUS will deliver significant long-term strategic benefits for Australia and the region. While these efforts will strengthen the combined industrial capacity of the three AUKUS partners, they also present significant fiscal, technological, and workforce challenges.

Developing national resilience is an additional pressure on Government funding separate to funding for defence. Protecting Australian business, information and trade will require industry and governments to adapt and collaborate in responding to existing and emerging vulnerabilities in cyber, supply chains and technology.

Challenges and opportunities

The military and technological modernisation in the Indo-Pacific is unprecedented. Technological advances present opportunities for intelligence innovation and increased military capabilities. However, to capitalise on these advances we will need to focus on innovation and the development of capabilities that can be achieved while ensuring value for money investments.

National security workforce challenges will also increase. The limited availability of sufficiently vetted and skilled personnel will put additional pressure on agencies.

Closer diplomatic and defence ties with regional partners can foster closer economic relations. AUKUS presents a chance for transformational change across Australia's economy. This includes building more resilient supply chains, growing the manufacturing base and enhancing domestic technological innovation.

Policy response

Maintaining stability in the Indo-Pacific region through diplomacy, development assistance, trade and building defence capability remains Australia's primary strategic objective framing national security funding. These investments will continue to reinforce internationally agreed rules and norms and build on existing mechanisms to settle international disputes.

Integrating all available tools of national power – economic, diplomatic, industrial, intelligence, cyber and military – will encourage greater flexibility and burden sharing across the national security community and strengthen its capacity to respond to new and emerging threats.

Demographic change and workforce constraints will limit recruitment and retention across the intelligence community, the Australian Defence Force and defence industry, particularly in shipbuilding. Management of these supply pressures will include the development of innovative skills matching and recruitment practices and will be explored further in the Government's Employment White Paper.

7.5   Retirement income system

Australia's retirement income system has three pillars: the compulsory Superannuation Guarantee; Age Pension; and voluntary savings, which include voluntary superannuation contributions, housing and other assets.

The Australian Government has a direct role in the retirement income system. It mandates the Superannuation Guarantee, provides tax concessions for superannuation contributions and earnings, and funds the Age Pension. The Government also supports older Australians by subsidising health and aged care and providing other supplementary payments such as Commonwealth Rent Assistance.

Most older Australians will rely on all three pillars for income during their retirement. The Age Pension currently supports most Australians in retirement. Almost 70 per cent of people over Age Pension age received some form of Australian Government pension or other income support payment in 2022‑23. It will continue to provide a safety net into the future for those who do not have the financial means to support a minimum standard of living in retirement. As the superannuation system matures, a greater share of superannuation assets will be held by retirees who will draw down on this capital to fund their retirement. The Age Pension will increasingly supplement retirement income to assist retirees in maintaining their standard of living.

Key trends and drivers

Superannuation

Superannuation helps Australians save for retirement through compulsory savings (the Superannuation Guarantee) and the opportunity to make voluntary superannuation contributions. Significant tax concessions provide incentives to save for retirement and allow for greater growth of those savings.

The superannuation system is maturing, with around 17 million Australians collectively owning around $3.5 trillion in superannuation assets (Box 7.4). By the mid-2040s most people retiring will have been receiving the Superannuation Guarantee at 9 per cent or more for the duration of their working lives. The superannuation system provides an important pool of assets to fund retirement income and represents an important source of capital in the economy, contributing to the strength of financial markets through capital deepening.

An ageing population and maturing superannuation system will see more Australians in the retirement phase and receiving income from superannuation. Future retirees will have higher superannuation balances because they received the Superannuation Guarantee for a longer portion of their careers and at a higher rate. In addition, they will benefit from greater investment earnings compounding over a longer period.

As balances increase, superannuation will become the primary source of retirement income for many future retirees. Drawdownsfrom superannuation are estimated to increase over time from around 2.4 per cent of GDP in 2022–23 to 5.6 per cent of GDP in 2062–63 (Chart 7.18). The proportion of people with accounts in the retirement phase, from which they are drawing a superannuation pension, will increase11 percentage points (from 8 per cent in 2022–23 to 19 per cent in 2062–63). By comparison the proportion of the population over 65 will increase byonly 6 percentage points (from 17 per cent to 23 per cent).

The development of funds' strategies to assist their members in maximising retirement income, managing longevity risk required and providing access to capital under the Retirement Income Covenant and the increasing proportion of members in the retirement phase is expected to impact patterns of how superannuation is drawn down in retirement over time.

Chart 7.18 Flows of superannuation monies
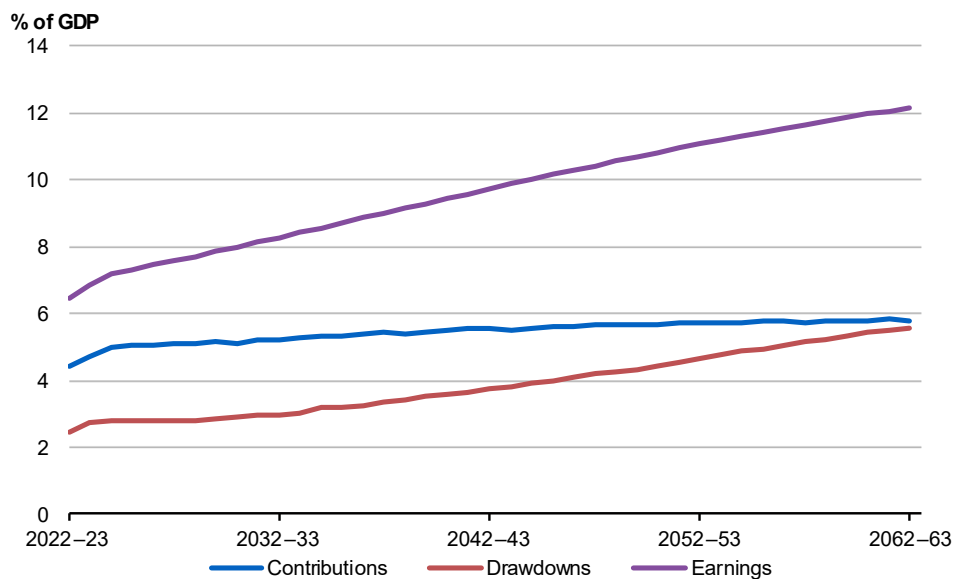
Note: Earnings are net of fees and superannuation fund tax. Contributions are net of superannuation fund tax.
Source: Treasury.

Box 7.4   Size of the superannuation system

Total superannuation assets are expected to continue to grow strongly over the next 40 years. The ongoing increase in the Superannuation Guarantee rate to 12 per cent from July 2025 means the system should continue to see strong growth for several decades. Australia currently has the fourth largest pool of retirement assets in the world, with total superannuation balances projected to grow from 116 per cent of GDP in 2022–23 to around 218 per cent of GDP by 2062–63 (Chart 7.19).

Chart 7.19   Total superannuation balances
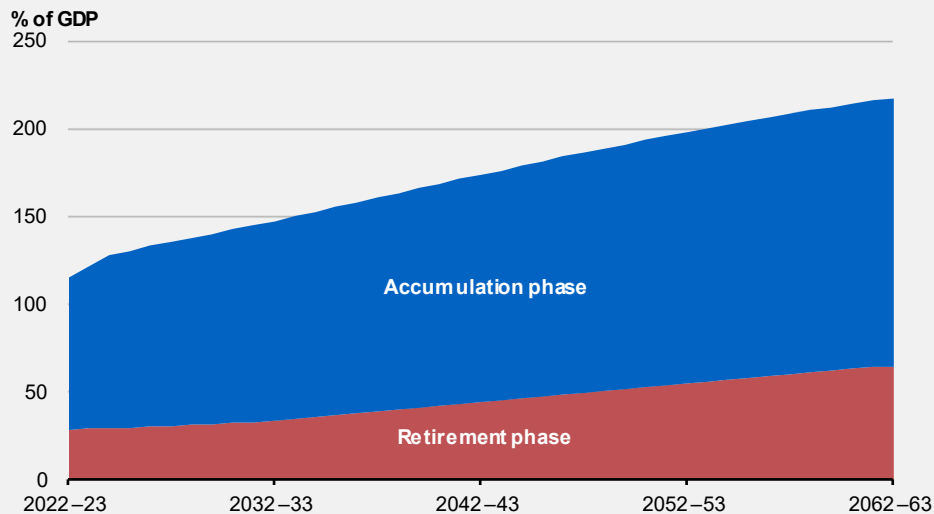
Note: Chart is a projection of total member balances that will not exactly match total superannuation funds under management.

Source: Treasury.

This large stock of assets will be a sustained driver of growth in national savings. Maximising the benefits of these savings requires strong performance within the superannuation system and continued access to high-quality investment opportunities.

Superannuation can also support the long-term capacity of the economy – including by leveraging investment in areas where the best financial interests of members align with national economic priorities. Greater scale can benefit funds' access to investment opportunities and lower costs but can add complexity to coordinating a larger asset pool and requires diligent stewardship.

Age and Service Pensions

The Age Pension, in the decades following its introduction, covered around 30 to 35 per cent of the eligible population. This began increasing after the Second World War when changes to means testing arrangements expanded its coverage It briefly peaked at almost 80 per cent in the late 1970s. Around 64 per cent of Australians over the eligibility age received the Age Pension in 2022–23, and nearly 70 per cent received some form of Australian Government pension or other income support payment (including Disability Support Pension, Carers Payment and Service Pension recipients over 66½ years old).

The total number of Australians of Age Pension age and over is expected to roughly double to around nine million by 2062–63. However, a smaller proportion of those will receive an Australian Government pension or other income support payment, declining by around 15 percentage points by 2062–63 (Chart 7.20). This reflects a shift towards superannuation as a key source of retirement income and the role of the Superannuation Guarantee in reducing reliance on the Age Pension. Of those older Australians who receive a pension, the shift towards more people receiving a part rate pension will continue and is projected to rise from 40 per cent currently to 60 per cent in 2062*63.

Chart 7.20 Persons of Age Pension age or over, by pension category
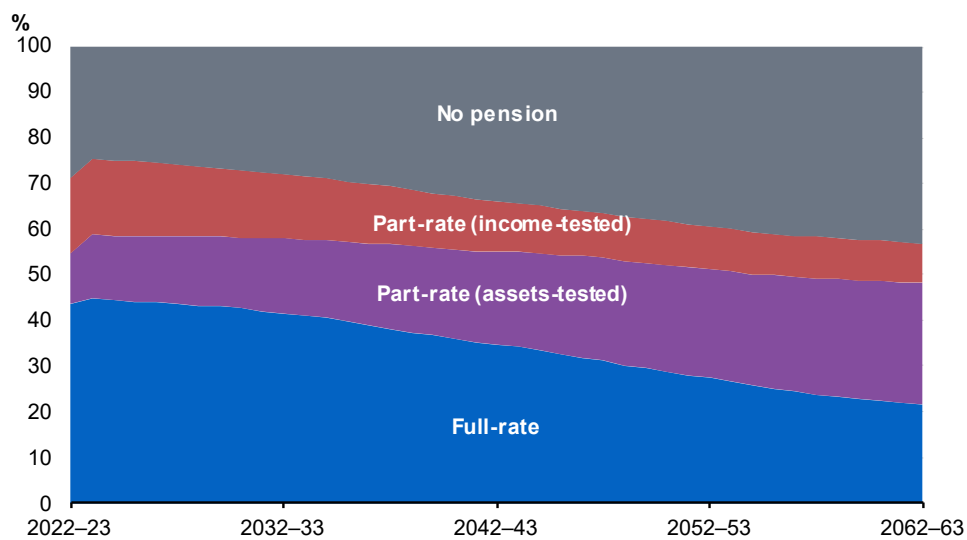
Note: The increase in 2023–24 is due to the Age Pension eligibility age increasing from 66.5 to 67 years old, which affects the measure of 'person of Age Pension age'.

Source: Treasury.

Voluntary savings

The largest asset held by Australian households has historically been the family home In 2019–20 it made up 37 per cent of net household wealth, followed by superannuation at 22 per cent.[iv] High rates of home ownership have historically been an important component of retirement outcomes for Australians. Those who own their home generally have lower housing costs in retirement compared with renters, as well as a store of wealth that can be drawn on in retirement. Changing trends in home ownership rates and in mortgage indebtedness present a fiscal risk to Age Pension spending in the future and may impact patterns of how superannuation is drawn down

Projections

The aggregate cost of the retirement income system has been measured by combining total Australian Government pension spending for those over the Age Pension age with the revenue forgone from the two main superannuation tax expenditures: concessions on contributions and earnings.

The total projected annual cost of Australia's retirement income system is expected to remain relatively steady over the next 40 years, at around 4.0 to 4.5 per cent of GDP, despite population ageing. The rise in total projected costs of tax concessions is driven by earnings tax concessions from the increased stock of funds, offset by a fall in projected spending on the Age Pension (Chart 7.21). These costs are very different in nature Age Pension costs support current retirees, while a significant proportion of superannuation tax concessions are costs incurred to support future generations of retirees.

Chart 7.21 Fiscal impact of the retirement income system
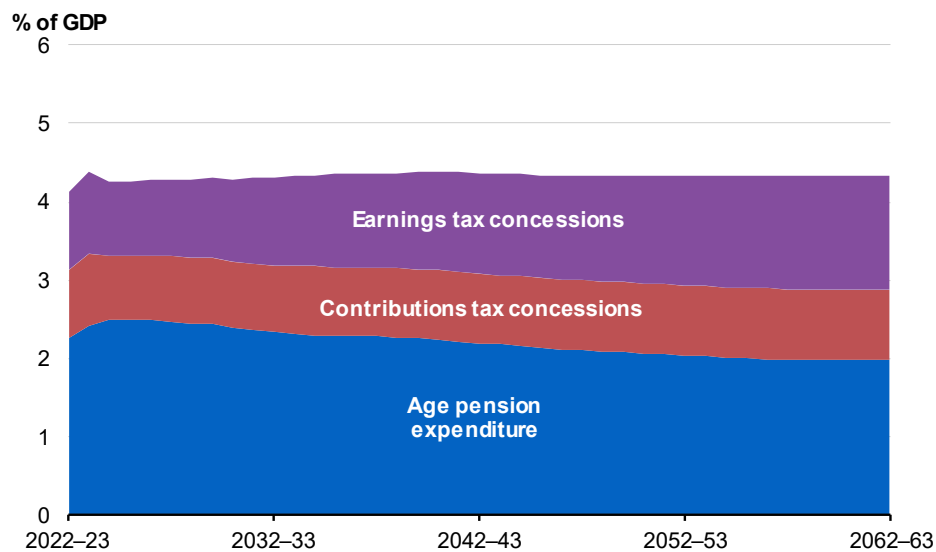
% of GDP

Note: Includes Service Pensioners. Further information is in Appendix A3.

Source: Treasury.

Age Pension expenditure

Spending on Australian Government Age and Service Pensions is projected to fall from around 2.3 per cent of GDP in 2022–23 to 2.0 per cent of GDP in 2062–63. The Age Pension is among the Australian Government's largest spending programs, and this trend will contribute significantly to the sustainability of the budget. The spending decline will occur despite Australia's ageing population and the almost doubling of the number of people over Age Pension age by 2062–63. The decline reflects a shift towards superannuation as a key source of retirement income and means testing of the Age Pension to target to those most in need. The change in Age Pension spending will also be impacted by economic parameters, as pension payments are indexed to prices and wage growth.

In contrast, long-term projections show that on average public pension spending is expected to grow by 1.4 per cent of GDP across most OECD countries from 2018 to 2020 by 2050.[v]

Superannuation tax concessions

The cost of superannuation tax concessions, or tax expenditures, represents forgone tax revenue for the Government. Superannuation tax concessions are measured by comparing the superannuation fund taxation rate – 15 per cent – to a benchmark tax treatment, giving an estimate of the revenue forgone. The appropriate benchmark is a matter of judgement and different benchmarks may be reasonably used depending on the context (Appendix A3 provides further information).

Superannuation tax concessions as a proportion of GDP are projected to increase from around 1.9 per cent in 2022–23 to 2.4 per cent in 2062–63. It is projected to overtake Age Pension expenditure in the 2040s. The increase is driven primarily by earnings tax concessions rising from around 1.0 per cent of GDP in 2022–23 to 1.5 per cent of GDP in 2062–63.

The Government's recently announced Better Targeted Superannuation Concessions measure improves sustainability of the superannuation system through a stable reduction in total superannuation tax concessions over the projection period. From 2025–26, earnings on superannuation balances above $3 million will attract a concessional headline tax rate of 30 per cent, rather than 15 per cent. This measure complements reforms to superannuation over the past decade that have reduced the ability for people to make post-tax contributions.

Projected contributions concessions (such as employer contributions and voluntary pre-tax contributions) are linked to total employee wages. Hence they are driven by the same factors that drive Australia's GDP: wage growth and the size of the workforce. Once compulsory contributions reach the ongoing rate of 12 per cent on 1 July 2025, contributions concessions are projected to remain steady as a proportion of GDP over the period to 2062–63. In contrast, earnings tax concessions projections are dependent on the growth of the superannuation system and the rates of return on these assets. As both are assumed to exceed GDP growth, earnings concessions are projected to increase in the long term.

Challenges and policy response

Going forward, costs associated with the retirement income system are expected to remain constant relative to GDP. Past reforms such as the gradual increase in the Age Pension eligibility age and changes to the Age Pension means testing have improved fiscal sustainability. However, trends in life expectancy and home ownership could present risks to sustainability.

Home ownership

High rates of home ownership have historically played an important role in supporting retirement outcomes for Australians. However, home ownership rates have been falling for several decades for those of pre-retirement age (Chart 7.22). The decline in homeownership is most significant for younger age groups. Home ownership fell by 18 percentage points from 1981 to 2021 for those aged between 30 and 34, and 17 percentage points for those aged 25 to 29. Asmaller decline in home ownership rates has occurred among those approaching retirement age– falling by nearly 3 percentage points between 1981 and 2021 for those aged between 60 and 64.

These trends present a fiscal risk to Age Pension spending in the future and may impact patterns of how superannuation is drawn down However, we are yet to see the long-term impact of recent government policies designed to support more people into home ownership.

Chart 7.22   Home ownership rates over past 40 years by age
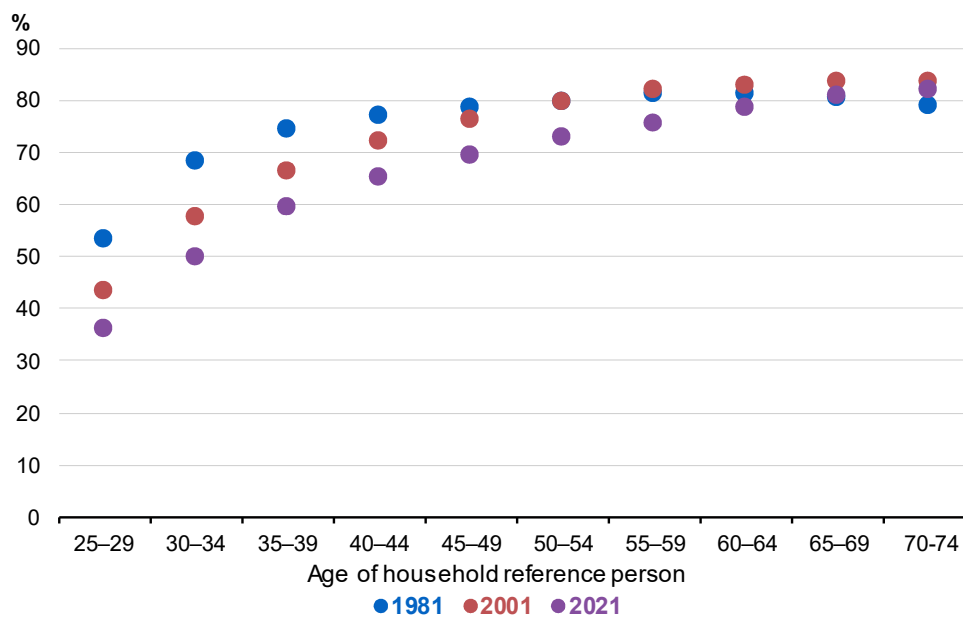
Note: Analysis was done at the household level. Analysis excludes Census responses where the answer was not stated. Data points show the home ownership rates in 1981, 2001 and 2021, with the gap indicating the percentage point difference.

Source: Treasury, AIHW analysis of customised ABS Census data (1981∗2021).

Life expectancy

Life expectancy for retirees is expected to continue to increase over the next 40 years. However, uncertainty over how much it will increase creates risks for the budget and makes it difficult for retirees to plan for retirement, potentially impairing their standard of living. Longevity risk – the risk of outliving savings – is a key concern for retirees in deciding how to draw down their superannuation, consequently, most retirees draw down at the legislated minimum drawdown rates.[vi] This results in many retirees leaving a significant proportion of their balance unspent, for example, a single retiree drawing down at the minimum rates would be expected to still have a quarter of their retirement assets at death.

In addition, the combination of an ageing population and rising demand for quality care services will drive higher demand for health and aged care services. As people live longer, with more years of both full and ill health, they are more likely to increase their use of health services or need aged care.

Most people rely on the Government for protection against longevity risk through the Age Pension, which provides a safety net for retirees who outlive their savings. Well-designed superannuation retirement products can assist retirees to make decisions to help smooth consumption over retirement – aligning income needs with expenditure needs – and draw down on their balances efficiently. This would also enable decision making early in retirement.

Gender

The gender gap in superannuation balances is expected to persist reflecting the lower lifetime earnings of women because of greater part-time and casual work, time out of the paid workforce and the gender pay gap. In 2020–21, the average super balance for women is $150,000 compared to $190,000 for men.

The workforce participation rate gap has narrowed significantly over the past 40 years. This will help to improve superannuation outcomes for women currently at the start of their working life.[52] Recent policies, such as increases to the Child Care Subsidy have been targeted at boosting women's participation in paid work.

Women historically have a longer retirement to fund due to earlier retirement and longer life expectancy. This puts further pressure on women's superannuation balances. This gap in the retirement period is expected to reduce as men's life expectancy deficit, relative to women, reduces. Beyond superannuation balances, the gender income gap in retirement

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52   By example, a 65-year-old woman approaching retirement in 2023, was 34 in 1992. In 1992, the participation rate for women aged 30 to 34 was 63 per cent; in 2022 it had increased to 80 per cent. At the same time, the proportion of similarly aged women employed in full-time work (vs part-time) also rose over this period, increasing from 50 to 62 per cent of women in the labour force. This higher labour force participation and the higher proportion of full-time work will flow through to balances over the next 40 years.

is smaller compared to working life. The Age Pension will remain important as the gender gap in superannuation balances persists.

7.6   Income support and family assistance payments

The Australian Government provides social security to people and families who require assistance.[53] Income support payments assist people who are temporarily unable to support themselves through work, or whose capacity to work is impacted by disability or caring responsibilities. Family payments are designed to assist with the costs of raising children. Most payments are indexed to Consumer Price Index (CPI) to help maintain their relative purchasing power.

Income support and assistance to families (excluding the Age Pension) totalled around $78.8 billion in 2022–23. Of this, the two largest components were the Disability Support Pension and Family Tax Benefit Parts A and B, with expenditure of $19.4 billion and $16.9 billion respectively.

While the cost of total income support and family assistance payments are projected to grow over the projection period in real per capita terms, consistent with the 2021 IGR, the GDP share of these payments is collectively expected to decline. This is because many of these payments are indexed to CPI, which is projected to grow slower than GDP. Total spending as a proportion of GDP on income support payments (excluding age-related pensions) is expected to decrease from 2022–23 to 2062–63, reflecting the indexation arrangements for these payments and changes in the broader population profile. Within these payments, some are expected to increase as a share of GDP, including Disability Support Pension and Carer Payment, and others are expected to decline, including Family Tax Benefit, JobSeeker Payment and the Child Care Subsidy.

Key trends and drivers

Income support and family assistance payments are sensitive to population and demographic changes, including changes to the size of the working age population. The total cost of payments is influenced in the short term by prevailing economic conditions including inflation, wage growth and unemployment. In the longer term, payments are also influenced by broader structural changes in the Australian economy, such as changes in the labour force participation rate due to population ageing.

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53   Income support payments include Job Seeker, Youth Allowance, Austudy, Parenting Payment (Single), Parenting Payment (Partnered), Disability Support Pension, and Carer Payment. Family assistance payments include the Child Care Subsidy and Family Tax Benefit. Paid Parental Leave is also available to assist eligible working parents take time off work to care for an infant or newly adopted child.

The costs in dollar terms of income support and assistance to families increase over the projection period, largely because of payment indexation and growing numbers of recipients driven by a higher population. Income support payments are projected to increase by $263 billion over the next 40 years to reach $312 billion in 2062–63. Family assistance payments are projected to increase by $84 billion over the next 40 years to reach $115 billion in 2063.

While the value of these payments will increase, their share of GDP will decline. These payments are expected to decline as a share of the economy from 31 per cent of GDP in 2022–23 to 2.7 per cent of GDP by 2062–63. This reflects GDP being projected to grow faster than CPI (to which many payments are indexed in part or in full)

The age distribution of those receiving income support payments is changing. An increasingly older cohort is expected to be in receipt of the Disability Support Pension, JobSeeker Payment and Carer Payment by the end of the projection period. For example, women aged 45 to 67 (the age pension eligibility age) are projected to comprise around 14 per cent of the population in 2062∗63, but account for 37 per cent of JobSeeker Payment recipients.[54] These income support payments play an important role in providing targeted support for those who do not have the capacity to fully support themselves through paid work due to barriers such as poor health, disability, caring responsibilities or age discrimination.

In the 2023∗24 Budget, the Government committed to a $40 per fortnight increase to the base rate of payment for the JobSeeker Payment, Youth Allowance, Parenting Payment (Partnered), Austudy, ABSTUDY, Disability Support Pension (Youth) and Special Benefit This will benefit around 1.1 million recipients. The Government also extended eligibility for the higher rate of JobSeeker Payment to single Australians aged 55 to 59 who have been on payment for nine or more continuous months, to match that applying to those aged 60 and over. Eligibility for Parenting Payment (Single) was also expanded to include single principal carers whose youngest child is under 14 years of age (up from under eight years of age). These changes will apply from 20 September 2023.

The Government is committed to ensuring the right balance of settings to encourage workforce participation, including mutual obligations and payment parameters such as rates or income test settings. The Government's Employment White Paper will further consider barriers to participation.

Income Support

Income support payments are targeted so payments are best suited to different people depending on their circumstances. The Government supports people who have a limited capacity to work due to a disability or unpaid caring responsibilities.

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54   This reflects the increasing labour force participation among older women. As the population ages, this means a larger number of older Australians are recipients of these payments.

The Government also supports job seekers who are unable to support themselves while looking for work, including looking for additional hours of employment, or who have a temporary injury or incapacity. These payments are means tested to target payments to those most in need and are typically dependent on meeting mutual obligations (specific tasks and activities to help recipients find a job) to encourage labour force participation.

The main income support payments are the Disability Support Pension, JobSeeker Payment, Parenting Payment Single and Partnered, Carer Payment and Youth Allowance (Chart 7.23). Collectively, income support payments are projected to increase from 1.9 per cent of GDP in 2022–23 to 2.0 per cent of GDP in 2062–63.

Chart 7.23 Composition of Australian Government income support payments
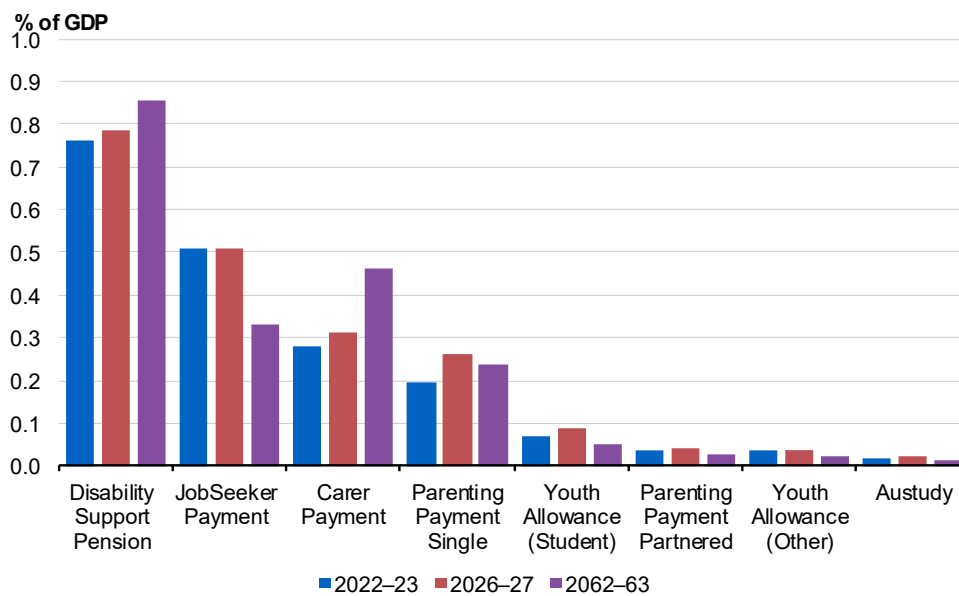
Source: Treasury.

The largest positive increase to income support payments between 2022–23 and 2062–63 is the Carer Payment. It is expected to grow by around 0.2 percentage points of GDP over the period. The Disability Support Pension is also projected to increase by around 0.1 percentage points of GDP over the same period. This reflects a larger number of recipients as the population ages.

Other payments are expected to decline as a share of GDP between 2022∗23 and 2062∗63, including the JobSeeker Payment, Parenting Payment Partnered, Youth Allowance, and Austudy. The slower growth of cohorts using these payments means that the share of the population in study, having children and seeking work is expected to decline, reducing calls on these payments as a share of GDP.

Most income support payments are indexed to CPI.[55] Consistent with the 2021 IGR, over time these payments decline as a share of GDP, as GDP is projected to grow faster than CPI.

Assistance to families

Assistance to families includes the Family Tax Benefit, Paid Parental Leave and the Child Care Subsidy. The Family Tax Benefit is designed to assist low and middle income families with the costs of raising dependent children. The Government funded Paid Parental Leave scheme supports parents to take time out from paid employment to care for a child and remain connected to the workforce following the birth or adoption of a child. The Child Care Subsidy helps families access early childhood education and care through reducing the out-of-pocket cost of early education and care fees.

Consistent with the 2021 IGR, spending on assistance to families is projected to fall from 1.2 per cent of GDP in 2022–23 to 0.7 per cent in 2062–63. Demographic change is a key driver of the reduction in spending on family assistance. The proportion of the population aged less than 15 is projected to fall from 18 per cent in 2022–23 to 15 per cent in 2062–63.

The Child Care Subsidy is projected to increase from 0.41 per cent of GDP in 2022–23 to 0.51 per cent in 2026–27, but to then fall to 0.32 per cent in 2062–63 (Chart 7.24). The projected increase to 2026–27 funding is due to increased Government investment in the early childhood education and care sector as a result of the Government's Cheaper Child Care reforms and slower near-term GDP growth. Child Care Subsidy payments fall as a share of GDP over the longer term as the share of children in the population declines and expenditure per child grows more slowly than GDP.

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55 Disability Support Pension and Carer Payment are indexed according to whichever scores highest out of the CPI and the Pension and Beneficiary Living Cost Index (PBLCI). They are then also benchmarked against Male Total Average Weekly Earnings (MTAWE) to ensure the payments reflect changes in wages. Parenting Payment (Single) is adjusted in line with CPI movements in the same way as JobSeeker Payment but is also benchmarked to 25 per cent of MTAWE.

Family Tax Benefit is projected to fall from 0.66 per cent of GDP in 2022∗23 to 0.32 per cent of GDP in 2062∗63. Paid Parental Leave is projected to fall from 0.11 per cent of GDP in 2022∗23 to 0.09 per cent of GDP in 2062∗63 (Chart 7.24). These changes are due to GDP growing faster than relevant child populations and falling eligibility caused by household incomes growing faster than Family Tax Benefit and Paid Parental Leave income thresholds.

Chart 7.24 Composition of Australian Government assistance to families
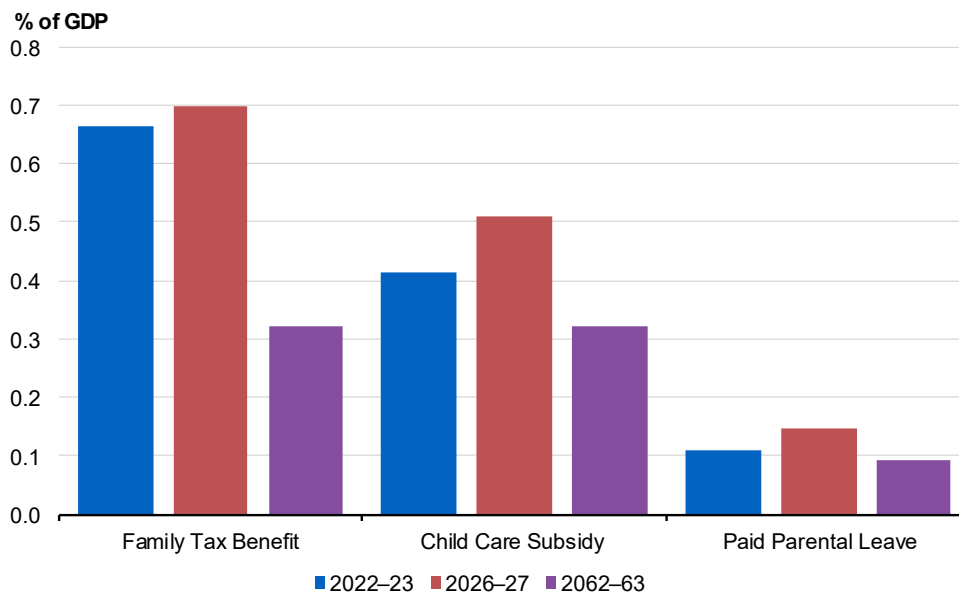
Source: Treasury.

Projections

Income support and family assistance payments are projected to increase from
3.1 per cent of GDP in 2022∗23 to 3.4 per cent in 2026∗27, before declining to
2.7 per cent by 2062–63. Across the total Australian population, real spending per person
on these payments is projected to increase steadily from around $3,000 in 2022–23 to
around $3,800 in 2062–63 (Chart 7.25 and Chart 7.26).

Chart 7.25 Australian Government social security spending as a share of GDP
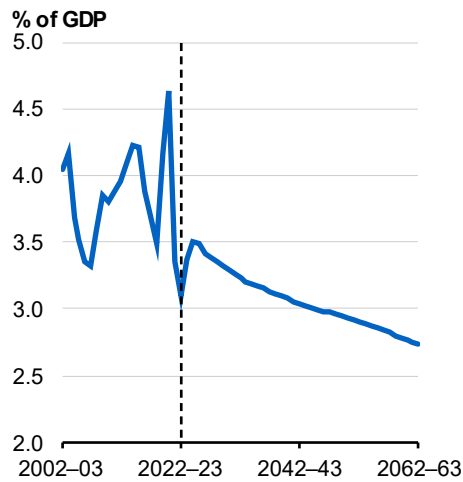
Chart 7.26 Real Australian Government social security spending per person
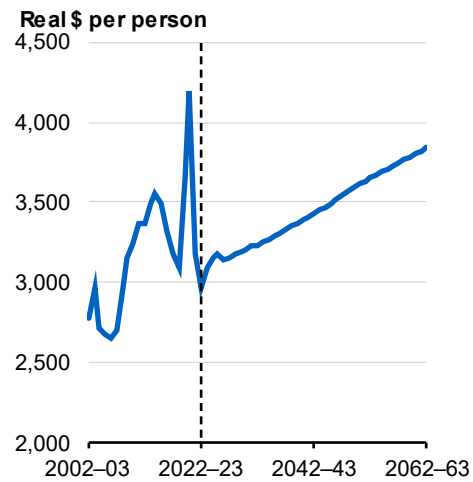
Note: Excludes Age Pension (Section 7.5); Real dollars per person refers to 2022–23 prices.

Source: Treasury.

7.7   Education and training

The Australian Government provides funding for the delivery of education and training services. These services comprise early childhood education and care (child care and preschool), schools, vocational education and training (VET) and higher education.[56] Provision of these services builds human capital, which improves productivity, labour market outcomes and social opportunity.

An increasing body of evidence demonstrates the importance of high-quality early childhood education supporting child development and lifelong outcomes, especially for those from disadvantaged and vulnerable backgrounds. Early childhood education and care generally refers to education and care provided to children aged from zero to school age. It is delivered in a range of settings including preschools (delivered by states and territories), and approved providers offering centre-based day care, family day care, outside school hours care or in-home care. Outside school hours care is delivered to older, school-aged children, before or after school.

States and territories deliver preschool typically in the year before primary school, providing children with a more structured preparation for school.

The Australian Government contributes funding for preschool to the states and territories on a per student basis through the Preschool Reform Funding Agreement. This supports delivery of 15 hours of preschool a week, or 600 hours a year, for all children in the year before they start school. Some jurisdictions are expanding this to deliver 'three-year-old preschool' in the year prior to this. The Australian Government and states and territories have agreed to pursue an ambitious reform agenda. New bilateral preschool targets and the implementation of a preschool outcomes measure will aim to lift preschool attendance to extend its benefits to more children.

The Government is spending around 1.1 per cent of GDP on schools in 2022–23. The proportion is slightly higher by the end of the forward estimates.

The Government provides funding to support school education in accordance with the *Australian Education Act 2013*.[vii] Under these arrangements, the Government funds a minimum of 20 per cent of the Schooling Resource Standard (SRS) for government schools and 80 per cent of the SRS for non-government schools in 2023. Funding is delivered through states under the current National School Reform Agreement (NSRA) and related bilateral agreements with each jurisdiction. The bilateral agreements set out minimum state and territory funding contribution requirements as a condition of receiving Australian Government school funding. They also provide specific reform actions, including activities to support priority student cohorts. The Review to inform

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56   For the purposes of this report, early childhood education and care will be split between child care and preschool, noting significant overlap between the two. Preschool education is partly funded by the Child Care Subsidy (discussed in Section 7.6 Income support and family assistance payments) and through funding agreements between the Commonwealth and the states and territories. Due to this complexity, preschool funding is not explicitly modelled in this Report.

a Better and Fairer Education System will inform what reform priorities will be tied to funding under the next National Schools Reform Agreement.

The Australian Government is the main provider of funding for higher education. This is delivered through the Commonwealth Grant Scheme which subsidises tuition costs, research block grants which support higher education research and research training, and a range of smaller supporting and enabling programs. The Government also provides financial assistance to students through the Higher Education Loan Program (HELP), which removes up-front cost barriers to higher education. Around 25 per cent of total education payments related to higher education in 2022–23. This share is stable at the end of the forward estimates period but increases over the longer term.

The Australian Government and state and territory governments provide funding for the VET system. The Government provides block funding to the states via national partnership agreements to support their training systems, including funding for fee-free TAFE and vocational education places from January 2023. In addition, the Government directly supports some VET activities, including apprenticeship support services and subsidies, foundation skills and VET Student Loans. Around 15 per cent of total education payments related to vocational education in 2022–23.

Increasingly, the Australian labour market has demanded higher skilled and adaptable workers. A key part of ensuring these skills needs are met is a comprehensive approach to lifelong learning. The Government is exploring options to elevate lifelong learning through its Employment White Paper and the Universities Accord. It is also working with VET, Higher Education providers and employers to reduce barriers to adult education and training.

Key trends and drivers

Key factors influencing education projections are the number of young people, the proportion of young people participating in education, and the type of education they undertake.

The proportion of the population aged under five years has decreased from 7.7 per cent in 1979–80 to an estimated 5.8 per cent in 2022–23. However, actual numbers have risen from 1.1 million to an estimated 1.5 million. By 2062–63, the proportion of the population aged under five years is projected to decrease to 5.1 per cent, with the actual number of people in this age group projected to reach 21 million.

Rates of preschool enrolment remained consistent between 2016 and 2021, decreasing by 1.3 per cent between 2021 and 2022.[viii]

Nationally in 2022, 99.2 per cent of First Nations children in the year-before-school age cohort were enrolled in a preschool program (Closing the Gap Outcome Area 3). This is an increase from 76.7 per cent in 2016.[ix]

More than four million students were enrolled in primary and secondary schools across Australia in 2022, an increase of 0.3 per cent compared with 2021.

- Primary school student enrolments dropped slightly (0.9 per cent), while secondary school enrolments increased (1.8 per cent).[57]

- Over the five years to 2022, total student enrolments (years Foundation[58] to 12) increased by 3.8 per cent. Independent schools recorded the largest increase (12.5 per cent), followed by Catholic schools (3.9 per cent) and government schools (1.9 per cent).[x]

- Across Australia it is mandatory that all children participate in schooling (or an approved equivalent) until they complete year 10. The apparent retention rate of students from the start of secondary school through to year 10 is above 97 per cent, including for First Nations students.

- While population growth has driven increases in school enrolments, there has been a gradual decrease in apparent retention rates over the last five years (apparent retention rates measure the proportion of a year group (or cohort) that is still enrolled after one or more calendar years).

- In 2022, the apparent retention rate from year 10 to year 12 was 79.0 per cent, down from a peak of 83.3 per cent in 2017. The rate was 73.5 per cent for government schools and 87.2 per cent in non-government schools. These apparent retention rates are affected by several factors including students moving between government and non-government schools after year 10.

School attendance rates for years 1 to 10 have been slightly but steadily decreasing since 2015, with a significant drop in 2022. The attendance rate was 86.5 per cent in 2022 compared to 92.4 per cent in 2017 and 92.6 per cent in 2015. Education Ministers have commissioned the Australian Education Research Organisation to investigate the causes of declining attendance and provide advice on evidence-based approaches that support attendance.

First Nations school attendance rates (both primary and secondary) have seen a minor, but steady, decline since 2015, with a significant drop between 2021 and 2022, from 79.4 per cent attendance to 74.5 per cent.[xi]

During the pandemic many First Nations students who would ordinarily attend boarding schools opted to remain closer to home, impacted by border closures, school shutdowns and greater vulnerability to COVID-19.[xii]

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57   In 2022, all remaining South Australian schools completed the transition to Year 7 as the starting grade of secondary schooling.

58   Foundation refers to pre-Year 1. The name for this differs across jurisdictions, for example in Victoria it is called Preparatory and in South Australia it is called Reception.

The number of domestic undergraduate students commencing and continuing higher education increased every year from 2011 to 2021, except for a small decrease in 2019. However, the rate of increase in student numbers has slowed in recent years, reflecting several policy changes to Commonwealth Grant Scheme funding. This includes an end to the demand-driven system in 2017 and a funding freeze in 2018 and 2019. The freeze in Government funding was lifted from 2020 and combined with stronger demand during the COVID-19 pandemic, domestic undergraduate student numbers again increased in 2021.

For VET, the number of young men and women in government-funded training has gradually fallen since 2012. The fall has primarily been driven by a decrease in the number of participating students aged 19 or under, which in part reflects more young people attending university. The number of students aged 20 to 24 years in government-funded training remained relatively stable over the same period. There was an increase in student and apprentice numbers from 2020 reflecting short-term financial incentives as policy responses to COVID-19, including through the Boosting Apprenticeship Commencements and JobTrainer programs.

Employment in occupations requiring the highest level of skills (bachelor's degree or higher) has increased from 15 per cent of total employment in the mid-1960s to above 30 per cent in 2023. In addition, Jobs and Skills Australia projects that more than half of new jobs will require the highest level of skills by 2026, and a further 40 per cent of new jobs will require a VET qualification (Certificate II through to Advanced Diploma) A more skilled and educated workforce boosts human capital which can benefit the economy by leading to productivity improvements. Because of this, it is also likely to increase demand for investment in education and training over time. Such forecasts of future demand are not modelled in the projections.

Intergenerational Report 2023 | Part II: The budget over the next 40 years

Projections

Australian Government spending on education and training is projected to increase in absolute and real per capita terms over the next 40 years. However spending is projected to decrease as a share of GDP from 1.7 per cent of GDP in 2022–23 to 1.2 per cent of GDP in 2062–63 (Chart 7.27 and Chart 7.28).[59]

This reflects slowing population growth (including in those cohorts most likely to undertake schooling, education and training) and the impact of indexation (including CPI and wage cost indexes) that grows more slowly than nominal GDP. When projected against those aged from 4 to 65 – the cohort most likely to use education services – growth in real education payments per person grows almost 10 per cent over the projection period.

Chart 7.27 Australian Government spending on education and training as a share of GDP

Chart 7.28 Real Australian Government education and training spending per person
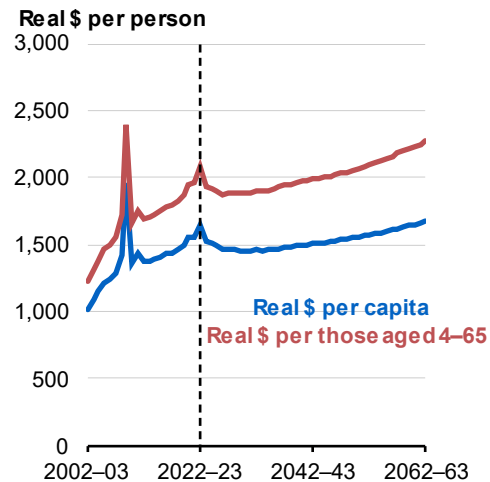
Note: Real dollars per person refers to 2022–23 prices. Note the decline in education payments in the years immediately following 2022–23 reflect the end of COVID-19 supports, including Boosting Apprenticeship Commencements wage subsidy and JobTrainer —and return real payments per capita to a level in line with the previous decade.

Source: Treasury.

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59   Note that this does not include the value of loans to higher education and VET students, which are counted on the balance sheet rather than a government payment (Chapter 9). By way of illustration, if the value of new loans each year were included in education and training payments, then the resulting total spending would be around 2.0 per cent of GDP in 2022–23 and 1.5 per cent of GDP in 2062–63.

The change in education spending from 2022–23 to 2026–27 reflects the end of short-term financial support measures during the COVID-19 pandemic, such as the Boosting Apprenticeship Commencements wage subsidy and JobTrainer fund. These measures were intended to be temporary, designed to keep students engaged in training and/or maintain the link between the apprentice and the employer during the pandemic

The Australian Government will provide an estimated total financial contribution to the states of $1.84 billion over 2022*25 under the Preschool Reform Agreement. The funding is estimated to increase marginally from year to year to 2025 In 2022, this funding represented 0.02 per cent of GDP. Arrangements from 2026 will be negotiated.

Preschool funding is included in this chapter in recognition of the importance of quality early education programs in the year before school on children's development and education outcomes. Discussion about additional Australian Government expenditure on early childhood education and care through the Child Care Subsidy program is provided in Section 7.6. While greater access to early childhood education and care will improve children's learning and development, wellbeing and success later in life, the payment is a direct income support payment and not categorised as Government spending for education.[xiii]

A range of initiatives will affect future education payments. These include a new Early Years Strategy, a renegotiated National Schools Reform Agreement, improvements to Higher Education though the Australian Universities Accord, and investing an additional $3.7 billion from 2024 in a new National Skills Agreement to further improve the VET sector. This will ensure that investments in education and training are well targeted to maximise economic and social benefits, while also being sustainable over the longer term.

7.8   Infrastructure

Infrastructure is important for supporting socio-economic development as the population grows. It enables economic and productivity growth by reducing congestion and allowing goods and people to move quickly and efficiently around the country and internationally. Infrastructure also facilitates social links and inclusion, connecting households with employment opportunities, health care services, education and community activities.

The Australian Government's Infrastructure Investment Program makes an important contribution to nationally significant land transport infrastructure projects and is the largest component of the Government's spending on transport infrastructure. However, Australian Government infrastructure spending is a small part of total government spending on infrastructure, with states and territories responsible for the majority of public infrastructure spending.

Key trends and drivers

Australian Government commitments to transport infrastructure expenditure have increased to historically high levels in recent years. The Australian Governments rolling 10-year land transport infrastructure pipeline has grown from $75 billion in the 2018–19 Budget (0.3 per cent of projected GDP) to around $120 billion at the May 2023–24 Budget (around 0.4 per cent of projected GDP). This is largely delivered through expenditure under the Infrastructure Investment Program, equity and loans, and other grants outside the Infrastructure Investment Program.

Total public sector road and rail expenditure has continued to grow in real terms to record levels.[xiv] This investment in new infrastructure has been driven by population growth, a greater volume of project activity and higher construction costs.

Australia's infrastructure needs and priorities will continue to evolve. Investment in utilities such as energy, telecommunications and digital infrastructure is expected to increase over the medium term. As will investment in port developments, housing and other forms of social infrastructure.

Projections

Infrastructure spending is not modelled over the long term. Instead, it is assumed to be at least 0.33 per cent of GDP through the medium term (consistent with medium-term Budget projections) and then held at that level through to the end of the projection period in 2062–63. This is consistent with the recent average historical expenditure for the Infrastructure Investment Program since 2013–14.

A range of initiatives will improve the quality and sustainability of long-term infrastructure spending. This includes a strategic review of the Infrastructure Investment Program and better planning and coordination with states and territories with advice from Infrastructure Australia. Embracing new technology to build infrastructure that is resilient to climate change and can manage congestion in Australia's growing cities will also provide long-term benefits. This will ensure that infrastructure investment will better meet the needs of Australians in future.

7.9   Other payments

Other payments include non-modelled payments, public sector superannuation and official development assistance. Non-modelled payments includes spending on all other areas not elsewhere included in this chapter, including environmental protection and conservation, national parks and world heritage area management, supporting First Nations people and communities, the arts and the film industry, and the Australian Public Service.[60] Payments that are not modelled are assumed to grow in line with GDP so are held as a constant share of GDP over the projection period Other payments are projected to decline as a share of GDP from 4.9 per cent of GDP in 2022–23 to 4.2 per cent of GDP in 2062–63. This decline partly reflects a reduction in unfunded public servant superannuation payments.

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60   Other payments do not include GST payments to states, state contributions to NDIS, interest on AGS or initiatives that are delivered through balance sheet items, including climate change initiatives. More detail is presented in Chapters 5 and 9.

Endnotes

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viii ABS, 'Preschool Education' Australian Bureau of Statistics (30 March 2023), https://www.abs.gov.au/statistics/people/education/preschool-education/latest-release, accessed 6 July 2023

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x   ABS, 'Schools' *ABS* (15 Feb. 2023), https://www.abs.gov.au/statistics/people/education/schools/latest-release, accessed 6 July 2023.

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xii Indigenous Education & Boarding Australia, 'COVID impact on 2022 Indigenous student enrolments – Survey Results' *Indigenous Education & Boarding Australia* (n.d), https://ieba.com.au/covid-impact-on-2022-indigenous-student-enrolments-survey-results/, accessed 6 July 2023.

xiii   OECD, 'Is Childcare Affordable? Policy Brief on Employment, Labour and Social Affairs',
         OECD (June 2020), 1,
         https://www.oecd.org/els/family/OECD-Is-Childcare-Affordable.pdf, accessed
         6 July 2023.

xiv   Department of Infrastructure, Transport, Regional Development, Communications and
         the Arts (Commonwealth of Australia), 'Australian Infrastructure and Transport
         Statistics – Yearbook 2022' (16 Dec. 2022), 67, 169.
         https://www.bitre.gov.au/publications/2022/australian-infrastructure-and-transport-st
         atistics-yearbook-2022, accessed 18 July 2023.

8   Revenue

Overview

Record low unemployment, a pickup in wage growth and strong commodity prices have seen tax receipts recover strongly after the COVID-19 pandemic. Tax receipts are projected to grow to 24.4 per cent of GDP over the medium term to 2033–34, consistent with the projections in the 2023–24 Budget. Tax-to-GDP is then assumed to remain at this level over the remainder of the 2023 Intergenerational Report (IGR) projection period to 2062–63.

Structural changes to the economy are projected to put pressure on the revenue base over the coming decades. Indirect sources of revenue are expected to decline as the decarbonisation of the transport industry and changing consumer preferences erode fuel and tobacco excise bases.

Changes to the structure of the economy over coming decades could also see other shifts in the composition of the tax base. Governments will need to make choices about how they respond to these shifts in the economy and tax bases while maintaining sustainable public finances and funding essential services

Non-tax receipts are projected to decline as a share of the economy over the long-term projection period. This reflects lower earnings from the Australian Government Future Fund (Future Fund) as assets are anticipated to be drawn down to fund public superannuation liabilities

Ensuring a sustainable tax system

An efficient, fair and sustainable tax system is vital to ensuring Australia can pay for the essential public services that will need to be delivered over the decades ahead.

Australian Government revenue is made up of tax receipts and non-tax receipts. Tax receipts are the largest source of revenue and were expected to make up 92.5 per cent of total receipts in 2022–23. This share is projected to rise to 93.9 per cent by 2062–63. Tax receipts are comprised of:

- income taxes, such as personal income tax and company income tax, and

- indirect taxes, including the goods and services tax (GST), excise and customs duties.

Tax projections in the 2023 IGR reflect the assumption that tax as a share of the economy remains constant at 24.4 per cent of GDP from the end of the medium-term projection period. This does not take into account policy decisions that may be taken by governments into the future. Technical assumptions that limit tax-to-GDP over long-term projection periods have been a feature of every intergenerational report. Without this assumption, taxes would rise significantly as a share of GDP over the projection period due to ongoing income and wages growth in the context of a progressive personal income tax system, which would not be realistic.

To ensure the tax system remains efficient, fair and sustainable, governments will need to respond to emerging issues and changes in the structure of the economy and the tax system over time. This may include tax reform, limiting growth in expenditure, and policies to support stronger economic growth, in order to fund Australia's essential services.

Structural changes in the economy will narrow the tax base

Tax receipts directly impact the underlying cash balance position and the sustainable level of goods and services the Government can fund.

Changing consumer preferences, rapid technological advances, global efforts to decarbonise and a more complex global strategic outlook are projected to reshape the economic environment over the next 40 years These broader economic trends will directly impact the tax system. For example, tax receipts from traditional sources such as fuel excise and tobacco excise are expected to decline over time (Box 8.1). Global demand for bulk commodities, and therefore reliance on them as a source of company tax revenue, is also expected to fall (Chapter 5). Personal income tax receipts are projected to increase due to income and wages growth and continued population growth consistent with the 2021 IGR.

Governments will need to make choices about the structure of the tax system to adapt in the face of this evolving landscape in order to pay for essential public services.

Box 8.1   Declining excise taxes leave a gap in the tax base

Indirect taxes (excluding GST) as a share of GDP are projected to decrease from 2.2 per cent in 2022–23 to 1.4 per cent in 2062–63, further extending the decline observed over the past 20 years. The decline reflects projected increases in the uptake of electric vehicles and a decline in per capita smoking rates (Chart 8.9).[61][62] However, the rate at which these indirect tax bases erode is highly uncertain.

To highlight the impact of this uncertainty on the outlook for the indirect tax base, Chart 8.1 illustrates potential further declines in fuel and tobacco excise. The steeper decline reflects the accelerated electric vehicle adoption scenario presented in Box 8.2, and smoking rates declining at an accelerated pace.[63] Under this scenario, the indirect tax share of GDP (excluding GST) is projected to decrease from 2.2 per cent in 2022–23 to 0.8 per cent in 2062–63.

Chart 8.1   Indirect tax receipts (excluding GST)

Source: Treasury.

2023 Intergenerational Report | Part II: The budget over the next 40 years
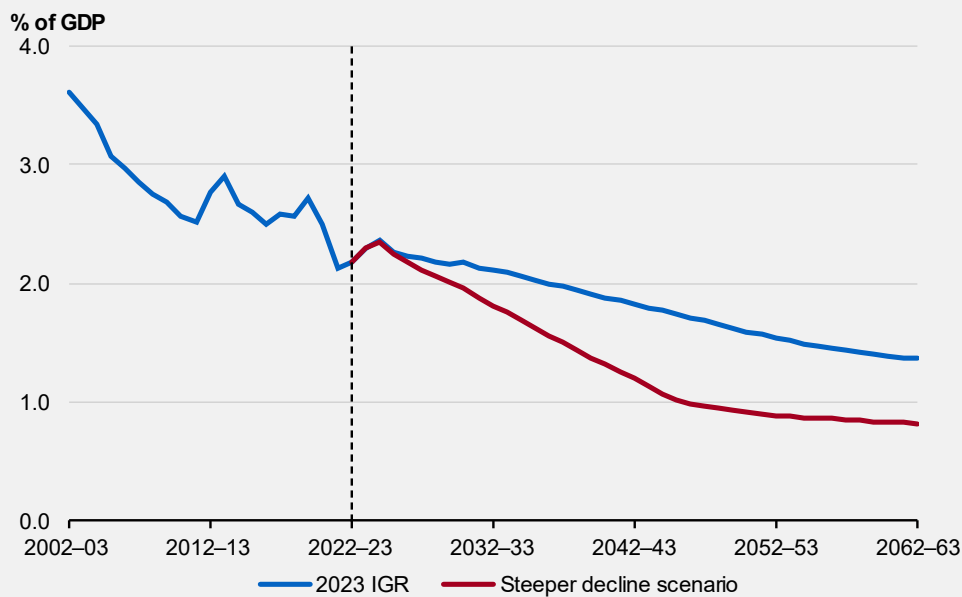
Total tax projections

Total tax receipts increase in the medium term

Total tax receipts as a share of the economy have recovered since the COVID-19 pandemic. After falling to a recent low of 21.8 per cent in 2019–20, the tax-to-GDP ratio is now forecast to reach 23.9 per cent in 2023–24, before declining to 23.3 per cent by 2026–27 at the end of the 2023–24 Budget forward estimates period (Chart 8.2). This decline is driven by lower personal income tax and company tax receipts as a share of GDP, in part due to lower assumed commodity prices.

Chart 8.2   Composition of Australian Government receipts
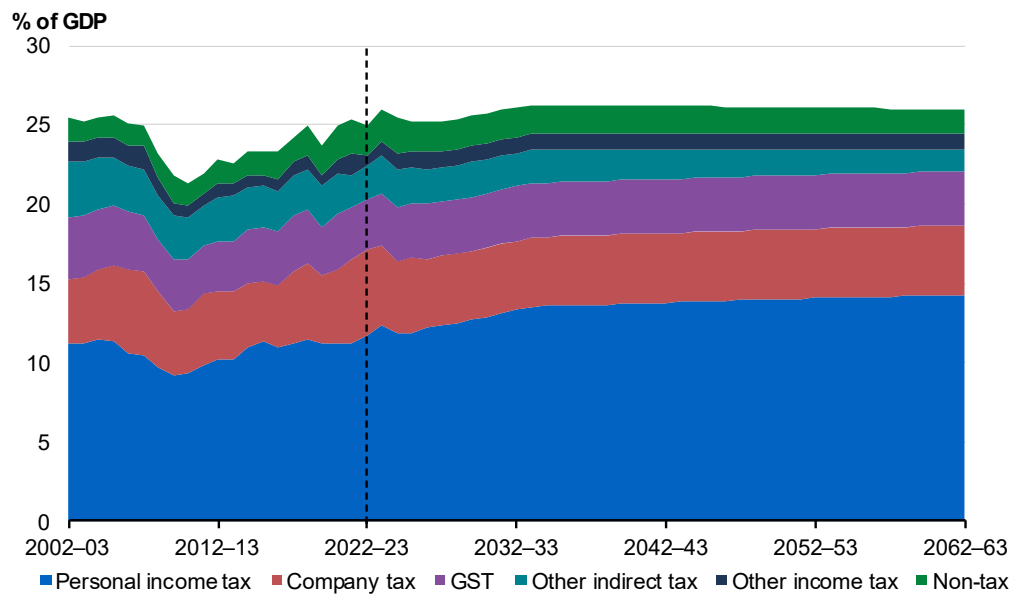
Source: Treasury.

The recent change in tax receipts as a share of GDP is consistent with the historical experience of tax receipts fluctuating with economic conditions. The tax-to-GDP ratio averaged around 23.9 per cent of GDP over the eight years to 2007–08 (the period following the introduction of the GST and prior to the global financial crisis) reaching

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61   Under the 2023 IGR scenario, electric vehicles are projected to increase from less than one per cent of the entire motor vehicle fleet in 2022–23 to 85 per cent by 2062–63 (Chart A5.1).

62   Tobacco consumption is assumed to be flat in aggregate terms.

63   Smoking initiation and cessation rates are projected to continue their trajectory downwards and upwards, respectively, in line with trends from the 2011–12 to 2020–21 ABS National Health Survey.

24.2 per cent of GDP in 2004–05 and 2005–06. Since 2007–08 the economy has been impacted by significant external shocks, including the global financial crisis and COVID-19 pandemic. This contributed to large volatility in tax receipts over that period. Since the recovery from the pandemic, elevated commodity prices and ongoing strength in the domestic labour market have resulted in higher tax receipts. By the end of the medium term in 2033–34, the tax-to-GDP ratio is projected to reach 24.4 per cent. These projections are consistent with the 2023–24 Budget estimates.

The level of taxation in Australia remains below the Organisation for Economic Co-operation and Development (OECD) average (Chart 8.3). A significant difference between Australia and most other OECD countries is that Australia's tax mix does not include Social Security Contributions (SSC). While compulsory superannuation contributions are similar in many respects to SSCs levied in other OECD countries, they are excluded from the definition of SSC as the benefits are owned and managed on behalf of the individual.

Chart 8.3   International comparison of total tax revenue – all levels of government
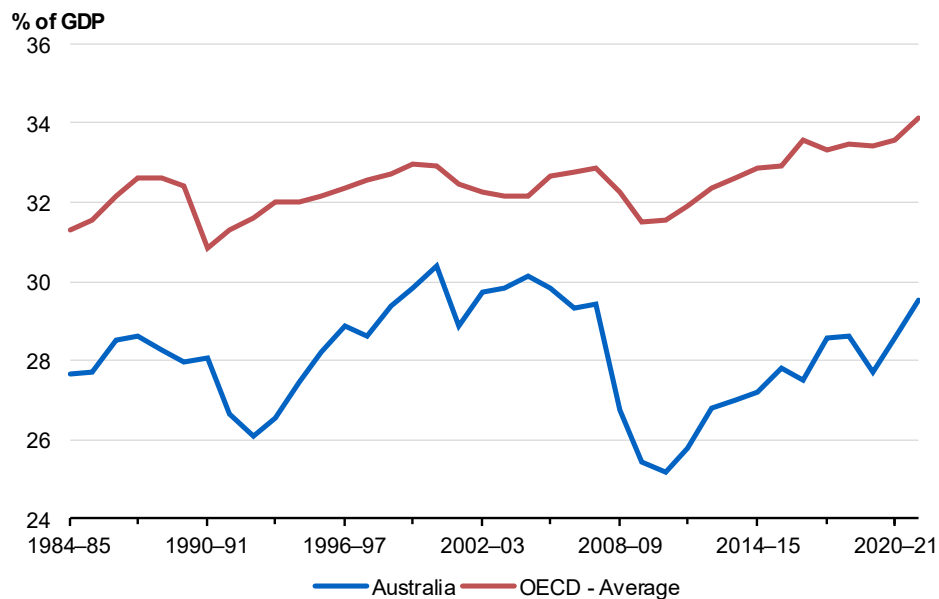
Note: State and local government taxes account for around 20 per cent of total Australian tax revenue on average, or around 5 to 6 per cent as a share of GDP.

Source: Treasury; OECD Revenue Statistics 2022.

Under the technical assumption of maintaining a long-run tax-to-GDP ratio of 24.4 per cent of GDP from 2033–34, increases in personal income tax, supported by

2023 Intergenerational Report | Part II: The budget over the next 40 years

income, wages and population growth, is limited to only offset the decline in indirect tax receipts. The assumption results in personal income tax increasing from 13.5 per cent of GDP in 2033–34 to 14.3 per cent of GDP in 2062–63. This is a technical assumption that does not take into account policy decisions that may be taken by governments into the future in response to the evolving economic circumstances.

The composition of taxes is projected to change

Longer-run trends in the economy will influence the composition of tax receipts. This includes increased take up of electric vehicles and reduced smoking rates, contributing to a decline of indirect taxes as a share of GDP. Governments will need to understand the potential implications of these trends on the efficiency, equity and sustainability of the tax system when considering what policy responses would be most appropriate

In the absence of policy change, personal income tax receipts are projected to grow from 50.5 per cent of total tax receipts in 2022–23 to 58.4 per cent in 2062–63. Company tax receipts are projected to fall from 23.5 per cent of total tax receipts in 2022–23 to 18.0 per cent by 2033–34, and remain at that share until 2062–63. GST receipts are expected to stay broadly level, moving from 13.9 per cent in 2022–23 to 14.0 per cent in 2062–63.

The share of total tax receipts from other indirect taxes (including excise) is projected to decline from 8.6 per cent in 2033–34 to 5.6 per cent in 2062–63 (Chart 8.4).

Chart 8.4   Composition of tax receipts
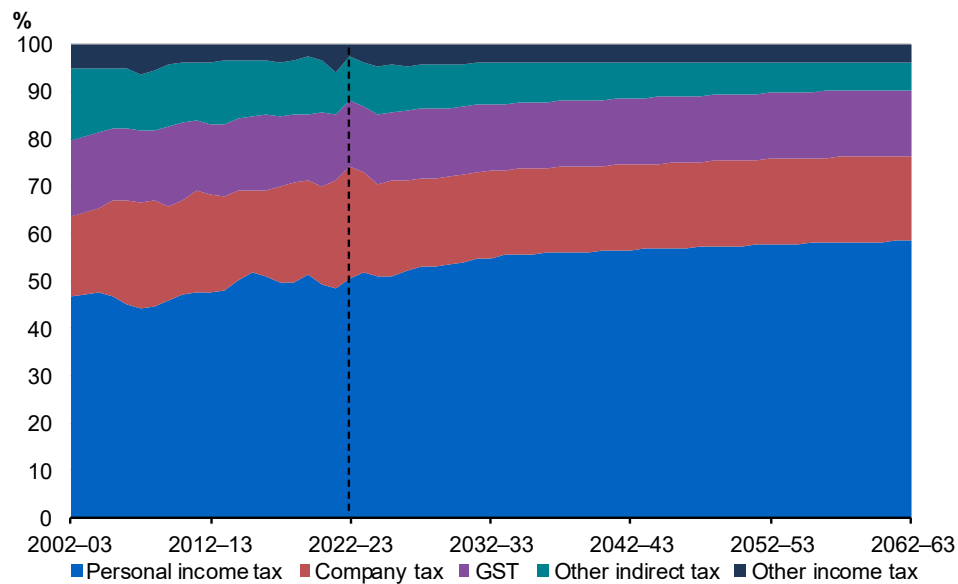
Source: Treasury.

8.1   Personal income tax

Personal income tax receipts were forecast to be 11.7 per cent of GDP in 2022–23. This is projected to increase to 13.5 per cent by 2033–34 (Chart 8.5).

Consistent with the 2021 IGR, personal income taxes are projected to grow as a share of GDP due to the progressive nature of personal income taxes and ongoing income and wages growth to be 14.3 per cent of GDP at the end of the projection period in 2062–63.

Increases in nominal wages result in increasing average personal tax rates over time as a higher proportion of an individual taxpayer's income is paid at the highest marginal tax bracket applicable to them. This phenomenon is often referred to as 'bracket creep'. Average personal tax rates fall when governments reduce personal income taxes.

Chart 8.5   Personal income tax receipts
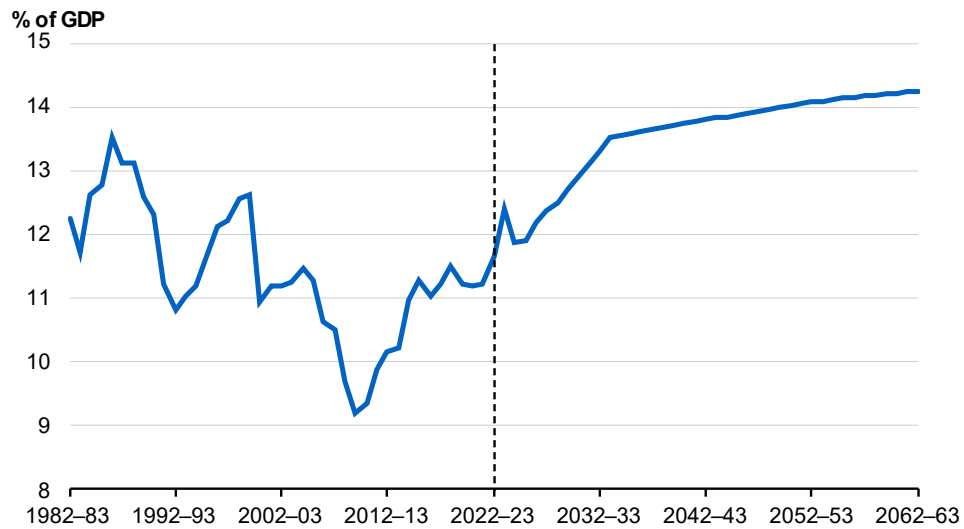
Source: Treasury.

In the absence of policy change, projections show increasing reliance on personal income tax. However, taxpayers have declined as a share of the total population since peaking in 2005–06 despite a similar employment-to-population ratio (Chart 8.6). This is the result of an increase in the effective tax-free threshold, driven by policy decisions to raise the threshold itself and associated increases to low income and age-related tax offsets, coupled with population ageing over the period.

As the population ages, the personal income tax base is projected to continue to narrow in line with the projected decline in workforce participation. Only 12 per cent of Australians aged 70 and over pay income tax and this age group now makes up 12.2 per cent of the total population. This age group is expected to increase to 18.1 per cent of the total population in 2062–63.

Chart 8.6   Taxable individuals as a share of total population
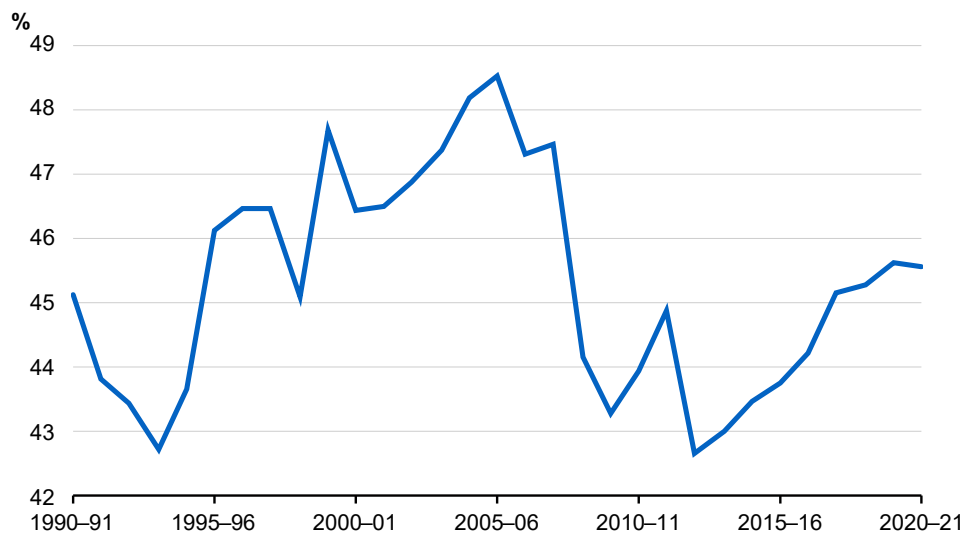
Source: Treasury; ATO Taxation Statistics; ABS.

8.2   Goods and services tax

GST receipts were expected to be 3.2 per cent of GDP in 2022–23. GST receipts increase slightly to 3.4 per cent of GDP over the forward estimates period and are projected to remain stable as a share of the economy over the projection period (Chart 8.7).

Chart 8.7   Goods and services tax receipts
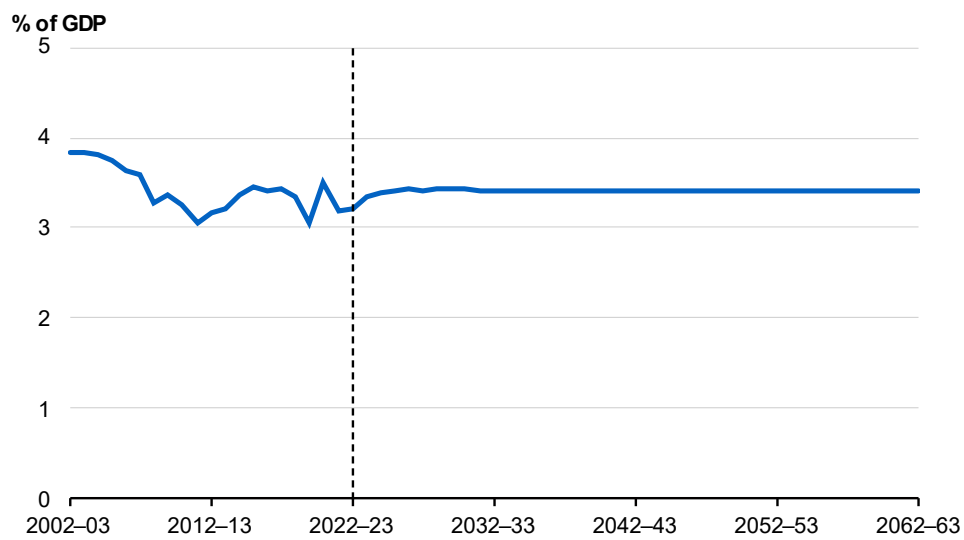
Source: Treasury.

Although GST receipts as a share of GDP initially declined in 2019–20 due to COVID-19, GST rebounded strongly in 2020–21 and reached its highest level since 2007–08. This was due to the significant rebound in household consumption. The lower GDP share in 2021–22 and 2022–23 is partly driven by a lower consumption share of GDP as commodity export values increased significantly.

Over the projection period, consumption patterns are likely to change, with possible implications for GST. For instance, as the population ages and demand for care and support services rises, the share of consumption subject to GST could fall. However, there is significant uncertainty around the magnitude of the effect on GST and any offsetting impacts. These include changes in private spending on GST-exempt education, and the broader impacts of climate change and technological transformation on consumption patterns.

2023 Intergenerational Report | Part II: The budget over the next 40 years

8.3   Indirect tax (excluding GST)

Indirect taxes (excluding GST) were forecast to be 2.2 per cent of GDP in 2022–23. This share is expected to gradually decline over the medium and long term reflecting changing consumption patterns and structural change in the economy. By 2062–63 indirect taxes (excluding GST) are projected to be 1.4 per cent of GDP (Chart 8.8).

Chart 8.8   Indirect tax receipts (excluding GST)
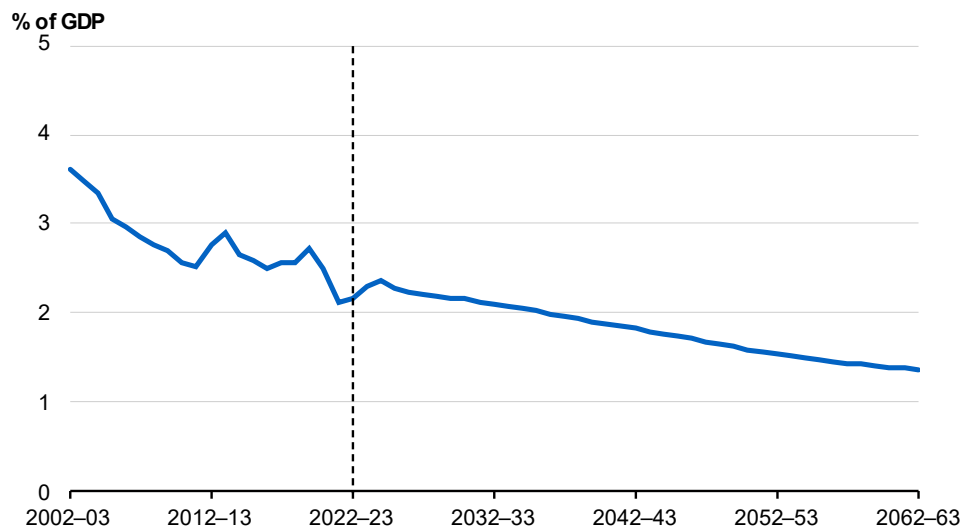
Source: Treasury.

Indirect taxes include excise and customs duties (1.7 per cent of GDP in 2022–23), visa application charges, the wine equalisation tax, the luxury car tax (LCT) and the major bank levy. The decline in indirect taxes over the projection period is the continuation of a long-term trend of declining excise and customs duty receipts since 2000–01 (Chart 8.9).

The decline in excise and customs duties as a share of GDP has been driven by a combination of changing consumption trends and policy decisions. These include changes in fuel excise rates and free trade agreements with key trading partners

Chart 8.9   Change in excise and customs duty receipts since 2000–01
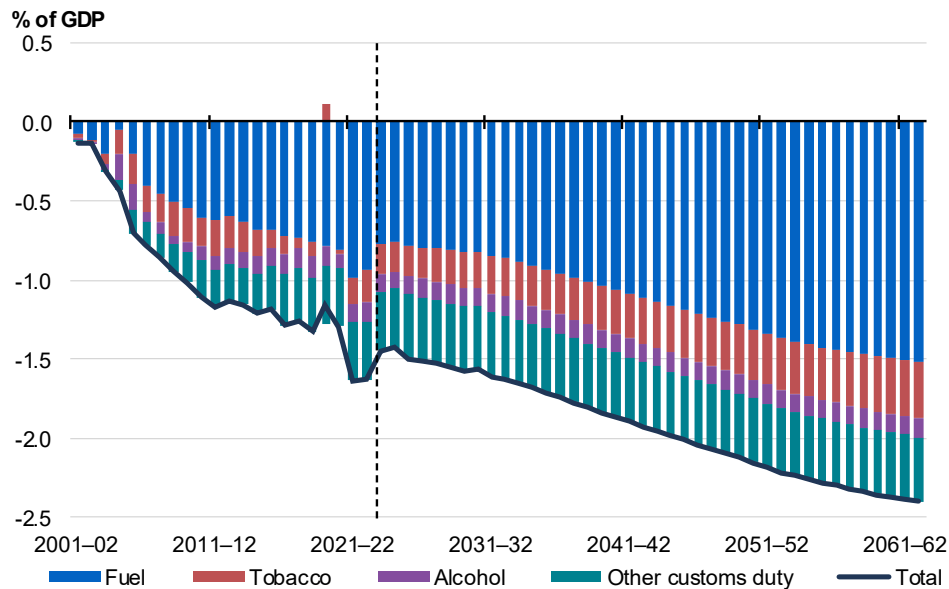
Source: Treasury.

Over the longer term, tobacco excise as a share of GDP is projected to fall further due to lower per capita consumption. Similarly, fuel excise as a share of GDP is expected to fall due to the impact of increased electric vehicle penetration (Box 8.2). Alcohol excise as a share of GDP is expected to remain constant, consistent with alcohol receipts maintaining a broadly constant share of GDP in recent years.

Box 8.2   Electric vehicle uptake and fuel excise receipts

The net zero transformation is expected to result in a shift from internal combustion engine vehicles to electric vehicles over the coming decades. The transition to electric vehicles will have many benefits – lower emissions, improved air quality, and lower running costs for drivers. However, there will also be a fiscal impact from a loss of fuel excise receipts unless there is a change of policy.

The analysis below examines the outlook for fuel excise and the potential impact on fuel excise receipts from electric vehicle uptake. It does not consider broader economic impacts from increased electric vehicle uptake, for example the macroeconomic impacts of lower fuel imports.

A range of critical factors will affect how quickly Australia transitions to electric vehicles. These include the supply of vehicles and inputs to the manufacture of batteries, how fast the affordability of electric vehicles improves, the availability of charging stations and government policies to encourage electric vehicle take-up.

Governments are acting to expedite the transition to electric vehicles. This includes incentivising the purchase of electric vehicles through exemptions from fringe benefits tax (FBT) and import tariffs.[64] To support supply, the Government has committed to implement a Fuel Efficiency Standard.

Given there is uncertainty about the speed of Australia's transition to electric vehicles and the impact on revenue, three scenarios of electric vehicle take-up rates are used to illustrate the differential impacts on fuel excise. This includes a baseline (2023 IGR scenario) and higher and accelerated scenarios which assume more rapid uptake of electric vehicles (Chart 8.10). Further details on these scenarios are provided in Appendix A5.

Under the 2023 IGR scenario, fuel excise receipts are expected to be 0.88 per cent of GDP by 2033–34, before falling to 0.25 per cent by 2062–63. The Higher scenario results in projected fuel excise receipts of 0.79 per cent of GDP by 2033–34 and 0.01 per cent by 2062–63. The Accelerated scenario results in projected fuel excise receipts of 0.65 per cent of GDP by 2033–34 and below 0.01 per cent by 2057–58.

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64   Battery, hydrogen fuel cell electric and plug-in hybrid electric cars (the latter until 1 April 2025) are exempt from FBT and import tariffs if they have a first retail price below the LCT threshold for fuel-efficient cars.

Chart 8.10 Fuel excise receipts over the scenarios
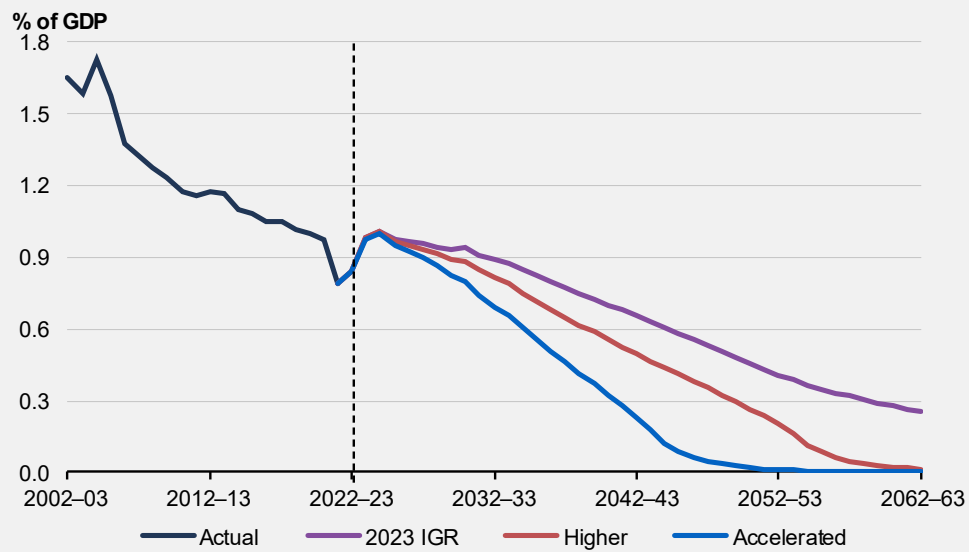
Source: Treasury.

The 2023 IGR and Higher scenarios suggest that across the medium term to 2033–34, take-up of electric vehicles is expected to have a relatively minor impact on fuel excise receipts. The Accelerated scenario is expected to have a greater impact on fuel excise receipts across the medium term as the transport sector is assumed to rapidly embrace electric and hydrogen-fuelled options to decarbonise light and heavy vehicle fleets. This leads to a faster decline in the diesel excise, which is the largest component of fuel excise. Over the longer term, these scenarios result in a significant decline in fuel excise receipts. The impacts diverge based on the differences in the assumed speed of Australia's transition to electric vehicles.

Decreasing fuel excise collections over the rest of the century represents a challenge and an opportunity for policymakers around the globe. Jurisdictions are investigating alternatives to charging a fuel excise to stabilise public revenue and maintain road infrastructure. For example, in the United States, Oregon and Utah are trialling opt-in, pay-per-mile road user charge systems, which provide reduced registration fees.[i] [ii]

LCT receipts have not been modelled in this analysis but will also likely be materially affected by the uptake of electric vehicles. Cars with an LCT value over the threshold attract an LCT rate of 33 per cent with a higher threshold for fuel-efficient vehicles compared to other vehicles.[65]

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65   The price of a vehicle excluding any LCT, and any other Australian tax or Australian fee or charge other than GST and customs duty.

8.4   Company and other income taxes

Company tax

Company tax receipts were forecast to be 5.4 per cent of GDP in 2022–23. Due to features of the tax system, as well as the composition of Australia's economy, company tax receipts are particularly exposed to volatility, with many factors having an influence on how much tax is collected for the same amount of profit.

In recent years and over the near term, temporary business support measures and significantly elevated commodity prices have increased volatility in company tax receipts. Commodity prices are assumed to return to long-run levels by 2024–25 resulting in a projected decline in company tax receipts to 4.4 per cent of GDP in 2033–34.

Company tax receipts then remain at this level over the remainder of the projections period to 2062–63, consistent with company profits maintaining a constant share of GDP (Chart 8.11).

Chart 8.11 Company tax receipts
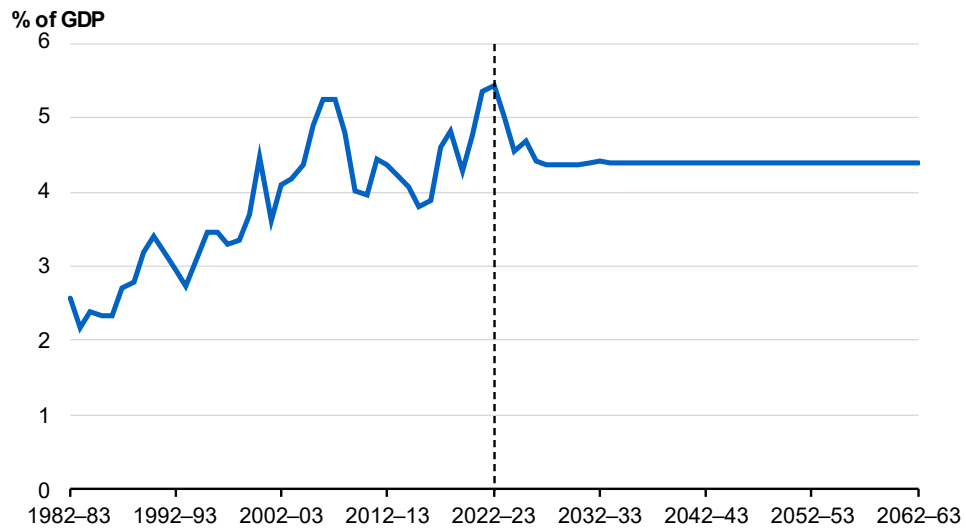
Source: Treasury.

Nonetheless, fluctuations in global commodity prices and company tax receipts will likely continue to be a major source of volatility in total taxes and history shows the distribution of profits across different companies and industry sectors can significantly impact how much and when profit translates to company tax (Chart 8.12).

Company tax may be affected by structural or compositional changes in the economy which are not captured by the assumed steady profit share of GDP. For example, company tax will be exposed to any changes in the value or composition of Australia's resources exports due to the global energy transition. Coal, oil and gas companies accounted for around 4 per cent of company tax payable in 2019–20. This share is likely to increase in the near term, following recent high commodity prices and decline over time as prices are assumed to return to long-run levels.

Chart 8.12 Tax payable by sector as a share of sector's gross operating surplus

Source: Treasury.

2023 Intergenerational Report | Part II: The budget over the next 40 years
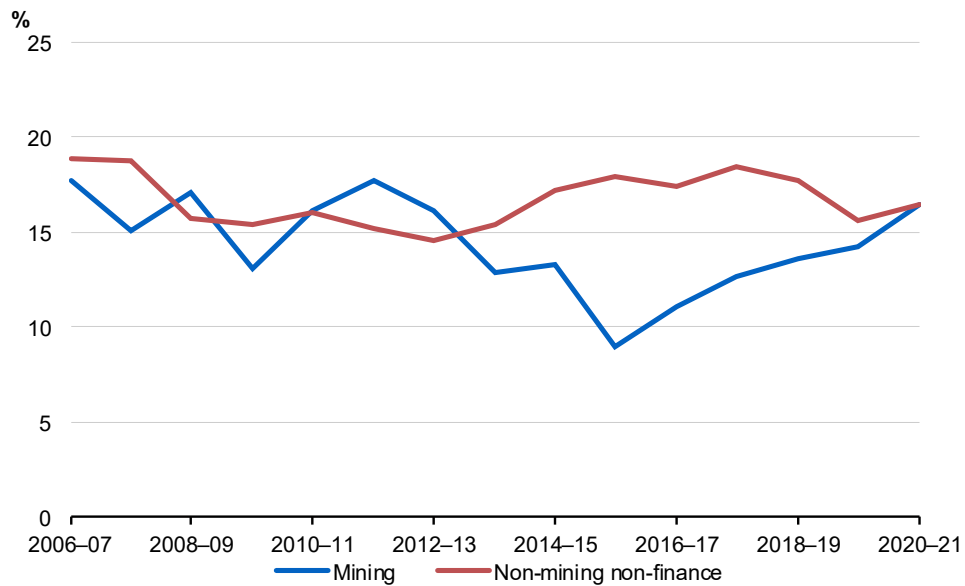
Other income taxes

Other income taxes, which include fringe benefits tax, petroleum resource rent tax (PRRT) and superannuation fund taxes, are projected to stabilise at 1.0 per cent of GDP beyond the forward estimates, remaining at this level until 2062–63 (Chart 8.13). These projections assume PRRT receipts remain at a constant share of GDP at their 2033–34 level. There are risks that this varies in the shorter term with the uncertain timing of expected receipts from newly paying projects. Conversely, longer term risks include decommissioning expenses and any decline in sales of offshore petroleum due to the global energy transition.

Chart 8.13 Other income tax receipts

Source: Treasury.

8.5   Non-tax receipts

Non-tax revenue includes interest received on government loans, interest and dividends from investments like the Future Fund and user charges for some government services.

Over the next 40 years, non-tax receipts are projected to fall as a share of the economy from 1.9 per cent of GDP in 2022–23 to 1.6 per cent in 2062–63 (Chart 8.14). The projected fall in non-tax receipts will reduce total receipts as a share of GDP over time.

The fall in non-tax receipts as a share of GDP is primarily driven by the Future Fund and state contributions to the NDIS.

Future Fund earnings will decline over time as the fund is anticipated to be drawn down. Future Fund earnings are expected to fall from over 0.2 per cent of GDP in 2022–23 to less than 0.1 per cent of GDP by 2062–63.

In line with bilateral agreements, contributions from states and territories towards the NDIS are capped at 4 per cent growth per year. Since this is lower than nominal GDP growth, this means that state contributions will increase in nominal terms but decrease as a share of GDP over time.

Other non-tax receipts, such as interest earnings on smaller investment funds, are assumed to grow with nominal GDP and remain relatively stable over the long run.

Chart 8.14 Non-tax receipts
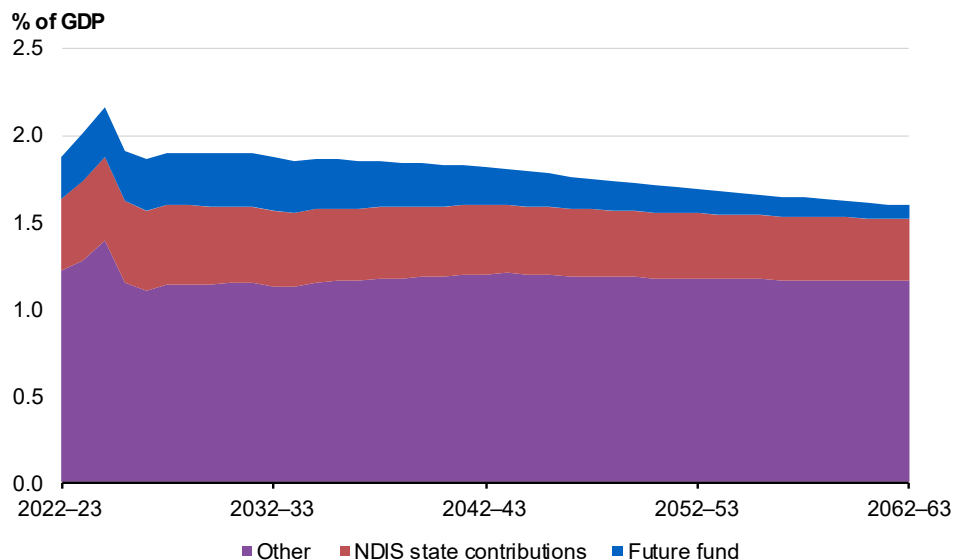
Source: Treasury.

Endnotes

i   State of Oregon, 'OReGO: Oregon's Road Usage Charge Program' *Oregon* (n.d) https://www.oregon.gov/odot/programs/pages/orego.aspx, accessed 9 Aug. 2023.

ii   Utah Department of Transportation, 'The future of Utah Transportation' *Road Usage Charge* (n.d) https://roadusagecharge.utah.gov/index.php, accessed 9 Aug. 2023.

9 The balance sheet

Overview

Australia's balance sheet is stronger than projected in the 2021 Intergenerational Report (IGR). This reflects improvements in the near-term fiscal position, driven by a faster-than-expected recovery from COVID-19, disciplined fiscal policy and decisions to direct the majority of tax upgrades to budget repair.

Australian Government gross debt-to-GDP is high by historical standards and long-term spending pressures are growing, but Australia has a strong balance sheet compared to most major advanced economies. A strong balance sheet positions governments to respond to long-term challenges and economic downturns and invest for future growth.

The Government is leveraging balance sheet investments to build a more productive economy, alleviate supply constraints and fund key government priorities including the net zero transformation.

Over the next 40 years, total assets are projected to gradually decrease as a share of the economy as Australian Government Future Fund assets are anticipated to be drawn down to meet government employee superannuation payments.

Australia has few significant liabilities outside of Australian Government Securities (AGS). Total liabilities as a share of the economy are projected to decrease until 2050–51, before increasing – following the growth profile of AGS.

2023 Intergenerational Report | Part II: The budget over the next 40 years

The Australian Government balance sheet

The government's balance sheet sets out public assets and liabilities[66] Assets include investments such as the Future Fund, other government investment funds, and government-financed investment vehicles. Liabilities include debt in the form of AGS and the government's superannuation liability.

While Australian Government gross debt-to-GDP is high by historical standards, Australia's balance sheet is stronger than projected in the 2021 IGR with gross debt-to-GDP lower across the projection period as outlined in Chapter 6. This reflects improvements in the near-term fiscal position, driven by a faster-than-expected recovery from COVID-19, disciplined fiscal policy and decisions to direct the majority of tax upgrades to budget repair. However, rising spending pressures are projected to weigh on the budget over the long-term.

Over the next 40 years, total assets are projected to gradually decrease as a share of the economy (Chart 9.1), largely reflecting a projected reduction in the value of the Future Fund due to anticipated drawdowns. Total liabilities as a share of the economy are projected to decrease until 2050–51 before increasing to 39.8 per cent of gross domestic product (GDP) in 2062–63. The reduction in liabilities over the next three decades is driven by the reduction in debt-to-GDP.

Chart 9.1   Total assets and liabilities
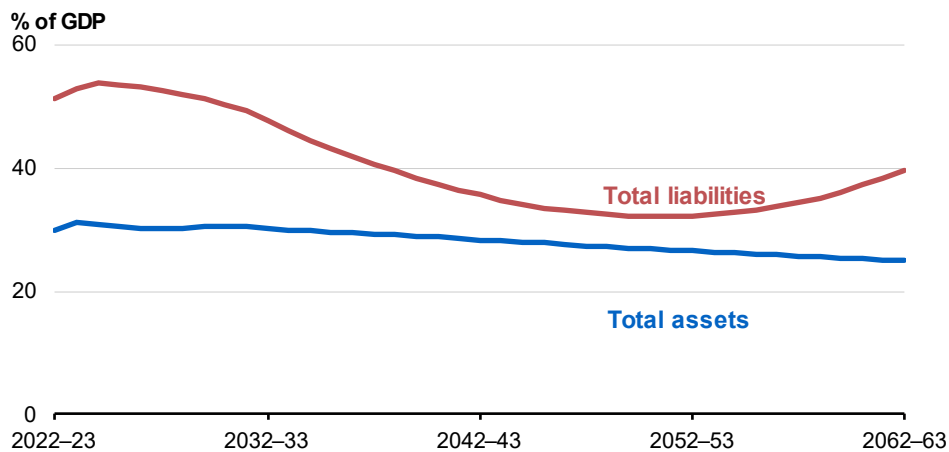
Source: Treasury.

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66   Assets are monetary and non-monetary resources that an entity owns. Liabilities are present obligations arising from past events that are expected to result in financial outflows. Liabilities represent the financial obligations of government.

Net financial worth improves in the medium term

Net financial worth is expected to be -29.5 per cent of GDP in 2022–23.[67] This is projected to improve to -14.5 per cent of GDP in 2048–49. It will then deteriorate to -24.5 per cent of GDP by 2062–63, as debt increases again as a share of the economy (Chart 9.2).

Chart 9.2   Net financial worth
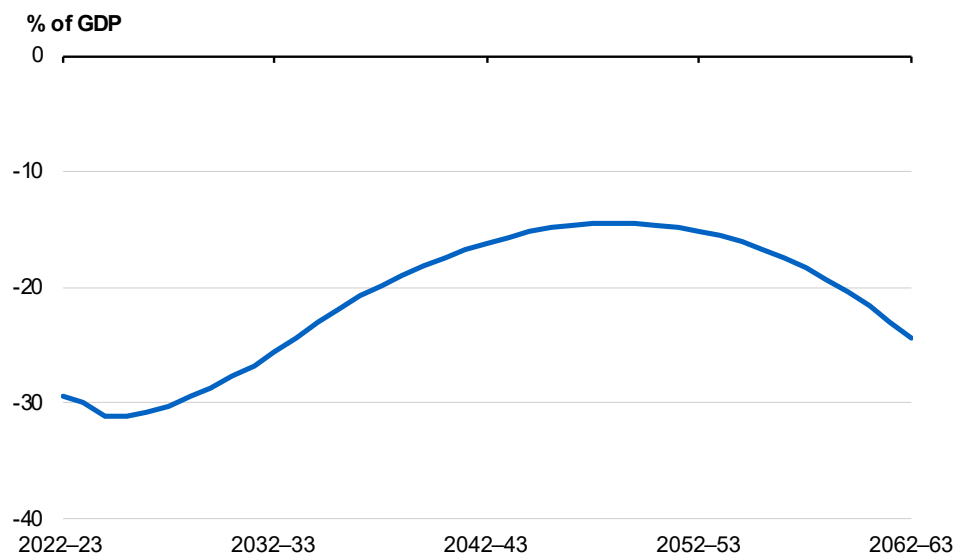
Source: Treasury.

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67   Net financial worth is a measure of the strength of the Government's balance sheet. It is equal to the value of financial assets minus the value of liabilities. A negative net financial worth means that a government holds more liabilities than financial assets.

2023 Intergenerational Report | Part II: The budget over the next 40 years

Major liabilities decrease as a share of the economy

Total liabilities are projected to decrease from 51.5per cent of GDP in 2022–23 to 32.2 per cent of GDP in 2050–51 before increasing in the longer term, reflecting the growth profile of AGS (Chart 9.3) outlined in Chapter 6.

Chart 9.3   Components of total liabilities
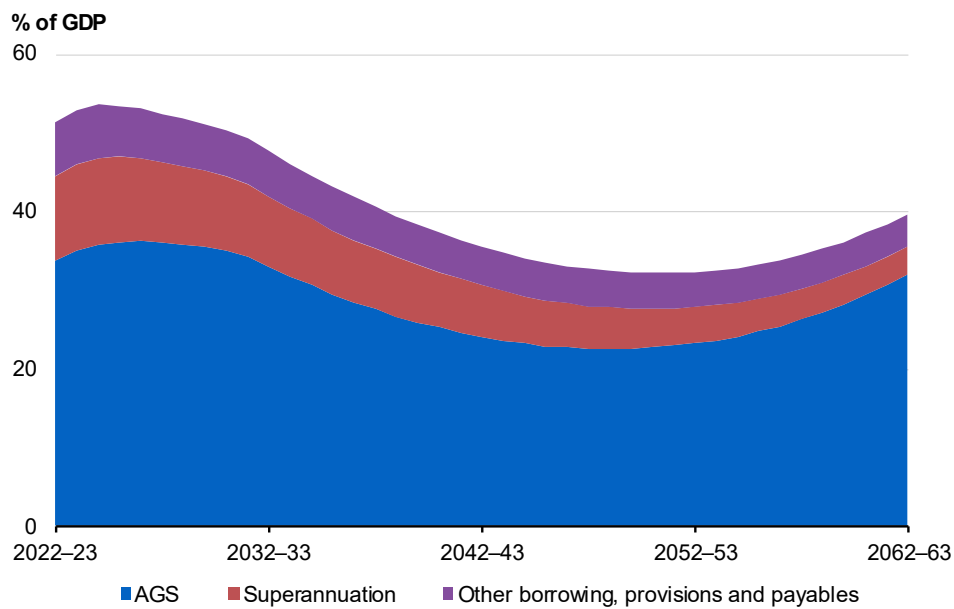
Note: Other borrowing, provisions and payables include a range of categories such as other employee liabilities, provisions (including subsidies), lease liabilities and loans.

Source: Treasury.

Government employee superannuation liability

The Government's employee superannuation liability arises from government defined benefit superannuation schemes. A defined benefit scheme commits governments to pay eligible beneficiaries an annual pension on retirement. These were once the predominant form of superannuation for public servants and military personnel. Almost all the defined benefit schemes are now closed to new members. New employees enter accumulation schemes that match assets and liabilities.

It is projected that the superannuation liability will fall as a percentage of GDP over the next 40 years, from 10.8 per cent of GDP in 2022–23 to 3.5 per cent of GDP by 2062–63 (Chart 9.4). This is primarily due to the closure of most defined benefit superannuation schemes.

Chart 9.4   Superannuation liability
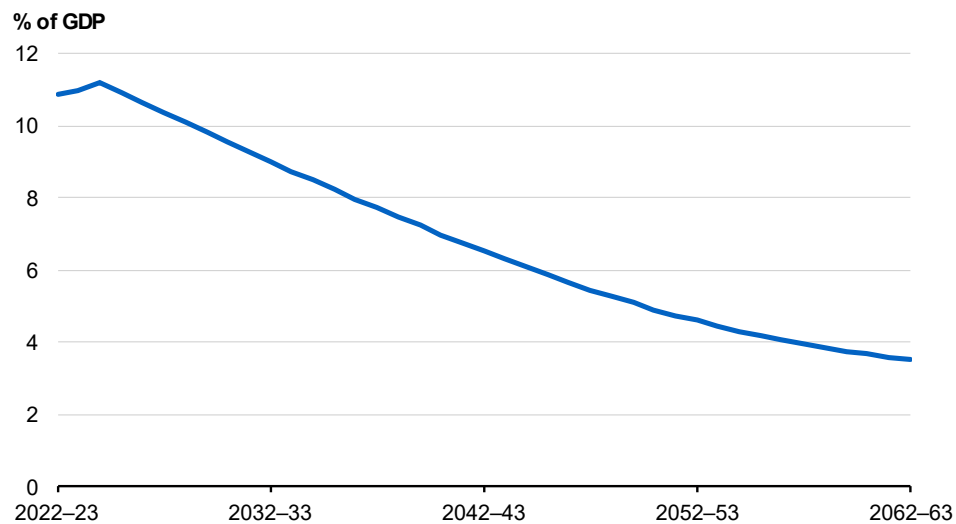
Source: Australian Government Actuary and Treasury.

Major assets are projected to decrease

The Government's assets are projected to decrease from 30.0per cent of GDP in 2022–23 to 25.0 per cent of GDP in 2062–63 (Chart 9.5). This largely reflects a projected reduction in the value of the Future Fund due to anticipated drawdowns.

Other significant government assets include student loan receivables, government-operated business and investment entities, infrastructure investments and other government investment funds.

Chart 9.5   Components of total assets
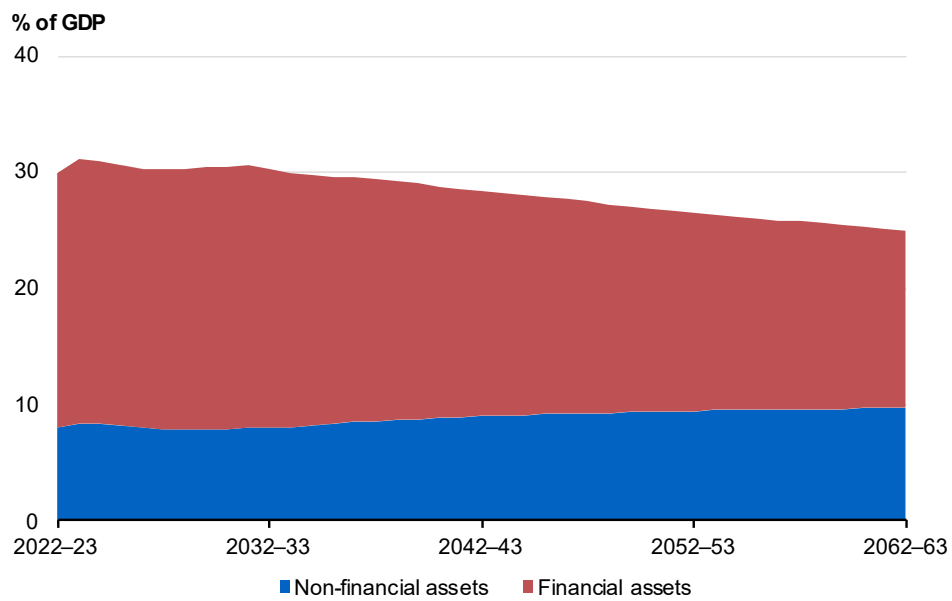
Source: Treasury.

Financial assets

Financial assets include investments on which the government aims to earn a financial return in the form of interest, dividends or capital gains. These investments may be held for liquidity management reasons or for policy purposes.

Liquidity management investments include term deposits held by the government with the Reserve Bank of Australia and investments through government investment funds, including the Future Fund (Chart 9.6). Policy-purpose investments include the Clean Energy Finance Corporation (CEFC) and the National Reconstruction Fund.

Financial assets are projected to decline from 22.0 per cent of GDP in 2022–23 to 15.3 per cent of GDP in 2062–63. This reflects the projected reduction in the value of the Future Fund due to anticipated drawdowns.

Chart 9.6   Components of financial assets
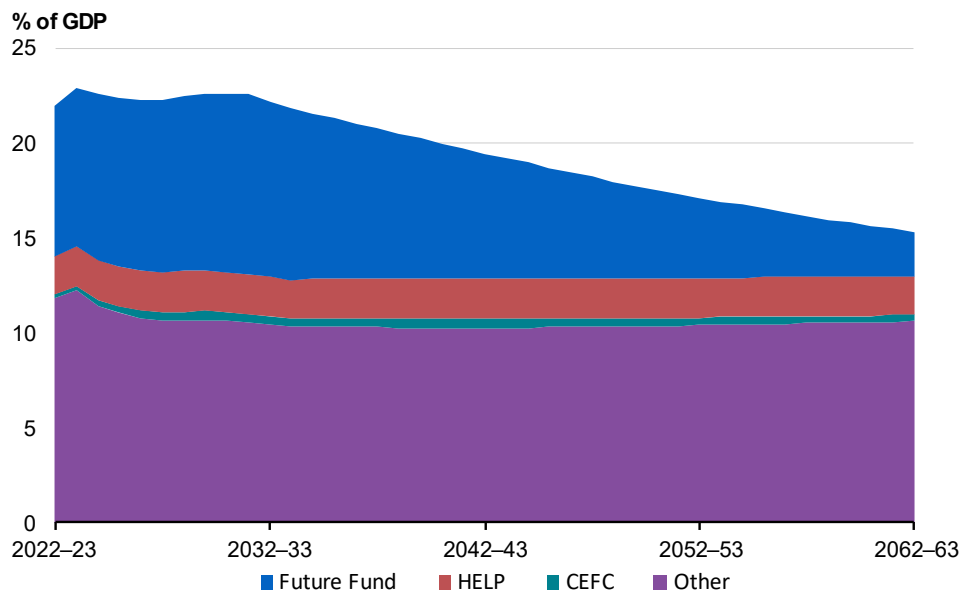
Note: CEFC assets only include the general portfolio. Other CEFC investments, including Rewiring the Nation, are included in "other".

Source: Treasury.

Government investment funds

A large component of financial assets is government-owned investment funds. There are currently six government investment funds:

• Future Fund

• Medical Research Future Fund

• DisabilityCare Australia Fund

• Aboriginal and Torres Strait Islander Land and Sea Future Fund

• Future Drought Fund, and

• Disaster Ready Fund.

As at 31 March 2023, the Future Fund was valued at $202.8 billion and delivered a 10-year return of 9.1 per cent per year, exceeding the investment target of 6.8 per cent per year.

The projected value of the Future Fund is based on an assumption of when drawdowns commence. The Government has not announced when drawdowns from the Future Fund will commence.

Consistent with previous intergenerational reports, this IGR assumes that Future Fund drawdowns will begin when the opening balance of the Future Fund is projected to reach the projected value of the public sector superannuation liability.[68]

Government investment vehicles

Government investment vehicles provide loans, guarantees and equity injections to private entities. Government investment vehicles partner with the private sector to unlock private investment for projects that deliver public value and a financial return to taxpayers. Government co-investment can reduce risk for investors in early-stage projects and provide certain, often concessional, long-term capital.

Current government investment vehicles include Export Finance Australia, Northern Australia Infrastructure Facility, the CEFC and the National Reconstruction Fund.

Higher Education Loan Program

The Higher Education Loan Program (HELP) is an income-contingent loan program that assists eligible higher and vocational education students with the cost of their student contribution amounts and tuition fees.

HELP loans (including Higher Education Contribution Scheme-HELP (HECS-HELP), FEE-HELP, Overseas-HELP (OS-HELP), Student Services and Amenities Fee-HELP (SA-HELP)

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68   This simplifying assumption is not equivalent to drawing down the fund when it reaches the Target Asset Level (TAL) estimated by the designated Future Fund Actuary. The TAL can differ from the assumption in this report due to differences in actuarial judgment on assumed economic parameters, rates of return and discount rates.

and Vocational Education and Training (VET) Student Loans) represent a financial asset on the Government's balance sheet as they are expected to be repaid by students in the future.

Students are only required to make repayments of HELP loans if their incomes exceed repayment thresholds. In the long run, around 12 per cent of HELP debt issued is not expected to be repaid.

As at 30 June 2023, the fair value of HELP is estimated to be $51.4 billion. HELP loans are projected to remain approximately 2 per cent of GDP across the projection period.

Non-financial assets

Non-financial assets include assets such as property, plant and equipment. The largest component of non-financial assets is defence acquisitions, which are included in the overall funding for defence (Chapter 7).

Non-financial assets are projected to increase from 8.0 per cent of GDP in 2022–23 to 9.7 per cent of GDP in 2062–63, as purchases of non-financial assets exceed sales and depreciations.

Appendices

2023 Intergenerational Report | Appendices

A1 Projections summary

Table A1.1 Demographic projections

		2022–23	2032–33	2042–43	2052–53	2062–63
Population (millions)		26.5	30.4	33.9	37.3	40.5
	0–14	4.8	5.1	5.5	6.0	6.3
	15–64	17.2	19.4	21.4	23.1	24.8
	65–84	4.0	5.0	5.7	6.4	7.4
	85+	0.6	0.9	1.4	1.7	2.0
Life expectancy at birth (years)						
	Male	81.3	83.5	84.9	86.1	87.0
	Female	85.2	86.9	87.9	88.7	89.5
Total fertility rate		1.66	1.62	1.62	1.62	1.62
Old-age dependency ratio		26.6	30.6	32.9	35.2	38.2
Population growth		2.0	1.2	1.0	0.9	0.8
Net overseas migration (contribution to population growth, percentage points)		1.5	0.8	0.7	0.6	0.6

Note: Life expectancy figures are calculated using the period method. The old-age dependency ratio refers to the number of people aged 65 and over for every 100 people of traditional working age (15 to 64) in the population.

Source: Treasury and McDonald (2020).

Table A1.2　　Economic and fiscal projections

	2022–23	2032–33	2042–43	2052–53	2062–63
Economic projections					
Real GDP growth (%)	3.1	2.5	2.2	2.0	1.9
Real GDP per person ($)	83,874	93,806	105,903	118,353	131,815
Real GDP per person growth (%)	1.1	1.3	1.2	1.1	1.1
Real GNI per person ($)	82,080	88,256	99,567	111,271	123,928
Real GNI per person growth (%)	0.3	1.3	1.2	1.1	1.1
Total participation rate 15–64 (%)	80.1	81.3	82.2	82.3	82.3
Total participation rate 15+ (%)	66.6	66.0	65.7	65.0	63.8
Male 15+	71.3	69.8	69.4	68.7	67.6
Female 15+	62.1	62.5	62.2	61.5	60.3
Fiscal projections (% of GDP)					
Underlying cash balance	0.2	-0.5	-0.5	-1.2	-2.6
Primary balance	0.7	0.5	0.4	-0.4	-1.4
Gross debt	34.9	33.6	24.2	23.3	32.1
Net debt	21.6	21.0	14.0	15.0	25.2
Net financial worth	-29.5	-25.6	-16.2	-15.2	-24.5

Note: Differences in the long-run economic projections for real GDP and real incomes between the 2023 IGR and 2021 IGR, primarily reflect the change in the long-term productivity growth assumption.

Source: Treasury.

Table A1.3   Projections of major components of Australian Government payments (% of GDP)

	2022–23	2032–33	2042–43	2052–53	2062–63
Payments to individuals					
Disability Support Pension	0.8	0.8	0.8	0.8	0.9
Family Tax Benefit	0.7	0.6	0.5	0.4	0.3
Child Care Subsidy	0.4	0.5	0.4	0.4	0.3
Parenting Payment Single	0.2	0.3	0.3	0.2	0.2
Parenting Payment Partnered	0.0	0.0	0.0	0.0	0.0
Paid Parental Leave	0.1	0.1	0.1	0.1	0.1
JobSeeker Payment	0.5	0.5	0.4	0.4	0.3
Youth Allowance	0.1	0.1	0.1	0.1	0.1
Carer Payment	0.3	0.4	0.4	0.5	0.5
Austudy	0.0	0.0	0.0	0.0	0.0
Total payments to individuals	3.1	3.2	3.0	2.9	2.7
Health	4.2	4.1	4.5	5.3	6.2
Age and Service Pension	2.3	2.4	2.2	2.0	2.0
Defence	2.0	2.3	2.3	2.3	2.3
Education	1.7	1.5	1.3	1.2	1.2
Aged care	1.1	1.5	1.7	2.1	2.5
National Disability Insurance Scheme (Australian Government)	0.9	1.7	2.0	2.0	2.1
Total payments	24.8	26.6	26.7	27.3	28.6
Total payments (excl. interest)	24.1	25.3	25.6	26.3	27.2

Source: Treasury.

Table A1.4   Projections of major components of Australian Government payments (real spending per person, 2022–23 dollars)

	2022–23	2032–33	2042–43	2052–53	2062–63
Payments to individuals					
Disability Support Pension	730	765	884	1,055	1,201
Family Tax Benefit	638	589	537	494	451
Child Care Subsidy	398	492	487	467	451
Parenting Payment Single	186	256	282	306	335
Parenting Payment Partnered	35	38	38	37	37
Paid Parental Leave	105	136	138	133	130
JobSeeker Payment	491	464	473	473	468
Youth Allowance	101	110	103	101	100
Carer Payment	270	365	464	570	651
Austudy	18	20	19	19	18
Total payments to individuals	2,970	3,235	3,426	3,654	3,842
Health	4,000	4,061	5,078	6,629	8,677
Age and Service Pension	2,174	2,350	2,487	2,574	2,765
Defence	1,875	2,330	2,621	2,931	3,263
Education	1,651	1,459	1,505	1,572	1,670
Aged care	1,076	1,498	1,882	2,602	3,481
National Disability Insurance Scheme (Australian Government)	855	1,686	2,267	2,563	2,879
Total payments	23,808	26,544	30,134	34,442	40,162
Total payments (excl. interest)	23,139	25,322	28,911	33,134	38,230

Note: Real spending per person refers to spending per head of total population, not per payment recipient. Changes in real spending per person reflect changes in the recipient population as a share of the total population due to ageing.

Source: Treasury.

A2 Key concepts

Assets are monetary and non-monetary resources that an entity owns. Government financial assets include investments, loans, equity, advances and cash. Government non-financial assets include equipment, buildings, heritage and cultural assets, land, inventories and intangibles.

Consumer price index measures the prices of a representative basket of goods and services consumed in Australia.

Decarbonisation refers to the reduction of carbon emissions in the atmosphere through sustainable systems and practice.

Economic dependency ratio provides a further perspective on ageing, by measuring the ratio of the number of people aged 65 and over for every 100 people of any age who are employed.

Employed means a person completed one hour or more of paid work in a given reference week.

Fiscal sustainability is the government's ability to manage its finances so it can meet its spending commitments, now and in the future, without large and sudden adjustments to policy settings.

Gross Domestic Product (GDP) measures the output (goods and services) produced in the Australian economy in a given period.

GDP deflator measures the level of prices across the goods and services contained in GDP.

Gross debt is the face value of Australian Government Securities on issue.

Gross National Income (GNI) measures how much Australia earns, rather than what output is produced in the economy. It is used as an indicator of Australia's standard of living. GNI measures total income received in Australia from its residents and businesses in Australia and abroad. It can be measured in real or in nominal terms similar to GDP.

Growth rate of a variable indicates its rate of change as a percentage of starting value. For example, a growth rate of 5 per cent in real GDP means that GDP increases in size by 5 per cent per year. This is a measure of 'how fast' the size of the economy is changing over time.

Health-adjusted life expectancy (HALE) considers the number of years a person of a particular age could expect to live in full health (without disease and/or injury) and in ill health (with disease and/or injury).

Heat stress refers to the physiological stress brought about by excessive heat.

Labour force is the sum of employed and unemployed people

Labour force participation rate is the percentage of the population aged 15 years and over in the labour force.

Labour productivity is a measure of output per hour worked. Growth in labour productivity can be decomposed into capital deepening and multifactor productivity (MFP). Capital deepening measures increases in capital per hour worked. MFP captures how efficiently labour and capital are used together to produce output and is considered the main driver of economic growth in the long term.

Level of a variable indicates its absolute size. For example, in real GDP it indicates 'how big' the economy is.

Liabilities are present obligations arising from past events that are expected to result in financial outflows. They represent the financial obligations of government.

Life expectancy measures how long a person at a specific age is expected to live if they experienced the age and sex-specific mortality rates for a given year for the rest of their life. In this report, 'life expectancy' usually refers to 'life expectancy at birth' unless otherwise specified.

Natural increase is the population change resulting from the number of births minus deaths in a given year.

Net debt is a measure of the strength of the Government's balance sheet. It is equal to interest bearing liabilities at current value, less the value of liquid financial assets.

Net financial worth is a more comprehensive measure of the strength of the Government's balance sheet. It is equal to the value of financial assets minus the value of liabilities. A negative net financial worth means that a government holds more liabilities than financial assets.

Net overseas migration (NOM) is the net gain or loss of population through immigration to, and emigration from, Australia. It is measured by counting people who stay in Australia for 12 months or more over a 16-month period. This includes individuals on both permanent and temporary visas, as well as returning and departing Australian citizens.

Net zero refers to a time when greenhouse gas emissions into the atmosphere are equal to the amount of greenhouse gas being removed from the atmosphere.

Net zero transformation refers to the decarbonisation, economic and social changes being undertaken to reach net zero.

Nominal GDP measures the value of the output produced in Australia at current prices. For example, nominal GDP in 2022 is calculated using prices for goods and services in 2022. Nominal GDP has a significant implication for tax revenue and the fiscal position.

Non-Accelerating Inflation Rate of Unemployment (NAIRU) is the rate of unemployment that can be sustained without generating inflationary pressures.

Old-age dependency ratio is the number of people aged 65 and over for every 100 people of traditional working age (15 to 64) in the population.

Potential GDP estimates the highest sustainable level of economic output, or the economy's productive capacity. Potential GDP grows through the accumulation of factors that expand the economy's productive capacity. Potential GDP is estimated based on an analysis of trends in population, productivity and participation. As spare capacity in the economy is absorbed over time, real GDP converges towards its potential level.

Primary cash balance adjusts the underlying cash balance to exclude interest receipts and interest payments. As, in the short term, interest payments are largely determined by the size of previous budget deficits, the primary balance can be viewed as a budget balance that is more directly within the Government's control.

Productivity refers to the efficiency with which inputs are transformed into outputs using capital, labour, and other resources. Productivity growth occurs when an economy can produce more output for a given level of input, or by maintaining a level of output using less inputs, or a combination of both. The most common measure of productivity is labour productivity.

Real GDP measures the total value of output produced in Australia using the prices of a chosen base year. It removes the effect of price changes, allowing a focus on changes in quantities of output.

Real GDP per person measures the average level of output produced per person, which is the most widely used comparative indicator of economic performance and an indication of average living standards.

Real GNI per person is often used as a measure of a country's economic prosperity because it captures a country's average real income per person from the economic activity of its residents and businesses, regardless of whether they are located in the country or abroad. Higher commodity prices (and hence terms of trade) have a direct impact on real incomes and hence GNI.

Terms of trade measures export prices relative to import prices. They have a significant influence on Australia's GNI and nominal GDP. Favourable terms of trade, or periods when export prices are high relative to import prices, imply that Australia is able to buy more imports for a given amount of exports.

Total fertility rate estimates the number of children a woman would have during her lifetime if she experienced the age-specific fertility rates for a given year at each age of her reproductive life.

Underlying cash balance is a cash measure of the fiscal position that shows whether the Government has to borrow from financial markets to cover its operating activities and net investments in non-financial assets used in the provision of goods and services. A negative value (or deficit) means the Government needs to borrow from financial markets to fund its activities.

Unemployed means a person is actively looking for work and available to work but has not found employment.

Unemployment rate is the percentage of the labour force who are unemployed.

Yield is the annual rate of return from investing in a bond as a percentage of the price of the bond.

A3   Methodology and assumptions

Economic projections framework

The 2023 Intergenerational Report (IGR) uses the same medium-term projection methodology for population, participation, productivity and prices as the 2023–24 Budget, and extends the projection horizon to 2062–63.

Together these fundamentals determine the supply side potential of Australia's economy Treasury uses a macroeconometric model that combines these trends to generate a projection for potential Gross Domestic Product (GDP).

The size of the economy in current prices (nominal terms) is determined by potential GDP and the trajectory for the price of Australia's output. Key export commodity prices are assumed to track in line with long-term fundamentals. Domestic price growth is assumed to remain at the midpoint of the Reserve Bank of Australia's (RBA) inflation target band of 2.5 per cent over the longer-term projection period. The macroeconometric model combines these assumptions and trend inputs to generate a projection for nominal GDP.

The output is then used to inform the assessment of Australia's long-term fiscal position.

Population projections

The population projections in this Report use the cohort-component method outlined in the 2022 Population Statement and the 2023–24 Budget.[i] [ii] The assumptions for the components of population growth are the same as for the 2023–24 Budget but extend to 2062–63. The population projections do not account for the effects of climate change.

Assumptions about fertility, mortality and net overseas migration are made over:

• the near term – the forecast period between 2022–23 and 2026–27, and

• the medium and longer term – the projections period between 2027–28 and 2062–63.

Population projections are estimated for each single year of age (0 to 120) and sex from 2022–23 to 2062–63.

Table A3.1 summarises population projections in the 2023 IGR.

Fertility

Future births are estimated by applying age specific fertility rate assumptions to the female population aged 15 to 49 in each year. These are based on Treasury analysis and projections by Peter McDonald, Professor of Demography at the University of Melbourne's Melbourne School of Population and Global Health.

The long-term total fertility rate assumption used in this report remains unchanged from the 2021 IGR.

2023 Intergenerational Report | Appendices

Mortality

Future deaths are estimated by applying age and sexspecific mortality rate assumptions to the population.

Assumptions about future mortality rates are based on life tables produced by the Australian Bureau of Statistics (ABS), to which the Australian Government Actuary's mortality improvement factors are applied. Mortality rates have been adjusted in 2022–23 to account for the impact of COVID-19. Mortality rates are assumed to return to pre-pandemic trends from 2023–24 onwards and continue declining at historical rates.

The mortality improvement factors used in this report are unchanged from the 2021 IGR.

Net overseas migration

Forecasts of net overseas migration (NOM) incorporate data on international border crossings, offshore visa grants, and overseas migration from the Department of Home Affairs and the ABS. The projections in this report build on those presented in the 2023–24 Budget.

Long-run NOM is assumed to be 235,000 persons per year, the same as in IGR 2021. NOM is assumed to transition to this long-run level over five years beginning from the end of the forward estimates. This long-run assumption amounts to an average contribution by NOM of 0.7 percentage points to annual population growth, consistent with the average contribution over the past 40 years. NOM outcomes over coming decades will depend on several factors including the future migration policy of successive governments and future economic conditions.

Table A3.1   Population projection summary

		2022–23	2032–33	2042–43	2052–53	2062–63
Population (millions)		26.5	30.4	33.9	37.3	40.5
	0–14	4.8	5.1	5.5	6.0	6.3
	15–64	17.2	19.4	21.4	23.1	24.8
	65–84	4.0	5.0	5.7	6.4	7.4
	85+	0.6	0.9	1.4	1.7	2.0
Life expectancy at birth (years)						
	Male	81.3	83.5	84.9	86.1	87.0
	Female	85.2	86.9	87.9	88.7	89.5
Total fertility rate		1.66	1.62	1.62	1.62	1.62
Old-age dependency ratio		26.6	30.6	32.9	35.2	38.2
Population growth		2.0	1.2	1.0	0.9	0.8
Net overseas migration (contribution to population growth, percentage points)		1.5	0.8	0.7	0.6	0.6

Note: Life expectancy figures are calculated using the period method. The old age dependency ratio refers to the number of people aged 65 and over for every 100 people of traditional working age (15 to 64) in the population.

Source: Analysis undertaken by Treasury and McDonald (2020).

Lifetime fiscal impact, as estimated using the FIONA model

The lifetime fiscal impacts of different groups of permanent migrants shown in Chart 2.13 have been estimated using Treasury's Fiscal Impact of New Australians (FIONA) model. FIONA is a demographic cohort model, which captures the fiscal impact of a single cohort of permanent migrants – the 2018–19 cohort – over their remaining lifetimes in Australia. The FIONA model presents results in net present values (NPV) in 2018-19 dollars, calculated using a nominal discount rate, broadly reflecting the Government's cost of borrowing over the long term. The results are best interpreted by comparing estimates of different migrant groups (or between migrant groups and the general Australian population), rather than focusing on absolute dollar values. This is because the relativities between groups are robust to different modelling choices and assumptions over the long run, whereas the absolute level estimates vary much more widely. The results presented in Chart 2.13 relate only to tax revenues retained and government expenses incurred by the Australian Government.

Participation rate projections

The increase in the total participation rate since the first IGR in 2002 has been larger than projected. Future projections for participation rates have been successively revised upwards.

The participation rate projections in this Report are based on the methodology explained in detail in Treasury Working Paper 2021–02 Australian Labour Force Participation: Historical Trends and Future Prospects. This methodology considers how participation rates vary with changes in the age structure of the population, over the lifecycle of cohorts, and between different generations. A generation's participation rates later in life partly depend on their observed participation at younger ages.

Productivity projections

Labour productivity is typically defined as output per hour worked. Factors that can affect labour productivity trends include workers' skills, technological change, management practices and the productive capital stock.

The macroeconomic projections in this Report use an approach to projecting labour productivity that incorporates a direct role for changes in the productive capital stock to lead to changes in labour productivity. Labour productivity growth depends on both underlying productivity and the productive capital stock.

Underlying productivity reflects changes in productivity that are unrelated to growth in labour and capital inputs. Underlying productivity is unobserved and so is typically modelled to reflect the remaining component of output growth that is unexplained by increases in measured labour and capital inputs.

Underlying productivity growth is assumed to converge over a 10-year period to 1.2 per cent per year, around the average growth rate in labour productivity over the last 20 years. This long-run assumption has been downgraded from the 30-year average of 1.5 per cent to better reflect Australia's more recent productivity experience.

The productive capital stock refers to the productive assets available to assist in producing output. It increases with business investment and decreases due to the depreciation of existing assets.

Long-run growth in the stock of productive capital is linked to growth in underlying productivity. This reflects an assumption that, in the long run, labour (adjusted for underlying productivity) and capital shares of output are constant.

Prices and wages

Output prices are a volume-weighted average of the price received for goods and services sold domestically and internationally.

High export prices often occur in periods of strong foreign demand for Australia's bulk commodities. For example, from the mid-2000s to 2011, strong demand for Australia's major commodity exports, particularly from China, drove a significant increase in the prices of iron ore and thermal and metallurgical coal. From 2011–12 to 2015–16, key commodity prices retreated from these record highs as new supply came online. This resulted in large falls in the terms of trade. Currently, the terms of trade are at a record high due to unusually high commodity prices caused by Russia's invasion of Ukraine and tight global supply conditions (Box A3.1).

Consistent with the approach to commodity prices in the 2023–24 Budget, key commodity prices are assumed to decline to their long-run anchors over four-quarters to be at their long-run level by 2024–25 and remain at these levels over the projection period. The terms of trade are projected to remain around their 2024-25 level over the projections.

Global and one-off supply factors played a significant role in Australia's recent elevated inflation. Supply disruptions associated with the COVID-19 pandemic and Russia's invasion of Ukraine and global energy price shock, resulted in high inflation over 2022. Broader domestic disruptions, including the impact of 2022's flood events, also contributed to high inflation.

Price pressures are expected to moderate gradually with inflation forecast to return to the midpoint of the RBA's inflation target band of 2 to 3 per cent by 2025–26 in line with the 2023–24 Budget forecasts. Inflation is then assumed to stay at 2.5 per cent per year for the duration of the long-term projection period. Nominal wages growth is projected to converge to 3.7 per cent per year, consistent with the projection for domestic inflation and the long-run labour productivity growth assumption.

Box A3.1   Terms of trade

The terms of trade measure export prices relative to import prices. They have a significant influence on Australia's gross national income (GNI) and nominal GDP. The terms of trade are currently at near record highs, with unusually high commodity prices arising from Russia's invasion of Ukraine and tight global supply (Chart A3.1).

The real prices of Australia's commodity exports are expected to fall until 2024–25, before stabilising at long-term levels. Income growth from 2026–27 is driven by real GDP growth alone as movements in the terms of trade cease to contribute to changes in real income growth.

However, there is considerable uncertainty around these projections. The global energy transition and other economic developments will shift demand and supply trends and change the products, prices and volume of goods demanded from Australia.

Favourable terms of trade – when export prices are high relative to import prices – increase domestic incomes as Australia is able to buy more imports for a given number of exports.

Chart A3.1   Terms of trade
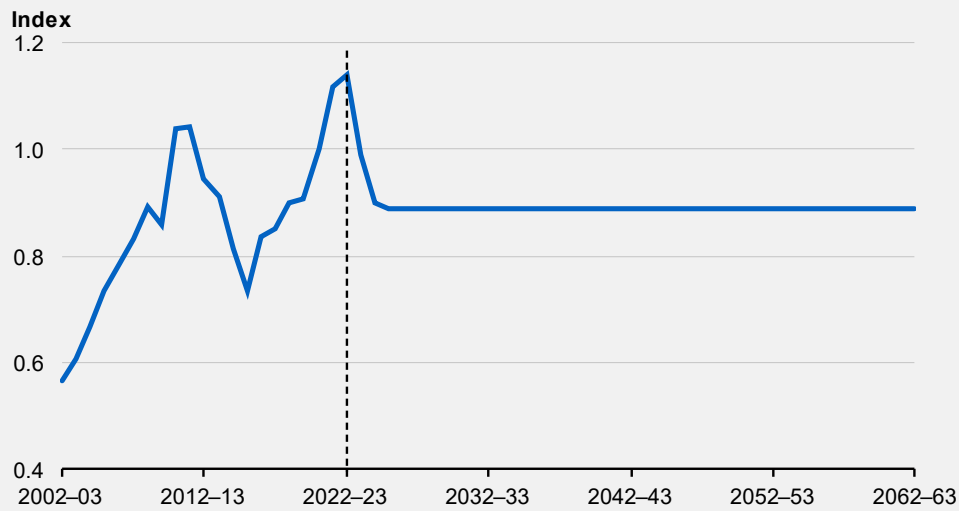
Note: Indexed to 2020–21.

Source: ABS Australian National Accounts: National Income, Expenditure and Product, and Treasury.

The terms of trade flow through the economy via several channels.

- An increase in export prices contributes to higher domestic incomes, including company profits.

- Higher domestic incomes support consumption and investment, which in turn support employment and wages growth.

- Stronger tax receipts from higher domestic incomes (particularly company profits) support greater general government revenue.

Aggregate fiscal projections

The IGR fiscal projections use the 2023–24 Budget medium-term projections as the baseline for the long-term projections. While the final budget outcome for 2022–23 is not yet finalised, the underlying cash surplus is expected to be around three quarters of one per cent of GDP higher. While this will lower the level of debt as a share of GDP, the outcome is not expected to materially change this report's 40-year projection trajectory.

The aggregate fiscal projections in this Report are produced using Treasury's Model of Fiscal Aggregates and Scenario Analysis (MFASA). MFASA brings together the outputs of separate but consistent models that project economic parameters, tax receipts, balance sheet items, and payments (Figure A3.1).

MFASA uses an internally consistent cash and accrual accounting system. This approach links the operating statement, the cash flow statement, and the balance sheet

2023 Intergenerational Report | Appendices

Figure A3.1   Preparing fiscal aggregates
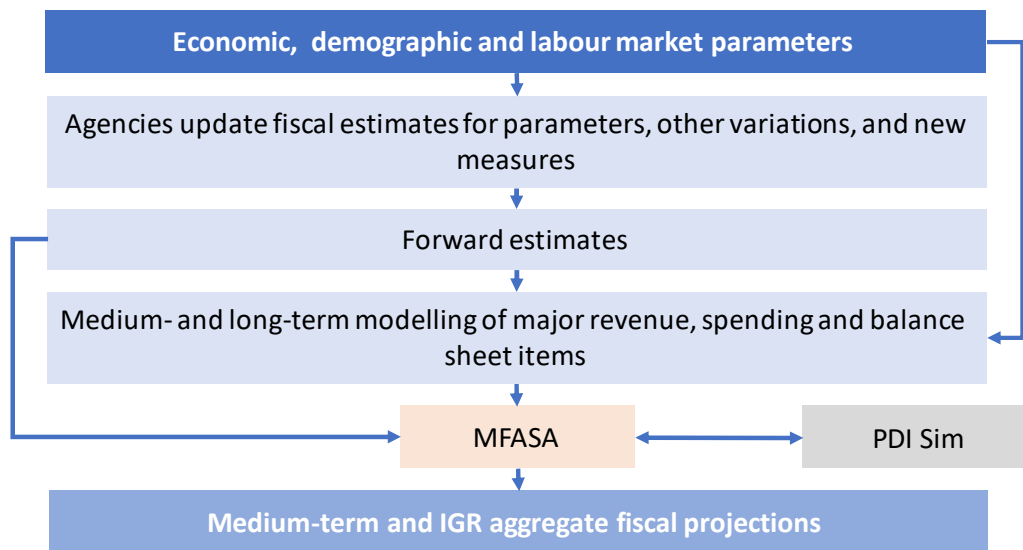
Source: Treasury.

In MFASA, the forward estimates are grown by relevant economic and demographic parameters to create long-term projections. Estimates are split into modelled and non-modelled components.

• The majority of receipts, spending and the Government's balance sheet are modelled and aggregated in MFASA.

• Non-modelled receipts and payments are grouped and grown by aggregate growth factors, such as CPI or nominal GDP.

The modelled and non-modelled components are then combined to calculate the financing task in each year. This is comprised of the underlying cash balance excluding interest payments on Australian Government Securities (AGS) plus balance sheet flows.

The financing task, the level of AGS on issue at the end of the forward estimates, and the yield curve in each year are inputted into a separate model, the Public Debt Interest Simulator (PDI Sim). PDI Sim calculates interest payments and the level of AGS This is inputted back into MFASA to generate the fiscal aggregates.

Revenue projections

The projection methodology for tax receipts in this Report relies on the broad correlation between major elements of nominal GDP (such as compensation of employees, gross operating surplus and nominal consumption) and their respective tax bases (personal income tax, company tax and GST). This is consistent with previous intergenerational reports. Projections of fuel and tobacco excise receipts take account of structural shifts, which are expected to result in their decline as a share of GDP over time.

Non-tax receipts are a relatively small component of total receipts and are projected based on assumptions. Sales of goods and services are assumed to remain constant as a share of GDP, and returns on financial assets are modelled using assumptions regarding interest rates and investment returns.

Long-term assumption to constrain tax receipts

A technical assumption that the tax-to-GDP ratio remains constant at 24.4 per cent from the end of the medium-term projection period is applied to projections beyond 2033–34. This assumption follows similar practices in past intergenerational reports where the tax-to-GDP ratio has been limited or held constant on the basis that a strict no-policy-change scenario would not be realistic.

A strict no-policy-change scenario over the long run would result in the tax-to-GDP ratio growing indefinitely due to the progressivity of the personal income tax scale and because personal income tax thresholds are set in nominal terms. Indefinite growth in the tax-to-GDP ratio through higher personal income tax is inconsistent with historical experience.

Spending projections

Demographic ageing impact on government spending

The expenditure impact of demographic ageing on major Government payments is estimated by comparing baseline projections of Government spending in 2062–63 to a hypothetical counterfactual scenario. This directly isolates the cost of demographic ageing for major Government payments (while other payment spending projections consider the effects of demographic ageing on payment growth, as well as non-demographic factors).

The counterfactual uses an alternative population projection which assumes the population age distribution remains fixed at June 2022 shares, but population growth is unchanged from baseline. Macroeconomic parameters (for example CPI, wages, GDP) also remain unchanged to fully isolate the impacts of a changing age structure (as opposed to broader effects from parameter changes).

Only selected major Government payments have been included in estimates of the impact of demographic ageing on spending, since these trends impact only some payments.

Payments modelled as part of these estimates include: Australian Government payments for Age Pension, Health, Aged Care, Carer Payment, Disability Support Pension, JobSeeker, Parenting Payment, Youth Allowance, Austudy, Child Care Subsidy, Family Tax Benefit, Paid Parental Leave, Higher Education, Schools and Vocational Education and Training.

Major payments not included are projections for Australian Government Infrastructure spending, Defence, and Official Development Assistance. National Disability Insurance Scheme (NDIS) payments are also excluded because the age distribution of Scheme participants over 65 is expected to change independently to the ageing of the general population.

Health

General methodology

Health expenditure beyond the forward estimates is projected initially based on individual component models for public hospitals, pharmaceutical benefits, medical benefits and private health insurance rebates. The share of health spending made up by each component has changed significantly over time. Expenditure not captured in the component models, such as veterans' health, public health programs and medical research, is held constant as a percentage of nominal GDP.

Component models are used to project the cost of health services per person from the end of the forward estimates to 2033–34. The uncertainty around the distribution of health expenditure between the components of health spending increases with the length of the projection period. Because of this, from 2034–35 onwards, an aggregate model is used to project total Australian Government health spending.

This long-run model assumes growth in the non-demographic factor trends towards a historical non-demographic growth rate for health spending by all levels of government. This is broadly consistent with the approach used in the 2010, 2015 and 2021 intergenerational reports.

The use of component models for the short term and an aggregate model for long-term projections seeks to balance the desire for more detailed projections against the uncertainty about recent trends in individual components of Government health spending will be representative of longer-term trends. Long-term modelling on a component basis could risk underestimating future spending pressures, which are driven by a variety of factors including technological change, demographic change and income growth.

Medical benefits

The medical benefits component model includes spending under the Medicare Benefits Schedule (MBS).

Projections are derived by combining non-demographic growth in current spending on medical benefits per person for age and gender cohorts with estimates of population (excluding the veterans' population) and CPI growth.

The non-demographic growth rate is derived from trends in historical MBS expenditure data. Real age-adjusted spending per person is calculated by adjusting historical spending for CPI growth and changes in the size and age structure of the population. An exponential trend is applied to this historical series, generating a non-demographic growth rate which is then applied as a constant percentage increase in spending across all age and gender cohorts.

Because veterans receive medical services under separate arrangements from the MBS, they are not included in the MBS projections. Spending on medical benefits for veterans is included as other health spending consistent with government budget presentation.

The age profile of medical benefits spending shows that spending per person is higher for older age groups than for younger age groups (Table A3.2). Spending per person on medical benefits peaks for those aged above 85.

Table A3.2   Index of the age profile of medical benefits spending per person, 2021–22

Age Group	Male	Female
0–4	0.45	0.40
5–9	0.34	0.30
10–14	0.34	0.36
15–19	0.39	0.63
20–24	0.40	0.80
25–29	0.42	0.89
30–34	0.50	1.10
35–39	0.59	1.18
40–44	0.68	1.11
45–49	0.76	1.10
50–54	0.87	1.18
55–59	1.05	1.26
60–64	1.28	1.40
65–69	1.63	1.65
70–74	2.06	1.98
75–79	2.58	2.38
80–84	2.87	2.60
85+	3.09	2.77
Weighted Average	**0.86**	**1.13**

Source: Treasury

Pharmaceutical benefits

The pharmaceutical benefits model covers spending under the Pharmaceutical Benefits Scheme and the Repatriation Pharmaceutical Benefits Scheme.

Projections are derived by applying non-demographic growth to current spending on pharmaceutical benefits per person for each age group in each gender. Population and CPI projections are then applied to derive nominal projections of spending. Expenditure on the Repatriation Pharmaceutical Benefits Scheme is included in the projections.

A non-demographic growth rate for each age and gender cohort is derived from trends in historical data on pharmaceutical benefits expenditure. Real per person expenditure for cohorts is calculated by adjusting historical expenditure for growth in CPI, with a linear trend applied to the series to calculate the non-demographic growth factors. Non-demographic growth is projected forward as a constant real dollar increase in spending each year for each age group and gender.

The age profile of pharmaceutical benefits spending shows that spending per person is higher for older age groups than for younger age groups (Table A3.3). Spending per person on pharmaceutical benefits peaks for those aged 80 to 84.

Table A3.3   Index of the age profile of pharmaceutical benefits spending per person, 2021–22

Age Group	Male	Female
0–4	0.10	0.09
5–9	0.17	0.12
10–14	0.24	0.19
15–19	0.25	0.26
20–24	0.27	0.34
25–29	0.33	0.40
30–34	0.39	0.50
35–39	0.49	0.66
40–44	0.60	0.79
45–49	0.77	0.91
50–54	0.95	1.04
55–59	1.26	1.25
60–64	1.64	1.53
65–69	2.31	2.02
70–74	3.09	2.66
75–79	3.81	3.11
80–84	4.41	3.51
85+	4.21	3.20
Weighted Average	**0.99**	**1.01**

Source: Treasury.

Hospitals

Government spending on public hospitals is projected based on the parameters of the 2020–25 National Health Reform Agreement over the medium-term period. Between 2022–23 and 2032–33, Australian Government spending on public hospitals grows by an average of 6.9 per cent per year.

Spending on hospital services for veterans has been included in the other health spending category consistent with government budget presentation.

Private health insurance rebate

The Government's contribution to an individual's private health insurance rebate is indexed annually by the lesser of the change in CPI or the actual average increase in the premium charged by insurers. Accordingly, the private health insurance rebate model projects spending based on growth in the CPI and population.

The current proportion of private health insurance holders in each five-year age cohort is assumed to remain constant beyond the forward estimates. The projection model assumes zero non-demographic real growth, as increases in private health insurance prices are capped at the CPI and increases in demand are assumed to be primarily driven by demographic factors.

The proportion of individuals holding private hospital cover is higher for older Australians, with 53 per cent of men aged 65 to 79 holding coverage. For women, those aged 70 to 74 are most likely to hold coverage (Table A3.4).

Table A3.4 **Proportion of the population holding private health insurance cover, 2021–22**

Age Group	Male	Female
0–4	0.36	0.36
5–9	0.44	0.44
10–14	0.46	0.46
15–19	0.45	0.46
20–24	0.32	0.34
25–29	0.22	0.27
30–34	0.35	0.41
35–39	0.44	0.49
40–44	0.48	0.51
45–49	0.49	0.51
50–54	0.49	0.52
55–59	0.49	0.51
60–64	0.51	0.53
65–69	0.53	0.55
70–74	0.53	0.56
75–79	0.53	0.56
80–84	0.53	0.52
85+	0.49	0.45
Weighted Average	**0.44**	**0.46**

Source: Treasury.

Other spending

Other health spending includes all other Australian Government health spending. Major components of this expenditure include:

• spending on veterans' health care

• population health and safety programs, health and research; and

• health workforce programs including payments to general practitioners for infrastructure, training and support, and the Practice Incentives Program.

For the purposes of this Report, other health spending also includes expenditure on measures to address the COVID-19 pandemic, including purchases of personal protective equipment and COVID-19 vaccines. It also includes funding provided to the states and territories through the National Partnership Agreement on COVID19 Response. This spending does not flow through to the long-run projections as it is expected to cease before the end of the forward estimates period.

Other health spending, excluding veterans' health care, is assumed to remain constant as a proportion of GDP. This approach is consistent with the modelling of other non-demographic payments, other than interest payments.

Veterans' health care includes all spending on veterans' health care administered by the Department of Veterans' Affairs except spending on the Repatriation Pharmaceutical Benefits Scheme, which is included in the pharmaceutical benefits projections.

Veterans' spending per person on medical benefits is assumed to be equivalent to the general population. Spending per person on hospitals is assumed to grow at the same rate it does over the forward estimates. Residual veterans' health spending per person is projected as a constant proportion of GDP per person.

Aggregate model

Spending on different components of Australia's health system will grow at different rates over time, in the short and medium term. These differences reflect a range of factors including advances in medical technology and policy choices (for example, in periods with a greater focus on preventative health). History suggests these differences are unlikely to remain consistent over the long term. For this reason, the projection transitions to an aggregate model of health expenditure from 2034–35.

Real spending per person in each age and gender group is grown by an aggregate non-demographic growth rate. This expenditure is combined with changes in Australia's demographics and forecasts of CPI growth to produce nominal expenditure projections for the years from 2034–35 to 2062–63. The non-demographic growth rate is calculated from the growth in real, age-adjusted spending per person from all governments. The growth rate is derived from the series of all government health spending adjusted for CPI growth and changes in the size and age structure of the population.

The non-demographic growth rate is determined by fitting an exponential trend to the series and is estimated using the past 20 years of pre-COVID historical data. This reflects the most recent period of growth in age adjusted health spending per person but is still long enough to abstract from cyclical changes.

Health spending data sources are at Table A3.5.

Table A3.5   Health spending data sources

Pharmaceutical benefits

Age-cost profiles

Five year age-cost profiles by gender from 2002–03 to 2021–22. Data includes all Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme spending sourced from the Department of Health and Aged Care. Where expenditure was not attributed it was imputed to have been distributed according to the profile of expenditure which was attributed .

Historical program spending

Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme data from the Department of Health and Aged Care.

Medical benefits

Age-cost profiles

Five year age-cost profiles by gender from 1984–85 to 2021–22. Data includes Medicare Benefits Schedule sourced from the Department of Health and Aged Care. Where expenditure was not attributed it was imputed to have been distributed according to the profile of expenditure which was attributed.

Historical program spending

Medicare Benefits Schedule data from the Department of Health and Aged Care.

Hospitals

Historical program spending

Australian Government funding for public hospitals from the Australian Institute of Health and Welfare and Department of Health and Aged Care.

Private Health Insurance

Proportion of individuals holding hospital cover

Calculated using data from the Australian Prudential Regulation Authority provided by the Department of Health and Aged Care.

Historical program spending

Private Health Insurance Rebate spending from the Department of Health and Aged Care and the Australian Taxation Office.

Other health

Historical program spending

Healthcare spending on veterans from Commonwealth budget papers and Department of Veterans' Affairs Annual Reports.

Veteran's Population

Veterans' population historical data and projections supplied by the Department of Veterans' Affairs .

Source: Treasury.

Aged care

Long-term projections involve judgements around how long trends in spending for different components are likely to continue. The changes to aged care modelling balance the desire for policy insight with the need for internal consistency and transparency in the long-term projections. These changes also align the modelling for aged care spending with the modelling approach taken for other health expenditure.

Projections of aged care spending over the next 40 years are based on historical trends in the cost of aged care services per head of population by age and gender, combined with projected population changes, CPI growth, and estimated non-demographic factors.

In general, projections are derived by first applying an estimated non-demographic growth rate to the current aggregate spending per person. These estimates are then increased by projected population growth and CPI growth to derive a nominal projection of spending.

For simplicity, the modelling approach estimates one non-demographic growth rate for total aged care spending, rather than for individual age cohorts. The non-demographic growth rate is derived from trends in the historical data. This is done by first adjusting historical aged care spending data for CPI growth and changes in the size and age structure of the population to derive a series of real, age-adjusted aged care spending per person. The non-demographic growth rate is then determined by fitting a trend to this series. For spending on aged care, an exponential trend fits the data more closely than a linear trend, so non-demographic growth is projected as a percentage increase in spending each year.

Modelling approaches for aged care expenditure have varied across intergenerational reports. They capture and project similar effects, leading to similar estimates of growth in aged care spending as a proportion of GDP over the long term. Aged care spending for the six years beyond the end of the forward estimates (over the medium-term period to 2033–34) is based on growth in aged care spending at a component level. From 2034–35 onwards (that is, the long term), this Report uses a model of total Australian Government aged care spending that assumes that non-demographic growth increases to the historical growth rate for aged care spending. This is consistent with the approach taken in the 2021 IGR.

The growth in aged care spending is driven by non-demographic factors and growth in the number of people aged 85 and over (the age cohort who make up the vast majority in aged care). The relative impact of recipient growth falls over the projection period and the growth in costs becomes the dominant factor in aged care spending growth. This is a result of the decreased growth in the number of people aged 85 and over as the smaller cohort which follows the baby boomers moves into aged care eligibility ages.

Non-demographic factors could include government policy decisions, changing consumer preferences and real wage developments. Population growth and price growth are relatively stable contributors to aged care spending growth. Growth in the estimated non-demographic factor has been volatile over history, largely reflecting policy adjustments over the past two decades as consumer preferences have changed and

people's desire and ability to age at home has grown. As a result, there can be large variability in the historical average non-demographic growth rate depending on the time period over which it is calculated. The approach used in this Report assumes that growth in the non-demographic factor converges to its 20-year historical average over a 10-year period to smooth the transition and avoid sharp adjustments between the end of the medium term and the beginning of the long-term period.

National Disability Insurance Scheme

NDIS projections in this Report focus on reasonable and necessary supports for participants.

In the medium term, as the Scheme matures, the growth of NDIS costs moderates over time, consistent with the 2023–24 Budget. Growth in Scheme costs continues to moderate until 2043–44, when it is assumed the Scheme will grow at the same rate as nominal GDP.

Underlying this methodology, is an assumption that the Scheme will mature by 2043-44. This is more than 30 years after its establishment. The date of maturity of the Scheme is uncertain. In the 2021 IGR the Scheme was assumed to mature earlier, by the early 2030s, and at a significantly lower per cent of GDP. Recent outcome data has suggested that the Scheme will take longer to mature. By 2043–44, the Scheme will have a cohort of older Australians who have aged in the Scheme after joining before age 65.

Once the Scheme matures, from 2043–44, it is assumed that costs will grow in line with nominal GDP growth. This is similar to the methodology used in the 2021 IGR at Scheme maturity. At maturity, the number of participants in the Scheme is assumed to grow with the Australian population. Average cost per participant is assumed to grow with increases in prices and wages, which are expected to rise with inflation and labour productivity.

The Australian Government and state and territory governments jointly fund the NDIS. State funding contributions to the NDIS are assumed to grow over the projection period in line with bilateral agreements, at 4 per cent, with the Australian Government responsible for the balance of the Scheme costs. Full Scheme agreements with seven states and territories provide for five yearly reviews of costs. Some of those agreements include that the growth rate of states' contributions may be reassessed by the parties following each independent review of NDIS costs. Other agreements provide for the growth rate to not be part of reviews of costs until the 2028 review.

Income support payments

Comprehensive policy models are outlined below.

Age and Service Pension

Age and Service Pension expenditure, as well as other projections related to the retirement income system, are produced using Treasury's Model of Australian Retirement Incomes and Assets (MARIA). MARIA is a long-term, population-level, dynamic microsimulation model of Australia's retirement income system. MARIA begins with 2019–20 administrative base data supplemented with survey data from the HILDA Survey and the ABS Survey of Income and Housing. The model is run on a representative sample of this complete dataset.

MARIA uses Treasury analysis to develop input parameters that simulate the characteristics of each individual for every year of the model run, based on their characteristics in the previous year. These characteristics include household composition, labour force participation, income, and compulsory and voluntary superannuation contributions. Some characteristics are not modelled dynamically year-on-year, but rather imputed at the point of retirement. These characteristics include home ownership status and non-superannuation savings. The imputation is based on factors such as age, education level, work experience and superannuation balance.

MARIA's key output is defined contribution superannuation amounts held by individuals, both accumulation throughout working life and drawdown in retirement. MARIA can, therefore, also project the aggregate defined contribution funds under management in the superannuation system.

MARIA projects Age Pension spending and coverage based on the simulated superannuation assets, imputed non-superannuation assets and deemed income of individuals and their partners.

Long-run estimates of superannuation tax concessions

The long-run value of superannuation tax concessions is estimated using MARIA on a revenue forgone basis. The cost of tax concessions is estimated independently each year (that is, there is no dynamic impact of the removal of concessions over time).

These estimates broadly replicate the methodology and benchmark used in the Tax Expenditures and Insights Statement. These include combined estimates of capital gains and earnings tax concessions provided to superannuation funds (reflecting a combined C1 and C4 estimate from the Tax Expenditures and Insights Statement), and contributions tax concession estimates (reflecting a combined C2 and C3 estimate from the Tax Expenditures and Insights Statement).

The long-run estimates in MARIA have been constructed on an additive basis to facilitate analysis of trends. The value of superannuation tax concessions is estimated by adding contributions and earnings to taxable income in two stages and applying the progressive income tax rates at each stage. This allows the benchmark scenario to be calculated,

where superannuation concessions are included in personal taxable income and taxed at marginal rates. The value of the earnings tax concession is the difference between the total value of concessions and value of contributions tax concessions.

From 2033–34, several personal income tax thresholds and offsets that comprise the benchmark are assumed to be indexed to wage growth, as was the case in the 2021 IGR.

Coverage trend models

Coverage trend models are used where spending is related to the number of recipients or recipient rates for a payment, and the unit cost growth is linked to a price index. These models are used to project spending on Disability Support Pension, Parenting Payment Single, Parenting Payment Partnered, JobSeeker Payment, Youth Allowance (Student and Other), Austudy, Carer Payment, Family Tax Benefit, Paid Parental Leave, and Child Care Subsidy.

The approach takes historical data on program take-up rates and applies it to forecast population growth and unemployment to project future recipients. This is used in combination with a standard unit cost to project the future level of spending. The standard unit cost is usually independent of age or gender and assumed to grow in line with either wages or CPI growth (or a combination) in the future. The projection of coverage may involve non-linear techniques such as logistic functions (Table A3.6).

Table A3.6   Coverage trend model projection methodologies

	Coverage rates	Future trends	Unit cost growth outside the forwards estimates
Disability Support Pension	Based on age and gender	Logistic function used to predict future take-up	The higher of Average Weekly Earnings and CPI
Parenting Payment Single	Based on age and gender	Based on current and historical recipient shares	The higher of Average Weekly Earnings and CPI
Jobseeker Payment	Based on age and gender	Based on age and gender unemployment growth	CPI
Youth Allowance (Other)	Based on age and gender	Based on age and gender unemployment growth	CPI
Parenting Payment Partnered	Based on age and gender	Based on age and gender unemployment growth	CPI
Carer Payment	Based on age and gender	Logistic function used to predict future take-up	The higher of Average Weekly Earnings and CPI
Youth Allowance (Student)	Based on age and gender	Based on constant recipient shares	CPI
Austudy	Based on age and gender	Based on constant recipient shares	CPI
Family Tax Benefit	Based on age	Based on constant recipient shares	CPI
Paid Parental Leave	Based on births	Based on current take-up and birth projections	10 year historical weekly minimum wage
Child Care Subsidy	Based on age	Based on constant recipient shares, child care hours and unit price growth	Assumes prices trend to CPI, and hours growth to zero, by end of the medium term.

Source: Treasury.

Education

The projections of Higher Education Funding use CPI and long-term averages of location-specific funding factors to project the Commonwealth Grant scheme over the long term. This assumes that the relative funding growth levels by region at the end of the medium term are held fixed through to 2062–63.

The projection of schools funding draws on the Schooling Resource Standard (SRS) – an estimate of how much total public funding a school needs to meet its students' education needs. This is an important factor influencing schools' spending. Average funding amounts per student are indexed to the SRS, and student growth is based on population projections by age.

Vocational education and training (VET) participation rates for apprentices and students are projected to grow in line with the general population. The average funding amount per student is indexed to a wage cost index.

Defence

Defence spending is consistent with the medium-term projections presented in the 2023–24 Budget. At the end of the medium term, defence spending is projected out to 2062–63 as a constant share of GDP. For the 2023 IGR, this projection assumes that defence spending is around 2.3 per cent of GDP from 2033–34 to 2062–63.

GST payments

As the GST is passed on to the states, GST payments are assumed to equal GST receipts plus the GST pool boost in the long run.

Other spending

Some Government spending such as on the Australian Public Service, tourism, and community development are not explicitly modelled. The 'other spending' component is calculated as the residual of the difference between total modelled payments and total payments over the forward estimates from Australian Government financial statements. This component is indexed to nominal GDP growth for the medium and long-term.

Other analysis

Care and support sector

In Box 1.4, estimates of the care and support sector as a share of GDP are based on the ABS Australian and New Zealand Standard Industrial Classification (ANZSIC) Health Care and Social Assistance industry division. This is grown by expected increases in total health, aged care and NDIS spending to obtain estimates of the size of the care and support sector over the projection period.

Estimates of total health and aged care spending are derived using historical estimates of spending splits between government and private payments. Projected Australian Government spending is then used to hold these shares constant over the projection period. Employment in the care economy is assumed to grow in line with output growth.

Health, aged care and NDIS are used as the spending projections provide an indication of how the care and support sector may grow due to their relative size. The inclusion of other care sectors, such as childcare and disability care that is outside the NDIS, is unlikely to change the estimates significantly. Estimates do not include the unpaid elements of the care and support sector.

These estimates consider the care and support sector in isolation from the rest of economy and assume that supply is available to respond to increased demand. Possible technological advancements are not reflected in the estimates.

Balance sheet items

Investment funds and government-financed investment vehicles

New investment funds and government-financed investment vehicles are financed through additional borrowing when the budget is in deficit. This will increase gross debt. Public debt interest associated with this additional borrowing increases the underlying cash deficit.

The impact on net debt depends on the nature of the asset acquired. Debt-like financial assets, such as loans, are included as assets in net debt and offset the increases in debt issuance. Acquisition of non-debt-like financial assets, such as equity investments, will increase net debt.

The acquisition of financial assets for policy purposes decreases the headline cash balance (HCB). The HCB does not capture investments in financial assets for liquidity purposes (such as the Housing Australia Future Fund).

Balance sheet investments which earn a market rate of return do not change net financial worth when they are established. This is because an increase in liability is offset by an equal increase in financial assets. However, where the value of the asset acquired is less than the amount borrowed (for example in concessional loans) net financial worth is reduced.

In this Report, investment funds and government-financed investment vehicles are modelled over the projection period based on indexation assumptions, such as CPI, and investment mandates.

Australian Government Future Fund

The Future Fund is the Government's largest investment fund. It is modelled based on the Government's current investment mandate. This states that the benchmark annual average return is equal to at least CPI plus 4 to 5 per cent per year.

The Government has not announced when drawdowns from the Future Fund will commence. As a technical assumption, drawdowns from the Future Fund are assumed to begin in 2032–33. This is when the opening balance of the Future Fund is projected to reach the projected value of the public sector superannuation liability.[69] Drawdowns are assumed to be equal to the Government's annual unfunded superannuation payments, consistent with the intent of the Fund's establishment.

Modelling assumes that the holdings of the Future Fund are broadly allocated between two financial asset classes: investment, loans and placements (cash and other liquid assets

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69   This simplifying assumption is not equivalent to drawing down the fund when it reaches the Target Asset Level (TAL) estimated by the designated Future Fund Actuary. The TAL can differ from the assumption in this report due to differences in actuarial judgment on assumed economic parameters, rates of return and discount rates.

such as interest-bearing liabilities) and equity holdings. The asset portfolio is weighted towards investment products, consistent with the current asset allocation of the Fund.

Interest and dividend receipts less management expenses make the Future Fund grow below the mandate. To ensure the Future Fund achieves its mandate, capital gains act as a balancing factor.

Higher Education Loan Program (HELP)

HELP projections depend on a microsimulation model of incomes and repayment parameters. Key inputs are data on the income and transactions of HELP debtors provided by the Australian Taxation Office, alongside a number of demographic variables. The model simulates future incomes for each individual with an outstanding HELP debt. Future repayments against the outstanding debt, as well as debt that is not expected to be repaid, can then be estimated.

The repayment pattern generated by the model for debt incurred in the most recent financial year is applied to debt expected to be incurred in future years. This means that any growth in the aggregate debts being incurred above normal indexation rates is the result of increased numbers of students rather than higher average debts in real terms.

Repayments of VET debt are modelled separately but also rely on income profiles and a broadly similar methodology to non-VET debt.

In the long term, the number of students taking out loans is assumed to grow in line with the population aged 15 to 34 and the average size of new loans is assumed to grow in line with wages. Based on analysis of historical data, in the long term, around 12 per cent of new debt is not expected to be repaid, reflecting the income contingent nature of the loans.

Government Employee Superannuation

The government's employee superannuation liability arises from government defined superannuation schemes. Projections of the unfunded defined benefit and the associated Australian Government cash outlays rely on actuarial valuations and demographic and economic assumptions.

The four major Australian Government defined benefit superannuation schemes are closed to new members. This includes the Commonwealth Superannuation Scheme, the Public Sector Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, and the Military Superannuation and Benefits Scheme.

Australian Defence Force Cover remains open to new members and is projected to continue to grow while the liability associated with the four major defined benefit superannuation schemes declines over time.

Endnotes

i   Centre for Population (Commonwealth of Australia), *2022 Population Statement 2022*
         (6 Jan. 2023), https://population.gov.au/sites/population.gov.au/files/2023-
         01/population_statement_2022_0.pdf, accessed 15 Aug. 2023.

ii   Treasury (Commonwealth of Australia), *2023–24 Budget Paper No.3, Appendix A:
         Parameters and further information* (Canberra: 2023), 117.

A4 Sensitivity of projections to economic and demographic assumptions

Long-term projections necessitate judgements and technical assumptions. Sensitivity analysis assesses the uncertainty inherent in these projections by considering alternative assumptions. The analysis in this appendix illustrates the impact of small changes in assumptions on economic and fiscal projections.

The following sensitivity analyses are considered in this Appendix:

• higher and lower population projections

• higher and lower trend participation rate, and

• higher and lower trend productivity growth.

The body of the Report also includes several other scenarios exploring how alternative outcomes could impact the fiscal position:

• disaster recovery spending under alternative climate scenarios (Chapter 5)

• higher and lower Government bond yields (Box 6.2)

• earlier and later dates of Scheme maturity for the NDIS (Box 7.2), and

• fuel excise impact under alternative take-up of electric vehicles (Box 8.2).

Summary of sensitivity analyses

Table A4.1 and Table A4.2 contain assumptions and results of the participation, productivity and population sensitivity analyses.

Table A4.1   Assumptions underlying sensitivity analysis

	Baseline	Lower	Higher
Population			
Long-run annual net migration (no. of people per year)	235,000	185,000	285,000
Long-run total fertility rate (babies per woman)	1.62	1.52	1.72
Participation			
Labour force participation rate (15+) (%)	63.8	61.8	65.8
Productivity			
Labour productivity growth (%)	1.2	0.9	1.5

Source: Treasury.

Table A4.2   Sensitivity analysis results

	Baseline		Population		Participation		Productivity	
			Higher	Lower	Higher	Lower	Higher	Lower
Economic	2022–23	2062–63	2062–63	2062–63	2062–63	2062–63	2062–63	2062–63
Real GDP growth (%)	3.1	1.9	2.1	1.6	2.0	1.8	2.2	1.6
Real GDP per person growth (%)	1.1	1.1	1.1	1.0	1.2	1.0	1.4	0.8
Real GDP per person ($)	83,900	131,800	131,900	131,500	135,900	127,700	144,000	120,100
Real GNI per capita ($)	82,100	123,900	124,000	123,600	127,800	120,100	135,400	113,000
Labour force participation (%)	66.6	63.8	64.7	62.9	65.8	61.8	63.8	63.8
Labour force size (millions)	14.3	21.7	23.4	20.0	22.4	21.0	21.7	21.7
Old-age dependency ratio	26.6	38.2	35.8	40.9	38.2	38.2	38.2	38.2
Spending (% of GDP)								
Aged care	1.1	2.5	2.3	2.7	2.4	2.6	2.3	2.7
Aged and Services Pensions	2.3	2.0	1.8	2.1	1.9	2.1	2.0	2.0
Education	1.7	1.2	1.2	1.2	1.2	1.2	1.1	1.3
Health	4.2	6.2	6.0	6.4	6.0	6.4	5.7	6.8
NDIS (Australian Government)	0.9	2.1	2.0	2.1	2.0	2.1	2.0	2.1
Payments to individuals	3.1	2.7	2.8	2.8	2.7	2.9	2.6	2.9
Total payments	24.8	28.6	27.9	29.5	27.7	29.6	27.0	30.5
Fiscal projections (% of GDP)								
Underlying cash balance	0.2	-2.6	-1.9	-3.4	-1.8	-3.5	-1.0	-4.5
Primary cash balance	0.7	-1.4	-0.9	-2.0	-0.9	-1.9	-0.4	-2.5
Gross debt	34.9	32.1	25.4	40.3	23.0	42.2	16.3	52.6

Source: Treasury.

Population sensitivity analysis

Future population growth is dependent on changes in the total fertility rate and the level of net overseas migration. This sensitivity analysis examines how different fertility rates and levels of migration may impact Australia's population and long-term economic and fiscal projections.

Under the higher population growth analysis, Australia's annual rate of population growth is 0.2 percentage points higher than in the baseline. This analysis assumes net overseas migration is 50,000 higher each year from 2031–32 with the total fertility rate assumed to converge to a higher long-run assumption of 1.72 babies per woman. These factors combined would result in the projected population being 3.1 million higher by 2062–63. The effect on population growth in the lower growth analysis is broadly symmetric.

Under the higher growth analysis, Australia's median age is lower, at 41.8 years in 2062–63. This is 2.7 years younger than it would be under the lower growth analysis, in which the median age increases to 44.5 years in 2062–63. Nevertheless, Australia's population is expected to continue ageing even under the higher population growth analysis.

The effects of higher and lower population growth on economic and fiscal projections are broadly symmetric. For illustrative purposes, the effects of higher growth are outlined.

The higher overall population results in an increase in the projected level of real and nominal GDP by around 7¾ per cent by 2062–63. As migrants are on average younger than the overall Australian population, increasing the level of migration increases the working-age population and delays the effects of population ageing. This lifts the participation rate by around three-quarters of a percentage point by 2062–63. However, this analysis does not consider any productivity effect of migration or other factors that may influence labour force participation beyond age and gender, such as a worker's skill or experience. Doing so may change the contribution of migration to GDP.

Payments are higher in nominal terms reflecting the fact that a variety of payments, such as infrastructure, payments to individuals, and health are projected to grow with population growth or assumed to increase in line with the economy. However, total government spending is projected to be lower as share of GDP, reflecting that the population is younger on average, and therefore has lower per person utilisation of Age Pension, health care and aged care. Tax receipts grow broadly in proportion to the increase in nominal GDP and remain constant as a share of GDP from 2033–34.

The net effect is that the underlying cash deficit is reduced by 0.7 percentage points of GDP in 2062–63 (Chart A4.1). As a result, smaller deficits cumulatively reduce gross debt by 6.7 percentage points of GDP in 2062–63 (Chart A4.2).
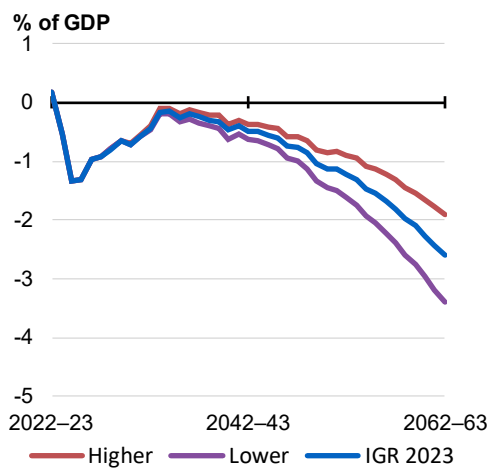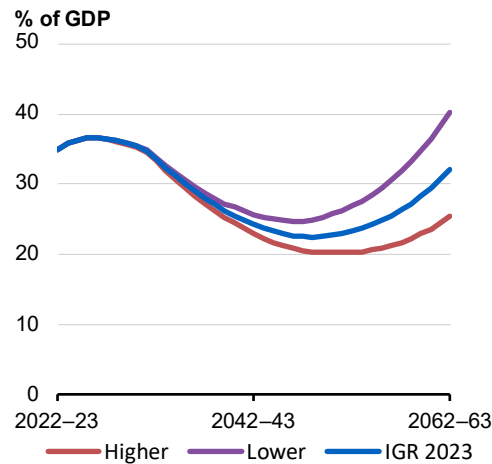
Chart A4.1   Underlying Cash Balance

Chart A4.2   Gross debt

Source: Treasury.

There are other fiscal implications of population growth that are outside the scope of this analysis. This includes environmental impacts and the additional revenues and costs for other levels of government for infrastructure and the provision of essential services.

Participation sensitivity analysis

Labour force participation is an important determinant of Australia's potential GDP growth. This sensitivity analysis examines the effects of a higher and lower labour force participation rate on long-term economic and fiscal projections.

The effects of higher and lower participation are broadly symmetric. For illustrative purposes, the effects of a 2 percentage points higher participation rate are outlined. The levels of real and nominal GDP are both projected to be around 3 ¼ per cent higher in 2062–63.

Total government spending is projected to be lower as a share of GDP. However, higher labour force participation increases the nominal value of some payments. For example, higher participation results in more people actively seeking work, resulting in more

recipients on unemployment benefits. Nominal defence and infrastructure spending are assumed to increase in line with GDP. Tax receipts grow broadly in proportion to the increase in nominal GDP and remain constant as a share of GDP from 2033–34.

The net effect is that the underlying cash deficit is reduced by 0.8 percentage points of GDP in 2062–63 (Chart A4.3). As a result, smaller deficits cumulatively reduce gross debt by 9.1 percentage points of GDP in 2062–63 (Chart A4.4).

Chart A4.3   Underlying Cash Balance
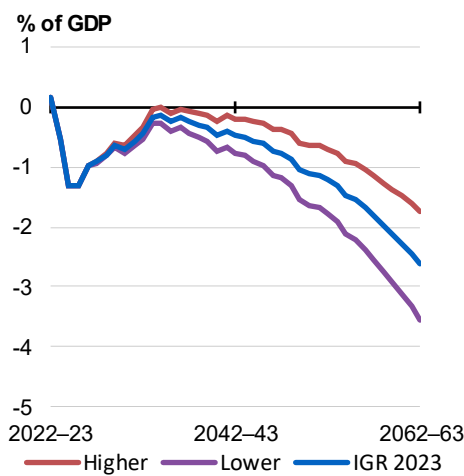
Chart A4.4   Gross debt
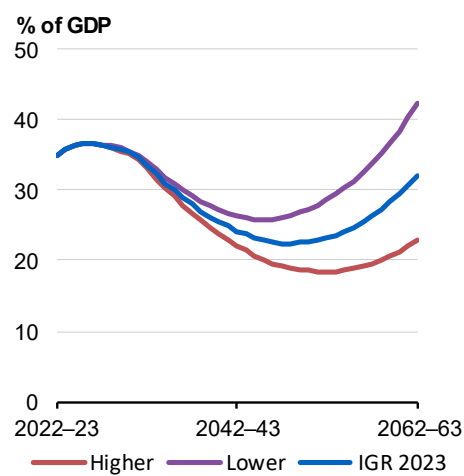
Source: Treasury.

Productivity sensitivity analysis

In the long term, productivity is the key driver of economic growth and rising living standards. This sensitivity analysis examines the effects of higher and lower underlying productivity growth on long-term economic and fiscal projections.

The effects of higher and lower productivity are broadly symmetric. For illustrative purposes, the effects of a 0.3 percentage points higher productivity growth are outlined. The level of real and nominal GDP is projected to be around 9½ per cent higher in 2062*63. Higher productivity is also projected to increase wages by 8½ per cent in 2062*63.

Total payments are projected to be lower as share of GDP. However, many payments are higher in nominal terms due to higher wages and a larger economy. Tax receipts grow broadly in proportion to the increase in nominal GDP and remain constant as a share of GDP from 2033–34.

The net effect is that the underlying cash deficit is reduced by 1.6 percentage points of GDP in 2062–63 (Chart A4.5). As a result, smaller deficits cumulatively reduce gross debt by 15.8 percentage points of GDP in 2062–63 (Chart A4.6).
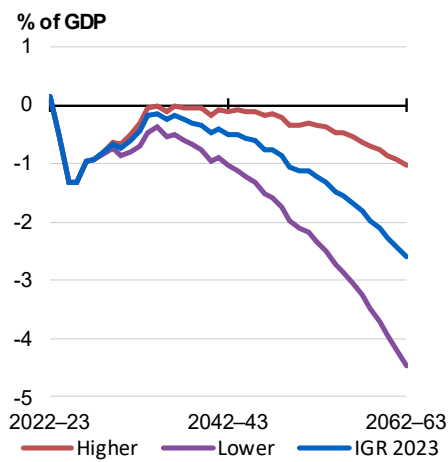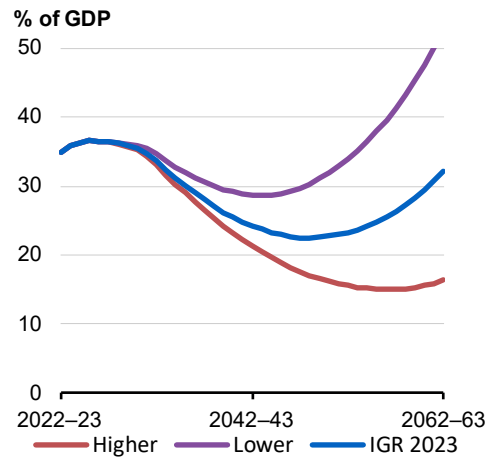
Chart A4.5   Underlying Cash Balance

Chart A4.6   Gross debt

Source: Treasury.

A5 Climate change modelling

This section explains key concepts, methodological approaches and assumptions underpinning the climate change-related analyses referenced throughout Chapter 5 and within Box 8.2 of this Report. It also provides further details on the modelling results and limitations.

Global climate scenarios

The future in relation to climate change is highly uncertain. The extent of future climate change, and the risks and opportunities emerging from it, will be affected by many unpredictable factors. These include global economic growth, population growth, urbanisation, consumption preferences, technology change and the extent of global policy cooperation. Global climate scenarios, which incorporate explicit assumptions about these factors, are a core input for modelling and analysis of how countries, sectors and regions may be impacted by climate change and the net-zero transformation.

To inform the analysis in this Report, four climate scenarios were selected to illustrate the range of potential future global warming level outcomes, as classified by their temperature outcomes at 2100. The scenarios are outlined in Table A5.1. Box A5.1 provides a short description of key concepts applied to climate change scenarios.

The four scenarios were chosen after consultation with climate change experts, an extensive literature review and review of the available data. Given the uncertainty of predicting long-term climatic conditions, they should not be considered forecasts of future outcomes. Instead, they provide an indication of the potential impact of climate change on Australia's economy under possible future climate scenarios. Actual outcomes will vary depending on future global emissions and their effect on the climate, the availability of new technology, and how economic, political and social systems respond

Table A5.1   Classification of climate scenarios into warming levels

Report scenarios	Global Warming Levels at 2100 (GWL)	Representative Concentration Pathways (RCP)	Shared Socio-economic Pathways (SSP)	International Energy Agency pathways*
Exceeding 4˚C	Exceeding 4˚C	RCP 8.5	SSP5-8.5	N/A
Sub 3˚C	Limit warming to 3˚C	RCP 4.5	SSP2-4.5	Stated Policies Scenario
Sub 2˚C	Limit warming to 2˚C	RCP 2.6	SSP1-2.6	Announced Pledges Scenario
Sub 1.5˚C	Limit warming to 1.5˚C	RCP 1.9	SSP1-1.9	Net Zero Emissions

Note: *The International Energy Agency Net Zero Emissions and Announced Pledges scenarios have similar CO_2 emissions trajectories to 2050 to the IPCC's vetted 1.5˚C scenarios (Category C1: 1.5˚C with no or limited overshoot) and the vetted 2°C scenarios (Category C3) from the Sixth Assessment Report (AR6) respectively.

Source: Treasury

Box A5.1   Scenarios and Global Warming Levels[i]

Global Warming Levels (GWLs)

GWLs categorise climate scenarios according to their modelled changes in the global surface air temperature in 2100, relative to the years 1850 to 1900.

The Intergovernmental Panel on Climate Change (IPCC) uses GWLs as a common climate dimension to link scenarios drawn from different frameworks, such as RCP and SSP-RCP frameworks.

Representative Concentration Pathways (RCPs)

RCPs are pathways of potential future atmospheric greenhouse gas emissions developed by the IPCC.[70] RCPs estimate emissions pathways through to 2100.

The pathways are developed using Integrated Assessment Models (IAMs), a type of scientific modelling that includes economic, demographic, energy and other climate components. RCPs were adopted in the fifth IPCC Assessment Report (AR5), spanning the range from approximately below 2˚C warming to high (exceeding 4˚C) warming by the end of the 21st century.

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70   RCP-based scenarios are referred to as RCPy, where 'y' refers to the approximate level of radiative forcing (in watts per square metre, or Wm-2) resulting from the scenario in the year 2100.

Shared Socio-economic Pathways (SSPs)

By design, the RCP emission and concentration pathways are stripped of their association with a certain socio-economic development.

SSPs have been developed to complement the RCPs scenario framework. They are used to facilitate the integrated analysis of future climate impacts, vulnerabilities, adaptation and mitigation. SSPs comprise five socio-economic development narratives; sustainable development, regional rivalry, inequality, fossil fuel development, and middle-of-the-road development.[71]

This integrative SSP-RCP framework is now widely used in the climate impact and policy analysis literature. Climate projections obtained under the RCP scenarios are analysed against the backdrop of various SSPs. The IPCC have identified the following plausible combinations of SSP and RCP scenarios:[72]

- SSP3-7.0 and SSP5-8.0 represent high and very high greenhouse gas (GHG) emissions scenarios in which CO_2 emissions roughly double current levels by 2100 and 2050, respectively

- SSP2-4.5 represents an intermediate GHG emissions scenario in which CO_2 emissions remain around current levels until the middle of the century, and

- SSP1-1.9 and SSP1-2.6 represent the very low and low GHG emissions scenarios that have CO_2 emissions declining to net zero around 2050 and 2070, respectively.

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71   Based on five narratives, the SSPs describe alternative socio-economic futures in the absence of climate policy intervention, comprising sustainable development (SSP1), regional rivalry (SSP3), inequality (SSP4), fossil-fuelled development (SSP5) and middle-of-the-road development (SSP2).

72   SSP-based scenarios are referred to as SSPx-y, where 'SSPx' refers to the shared socioeconomic pathway describing the socioeconomic trends underlying the scenarios, and 'y' refers to the level of radiative forcing (in watts per square metre, or Wm-2) resulting from the scenario in the year 2100.

Methodologies

Modelling selected physical climate impacts

The economic estimates of physical climate risk included in this report are based on research conducted by Treasury that draws on previous work connecting physical climate impacts with economic outcomes, including by Roson and Sartori, the International Labour Organization (ILO) and Kompas et al, amongst others.[ii] [iii] [iv]

The analysis adopts a 'bottom-up' approach, incorporating granular data on physical climate risks, which are then aggregated within the Treasury Industry Model to produce estimates of the overall economic impacts.[73] This approach better-captures the heterogeneity of specific climate risks, which will affect different sectors and geographic regions to different degrees and over different time horizons. Variations of this approach have been applied in Australia by the New South Wales Treasury and Deloitte, among others. Improvements on previous work are made where possible – particularly in national estimates – by incorporating more detailed data for Australia along several dimensions.[v] [vi]

Analysis of four specific physical climate risks were prioritised in this analysis given the likelihood of the risk occurring of the next 40 years, its measurability and its applicability to economic modelling frameworks.

- **Estimating the impact of increasing heat stress on labour productivity:** This analysis adopts a similar approach to the ILO and Kompas et al.[vii] [viii] Using relationships at different physical work intensities between heat stress and worker productivity estimates of productivity loss per worker are produced subject to occupation, location and heat exposure. The estimation procedure improves on previous Australian results by using highly disaggregated occupation and industry data. These values are then introduced to Treasury Industry Model as shocks to industry-specific labour-augmenting technological progress.

- **Estimating the impact of increasing heat stress on agricultural crop yields:** This analysis follows the standard approach of Roson and Sartori with improvements drawn from Kompas, Pham and Che and Li et al.[ix] [x] The analysis leverages estimates of the relationship between crop yields and climate variables including temperature, precipitation and CO_2 concentration. Crop-specific estimates of damages to yields are drawn from the literature and applied to Treasury Industry Model as a shock to total factor productivity across directly affected agricultural sectors.

- **Estimating the impacts of climate change on tourism flows and expenditure:** This analysis uses functions from Roson and Sartori which capture the relationship between changes in temperature and changes in international tourist arrivals and departures[xi]

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73 The Treasury Industry Model is a multi-sector, dynamic, forward-looking, general equilibrium model of the Australian economy with significant industry detail based on the Australian Input-Output Tables. See the forthcoming Treasury working paper Modelling industry specific policy with TIM for more detail.

This approach is based on earlier analysis by Hamilton et al who use a global tourist origin-destination matrix to estimate functional relationships linking tourism flows to nation-specific average temperature for 207 countries[xii] This mapping accounts for land area, length of coastline, per capita income, number of countries with shared land borders, and population. These relationships are re-calibrated using more recent Australian data and then applied as shocks in Treasury Industry Model to household and export consumption preferences.

- **Estimating the impact of increasingly frequent and severe natural disasters on capital:** This analysis translates natural disaster risk into an economic impact through an increase in the rate of capital destruction. It draws on highly disaggregated regional hazard risk projections for storms, cyclones, riverine floods and bushfires to capture the expected damage to residential and commercial property. The change in expected average annual losses as a share of sum insured is calculated by region and then applied as a shock to capital depreciation in Treasury Industry Model. Expected average annual losses are calculated using the average yearly cost of repairs and replacement for insured assets due to damage from natural disasters. The share of sum insured is based on total rebuild cost of all insured assets.

Data

To account for the uncertainty inherent in forecasting future climatic conditions, estimates for this analysis are produced under three climate scenarios (Sub 2°C, Sub 3°C, Exceeding 4°C). See Global climate scenarios section for more detail. Table A5.2 lists other key data sources for this analysis.

Table A5.2 Key data sources

Variable	Data Source
Historical temperature and precipitation data from 1980 to 2023	Bureau of Meteorology and the Australian Climate Service
Temperature, precipitation and relative humidity projections from 2023 to 2100	Bureau of Meteorology and the Australian Climate Service
Yield changes for wheat, soy, rice and maize	Analysis provided by Li, Camac, Robinson, & Kompas [xiii]
Occupation classifications	O*Net 2023 database Jobs and Skills Australia – Australian ANZSCO 2013 occupation classification concordance with O*Net database Australian Bureau of Statistics – Australian ANZSCO 2022
Occupation characteristics	O*Net 2023 database Physical intensity measures mapped to survey question 16 Heat exposure measure mapped to survey question 23
Tourist flows	Australian Bureau of Statistics: Monthly Overseas Arrivals and Departures December 2019 Tourism Satellite Account 2019
Tourism industries	Australian National Accounts: Input – Output Tables 2019
Natural disaster loss estimates	Sourced from Finity. See section below on Estimating future Commonwealth disaster relief expenditure for more detail on this dataset

Limitations and key assumptions

This analysis is not a full and comprehensive account of all the channels through which physical risk from climate change could affect the Australian economy.

This analysis does not account for adaptation measures or technology improvements which may mitigate physical climate impacts. Treasury Industry Model incorporates substitution between factors of production and commodities, allowing for shifts in the economy which may partially mitigate some economic impacts. However, this has not been modified to account for specific forms of adaptation.

In addition, this analysis does not include the impacts of any exogenous structural shifts in Australia's future industry composition, such as new sectors or changes in the size of different industries. It also does not incorporate the flow-on effects for Australia of global climate damages.

Following the standard approach in the literature, this analysis uses average estimates, rather than distributions, of potential future climate trajectories. A limitation of this approach is that it does not incorporate 'tail risks' or 'tipping points'. However, this is partly captured by presenting results across a range of climate scenarios, including an exceeding 4˚C scenario. This analysis also incorporates projections from four different

2023 Intergenerational Report | Appendices

global climate models, allowing results to be presented as a range to underscore the uncertainty of predicting future temperature pathways.

Estimating future Commonwealth disaster relief expenditure

Expected natural disaster costs are driven by changes in natural hazard risk and changes in exposure. Treasury's projections of future Disaster Recovery Funding Arrangements (DRFA) expenditure are derived by applying these two factors to historic average DRFA expenditure for each natural hazard category. The underlying equation is expressed as:

$$*_* * \sum_{*=1}^{*} (*_* \times \Delta*_{*,*} \times *_*)$$

where $*_*$ is the expected fiscal costs of the DRFA in year $*$, $*$ is the historic average DRFA expenditure for hazard category $*$, $*$ refers to a specific natural hazard risk and $*$ is the exposure risk factor.

Four natural hazards were considered: bushfire, tropical cyclone, flood and storm. This is because they represent the largest categories of climatic natural disasters that receive funding under the DRFA. Hazards not covered by these four terms were categorised as 'Other' and assumed to have nil change in hazard risk. This modelling excludes events such as drought and heatwaves, as they are outside the scope of the DRFA.

Historic average DRFA expenditure is calculated as the average DRFA expenditure data from 2012–13 to 2022–23 for each natural hazard. Detailed expenditure data is limited prior to this point.

Projections of residential Average Annual Losses (AALs) for each natural hazard were used to derive the expected change in hazard risk.[74] As AALs represent the expected losses to residential properties, the change between years in this value is used as a representative proxy for the increasing frequency and severity of natural disasters.

As the AALs projections used in this analysis reflect the current built environment, they do not incorporate exposure risk (that is, the increasing stock of assets at risk). Treasury's annual long-term projections of real GDP were used to estimate this risk. Real GDP is considered a suitable proxy for exposure as it accounts for population and economic activity, which are factors of exposure. Actual exposure risk will vary based on other factors outside the scope of this analysis, such as land use planning and building codes.

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74   The concept of AALs is widespread in the insurance sector and broadly refers to the expected average financialised losses in $AUD per year. It is a key output from catastrophe models which can translate temperature and precipitation projections into probabilistic loss distributions from specific natural disaster events.

Data

To account for the uncertainty inherent in forecasting future climatic conditions, estimates for this analysis are produced under three climate scenarios (Sub 2˚C, Sub 3˚C, Exceeding 4˚C). See *Global climate scenarios* section for more detail.

DRFA and Natural Disaster Relief and Recovery Arrangements (NDRRA) program expenditure data

Treasury received DRFA expenditure data from the National Emergency Management Agency (NEMA), which is responsible for administering and managing the DRFA and predecessor mechanism NDRRA. The dataset contains unit records of each declared natural disaster event and the corresponding estimated Australian Government reimbursement amount from 2012–13 to 2022–23, for all DRFA Expenditure Categories.

Natural hazard risk data

Treasury procured climate natural hazard risk data from Finity, including data on residential AALs today and over the next 40 years.

Limitations and key assumptions

While the DRFA is a joint reimbursement scheme, the estimates presented in this Report represent only the impact on the Australian Government fiscal position. They do not seek to estimate the total expenditure on disaster relief by the Australian Government and state and territory governments.

Additionally, DRFA expenditure is one of many other direct Australian Government expenditure sources on natural disaster resilience and recovery. Other programs have not been modelled due to a lack of data, the discretionary nature of programs or funding, and/or historic changes in scope to payments such as the Australian Government Disaster Recovery Payment. The analysis also does not consider the indirect fiscal costs of natural disasters, which is an area for future development.

The expenditure projections are expected costs, not actual costs. Expected costs represent the average cost of a disaster event in any given year while the actual costs represent the total cost incurred if a disaster event materialised. Actual costs in any given year will vary significantly from the expected costs given the limitations of models to predict natural disaster events. As such, these estimates do not refer to any actual commitment of funds, current or otherwise, by the Australian Government.

The use of DRFA expenditure data imposed several limitations. This analysis does not take into consideration DRFA funding thresholds, which could result in the Australian Government being liable for a higher proportion of state and territory government expenditure when spending exceeds a certain point. The historical time series of DRFA expenditure may also underestimate expenditure from low-occurrence, high-severity hazards such as earthquakes and cyclones.

2023 Intergenerational Report | Appendices

There are areas Treasury could examine and explore in greater detail in future analyses. This includes examining the types of damage driving Australian Government fiscal disaster recovery expenditure. It could also include a more detailed account of the concentration of growth in at-risk areas through the lens of the DRFA.

Illustrating global transition impacts on Australia's coal and lithium exports

The framework in Treasury's 2014 Long-run forecasts of Australia's terms of trade working paper was used to illustrate demand for Australia's thermal coal exports over the next 40 years.[xiv] This applies a partial global demand and supply framework to two global climate scenarios, providing a sense of how Australia's thermal coal exports may be affected by different potential global decarbonisation trajectories.

Thermal coal exports are modelled based on a rank ordering of the average cost of thermal coal supply, sourced from Wood Mackenzie. Projections for Australian export thermal coal volumes each year are calculated as the sum of Australian mine output that does not exceed cumulative supply equal to a point estimate of global thermal demand.

The lithium projections were approached differently. As the industry is still in its infancy, there are no globally accepted specifications for lithium and, therefore, no accepted anchors to ground pricing.[xv] This analysis therefore applies International Energy Agency (IEA) World Energy Outlook 2022 projections for global lithium demand. These projections run to 2050, following which this analysis assumes constant growth using the historical average between 2040–50.

Data

Demand data

The global volumes for thermal coal and lithium are sourced from the IEA. The IEA uses a global energy model with the capacity to analyse global energy markets, technology trends, policy strategies and investments across the energy sector that would be critical to achieve different climate goals.

Wood Mackenzie reports seaborne import projections of thermal coal for determining trade patterns and prices for each coal type. However, it does not conduct this analysis under net zero climate scenarios as presented by IEA. The IEA data was therefore used to scale Wood Mackenzie's data.

Supply data

Estimates of the annual supply curves of thermal coal inputs were sourced from Wood Mackenzie's global cost curve tool. Production costs are estimated on a nominal US dollar (converted to AUD) per tonne basis. The total cash cost is a combination of a mine's operating cash costs plus royalties and levies. Capital costs are not included in the cash cost estimate. Examples of the cost components considered include the cost of mining, processing, maintenance, royalties, transportation and loading, but not shipping costs, with total costs estimated as Free on Board (FOB).

Limitations and key assumptions

The impact of climate change on Australia's export commodities will largely depend on actions taken by of the rest of the world, including levels of global mitigation ambition.

As such, this framework only presents a stylised illustration of what might happen to thermal coal and lithium under different potential future warming levels. In reality, the effect on the Australian economy of the net zero transformation will depend on many factors, including how we capitalise on the opportunities that emerge in new sectors.

The infancy of the lithium market creates significant uncertainty around all future scenarios as the industry is still exploring various sources and production processes.

Electric vehicle uptake and fuel excise

The uptake of electric vehicles is expected to slow the growth in fuel excise receipts This will cause a decline in receipts from the point where electric vehicles make up a sufficient share of all vehicles, with fuel excise calculated as:

*fuel excise receipts * fuel excise rate × clearances (volumes of fuel consumption)*

Fuel excise rates are indexed every six months to movements in the CPI with adjustments made in February and August. This analysis assumes fuel excise rates move in-line with projected CPI (2.5 per cent per annum).

Fuel excise clearances are projected based off a range of factors depending on the type of fuel (petrol, diesel, and other fuels). These include:

- the broad correlation between real GDP and the fuel excise base

- long-term trends in clearances

- lower internal combustion engine (ICE) vehicle fuel consumption due to assumed improvements in fuel efficiency and lower kilometres driven

- the ABS Survey of Motor Vehicle Use

- expected consumption of fuels used for purposes unrelated to motor vehicle use, and

- the reduced consumption of excisable fuels due to various scenarios on the speed of electric vehicle adoption by vehicle type (based on electric vehicle uptake scenarios).

Data

Electric vehicle uptake scenarios are based on CSIRO's Electric vehicle projections commissioned for AEMO's Draft 2023 Input, Assumptions and Scenarios Report:[xvi][xvii]

- **Accelerated Scenario:** A scenario with rapid and widespread transformation of the economy to achieve a temperature rise limited to 1.5°C. Investments are high, and global demand for green energy contributes to a strong green energy export economy. This is informed by the AEMO: 1.5˚C Green Energy Exports scenario.

- **Higher Scenario:** A scenario with modest consumer investments, less success in providing consumer appetite for and/or economic stimulation of orchestration of these investments, yet still rapid overall transformational investment to decarbonise the economy, leading to a temperature rise below 2°C. This is informed by the AEMO: 1.8°C Diverse Step Change scenario

- **2023 IGR Scenario:** A scenario with more challenging economic conditions affecting energy consumers' actions to decarbonise the economy, which achieves current domestic and global policy objectives, but slows further progression and leads to a global temperature rise above 2°C. This is informed by the AEMO: 2.6°C Progressive Change scenario.

An observed increase in passenger electric vehicle sales in the months since CSIRO's projections were published required a small upward revision in the fleet of electric vehicles in the first few years of projected data.[xviii] The difference between the passenger electric vehicle fleet due to additional sales was approximated and added to 2022–23 and a smaller proportion of the difference was added to 2023–24 and 2024–25, smoothing the additional vehicle sales across three years.

The underlying CSIRO projections were available to 2054–55, requiring an extension of the data to 2062–63 for this analysis. For each scenario, average fleet growth in the final years to 2054–55 was used to project fleet growth out to 2062–63 by vehicle type. For the Higher and Accelerated scenarios, the proportion of each technology type by vehicle type was held constant at the 2054–55-year proportion as this represents the projected maximum feasible electric vehicle take-up. For the 2023 IGR scenario, the growth rate for each technology type within each vehicle type in the final years to 2054–55 was used to increase (or decrease) the proportion of each technology type by vehicle type.

The stock of electric vehicles as a percentage of the entire motor vehicle fleet by data source (per cent of stock by year) used for the analysis is included in Chart A5.1. The motor vehicle fleet includes all road motor vehicle types (passenger vehicles, light commercial vehicles, buses, motorcycles, rigid trucks and articulated trucks)

Under the 2023 IGR scenario electric vehicles are expected to reach 85 per cent of the fleet by 2063. Under the Higher scenario electric vehicles reach 99 per cent of the fleet by 2055. Under the Accelerated scenario electric vehicles reach 99 per cent of the fleet by 2045. The 2023 IGR scenario is based around currently legislated domestic policies and international climate action, while the Higher and Accelerated scenarios include more ambitious climate action. This analysis does not suggest that certain global temperature outcomes require particular electric vehicle uptake rates. Nor does it suggest that achieving a particular electric vehicle uptake rate will lead to a certain global temperature outcome.

Chart A5.1   Stock of electric vehicles as a percentage of fleet by scenario
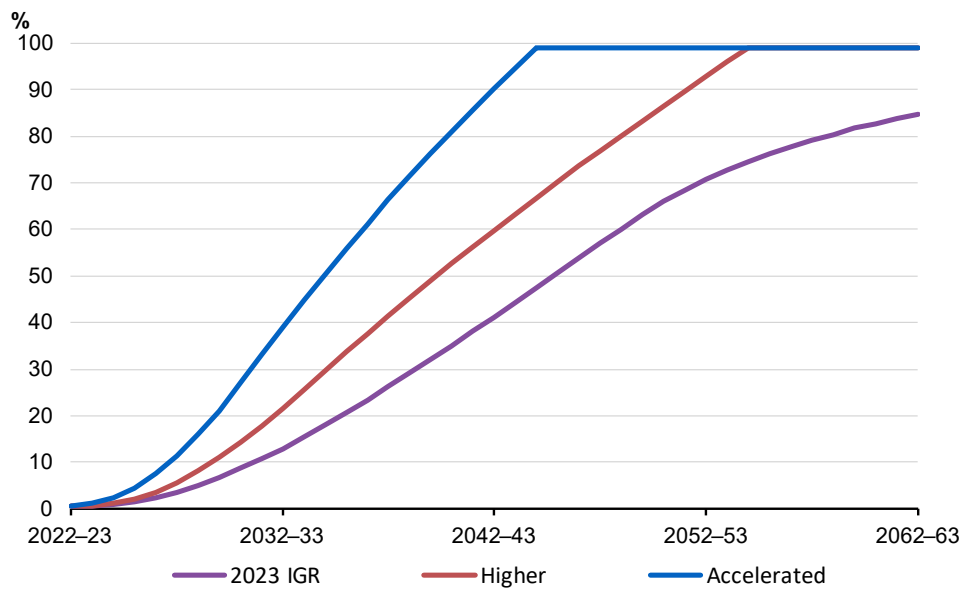
Note: Electric vehicles includes battery electric vehicles, fuel cell electric vehicles and plug-in hybrid electric vehicles.

Source: CSIRO, AEMO data with Treasury adjustments.

Limitations and key assumptions

A non-zero level of fuel excise receipts remains over the report period due to ongoing consumption of fuels used for purposes unrelated to motor vehicles, such as aviation, machinery and equipment, petroleum processing, crude oil condensate, and lubricants (such as oils and greases). Given significant uncertainty about when low emissions alternatives will be viable for these alternative uses of fuels, a transition away from these fuels to a source that does not attract excise has not been modelled in this analysis.

The observed increase in sales of passenger electric vehicles in 2022–23 was assumed to not change the projected electric vehicle fleet beyond 2024–25 as the recent increase to sales does not represent a change in the underlying projection assumptions (price parity reached, charging option rollout, model availability).

Electric vehicle uptake rates differ under each scenario subject to varying assumptions, including:

- when electric vehicles reach price parity with ICE vehicles
- accessibility to a variety of charging options, and
- new ICE or electric vehicle model availability.

Additional information about scenario assumptions is available in CSIRO's Electric vehicle projections and AEMO's Draft 2023 Input, Assumptions and Scenarios Report.[xix][xx]

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x   Kompas, T., Pham, V. H., & Che, T. N., 'The Effects of Climate Change on GDP by Country and the Global Economic Gains From Complying With the Paris Climate Accord,'

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A6 Comparison of 2002 IGR projections to actuals

IGR projections can for the first time be compared to outcomes for the 20 years since the first IGR in 2002. Several unexpected shocks – including the Global Financial Crisis, COVID-19 pandemic and recovery and global energy price shock caused by Russia's invasion of Ukraine – as well as stronger population growth and participation, have led to some fiscal and economic results not anticipated by the 2002 IGR.

The 2002 IGR projected the underlying cash balance would be in surplus for 20 years from 2002–03. The budget was in surplus until 2008 before moving into deficit with the onset of the Global Financial Crisis and remaining in deficit through to 2021–22 (Chart A6.1). Net debt also increased above projections from 2008 (Chart A6.2).

Chart A6.1 Underlying cash balance   **Chart A6.2 Net debt**
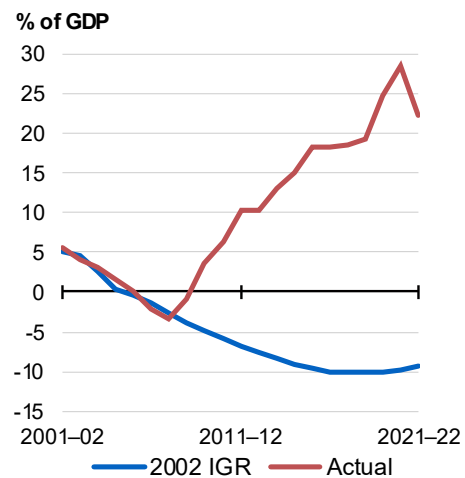
Source: Treasury

Net overseas migration has been around double what was projected over the period to 2021–22, with the population around three million (12 per cent) higher than was originally projected. This has grown the economy, including by bringing in younger, skilled migrants and international students. A higher-than-expected participation rate increased real GDP above projections. The increase in labour force participation over the past 40 years has largely been driven by women. This was offset by lower-than-projected productivity growth, which over the decade to 2020 was the slowest in 60 years, resulting in real GDP per capita being lower than projected. In 2021–22, spending was higher than

2023 Intergenerational Report | Appendices

projected in real terms, but 0.2 percentage points lower as a share of GDP. Tax receipts-to-GDP were 0.7 percentage points lower than projected (Table A6.1). Spending on health and age pensions as a share of GDP was lower in 2021–22 than projected at the time of the 2002 IGR as a result of non-age related costs of health being lower than expected and having a younger population than projected, but payments like aged care were higher. Programs like the National Disability Insurance Scheme were not anticipated in the 2002 IGR and have significantly affected payments projections.

Table A6.1   Comparison of 2002 IGR projections to 2021–22 to actual

	2002 IGR (estimate)	2021–22	Difference
Economic			
Life expectancy at birth males (years)[1]	80.7	81.3	0.6
Life expectancy at birth females (years)[1]	85.7	85.4	-0.3
Total fertility rate	1.63	1.69	0.06
Population (millions)	23.2	26.0	2.8
People aged 65 and older (share)	18.7	17.1	-1.6
Participation rate (%)	60.2	66.0	5.8
Productivity growth (20-year average %)[2]	1.8	1.2	-0.6
Real GDP per capita (index 2001–02 = 100)	142	128	-14.2
Real GDP (index 2001–02 = 100)	169	170	1.0
Fiscal			
Government spending (% of GDP)	26.9	26.7	-0.2
Government spending (real) ($b)	510.5	659.5	149.0
Government spending per person (real) ($)	22,008	25,369	3,361
Health spending (% of GDP)	5.2	4.6	-0.6
Aged care spending (% of GDP)	1.0	1.1	0.1
Education spending (% of GDP)	1.6	1.6	0.0
Age pension (% of GDP)	3.6	2.2	-1.4
Transfers (% of GDP)[3]	3.1	2.3	-0.8
Other spending (% of GDP)	15.9	17.1	1.2
Commonwealth taxation receipts (% of GDP)[4]	20.8	20.1	-0.7

Notes:
1   Life expectancy figures are 2019–21.
2   Productivity growth presented here is the average annual productivity growth projected from 2001–02 to 2021–22 in the 2002 IGR, compared to the actual productivity growth over the same period.
3   Transfers include the Jobseeker payment, the family tax benefit, the paid parenting single payment and the disability support pension.
4   Commonwealth taxation receipts excludes goods and services tax (GST).
Source: Treasury; ABS.

A7   2023 IGR consultation

Treasury consulted a wide range of stakeholders to inform development of the 2023 IGR. Treasury would like to thank all stakeholders who took the time to review or discuss the IGR. This feedback has shaped the 2023 IGR and will inform preparation of future IGRs.

Stakeholders are listed in Table A7.1.

Table A7.1   **Stakeholders consulted**

Australian Bureau of Statistics

Australian Banking Association

Australian Chamber of Commerce and Industry

Australian Climate Service

Australian Council of Social Services

Australian Council of Trade Unions

Australian Government Actuary

Australian Industry Group

Australian Institute of Health and Welfare

Australian National University

Australian Office of Financial Management

Australian Trade and Investment Commission (Austrade)

Bureau of Infrastructure and Transport Research Economics

Bureau of Meteorology

Business Council of Australia

Centre for Policy Development

Clean Energy Finance Corporation.

Coalition of Peaks

Commonwealth Scientific and Industrial Research Organisation

Committee for Economic Development of Australia

Council of Small Business Organisations Australia

Dan Andrews, Program Director and Head of Policy Engagement, e61 Institute

Deloitte Access Economics

Department of Agriculture, Fisheries and Forestry

Department of Climate Change, Energy, the Environment and Water

Department of Defence

Department of Education

Department of Employment and Workplace Relations

Department of Finance

Department of Foreign Affairs and Trade.

Department of Health and Aged Care

Department of Home Affairs

Department of Industry, Science and Resources

2023 Intergenerational Report | Appendices

Department of Infrastructure, Transport, Regional Development, Communications and the Arts
Department of the Prime Minister and Cabinet
Department of Social Services
Dr Andrew Charlton MP, Member for Parramatta
Future Fund
Grattan Institute
Melbourne Institute
National Disability Insurance Scheme (NDIS) Scheme Actuary
National Emergency Management Agency
New South Wales Treasury
New Zealand Treasury
Nigel Ray, Former Deputy Secretary, Fiscal Group, Treasury
Organisation For Economic Co-operation and Development
Productivity Commission
Reserve Bank of Australia
Rural Business Tasmania

Source: Treasury

Name

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