



BIS OXFORD
ECONOMICS

2021 MACROECONOMIC PROJECTIONS REPORT: FINAL

PREPARED BY BIS OXFORD ECONOMICS FOR
THE AUSTRALIAN ENERGY MARKET OPERATOR

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Executive Summary

In this report we present the economic projections for five of the Australian Energy Market Operator's (AEMO) alternative outlooks; a Current Trajectory case, Slow Growth case, Sustainable Growth case, Rapid Decarbonisation case and Export Superpower case. The analysis was conducted using AEMO's core assumptions for each case coupled with BIS Oxford Economics' suite of quantitative models for the Australian economy, that enable rigorous modelling at the macro, industry and state level. The forecasts were produced in March 2021.

Current trajectories

The Current trajectories scenario encapsulates the most likely outcome for Australia's economy over the next thirty years. It is built up using mid projections for population growth and assumes a continuation of current policies and trends in technological progress (including current policies towards the uptake of renewable energy and transformation of the power network). In this scenario, moderate improvements are made in energy efficiency, and some fuel switching away from fossil fuels towards low emissions sources takes place. This outcome is consistent with the Shared Socioeconomic Pathway (SSP) 2 and with Representative Concentration Pathway (RCP) 4, which is consistent with an increase in global temperatures of 2.6°C by 2100.

The recovery from the COVID-19 pandemic and recession will dominate the near-term outlook for the economy. Australia's public health response in H1 2020 was relatively successful at containing the pandemic, with the number of cases and deaths per capita well below the global average. The ongoing international border restrictions, which require all entrants to the country to quarantine for two weeks, has resulted in the disease being largely eliminated from the community, though there have been a number of localised outbreaks in recent months that have been traced back to quarantine breaches.

As a result of controlling the disease domestically state governments have been able to relax restrictions considerably, which has enabled most sectors to resume normal production levels. In addition, the RBA and the Federal and state governments have provided substantial economic support to the economy. Monetary supports include lowering the cash rate to 0.1%, setting a target for the 3 year government bond yield (0.1%), providing funding to local financial institutions at a fixed interest rate for a fixed period of time (3 years) via the Term Funding Facility, and implementing a Quantitative Easing program that targets 5 and 10 year government bonds¹. Together these supports have substantially loosened monetary policy. This has driven down borrowing rates for all economic participants (households, businesses, and the government) and limited market turmoil and a tightening of credit conditions since the very early days of the pandemic in March 2020.

While monetary policy has prevented financial stress and laid the bedrock for the economic recovery, fiscal policy has been used to directly stimulate activity. In the initial phase of the pandemic the Federal government focused on temporary measures to replace the income that was lost through shutting down large parts of the economy. Programs such as JobKeeper, which maintained employment and provided an income to workers, the JobSeeker supplement (which partially replaced income for those made unemployed), other welfare payments and grants to small and medium-sized businesses were all part of these measures.

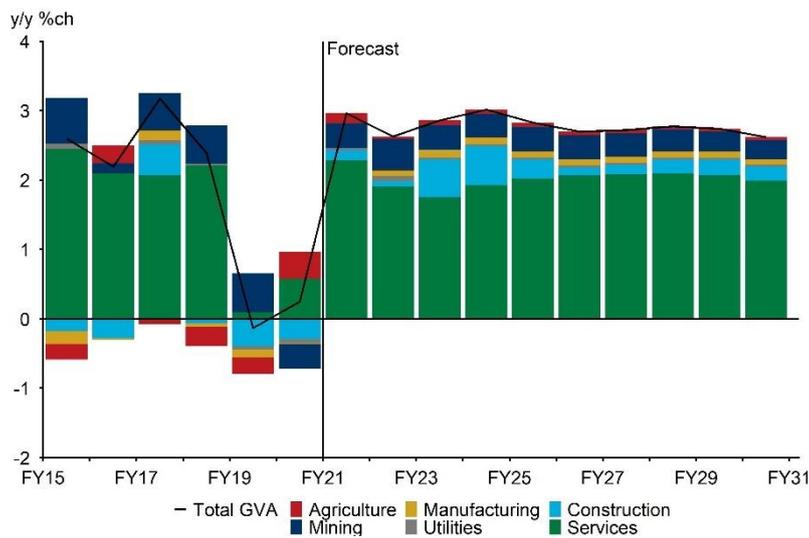
With the economy pivoting into the recovery phase through H2 2020, the October 2020 budget shifted fiscal policy away from emergency supports towards traditional stimulus measures. In

¹ The RBA have also implemented a number of other technical changes to monetary policy operations to ensure the smooth-running of financial markets and their own policy operations.

addition to ongoing spending to fight the pandemic, funding was announced to accelerate infrastructure investment projects and get new projects underway, conduct road maintenance and stimulate residential construction activity (via the HomeBuilder scheme). A personal income tax cut was also announced, as was the temporary removal of the upper limit for the instant asset tax write-off for businesses. A number of state governments have also announced their own fiscal supports, including voucher schemes for hospitality and entertainment and further spending on infrastructure and maintenance.

The collective impact of the policy stimulus and successful public health response has been a rapid rebound in economic activity. Output will see a small gain in FY21 (of 0.5%), dragged down by the weak start to the year². Activity is expected to rebound 3.2% in FY22, and the pace of growth is set to remain elevated through until the mid-2020s. By sector, services will be responsible for the initial rebound, which reflects the fact that they were the most impacted by the downturn in 2020. But moving through into FY22 and beyond, construction and manufacturing will account for increasing shares of the upturn, as the full impact of the government’s fiscal stimulus feeds through. Over the long term the composition of growth will return to its structural fundamentals, with services accounting for the majority of growth, followed by mining and construction.

Figure 1 Gross Domestic Product by industry sector breakdown – History & Forecast



Source: BIS Oxford Economics

Across the states, the relative winners are those where population growth is strongest and/or where recent underperformance results in a strong cyclical upturn in the near term – this will be particularly true of VIC in 2021, as the state recovers from its prolonged lockdown in H2 2020. Over the long run, of the largest states VIC will continue to be the strongest performer and NSW and SA the weakest. This is a product of demographic fundamentals, with VIC expected to see a return to robust population growth, while NSW and SA experience the opposite; both states typically see negative interstate migration flows, which will weigh on growth momentum. QLD and WA are also expected to see relatively robust growth over the forecast horizon. Both economies have been relative outperformers in recent months, with QLD in particular attracting a number of domestic migrants, which in turn has driven an uptick in employment growth and economic activity. Moving into the mid-2020s the turn in the mining investment cycle (which is currently

² Note that ongoing restrictions in Q3 and early Q4 2020, in particular the second Victoria lockdown, are responsible for the weakness.

underway) will provide ongoing support, although the volume of activity is projected to be much smaller than the previous supercycle.

Table 1-1 GDP & GSP, Compounded Annual Growth Rate (CAGR)

	AUS	ACT	NSW	QLD	SA	TAS	VIC	WA
FY 21-26	2.9%	2.1%	2.5%	2.7%	2.0%	2.0%	3.8%	3.2%
FY 26-31	2.7%	2.8%	2.4%	2.6%	2.2%	1.8%	3.0%	3.0%
FY 31-36	2.3%	2.5%	2.2%	2.4%	1.9%	1.6%	2.5%	2.6%
FY 36-41	1.9%	2.1%	1.7%	2.0%	1.5%	1.3%	2.0%	2.2%
FY 41-53	1.7%	1.9%	1.7%	1.7%	1.3%	1.2%	1.6%	1.9%

Source: BIS Oxford Economics

The trends in GSP are reflected in household income. Once again VIC and WA are outperformers, while NSW and SA lag behind, reflecting their growth fundamentals. But NSW remains a relatively high-income state as a result of the industry composition of its economy (particularly the focus on high value add services such as financial intermediation).

Table 1-2 Household disposable income, CAGR

	AUS	ACT	NSW	QLD	SA	TAS	VIC	WA
FY 21-26	1.7%	2.1%	1.8%	1.2%	1.6%	1.2%	1.8%	1.7%
FY 26-31	2.5%	2.9%	2.5%	2.5%	2.2%	1.9%	2.6%	2.7%
FY 31-36	2.4%	2.5%	2.3%	2.4%	1.9%	1.6%	2.6%	2.6%
FY 36-41	2.0%	2.2%	1.8%	2.0%	1.6%	1.4%	2.1%	2.2%
FY 41-53	1.7%	1.9%	1.7%	1.7%	1.3%	1.3%	1.7%	1.9%

Source: BIS Oxford Economics

Alternative cases

In addition to the current trajectories case this report includes four others: slow growth, sustainable growth, rapid decarbonisation and (hydrogen) export superpower. In each of these alternatives, the economic outlook relative to the current trajectories case is broadly determined by the demographic outlook, general technological progress, and the climate policy settings. For each case the following settings were assumed:

- **Slow growth:** Weaker overseas migration and technological progress than in the current trajectories case. No explicit decarbonation target, no significant progress towards the development of hydrogen as an alternative fuel source, more limited progress to substituting away from fossil fuels.
- **Sustainable growth:** Similar outlook for overseas migration/population as current trajectories. Significant acceleration in pace of electrification/uptake of hydrogen and move away from fossil fuels compared to current trajectories, resulting in an outcome consistent with RCP2.6 (1.8°C temperature increase). Overall technological progress is broadly similar to current trajectories, resulting in a similar GDP profile.
- **Rapid decarbonisation:** Stronger outlook for migration/population and a more rapid shift away from fossil fuels and towards electrification. Net-zero emissions are achieved by the early 2040s, consistent with RCP1.8 (less than 1.5°C increase in global temperature). Overall the trajectory for GDP is stronger than under the current trajectories case.
- **Export superpower:** Stronger outlook for migration/population and a very rapid shift away from fossil fuel usage. In addition the government explicitly and aggressively targets the development of hydrogen production, which results in Australia becoming a

leading global producer and exporter, particularly to countries in Asia. This case produces the strongest trajectory for GDP over the forecast horizon.

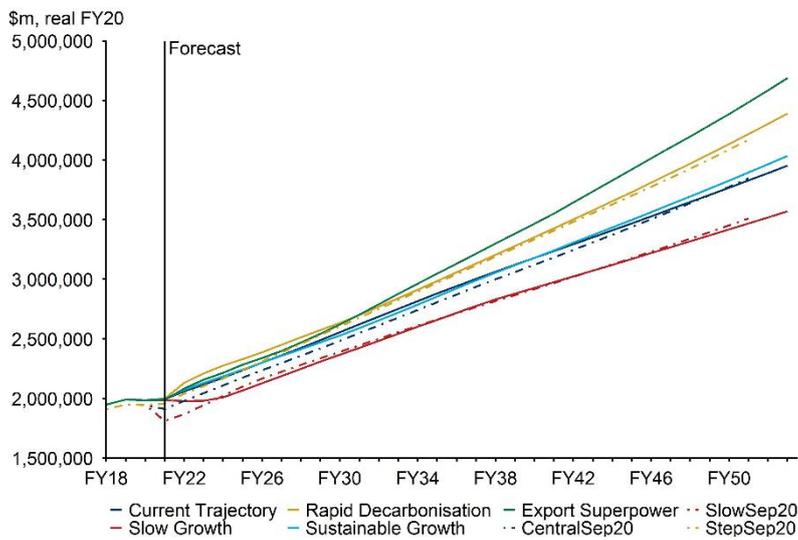
Table 1-3 GDP y/y growth Current Trajectory vs. Alternative Cases, Australia, CAGR

	Current Trajectories	Slow Growth	Sustainable Growth	Rapid Decarbonisation	Export Superpower
FY 21-26	1.3%	1.1%	1.3%	1.4%	1.6%
FY 26-31	1.0%	0.9%	1.0%	1.2%	1.3%
FY 31-36	1.2%	1.0%	1.2%	1.4%	1.5%
FY 36-41	1.1%	0.9%	1.1%	1.3%	1.5%
FY 41-53	0.9%	0.7%	0.9%	1.1%	1.2%

Source: BIS Oxford Economics

The outlook across the states in each case depends on their exposure to net overseas migration and the importance of the mining sector to overall economic activity. Of the larger states, NSW, VIC and SA are most exposed to the migration channel, and NSW in particular is a relative underperformer in the slow growth case. For WA and QLD the importance of the mining sector dominates the economic outturn. As a result, they are relative underperformers in the sustainable growth and decarbonisation cases, as both of these assume a shift away from fossil fuels with (at least partially) limited moves into hydrogen – WA lags behind QLD relatively-speaking, as it is more exposed to these trends. The export superpower case is somewhat different, as the shift into hydrogen (which will naturally favour these states) helps to compensate for the reduction in activity in the mining sector.

Figure 2 Gross Domestic Product: Current Trajectories case vs. Alternative Cases



Source: BIS Oxford Economics

1. Introduction

BIS Oxford Economics has been re-engaged by the Australian Energy Market Operator (AEMO) to produce the economic and population forecasts that feed into AEMO's five key cases for their 2021 suite of energy outlook reports for the NEM and WA publications:

- **Current Trajectory:** the central pathway for Australia's energy transition, defined by current policies and the most likely trajectory for technological progress and economic development. In this case, government policy, technological progress and shifting preferences lead to an economic outcome that is consistent with Representative Concentration Pathway (RCP) 4.5 (approximately 2.6°C temperature increase by 2100).
- **Slow Growth:** a more moderate energy transition characterised by a slower consumer response, reduced investment appetite (globally as well as in Australia) and lower government involvement. This case is also characterised by a subdued pace of economic and population growth (compared to the Current Trajectories Case), and a weaker AUD. In this case, government policy, technological progress and shifting preferences lead to an economic outcome that is consistent with RCP 7.0 (approximately 4°C temperature increase by 2100).
- **Sustainable Growth:** a moderate GDP growth scenario that encapsulates an aggressive shift in energy consumption patterns away from fossil fuels towards renewable energy sources. The scenario assumes that decarbonisation is achieved by 2050, with coal consumption phased out first followed by oil and natural gas. The trajectory for GDP population growth are broadly the same as the Current Trajectory case, with the overall pace of technological progress broadly the same as assumed in the Current Trajectory case. The outcomes in this case are consistent with RCP 2.6 (approximately 1.8°C temperature increase by 2100).
- **Rapid Decarbonisation:** strong action on climate change leads to an acceleration in the pace of the reduction of greenhouse gas emissions. Decarbonisation is achieved by the 2040s, earlier than in the Sustainable Growth case. In addition, advances are made in a broader range of sectors, resulting in a faster pace of technological improvements and increased infrastructure developments, and a more aggressive profile for consumer-led innovation and emissions reduction. This case is also characterised by stronger economic and population growth than the Current Trajectories case, and a stronger AUD. The outcomes in this case are consistent with RCP 1.9 (<1.5°C temperature increase by 2100).
- **Export Superpower:** the global transition to a greener pathway is further accelerated, with Australia being a relative leader, including leading production and export of hydrogen, and reaching net zero emissions by the early 2040s. In this case, significant global and domestic electrification arises from greener investment by businesses and households. Australia's relatively stronger fundamentals also result in increased inward migration. The additional assumption of Australia leading the shift into hydrogen results in a faster pace of productivity improvements and ultimately GDP growth than in the Rapid Decarbonisation case. The outcomes in this case are consistent with RCP 1.9 (<1.5°C temperature increase by 2100).

Note that in the context of the WA suite of publications, these scenarios are consistent with the WEM rules and the WEM scenario mappings are given as follows:

Scenario names in this report	WEM Scenario mapping
Central Trajectory	Expected
Slow Growth	Low
Sustainable Growth	-
Rapid Decarbonisation	High
Export Superpower	-

This report has been produced to accompany a set of quantitative macroeconomic forecasts for the five cases outlined above. This report has been structured as follows:

Chapter 2: Outlines the economic and demographic assumptions for each of the five case settings

Chapters 3 & 4: Presents the economic and demographic projections for the *Current Trajectories* case

Chapters 5 - 8: Presents the economic and demographic projections for the other alternative cases

Appendix A: Details BIS Oxford Economics' proprietary global, industry and state models.

Appendix B: Provides a comparison of BIS Oxford Economics population forecast to the Federal Treasury's Centre for Population

Appendix C: Provides a comparison of BIS Oxford Economics economic forecasts to public forecasts

2. Case Assumptions

2.1. Case Definitions & Summary Table

As part of our coverage of Australia's economy, BIS Oxford Economics produces internal population forecasts that are consistent with economic developments across the country. The core demographic assumptions (such as fertility rate, births and deaths) that primarily drive the Natural Increase (NI) in the population, are consistent with the Centre for Population baseline projections for the population; we see these variables as being largely unaffected by economic developments, and we therefore treat them as exogenous assumptions. The exception to this is the very near-term fertility rate, which is assumed to fall back as a result of the economic shock generated by the COVID-19 recession; this assumption is consistent with movements in the fertility rate through previous downturns. In contrast, analysis of the historical data highlights that migration flows are linked to economic fundamentals, and we therefore model these series endogenously.

Cases	Slow Growth	Current Trajectory	Sustainable Growth	Rapid Decarbonisation	Export Superpower
Population Growth	Lower than Current Trajectory: Apply ABS Series C NOM dispersion to BIS OE baseline	BISE OE baseline	BISE OE baseline	Higher than Current Trajectory case: Apply ABS Series A NOM dispersion to BIS OE baseline	Higher than Current Trajectory case: Apply ABS Series A NOM dispersion to BIS OE baseline
Investment	Lower than Current Trajectory case	BIS OE Baseline	Aggregate level is consistent with Current Trajectory, but sector composition reflects more aggressive decarbonisation	Higher than Current Trajectory case	Higher than Current Trajectory case
Global Demand	Lower demand than Current Trajectory case	BISE OE Baseline	Aggregate level is consistent with Current Trajectory, but sector composition reflects more aggressive decarbonisation	Higher demand than Current Trajectory case	Higher demand than Current Trajectory case
Climate Warming settings	~4°C by 2100 from pre-industrial levels	~2.6°C by 2100 from pre-industrial levels	~1.8°C by 2100 from pre-industrial levels	<1.5°C by 2100 from pre-industrial levels	<1.5°C by 2100 from pre-industrial levels
Resource Intensity	Higher than Current Trajectory case	BIS OE baseline	Lower than Current Trajectory case	Lower than Current Trajectory case	Lower than Current Trajectory case
Commodity Intensity	Higher than Current Trajectory case	BIS OE baseline	Higher than Current Trajectory case	Lower than Current Trajectory case	Lower than Current Trajectory case
COVID-19 Recovery	Slower pace of recovery and international border reopening is delayed	BIS OE baseline	BIS OE baseline	Faster pace of recovery and international border re-opening is fast-tracked	Faster pace of recovery and international border re-opening is fast-tracked

2.2. Short-run assumptions & COVID-19

Across all of the cases, the recovery from the COVID-19 pandemic recession dominates the near-term outlook. As such, all cases incorporate the same broad assumptions, which can be summarised as follows:

- Notwithstanding the rapid pace of recovery that has been seen, particularly over the last five months, uncertainty remains about the outlook and restrictions are continuing to have an impact on some sectors. In contrast, other sectors are benefitting from fiscal and monetary stimulus, and are now operating comfortably above their pre-COVID levels.
- Public sector activity remains elevated, driven by spending on contact tracing, vaccine rollout, other supports within healthcare and education, and additional capital expenditure on a number of infrastructure and maintenance projects.
- The vaccine rollout is assumed to provide some certainty, particularly with respect to internal state border restrictions which continue to hamper the hospitality and

entertainment sectors. It is also assumed to provide a fillip to business investment, with firms more willing to undertake major projects once the environment is more stable.

- The vaccine rollout is not assumed to be sufficient for a full re-opening of the international border. Based on announcements and comments from the Federal government, we have assumed that there will need to be a marked step down in cases overseas as well as definitive evidence that the vaccination program is reducing transmission, hospitalisations and deaths. Given this, we expect the border to re-open gradually, through travel bubbles and other reductions (e.g. a shift to home quarantine), with the re-opening having a material impact on activity from 2022 Q1 onwards.

2.3. Long-run assumptions

Beyond the recovery from COVID, the outlook under each case can be broadly segmented into two buckets; demographics and economic assumptions. In this section we discuss the main facets of each of these in turn, more detail for individual cases is provided in their relevant chapter

2.3.1. Demographics

As part of our coverage of Australia's economy, BIS Oxford Economics produces internal population forecasts that are consistent with economic developments across the country. The core demographic assumptions (such as fertility rate, births and deaths) that primarily drive the Natural Increase (NI) in the population, are consistent with the Federal government's Centre for Population assumptions. This is a slight departure from our approach to the 2020 projections, where we anchored the projections for NI to ABS Series B assumptions. Death rates effectively remain anchored to Series B, but the birth rate is now assumed to be slower than Series B over the forecast horizon; this reflects the realised birth rate since 2016 and the impact of COVID-19 on the very near term; in line with previous negative economic shocks, the birth rate is expected to fall temporarily before recovering in line with the improved outlook.

Note that these fundamental assumptions are applied across all scenarios, and they interact with the different migration trajectories to define the profile for the resident population.

Drivers of migration

As migration trends are more closely tied to economic fundamentals (both at home and externally), BIS Oxford Economics takes an independent view on Net Interstate Migration (NIM) and Net Overseas Migration (NOM)³. Historically, changes in NIM have been associated with the relative economic performance of the states. The mining investment boom and subsequent downturn over the last decade has resulted in the level of NIM and NOM (as a proportion of total NOM) into WA and QLD rising above historical averages in the years 2011-13, before a sharp fall back over 2013-16 when engineering construction activity entered a sharp downturn. Most recently, both states have seen a reversal (particularly a fall in NIM), in line with the trough of mining investment activity.

The level of NOM is also influenced by external economic conditions, which impact both the net supply of skilled labour (both temporary and permanent migrants) and the net supply of international students. Fluctuations in the net supply of skilled labour are impacted by relative economic conditions in Australia compared to the rest of the world⁴, while net student arrivals are

³ See Appendix B for a summary of the assumptions underpinning ABS Series B projections, which is used as a point of comparison for the Current Trajectories Case.

⁴ Our analysis suggests that changes in conditions within Australia are a more important driver. For example, the high levels of NOM seen in the early 2010s were largely a result of the mining investment boom.

determined by the relative competitive of Australia as a destination for higher education, the size of the student-age population, and average income levels in the source country⁵.

2.3.2. Economic Assumptions

The current trajectories case is developed using BIS Oxford Economics' Global Macro, Industry and Local Area models⁶. In the absence of policy and technology shocks, that fundamentally alter the profile for technological progress, this represents the most likely pathway for the domestic and global economy, which will then feed into the central pathway story for energy transition.

Around this Current Trajectories Case we have constructed assumptions for the alternative cases, that focus on varying key assumptions for technological progress (including its profile with respect to commodities consumption), labour force participation, and capital accumulation. As part of this exercise, we have explicitly considered the political environment (both domestically and globally), and the impact of these changes on commodity prices and the AUD, with some differentiation expected across the commodities spectrum.

These assumptions define not only the trajectory for GDP, but also the profile for individual sectors (and so the industrial composition of GDP) and expenditure components. As a result, it is possible for the same GDP profile to be composed differently, both in terms of industry shares and in terms of current consumption expenditure shares. It should also be noted that the split of expenditure into current consumption (public and private) and investment (public and private) also has an impact on the future level of output; higher levels of investment increase the economy's capital stock and therefore productive potential in the future. This channel is particularly important in the Export Superpower case, where substantial investments in hydrogen capacity in the early years is one of the drivers of a rapid acceleration in GDP growth (relative to the Current Trajectories Case) in the out years.

⁵ The drivers listed typically drive gross student arrivals in any given year. The outflow of students is largely determined by the inflow in previous years, reflecting the fact that most foreign students return to their country of origin after they have completed their course of study.

⁶ For a more detailed outline of these models please see Appendix B.

3. Current Trajectories Case: Demographic projections

- **Our forecasts for Australia’s resident population have been revised down since the previous projections we supplied. This has been mostly underpinned by lower forecasts for total fertility rates, with recent leading indicators showing further weakness. The adjustment drives the profile for NI lower, taking off around 0.2% to total population growth p.a. over the forecast period. This change is consistent with the Centre for Population’s baseline projection for population.**
- **NOM has been revised lower in FY21; departures have continued to outpace arrivals, and the border is now expected to re-open in late 2021. Upon the opening of borders, it is expected NOM will recover steadily as the backlog of temporary migrants looking to travel to Australia is able to be unwound. By FY23, NOM is expected to return to trend at 245,000.**
- **NSW and VIC are anticipated to be worst affected by the loss from NOM, although VIC should see a small offset from NIM. QLD is expected to hold up relatively better than the other regions with NIM helping to counter the loss from overseas migration.**

This chapter presents the Current Trajectories Case outcomes for demographics at a national and state level. The COVID-19 pandemic has generated a significant shock to near-term national population growth. Historically, NOM has made up a substantial portion of Australia’s population growth, averaging around 60% of the population increase over the last decade. Although the rollout of vaccines has commenced overseas and domestically, international borders remain largely closed and overseas travel severely curtailed. Our Current Trajectories Case estimates population growth of just 0.17% in FY21 with an expected 80,000-person loss in net overseas migration just offset by domestic natural increase. This estimate has been revised weaker since September as we now expect the border to remain effectively closed until late 2021. Permanent residents have been able to return home, but often with difficulty.

Students have been the main driver of the collapse in NOM to date, as it has proved increasingly difficult to enter Australia under a modest arrivals cap and entry restrictions. All the while, it has been far easier for temporary residents to exit, resulting in a NOM net outflow. Nonetheless, student visas have continued to be granted offshore during the pandemic. Adding to the already sizeable pool of students unable to commence earlier in 2020, the additional student visas granted in H2 2020 totalled 40,872. From late 2021, this backlog of student demand is expected to be steadily realised, aided by waning student departures as the stock of current international students shrinks. Australia’s relatively favourable pandemic outcome should bode well for Australia generally as a destination for migration.

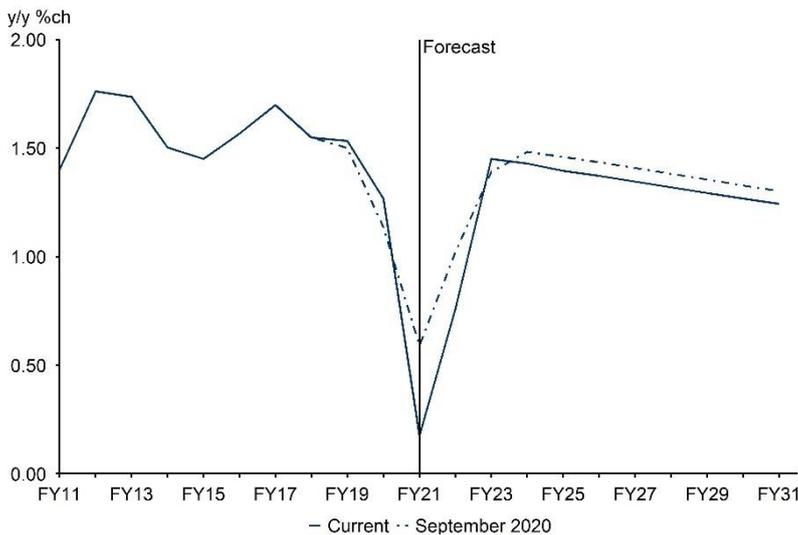
The gradual reopening of borders should allow population growth to recover from FY22 onwards. The government is expected to be cautious in allowing materially greater volumes of international arrivals while the virus remains at large overseas. Border openings are expected to be staged,

initially restricted to other near-virus-free nations from late 2021, with the announcement of the travel bubble with New Zealand an example. Early progress on the global vaccination efforts has been positive for global case numbers, although there is a way to go before conditions normalise and travel at scale returns. Longer term, we forecast net overseas migration returning to 245,000 by FY23, before remaining at 250,000 from FY24 onwards.

On natural increase, fertility rates have been revised down since September (from 1.74) following the weak lead of the latest ABS births data (1.66 births per woman were recorded in the period 2019). A further drop to 1.6 is expected for FY21, before stabilising economic and health conditions encourage the resumption of backlogged family plans, the birth rate is projected to stabilise at 1.65 in the long term. This represents a moderate downgrade for NI over the forecast horizon.

Overall, the estimated resident population is forecast to reach 36.7 million persons by 2053. This represents a loss of around 800,000 compared with the September forecast, mostly driven by the downgrade to natural increase.

Figure 3 Population y/y percentage change, Australia

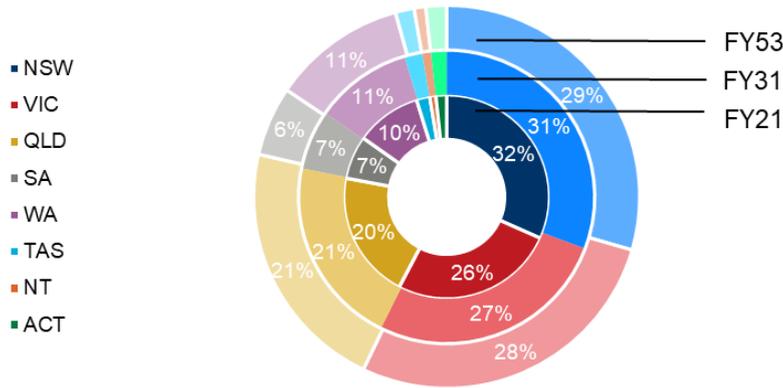


Source: BIS Oxford Economics/ ABS

3.1. State level projections

Across the states, similar assumptions for birth and death rates mean that the main driver of shifts in population shares are trends in overseas and interstate migration.

Figure 4 Share of national population

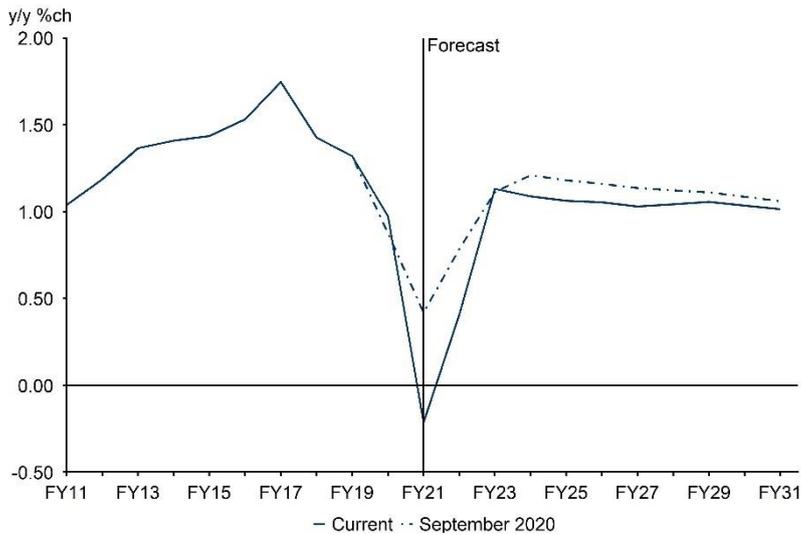


Source: BIS Oxford Economics/ ABS

3.1.1. New South Wales

Following three years of softening increases, population in New South Wales is set to contract in FY21, by 0.21%. The impact of lost net overseas migration will be felt acutely in the state with materially lower volumes of overseas students and temporary workers dragging on population growth. Naturally, the recovery in population flows rests heavily on the timeline for the resumption of overseas travel, with the Current Trajectories Case expecting a return to pre-pandemic growth around FY23.

Figure 5 Population y/y percentage change, NSW

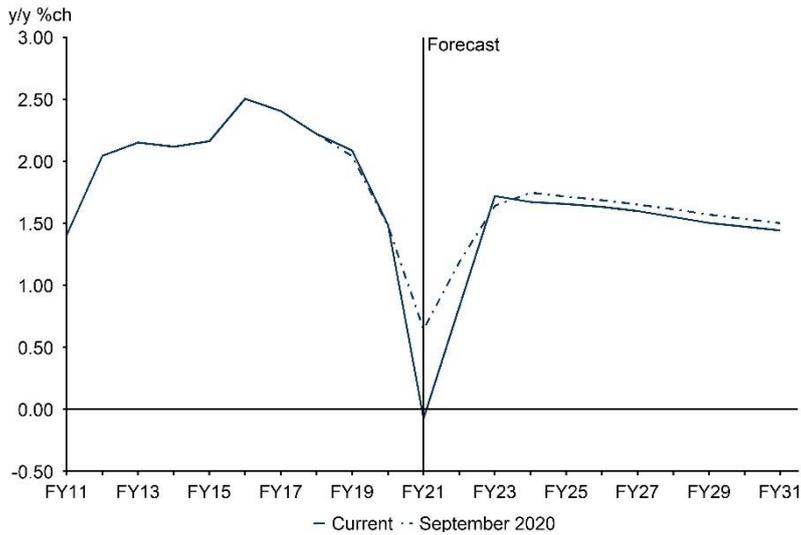


Source: BIS Oxford Economics/ ABS

3.1.2. Victoria

Population growth in Victoria is expected to turn negative, to -0.07% y/y, in FY21. Victoria has been heavily dependent on net migration inflows in recent years, leaving the state heavily exposed to the pandemic-induced collapse in overseas migration. Further, Victoria has historically been a beneficiary of interstate migration, although the channel has reversed over the last six months with the flows between VIC and QLD in particular reversing. As these headwinds unwind, a recovery in population should materialise, with long term growth projected to exceed the national average.

Figure 6 Population y/y percentage change, VIC

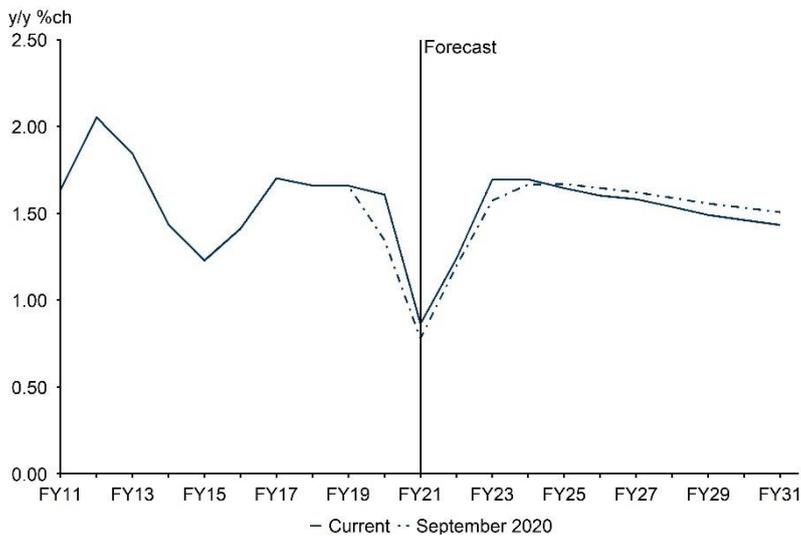


Source: BIS Oxford Economics/ ABS

3.1.3. Queensland

Queensland population growth is expected to fall back moderately, to 0.86% y/y; the state is expected to hold up far better than others. The state historically captures the majority of net interstate migration, particularly from New South Wales, and this flow has been added to with an upturn in net inflows from VIC in particular. But softer net overseas migration will be a drag on growth in the short term, before the state slowly lifts back to trend growth by FY23. Queensland’s population growth in the long run is anticipated to exceed the national average.

Figure 7 Population y/y percentage change, QLD

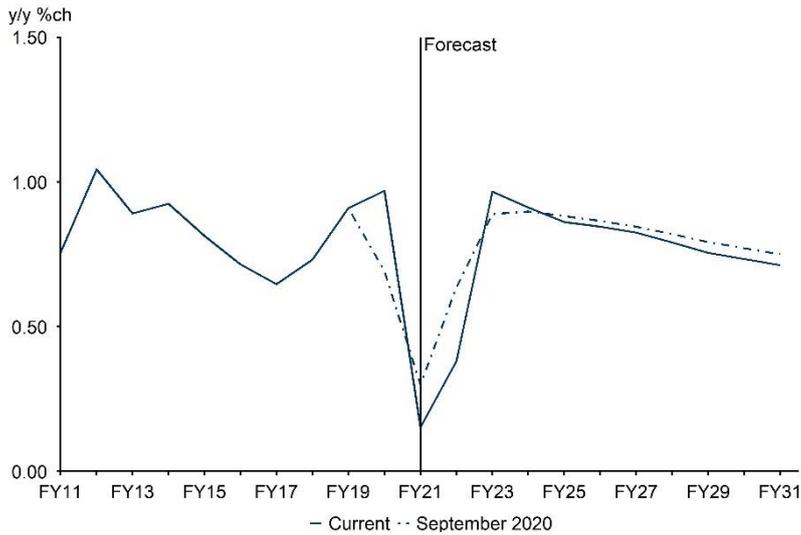


Source: BIS Oxford Economics/ ABS

3.1.4. South Australia

Population growth in South Australia is expected to drop to 0.15% y/y in FY21. The downward revision to our outlook for NOM has resulted in a weaker profile for SA, but the impact is less than for NSW and VIC. As an offset, the historical outflow of interstate migration returning to a more balanced position will soften the blow. Longer term, the state is expected to return to growth below the national average, driven by low levels of NOM and interstate outflows.

Figure 8 Population y/y percentage change, SA

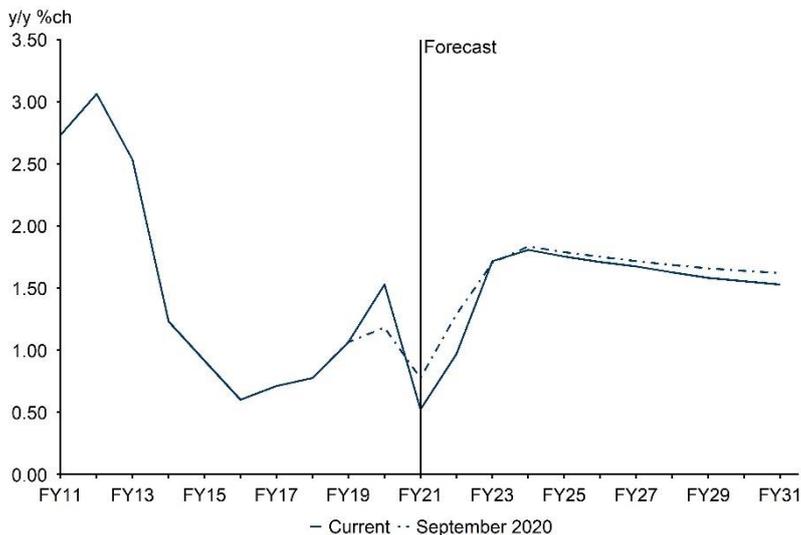


Source: BIS Oxford Economics/ ABS

3.1.5. Western Australia

Western Australia has seen population growth soften materially since the peak during the mining boom, as NOM collapsed and NIM turned negative. Coming off a modest base, population growth in FY21 is estimated to be 0.53% y/y, with a further pick-up projected after this. Interstate outflows have become less negative during the pandemic, with border restrictions and a faster economic recovery (partly fuelled by a gradual upturn in mining investment activity) encouraging locals to stay put. Western Australia is also expected to capture a greater share of NOM in the coming years due to the expected outperformance of the states' economy, aiding an improving outlook for population growth. Growth is forecast to exceed the national average longer term.

Figure 9 Population y/y percentage change, WA

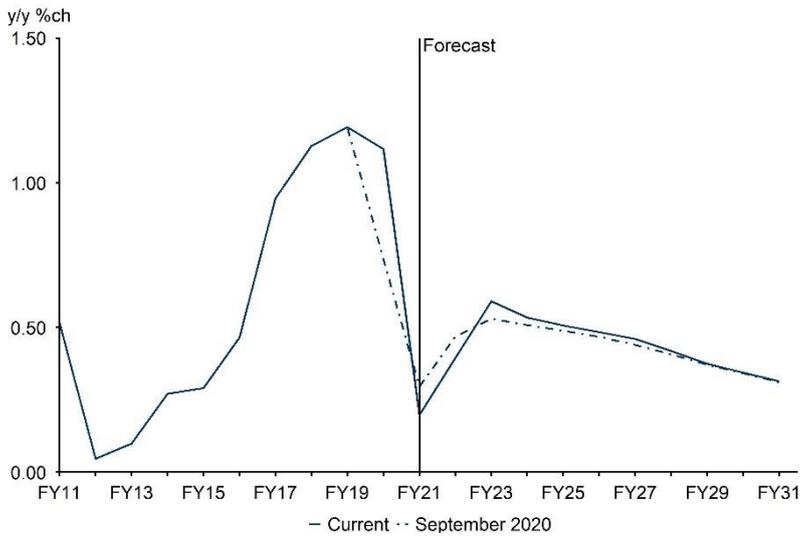


Source: BIS Oxford Economics/ ABS

3.1.6. Tasmania

Following an uptick in NOM in recent years, Tasmania is set to suffer a sharp drop off in population growth in FY21 to 0.2% y/y. Adding to the collapse in NOM, domestic border restrictions in the latter half of 2020 are dragging on NIM for the state which has been a recipient of interstate inflows in recent years. Although these components of population will improve from FY22, they are not expected to return to levels seen pre-FY20. Longer term, natural decrease will be a material drag, leading to minimal growth well below the national average.

Figure 10 Population y/y percentage change, TAS

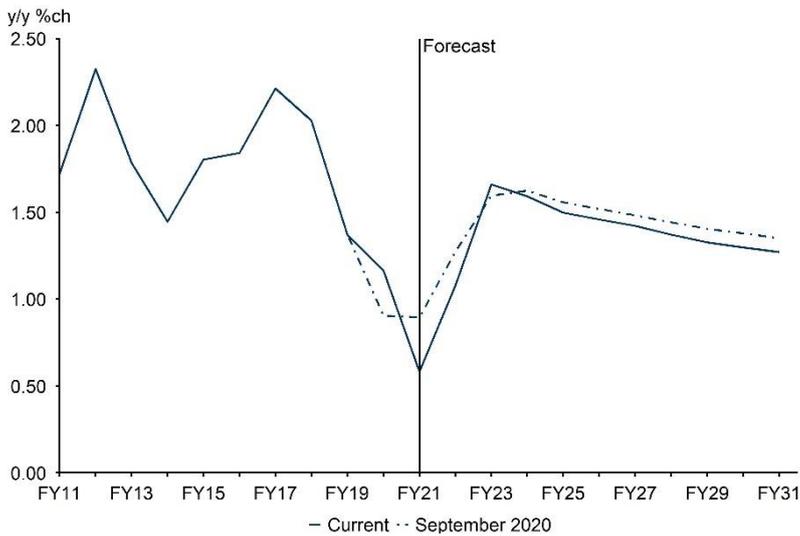


Source: BIS Oxford Economics/ ABS

3.1.7. Australian Capital Territory

Population growth in the capital is set to ease back to 0.58% y/y in FY21; the ACT is not immune to the collapse in overseas migration. However, the impact is more subdued than for its larger state counterparts. As a counterforce, natural increase makes up a comparatively large share of population growth in the capital, a component expected to be more resilient to the pandemic. Longer term, growth is forecast to be track similarly to the national average.

Figure 11 Population y/y percentage change, ACT



Source: BIS Oxford Economics/ ABS

4. Macro outlook – Current Trajectories Case

- **The near-term outlook continues to be driven by recovery from the COVID-pandemic. The global economy is expected to rebound rapidly, by 6.05% in 2021, driven by the vaccine rollout (which will ultimately enable the removal of restrictions), further fiscal support (particularly in the US) and a release of pent-up consumer demand.**
- **The outlook for Australia’s economy broadly mirrors the international picture. But better control of COVID-19 in 2020 resulted in a shallower recession (albeit still the biggest on record), which in turn will mean a less pronounced rebound in 2021 – the economy has less ground to make up.**
- **The recovery will primarily be driven by the services sector, which saw the largest decline in 2020. Growth in mining sector activity is also expected to continue, encouraged by global demand for commodities strengthening, but the pace is slowing as the ramp-up following the investment boom of the 2010s comes to an end. Activity in the construction and manufacturing sector is also set to accelerate, as the impact of direct government spending and indirect supports (such as the HomeBuilder scheme and tax breaks for investment) feed through.**
- **Over the long run the outlook will continue to be dominated by demographics and productivity growth. Continued positive overseas migration will see Australia outperform most other developed economies.**

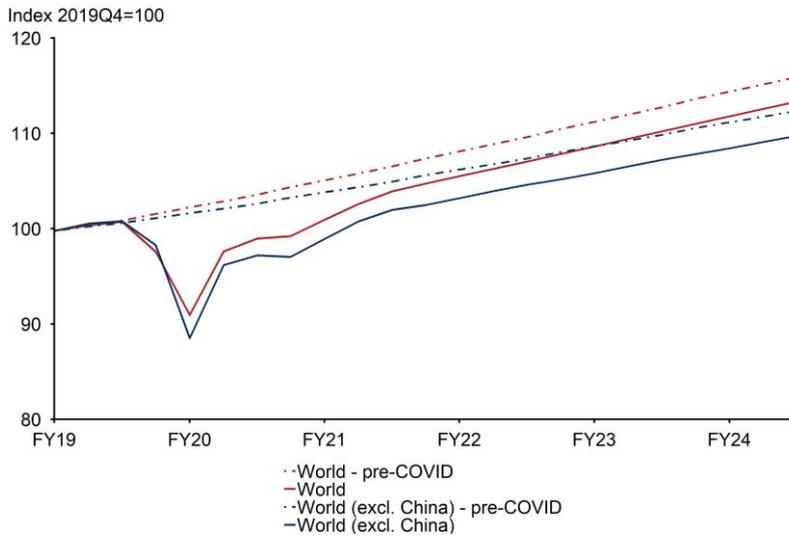
4.1. International outlook

After the initial sharp fall in activity in H1 2020, the global economy’s recovery from COVID-19 has been patchy. The trajectory for individual countries has been heavily influenced by their experience of the disease, the spread of more infectious variants (which has generally forced a tightening of restrictions where they have appeared) and most-recently the speed of the rollout of the vaccine. Overall, momentum moving into 2021 has been subdued, with many economies battling against second (or subsequent waves) which required tighter restrictions to bring them under control. In addition, countries that successfully suppressed the disease early on, such as China, have also experienced a moderation in their pace of growth; the initial burst of activity associated with re-opening has faded as conditions have normalised.

Notwithstanding some outliers, particularly the US, this pattern of relatively modest growth is expected to continue until H2 2021. At this point many economies should have vaccinated enough of their vulnerable populations to enabled a meaningful, permanent relaxation of restrictions which in turn will drive an upturn in activity. Coupled with this, further fiscal support is likely to materialise and provide further support for the recovery.

Moving into the mid-2020s, although the immediate recovery from COVID-19 will be completed the pandemic will have a long-lived impact. For some sectors such as international travel it is likely to be four years before activity has fully rebounded. And the depth of the downturn and prolonged nature of unemployment for some workers will lead to skill atrophy, an increase in apathy and in some cases a complete exit from the labour force. Overall, COVID-19 will have a permanent, negative impact on activity levels across the world.

Figure 12 Impact of COVID-19 on World GDP



4.2. GDP, Income & FX

Australia's success at controlling the pandemic coupled with significant fiscal and monetary supports has resulted in the economy outperforming other developed countries over the last year. Although the recession was the biggest on record (and likely the most severe fall in GDP since the Great Depression), the economy only contracted by 2.4% in 2020. Moving into 2021 and beyond, the elimination of COVID domestically, notwithstanding isolated outbreaks from hotel quarantine, has enabled most sectors within the economy to return to normal operating conditions. And the pivoting of fiscal policy towards traditional measures that directly stimulate demand (rather than providing emergency support) is driving economic activity in a number of sectors.

The additional stimulus and sustained control of the disease has significantly improved the economic outlook over the last nine months. GDP is now expected to grow 3.5% in 2021, and to maintain above-trend growth until the mid-2020s.

Household disposable income

The trajectory for household income has been somewhat perverse over the last year. As a result of lower interest rates (which have reduced mortgage payments), the JobKeeper program, the JobSeeker supplement and other discretionary payments to welfare recipients, household disposable income increased by 5.3% in 2020, its *fastest* pace of growth since 2011. The government support payments more than outweighed drags on income from lower employment earnings and reduced interest, rental and dividend payments from investment assets.

Moving into 2021 this shift will reverse, with all of the temporary government supports now unwound. As a result, household income is expected to fall 2.2%. But this is not expected to put a significant drag on the economic recovery; with consumer spending on services severely limited in 2020, households have built up substantial buffers which are expected to underpin a rebound in spending.

Exchange rate

As a commodity-currency the AUD typically sees sharp movements in its value that track commodity prices and the general health of the global economy. This has been evident over the last year, with the AUD falling from 70 US cents per AUD at the end of 2019 to 58 US cents in mid-March before recovering to finish 2020 at 77 US cents. Since then the currency has held

broadly steady, with continued strength in commodity prices offsetting general downward pressure on non-US assets; the passing of President Biden's fiscal package and improvement in the outlook in the US has driven a general appreciation in the USD.

Looking ahead, the AUD is expected to hold broadly steady in the near term, as these two trends continue to play out. And over the long term we expect the AUD to appreciate modestly to return to its fair value of just under 80 US cents.

4.2.1. Long run trends

Moving beyond the cyclical recovery from last year's recession, the long run outlook for the economy will continue to be impacted by demographics, which determine the size of the labour force, and the profile for productivity improvements. Both of these have been impacted by COVID-19.

As outlined in Section 3, the pandemic is expected to have a permanent negative impact on the size of the population, as a result of the closure of the international border and a temporary fall in the birth rate. While migration flows are expected to recover, we do not anticipate a substantial catch-up of the migration flows that are 'missing' from 2020 and 2021 (and potentially, early 2022). As a result, the resident labour force will be significantly smaller in the long run than was previously projected, which in turn means that the economy's productive potential will also be reduced when compared to previous projections.

In addition to the impact on the population, the COVID-19 recession will also have a permanent, negative impact on productivity. This will manifest itself through the impact on labour productivity of hysteresis in the labour market, that is a sustained period of unemployment or underemployment for some workers. This outcome is likely to be concentrated in the sectors that will experience the most long-lived drag from the pandemic, education, hospitality and arts and entertainment, all of which are reliant on international visitor demand for their services.

Some workers in these sectors are likely to experience a sustained period of unemployment, which will lead to skill atrophy, apathy in motivation, and in some cases an exit from the labour force altogether. As a result these workers will see a fall in their productive potential, which in turn will weigh on total output.

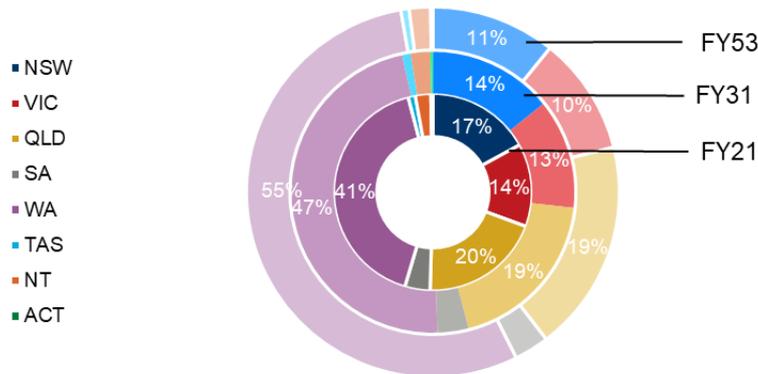
Overall, by far the biggest impact will come from the shrinking of the workforce (relative to pre-COVID trends). Although the hysteresis channel is significant the government's success in controlling the pandemic and restarting the economy, along with policies that support on-the-job training and re-skilling will limit the degree of hysteresis. The majority of workers that lost their jobs initially are now back in work, and for the most vulnerable groups (particularly younger workers) there are strong incentives for firms to hire and train them which will further limit the negative fallout.

4.3. Industry

Industrial production (excluding construction) is comprised of three main sectors:

- Mining (55% of industrial production GVA)
- Manufacturing (31%)
- Utilities (14%)

Figure 13 States share of industrial production (gross value added)



Source: BIS Oxford Economics/ Haver Analytics

Overall, relative to the services sector industrial production outperformed during the pandemic, as expected. All three sectors were relatively unimpacted by the restrictions on activity, and mining and manufacturing have both benefitted from stimulatory fiscal policy and the initial rebound in activity, both domestically and overseas. As a result, industrial production contracted by just 1% in 2020, against a 2.4% fall in GDP. But the outperformance in 2020 at least partially explains the under performance in 2021, with GVA projected to increase by just 1.4% this year.

Moving into the long run, industrial production is generally expected to lag behind the rest of the economy. Although the outlook for the mining sector is solid, with growing demand for natural gas, industrial commodities and new resources such as lithium set to offset drags from coal mining, manufacturing and utilities will continue to lag behind the rest of the economy.

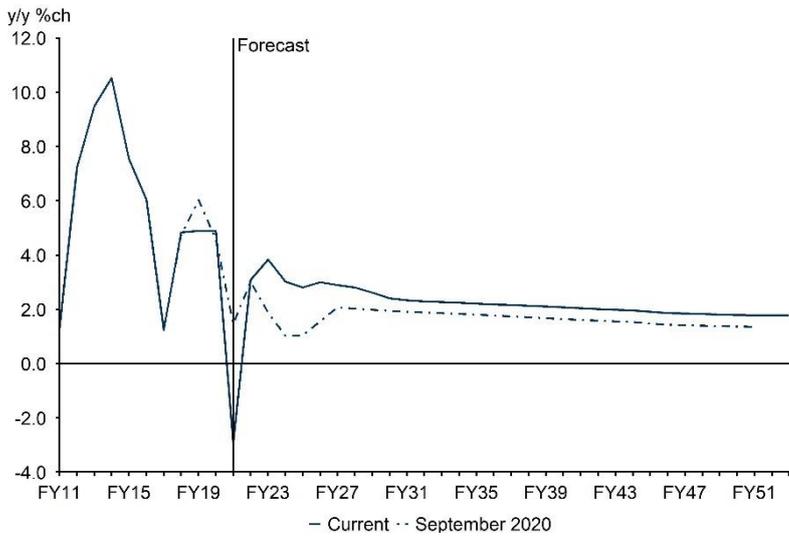
4.3.1. Mining Sector Outlook

After a period of strong growth that followed the mining investment boom in the early 2010s, the pace of growth in mining sector output is expected to moderate. With less new capacity coming on-stream over the recent past and in the near future, incremental increases in output will necessarily be smaller. Output was broadly flat in level terms in 2020 and is expected to fall modestly in 2021, by 0.4%.

Although investment activity has been rising over the last twelve months it remains modest, both in growth rate and absolute terms, when compared to the previous cycle. As a result, there is limited potential for a sharp acceleration in the pace of growth in output over the medium term. As a result we are projecting solid but not spectacular growth over the forecast horizon, with the sector broadly maintaining its share of GVA in the long run.

By commodity, natural gas and industrial metals will continue to outperform, with newer resources such as lithium becoming more important. Coal production will lag, as thermal coal in particular is impacted by climate change policy nationally and internationally. The recent trade spat with China will also have a negative impact; while we don't expect there to be a further deterioration, we are also not anticipating a swift resolution and return to previous trends.

Figure 14 Mining GVA (y/y change): Australia



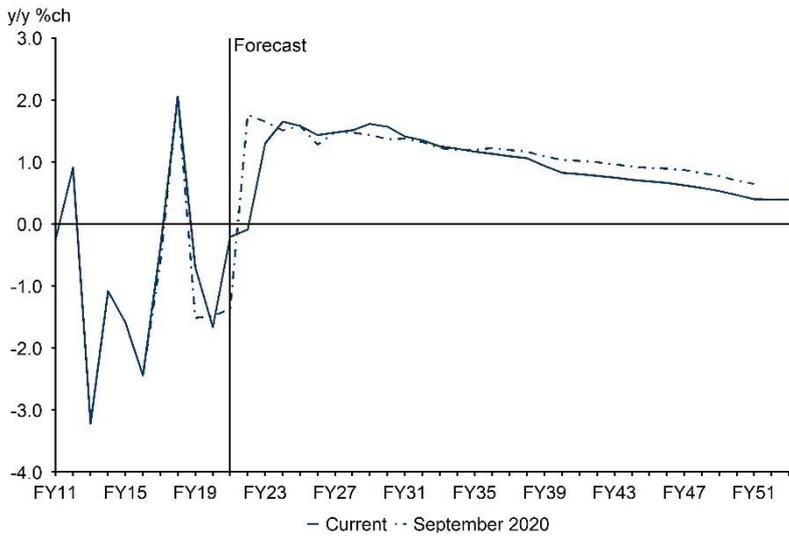
Source: BIS Oxford Economics/ Haver Analytics

4.3.2. Manufacturing Sector Outlook

After a period of decline through most of the 2010s, manufacturing sector output had been showing some tentative signs of trending up pre-COVID, led by high value add sectors such as food processing and petrochemicals, where Australia has a natural comparative advantage. The pandemic initially put a significant drag on output, with an 8.9% fall in GVA recorded in Q2 2020. But since then the sector has rebounded and this trend looks set to continue. Spending on services has been curtailed, leading consumers to switch to goods, while businesses are increasing their demand for machinery and equipment and other capital goods in response to the government’s tax incentives. Overall, we expect output to rise 0.8% this year, and then accelerate to 1.7% growth in 2023.

Beyond the recovery from the pandemic the structural fundamentals for the manufacturing sector remain relatively weak. Although some sub-sectors are able to compete effectively on the international stage, Australia’s position as a high-wage economy with limited trade barriers will result in further consolidation over time. In addition, the structural shift towards spending on services is expected to continue; services sectors will generally see faster growth than manufacturing in all countries. Overall, manufacturing’s share of output is expected to fall from 6.5% in 2019, to 4.6% in 2053.

Figure 15 Manufacturing GVA (y/y change)

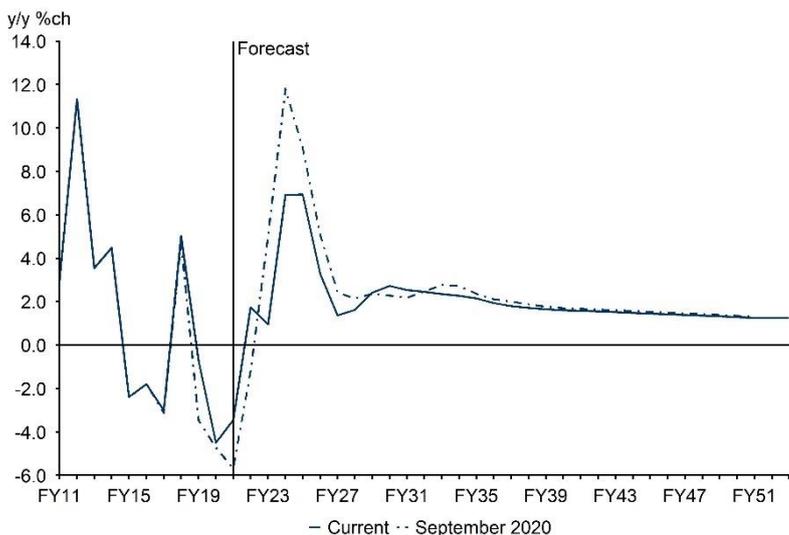


Source: BIS Oxford Economics/ Haver Analytics

4.3.3. Utilities Outlook

Although not directly impacted by COVID-19 restrictions, the closure of much of the economy in H1 2020 resulted in a fall in utilities consumption and so output in the first half of 2020. But the decline was much more modest than other sectors, and output levels have recovered since (notwithstanding lower electricity consumption in Q4 2020 as a result of the relatively cool summer experienced on the east coast). With the unusually cool, wet weather continuing into 2021 output is expected to fall back further in the near term before the sector returns to its long run underlying trend growth profile. Continued improvements in resource efficiency, both energy and water, will result in the pace of growth lagging behind the rest of the economy.

Figure 16 Utilities GVA (y/y change)



Source: BIS Oxford Economics/ Haver Analytics

4.3.4. Services Sector Outlook

The recent performance of services sub-sectors has been dominated by the impact of the pandemic. At a broad level, public sector activity has surged over the past year while private

sector activity has fallen back, and within the private sector there have been outperformers (financial services, professional and technical services) and laggards (hospitality, arts and recreation) who continue to be negatively impacted by restrictions and uncertainty around COVID-19 outbreaks. Looking ahead, the pace of growth in public sector activity is expected to slow, and then turn negative as the emergency response to the pandemic is completed and wound back. But activity levels are expected to be permanently higher than pre-COVID, as a result of the need to maintain track and trace capabilities and roll out a continuous vaccination program.

For the private sector, those services that are directly and indirectly exposed to the fiscal and monetary stimulus are set to out-perform in the near term, with financial services and professional and technical services already leading the way. Retail and wholesale trade are also performing strongly, as households re-direct spending from services (particularly travel and tourism) towards goods. But the shift to online spending has created challenges for some 'traditional' businesses in this space.

Table 4 Composition of Services GVA: FY21 vs. FY53

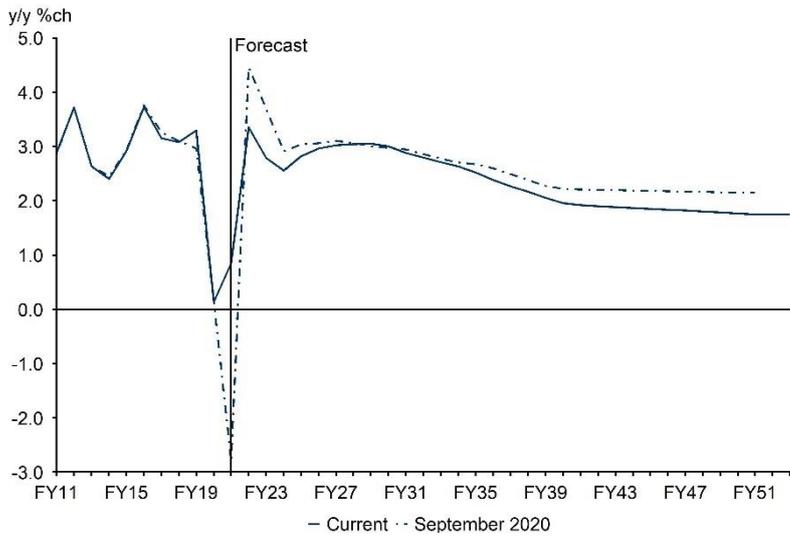
	2021	2053
Accommodation & Food Services	3.3%	3.7%
Administrative and Support Services	5.2%	4.8%
Arts and Recreation and Other Services	4.1%	3.7%
Education & Training	8.2%	5.5%
Finance and Insurance	14.5%	14.7%
Health Care & Social Assistance	13.0%	16.5%
Information Media and Telecom	3.9%	4.0%
Prof Scientific & Technical Services	12.4%	15.0%
Public Administration and Safety	9.8%	7.9%
Rental Hiring and Real Estate Services	4.7%	4.2%
Retail Trade	7.3%	6.7%
Transport Postal and Warehousing	7.0%	7.0%
Wholesale Trade	6.6%	6.3%

Source: BIS Oxford Economics/ Haver Analytics

For those sectors that continued to be weighed down by restrictions and uncertainty the very near term outlook is still challenging; the localised lockdowns in NSW, VIC, QLD and WA since the start of 2021 highlight the ongoing uncertainty about trading conditions, and have made consumers cautious about committing to significant purchases such as a holiday. But the vaccine rollout should provide some relief to this uncertainty, particularly from H2 2021 onwards when the majority of vulnerable people will have received at least one dose. Notwithstanding this brighter outlook, the permanent negative impact of the pandemic on the economy will be concentrated in these areas.

Overall, the service sector is expected to continue to grow faster than the national average in the long run, and as a result increase its share of output over time.

Figure 17 Services sector GVA (y/y change)



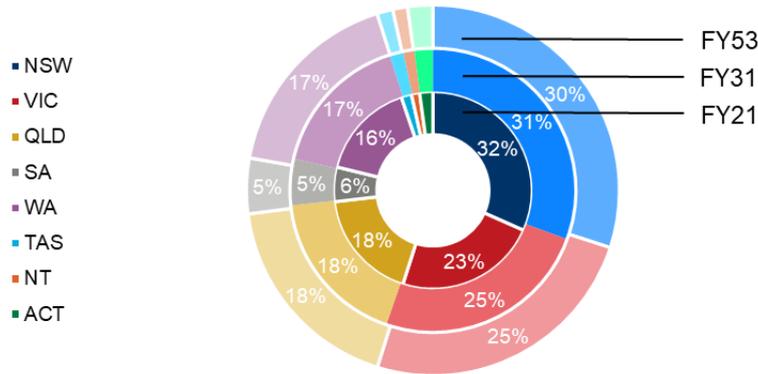
Source: BIS Oxford Economics/ Haver Analytics

5. States outlook – Current Trajectories Case

- Structurally NSW, VIC and TAS were the most exposed to the immediate impact of the COVID-19 pandemic; in all three states international students and tourists accounted for a disproportionately large share of demand. For NSW and VIC this channel was compounded by their exposure to the disease, which necessitated the imposition of restrictions for longer than in other states – this was particularly true of VIC, which had to endure a lengthy second lockdown in H2 2020. As a result, both states have lagged behind the rest of the country through the recovery thus far.
- In contrast, WA and SA have escaped relatively unscathed in terms of restrictions, and both states have seen a relatively rapid recovery in economic activity. WA's economy has also been helped by the strength in global demand for commodities (linked to government spending infrastructure projects globally), which is providing further incentives for mining investment.
- QLD has been a relative outperformer, with the state benefitting from inward migration from other parts of the economy and the upturn in mining sector activity, although the recent trade spat with China has put a damper on the thermal coal sector. The ACT has also seen a sharp upturn in activity, with employment already above pre-COVID levels – this has been driven by the expansion in government activity to tackle the pandemic.
- Over the long run, demographic fundamentals will be the main driver of the relative performance of the states. The outlook for these is broadly unchanged and reflects structural fundamentals that were in place prior to the pandemic. NSW, SA and TAS are likely to underperform, with interstate migration flows in all three projected to remain negative, while the other states and territories will be relative outperformers.

NSW and VIC will contribute the most to incremental output over the forecast period, concentrated in the services and construction sectors. QLD and WA will be the next highest performing states. While services are also a strong driver for these states, mining and manufacturing play a much bigger role, particularly in WA where we expect these sectors to contribute 55% of total increase in output in the state, over the forecast period.

Figure 18 States shares of GDP



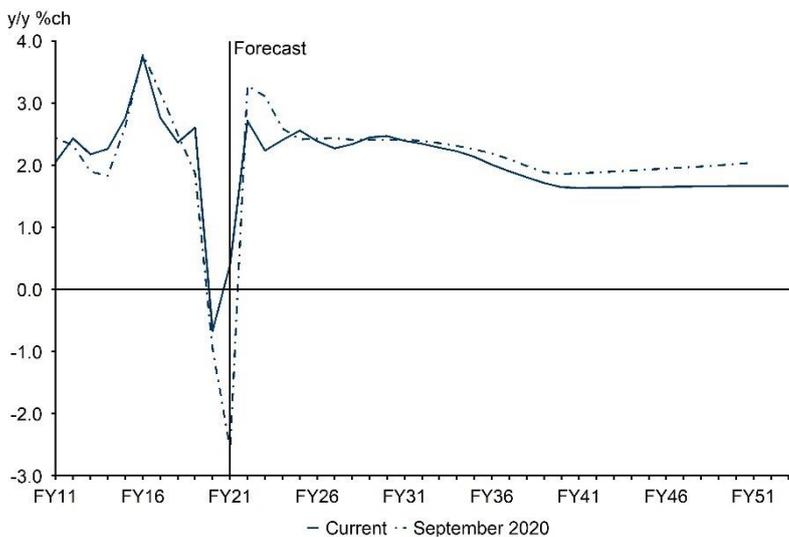
Source: BIS Oxford Economics/ Haver Analytics

5.1. State macroeconomics

5.1.1. New South Wales

NSW's relative exposure to the fallout from the COVID-19 pandemic made the state an underperformer in 2020, with output contracting -0.7% in FY20 before modest growth of 0.4% in FY21. The recovery is being driven by financial and professional services along with elevated public sector activity and a rebound in construction linked to infrastructure projects, maintenance and residential construction. Above-trend growth is expected to persist until the mid-2020s, after which the structural drags from relatively weak population growth will kick in. The state is also relatively exposed to the long-term impact of COVID-19, from both a smaller population (as a result of weaker migration flows) and hysteresis effects in higher education and tourism-exposed industries. Over the very long run, services will contribute the most to economic growth, as the state continues to transition to high value-added sectors such as financial services.

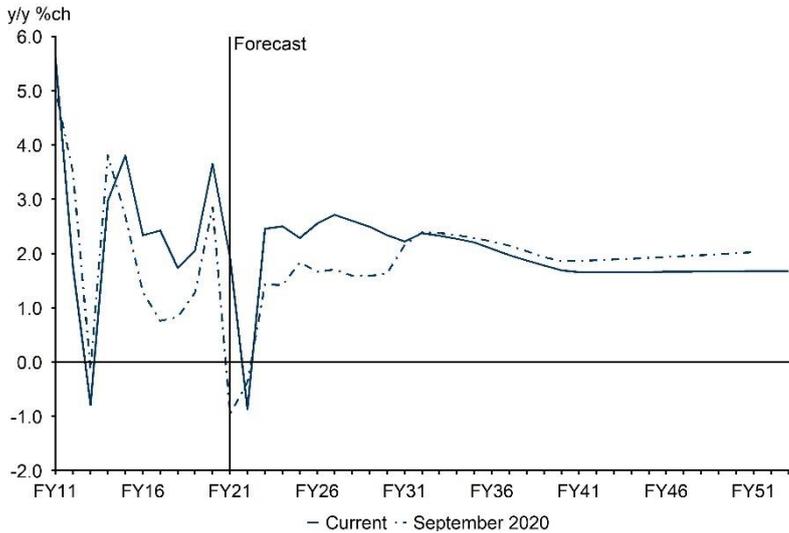
Figure 19 GSP (y/y change): NSW



Source: BIS Oxford Economics/ Haver Analytics

As in all other states, household income was temporarily lifted through the pandemic as a result of government supports for the economy. This channel is now unwinding, and income is set to fall back over the near term. As the economy recovers and labour demand picks up again, wage growth will resume, lifting growth in household disposable income through the mid-2020s. In the long-run income growth is expected to match GSP (implying labour's share of output remains constant), slowly declining to 1.7% p.a. by FY53.

Figure 20 Household disposable income (y/y change): NSW



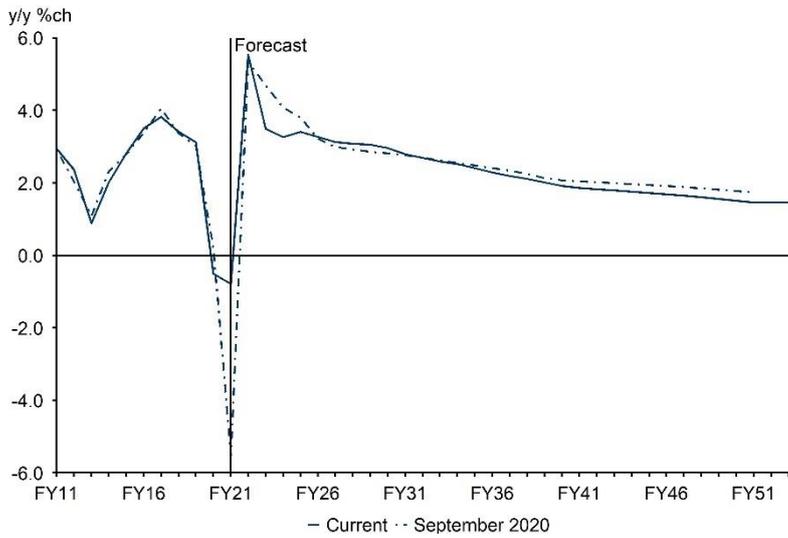
5.1.2. Victoria

Like NSW, VIC was relatively exposed to the COVID-19 pandemic, with the economy more reliant than other states on international students and tourists. Coupled with this, a major breach of hotel quarantine in June 2020 forced the state government to impose one of the harshest lockdowns seen globally, with restrictions not significantly eased until late October 2020. The most recent data suggests that the second lockdown delayed rather than derailed the recovery, with retail turnover and the labour market both rapidly catching up with other parts of the country.

As in other parts of the economy the recovery is being driven by direct government spending and indirect supports for the private sector. The construction sector (and related services such as finance and professional and technical) is expected to see an upturn in activity, with infrastructure projects, road maintenance and residential dwelling construction all set to pick-up. Retail, hospitality and travel should also see strong growth in 2021, with the state government rolling out voucher schemes to encourage household spending.

The recent outflow of people to other states is expected to reverse over the long run, as economic conditions improve and the fear of further lockdowns fade; Melbourne's favourable fundamentals and the city's focus on economic development are expected to continue to drive strong jobs growth. Together with a return of international migrants this will lead to VIC's population growth returning to above-average levels, which will reinforce the economic outperformance over time.

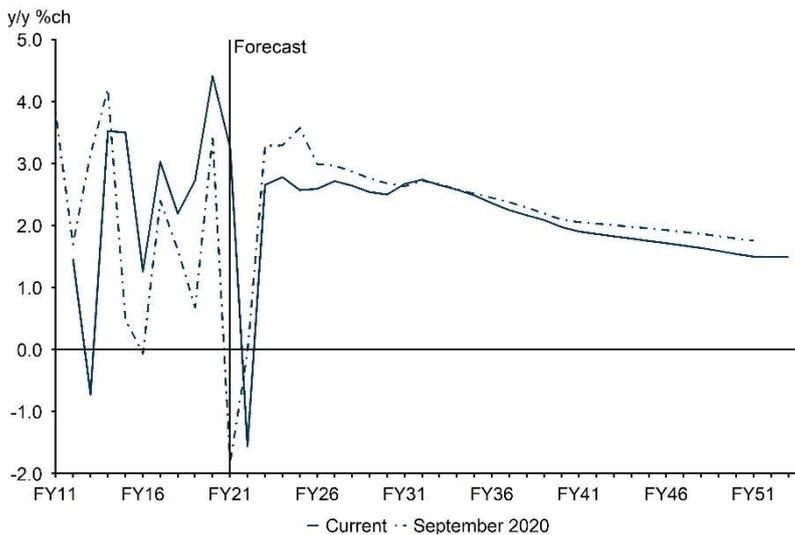
Figure 21 GSP (y/y change): VIC



Source: BIS Oxford Economics/ Haver Analytics

Employment growth, and consequently real household disposable income, is projected to remain healthy and track ahead of the national average over the medium term. This largely reflects the demographic outlook for VIC. Inward migration flows are expected to recover and turn positive, which will allow employment and output growth to stay ahead of the pack in the long run. The long-run growth rate for household disposable income in VIC will settle at 1.7% p.a.

Figure 22 Household disposable income (y/y change): VIC



Source: BIS Oxford Economics/ Haver Analytics

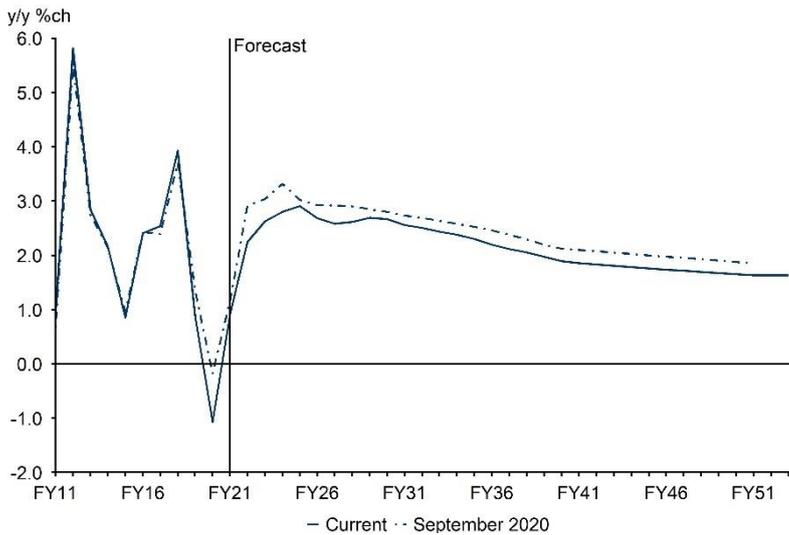
5.1.3. Queensland

After a period of prolonged weakness QLD's economy has outperformed all of the other major states through the pandemic. Relatively low case numbers (and so limited restrictions on activity) coupled with an upturn in interstate migration flows have driven the reversal in economic fortunes, with employment and retail spending already above pre-COVID levels. A further acceleration in activity is expected, with government support for residential construction activity,

an acceleration in government infrastructure projects, and an upturn in domestic spending all contributing; the tourism sector should also receive a fillip from the vaccine rollout, with state governments expected to become more willing to accept some cases of community transmission of COVID-19 once vulnerable people are protected from the disease.

Over the long-run, the economy will broadly align with the national average, with GVA growth expected to average around 2% pa by the 2040s. The services and construction sectors will drive the major share of economic growth, making up over 78% of total GVA by FY53.

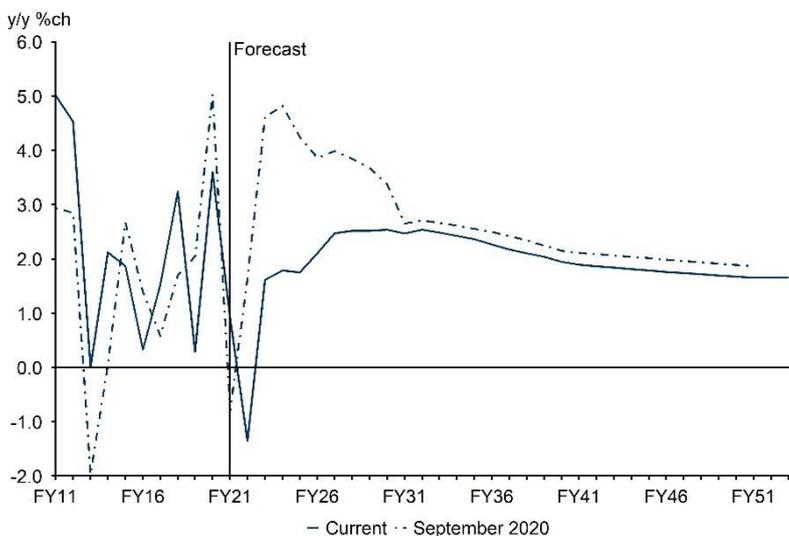
Figure 23 GSP (y/y change): QLD



Source: BIS Oxford Economics/ Haver Analytics

Growth in household disposable income has been relatively robust in recent years, underpinned by solid gains in non-employment income including interest earnings and rental income from investment properties. Most recently the pace of growth has accelerated sharply, driven by the temporary COVID-19 government supports. Incomes are likely to fall as these are wound back but this will be temporary, with the pace of growth returning to broadly align with GSP growth in the long run.

Figure 24 Household disposable income (y/y change): QLD



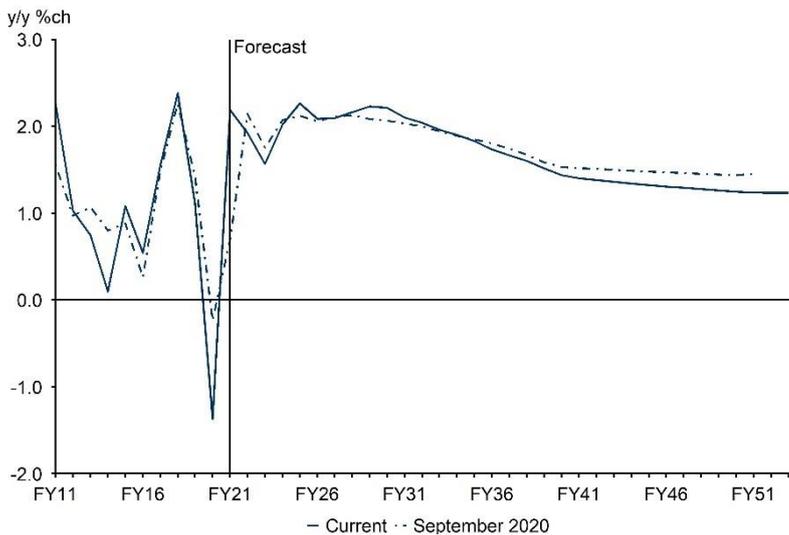
Source: BIS Oxford Economics/ Haver Analytics

5.1.4. South Australia

Momentum in SA’s economy slowed in FY19, with GSP increasing 1.4% y/y after a 2.3% rise in FY18. But this pace is a marked improvement on the years following the financial crisis, when SA’s economy was hampered by the strength of the AUD, which accelerated the decline in the local manufacturing sector. Most recently the economy has travelled relatively well through the pandemic, with low case numbers and relatively limited exposure to the most impacted sectors helping to support activity.

Looking ahead, we expect the pace of growth to accelerate in 2021 before falling back towards trend. Supporting the economy is the Federal government’s decision to base shipbuilding, bus building, other defence activities and the Australian Space Agency in Adelaide; this activity is generating positive spillovers to business investment activity. The state will also see a boost to demand as the border re-opens, which will enable the return of international students.

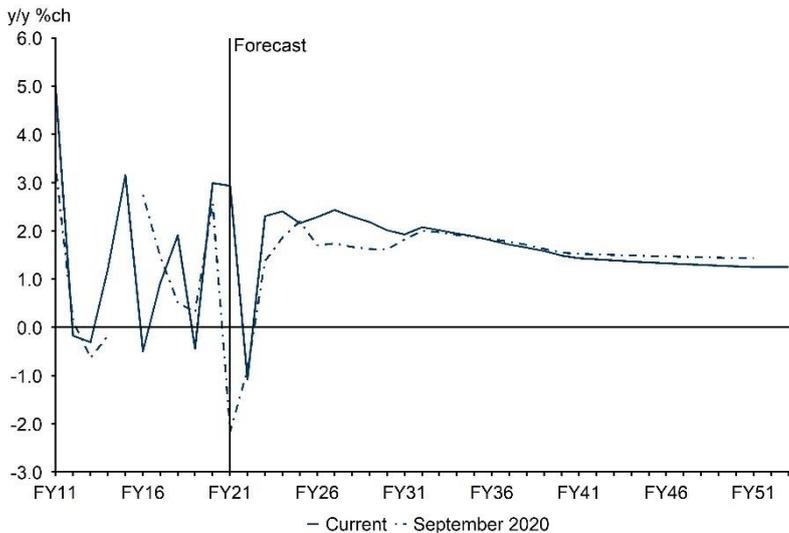
Figure 25 GSP (y/y change): SA



Source: BIS Oxford Economics/ Haver Analytics

In line with its demographics, the pace of employment growth in SA generally lags behind the rest of the economy. This slower pace is reflected in both GSP and household disposable income, with both set to underperform relative to the national average.

Figure 26 Household disposable income (y/y change): SA



Source: BIS Oxford Economics/ Haver Analytics

5.1.5. Western Australia

Momentum in WA's economy remains very weak, with State Final Demand (SFD) contracting once again in FY19 (by 1.0%), the fifth year in six of contraction⁷. Domestic spending is being weighed down by further falls in mining investment (linked to the final completion of the LNG installations), weakness in consumer spending and a downturn in residential construction activity. In contrast, the move of the mining sector from investment to production is driving GSP, which increased 1% p.a. in FY19.

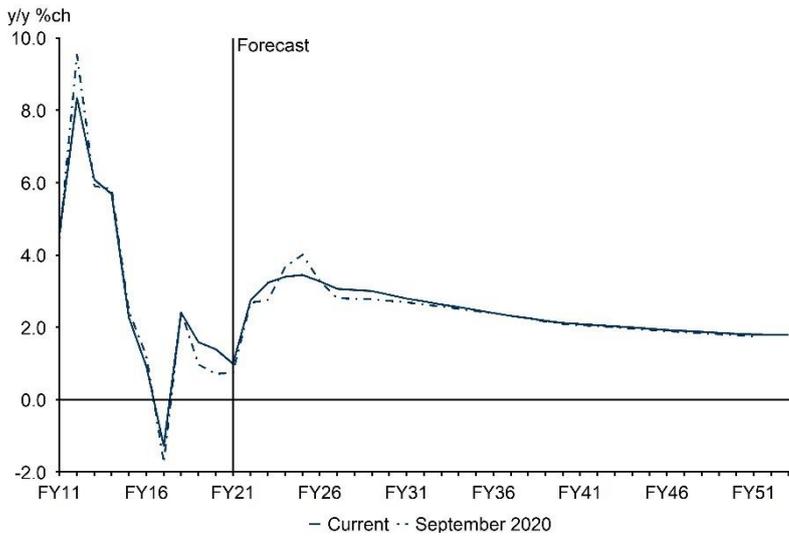
Looking ahead, we expect the gap between SFD and GSP to close. Mining production growth is set to moderate in the near term, but the next round of mining investment projects are now in the pipeline and expected to kick off over the next 12-24 months⁸. This activity will drive investment spending and the construction sector and will spill over to a number of other areas, including financial services, rental, hiring & real estate, and professional services. The uptick in activity is expected to drive inward migration and employment into WA, and this in turn will feed back to consumer-exposed sectors such as retail trade. Negative base effects⁹ will limit growth in GSP this year to 2.0%, with a slight pick-up (to 2.2%) in FY21.

⁷ SFD in WA contracted each year of FY14-FY17. It then increased modestly in FY18, by 0.6%, before declining again in FY19.

⁸ The Current Trajectories Case assumes that all projects which have reached FID/are in the final stages of approval proceed and are completed. Other projects which have been announced but are in the early stages of planning are not assumed to go ahead (the exception to this is Pluto Train 2, which is assumed to proceed given that the Scarborough development has received FID). The specific assumption for each major project were developed in consultation with AEMO.

⁹ Base effects refer to a distortion in reporting over a period of time due to spikes in data at lower frequency over that time period (e.g. monthly or quarterly spikes impacting reporting of year-to-date figures).

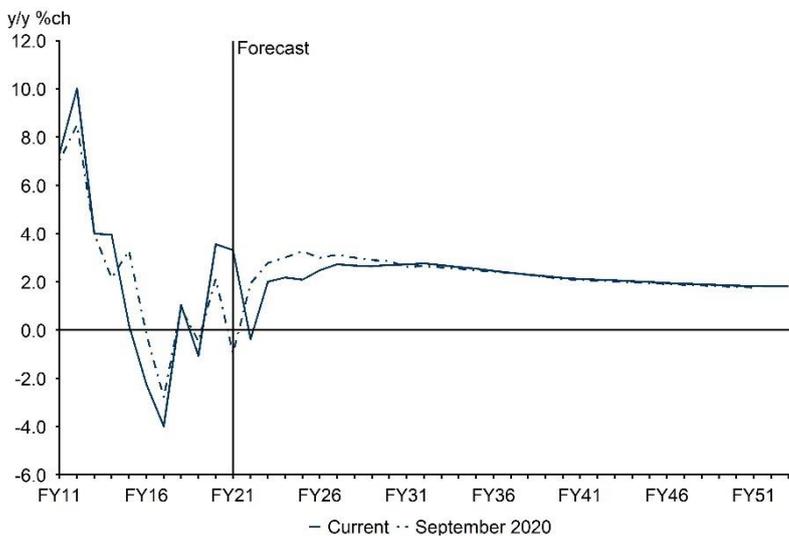
Figure 27 GSP (y/y change): WA



Source: BIS Oxford Economics/ Haver Analytics

The growth rate of household disposable income has broadly tracked GSP in recent years. As in other states, over the last year income growth has picked up but will fall back as the government supports are unwound. Over the long run, as in other states income is expected to broadly track in line with GSP.

Figure 28 Household disposable income (y/y change): WA



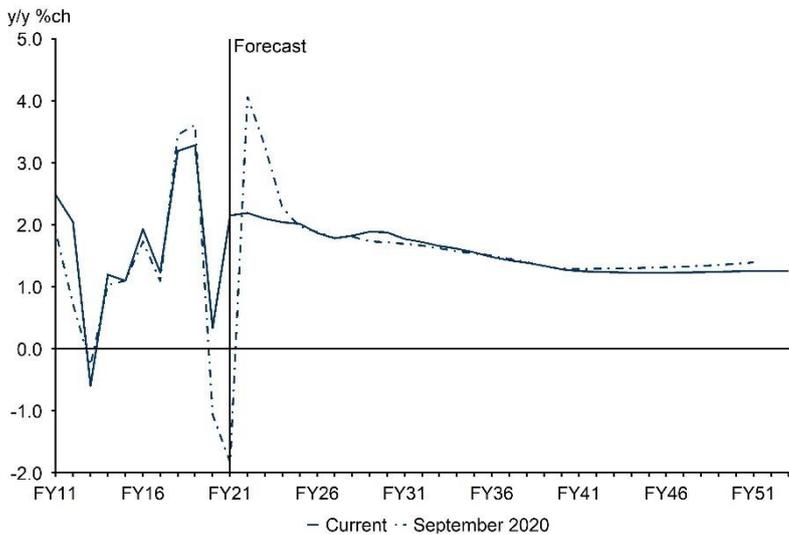
Source: BIS Oxford Economics/ Haver Analytics

5.1.6. Tasmania

Bucking the national trend, growth momentum in TAS had accelerated in the years immediately before the pandemic. Against a backdrop of a weaker AUD, the economy benefitted from a surge in tourist arrivals and the continued development of high value add manufacturing sectors, such as food processing. But the pandemic has put paid to this momentum, with the closure of the international border resulting in a sharp fall in international visitors and students. While domestic tourists are providing some offset, conditions will remain challenging and Tasmania's economic recovery is likely to lag behind other parts of the country in the near term.

Over the long run, GSP is expected to slow, reverting to a trend pace that is moderately below the national average. Driving this will be a moderation in inward migration, with workers attracted to other states as their economic outlook improves.

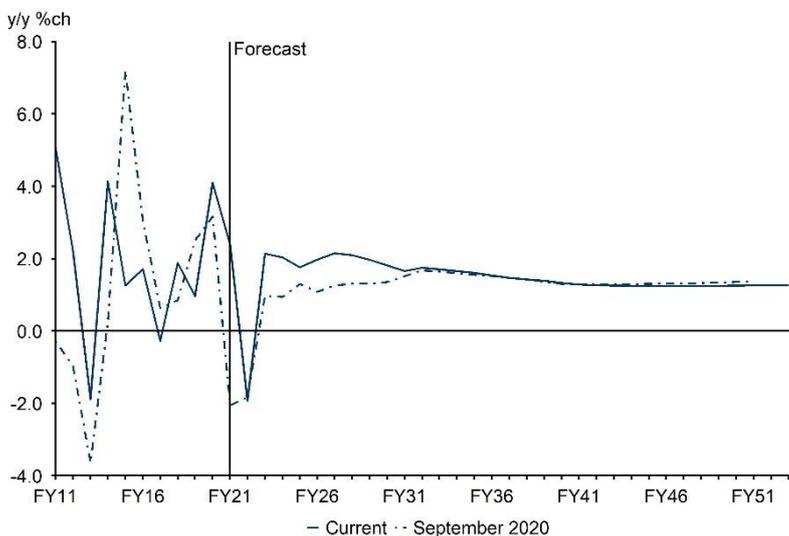
Figure 29 GSP (y/y change): TAS



Source: BIS Oxford Economics/ Haver Analytics

The profile for household income will mirror other states, with last year’s growth followed by a correction as government supports are removed. Over the medium and long run, the pace will broadly match GSP.

Figure 30 Household disposable income (y/y change): TAS



Source: BIS Oxford Economics/ Haver Analytics

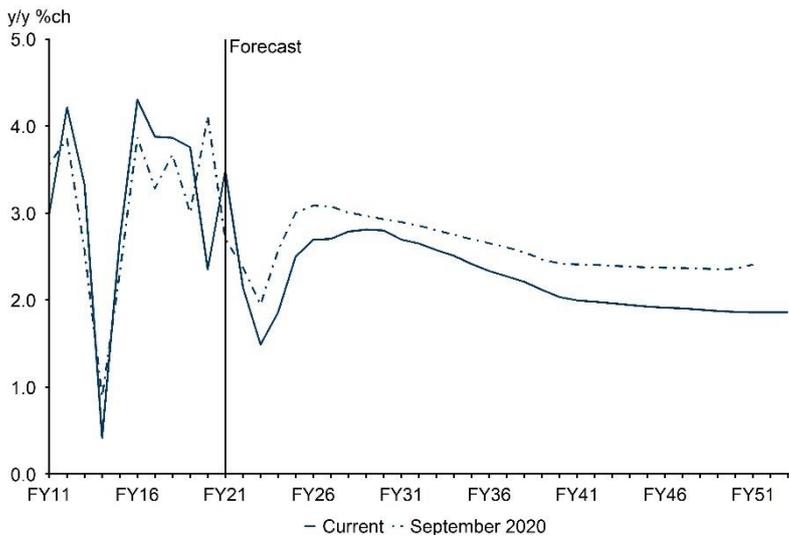
5.1.7. Australian Capital Territory

Home to the Australian Public Service, the Australian Capital Territory’s economy is based around service delivery and public administration. The government’s response to the pandemic has resulted in a substantial step-up in public sector activity, and as a result GSP increased in FY20 despite the pandemic’s impact on the private sector. Many other sectors are indirectly tied to the public sector, such as professional services, financial intermediation and information and communications. Healthcare, construction and education are also major industries, in terms of

GVA, and with the exception of education (where the ANU has struggled amid the border closure) all of these sectors are now growing strongly as a result of the various government stimulus packages. Looking ahead into FY22, the winding back of the government’s response to the pandemic will weigh on growth, and unlike the rest of the country the mid-2020s are expected to be characterised by below-trend. Over the long the outperformance of Canberra compared to the national average will resume.

Given the concentration of the service sector in ACT, it is no surprise that over the forecast period, the primary driver responsible for 99% of state economic growth is services. Within the services sector, much of the growth comes from public services.

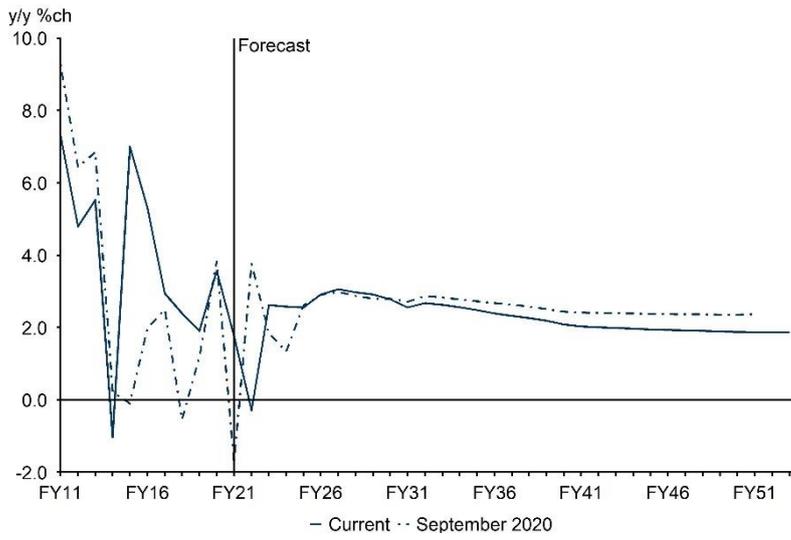
Figure 31 GSP (y/y change): ACT



Source: BIS Oxford Economics/ Haver Analytics

As in other regions, FY20 saw an uptick in income growth, but the strength of the local economy and relatively low reliance on government social security support mean it wasn’t as marked a turnaround as elsewhere. Incomes are expected to hold steady this year, before returning to trend growth as wages growth picks up. Over the medium-term we expect the pace to moderate somewhat, as economic conditions improve in other parts of the country (and so attract workers), and labour market tightness subsides, dampening income growth. In the long-run, income growth trends with economic growth, and is projected to gradually slow to around 2.3% pa.

Figure 32 Household disposable income (y/y change): ACT



Source: BIS Oxford Economics/ Haver Analytics

6. Slow growth case

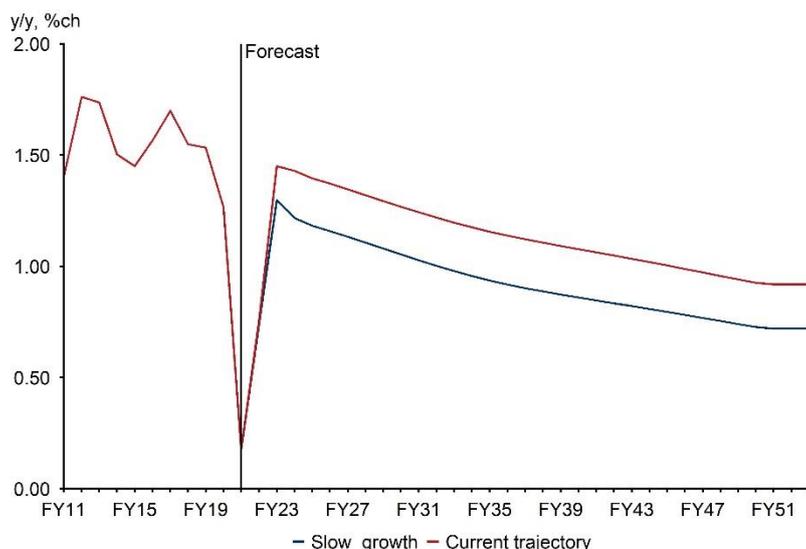
- In the slow growth case, the outlook for population growth is weaker relative to the current trajectory. The drawn-out recovery from COVID-19 weighs on net overseas migration flows in the near term, and they are assumed to not recover to their pre-COVID level in the long run.
- Slower pace of technological progress (due to lower investment and less ambitious decarbonisation efforts) drives weaker productivity. Alongside lower population, national GDP ends nearly \$380 billion lower than current trajectory by 2053.
- Broadly speaking, the distribution of economic activity across the sectors is the same as in the Current Trajectories case. This outcome is reflected across the states' output shares, although a small gain is recorded for NSW and a loss for WA.

The slow growth case is characterised by lower population growth (particularly net overseas migration), a slower pace of technological progress, and weaker pace of investment growth (both globally and nationally).

6.1. Demographics

In this scenario, Australia's population growth eases compared to baseline. In the short term, net overseas migration including both temporary migrants and permanent skilled workers, faces similar headwinds as in the Current Trajectories Case. Relative employment and economic prospects are a key determinant of net migration flows. Looking past the immediate border restrictions, a slowing economic outlook for Australia discourages inwards migration. Relative to the current trajectories case, this contributes to around 56,000 p.a. lower net overseas migration over the forecast period.

Figure 33 Population Growth, Current Trajectories Case vs. Slow Growth Case: Australia



Source: BIS Oxford Economics/ ABS

The weaker profile for NOM takes off approximately 0.2 ppts from national population growth each year over the forecast horizon. By 2053, this leaves Australia estimated resident population 2.30 million persons lower than the current trajectories case.

The weaker population growth accrues to the states in proportion to their composition of NOM. This leaves states where NOM has been their largest contributor to population growth, such as New South Wales, Victoria and South Australia, most affected. Others such as Queensland where net interstate migration plays a more pivotal role in population growth, are less impacted by the shock to NOM.

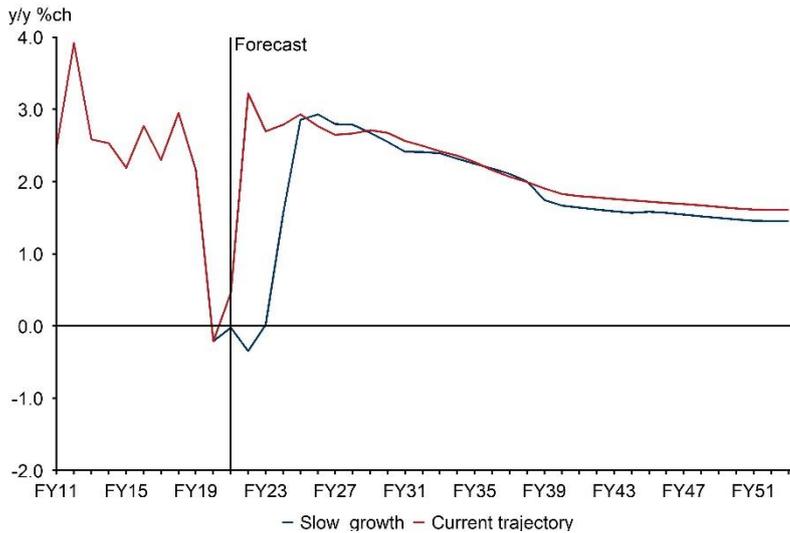
6.2. Macroeconomic outlook

In the near term the downside risks associated with the recovery from the COVID-19 pandemic are assumed to materialise. The vaccine rollout is delayed domestically and globally amid supply chain problems, and the emergence of new variants poses a challenge as they are partially resistant to the vaccines. This necessitates a longer period of time with the international border closed, which in turn leads to a more protracted economic recovery. Fears about the new variants and the withdrawal of government support weigh on private consumption and investment compared to the current trajectories case, and as a result the economy slips back into recession. Overall, it is the mid-2020s before there is a marked improvement in the outlook.

Over the long run, population growth is a key determinant of economic growth. Ultimately, the level of population underpins the level of underlying demand, dictating investment, consumption and output. In the slow growth scenario, the weaker population outlook weighs on labour supply growth. With a weaker profile for technological progress which feeds through to lower labour productivity, this drives real wages lower. Over the long run, lower labour supply and weaker productivity underpin weaker economic growth.

Consistent with moderating pace of globalisation, lower investment and less progress made towards developing more efficient technologies that reduce commodity usage per unit of output, we have assumed a slower pace of technological progress. This leads to declining labour and capital productivity, slowing economic growth. As a second order effect, reduced labour productivity places downwards pressure on wages and disincentives firms to invest, which in turn reduces productivity growth further as the ageing capital stock becomes less suitable for current and future processes.

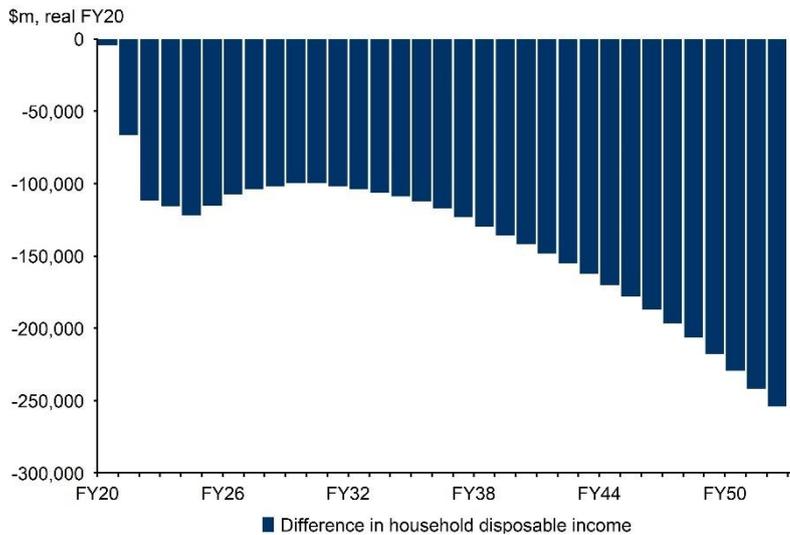
Figure 34 GDP y/y Change: Australia



Source: BIS Oxford Economics/ ABS

In line with a weaker profile for economic output, household disposable income also tracks lower. This is driven by falling labour productivity and easing economic growth, resulting in softer income growth over the forecast period. By FY53, household disposable income finishes around \$250 billion lower than the current trajectories case in real FY20 terms.

Figure 35 Change in Household Disposable Income: Slow Growth Case vs. Current Trajectories Case



Source: BIS Oxford Economics

The AUD sits lower in the slow growth case at 0.75 USD. Although commodity intensity of production is higher in this case, the slower pace of technological progress leads to lower global output levels and therefore absolute consumption levels are lower. Lower global consumption places downwards pressure on commodity prices, weighing on the AUD relative to the Current Trajectories Case.

6.3. Sector breakdown

Broadly speaking the distribution of activity across the sectors is unchanged from the Current trajectories case. For the mining sector, the weaker global demand environment and the slower transition towards lower carbon, greener fuel sources and technologies results in a number of

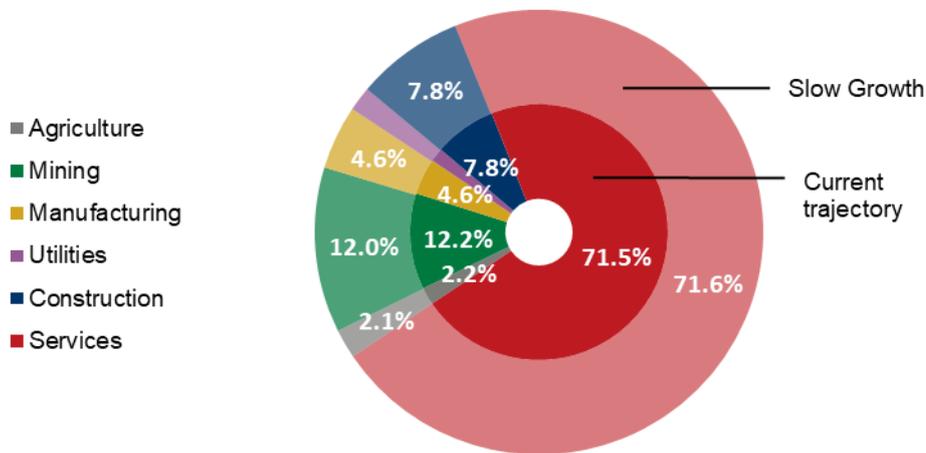
projects being shelved that are assumed to go ahead in the Current Trajectories case. These projects include:

- Iron Ore: Robe Valley expansion, West Angelas expansion, Eliwana, South Flank
- Gas: Scarborough gas field expansion, Waitsia gas project (Stage 2), Pluto LNG project (Stage 2)
- Other: Bullabulling, Pilgangoora Lithium (Stage 2)

The construction sector holds its share in the slow growth scenario. Softer forecasts for investment as slower pace of technological progress reduces the demand for new construction. Concurrently, lower population growth reduces the incremental need for infrastructure investment, both new and replacement. However, the impact for the construction GVA is in line with the broader impact to total GVA. In absolute terms, construction GVA is lower in this case.

With a more sluggish energy transformation pathway, engineering construction activity is expected to be more subdued as there are fewer greenfield investments into renewable energy generation. Although some level of maintenance to existing generation would be necessary, we expect construction activity will be reduced at an aggregate level.

Figure 36 Industry Share of Total GVA (FY53): Slow Growth Case vs. Current Trajectories Case



Source: BIS Oxford Economics

The services sector sees a marginal increase in its share of total output, relative to the Current Trajectories Case. Despite slower pace of income growth weighing on services, the setback from slower technological progress is less severe than for other sectors, leading to a small increase in its share.

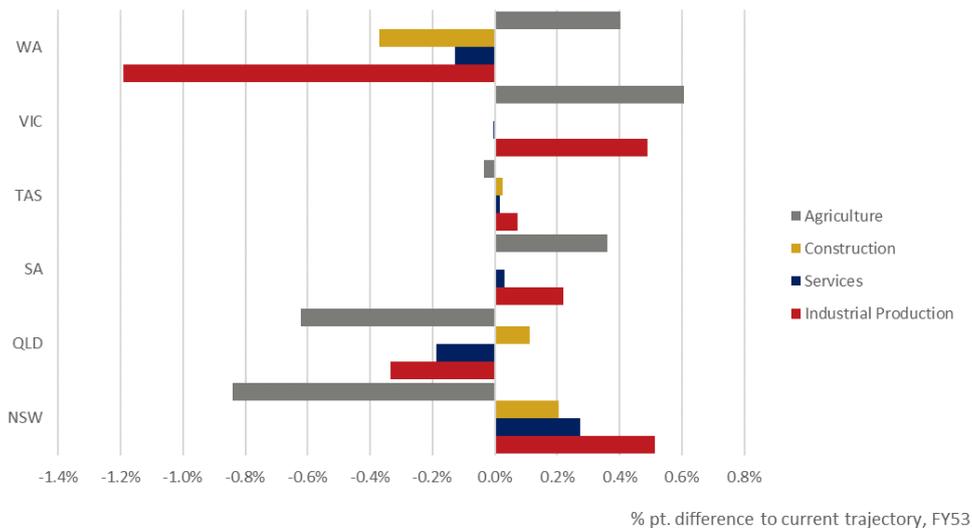
Industry Composition across states

The national sectoral trends are broadly mirrored at the state level, skewed by the sectoral idiosyncrasies of each state. The reduction in global demand for commodities and the resulting lower level of mining investment and output is concentrated in WA and results in a noticeable fall in WA's share of industrial production relative to the current trajectories pathway. QLD sees a

similar but less pronounced fall in industrial composition in the Slow Change case. On balance, NSW and VIC see the largest increase in their shares, as industrial production in these two states is more concentrated in manufacturing. SA also benefits, although the small absolute size of its economy means the increase in the state’s share is smaller in absolute terms.

The rise in the share of services at a national level is led primarily by NSW, with swings away from the mining states of QLD and WA. This shift reflects i) the absolute size of NSW’s economy and ii) the relationship between mining activity and the broader economy in WA and QLD. While construction at a national level retains a similar share to the current trajectories case, at a state level the composition shifts from WA towards NSW. Though we note that in general the movements in construction’s share of output are small.

Figure 37 Percentage point difference in state composition between Slow Growth and Current Trajectories case (FY53), by industrial sector

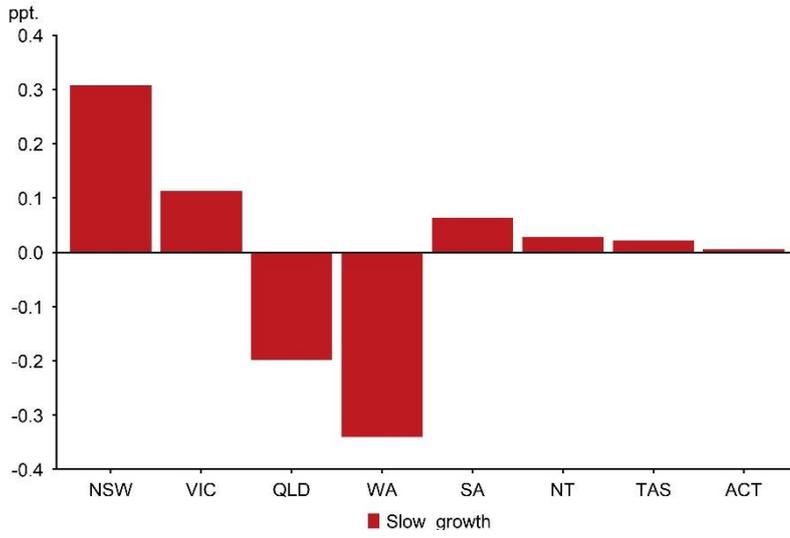


Source: BIS Oxford Economics/ ABS

6.4. State comparison

The impact on the state composition is largely a result of the relative changes (albeit limited) to the industry composition and asymmetric impacts of the population assumption changes compared to the Current Trajectories Case. The relatively weaker mining GVA outlook (compared to other sectors) in the slow growth case means QLD and particularly WA see the largest negative swings in their shares of national GDP. In this case, the majority of the large mining projects shelved were concentrated in WA, resulting in the state disproportionately losing share. NSW, VIC and SA are less exposed to weaker mining outlooks, as they have larger concentrations of services and manufacturing.

Figure 38 Percentage Point Change in State Composition of GDP from Current Trajectories Case to Slow Growth Case FY53



Source: BIS Oxford Economics

7. Sustainable growth case

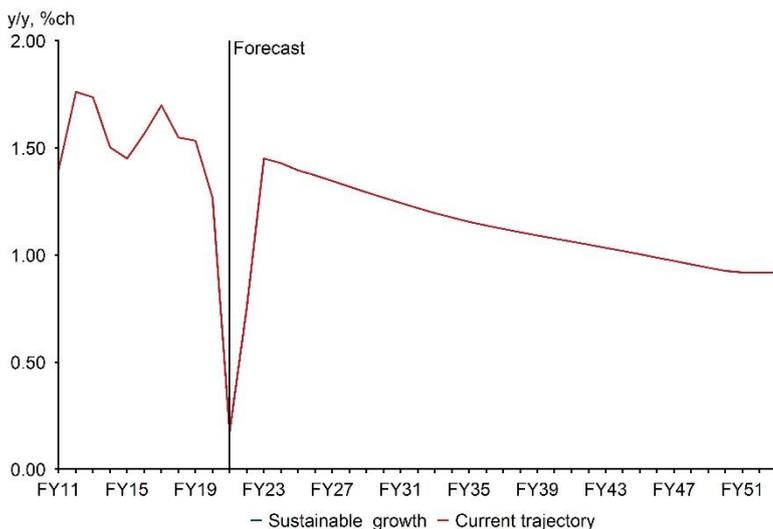
- With moderate population and economic growth, we see a similar long-run profile to the current trajectory case. However, driven by the reallocation of investment and policy focus towards strong decarbonisation objectives, there are material changes in the composition of the economy.
- The shift in focus towards green energy sources through investment boosts technological progress in these areas. But overall the pace of technological growth across the economy is the same as the Current Trajectories case.
- Construction and services GVA are relative winners, improving their shares of gross output, while mining loses share as the economy transitions towards greener energy source. This translates to the largest mining state, WA losing share of national GDP, while the state economies with greater service shares, NSW and VIC are relative winners. The other states remain broadly unchanged in shares.

The sustainable growth case is characterised by strong decarbonisation objectives, consistent with limiting temperatures rise to $\sim 1.8^{\circ}\text{C}$, and moderate economic and population growth.

7.1. Demographics

Consistent with moderate population growth, the sustainable growth case has identical population assumptions to the Current Trajectories Case. This includes for natural increase, NOM and NIM, in addition to state compositions of these.¹⁰

Figure 39 Population Growth, Current Trajectories Case vs. Sustainable Growth Case: Australia



Source: BIS Oxford Economics/ ABS

¹⁰ See Section 3 for details on demographics used in this case.

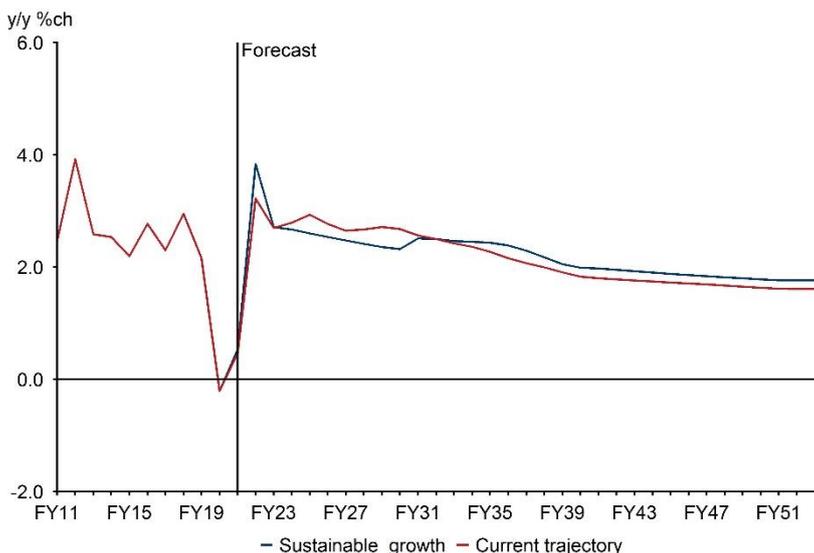
7.2. Macroeconomic outlook

In line with identical assumptions for population, economic output is expected to broadly track the current trajectory case. Rather than assessing different growth trajectories, the sustainable growth case is characterised in terms of structural compositional changes within the economy, with moderate economic and population outcomes.

In the sustainable growth case, the decarbonisation objectives are targeting limiting temperature increases to ~1.8 degrees Celsius (RCP 2.6). To achieve this, we see an aggressive shift in energy consumption patterns away from fossil fuels towards renewable energy. Aided by an explicit policy focus on achieving the stronger decarbonisation objectives, this necessitates a reallocation of investment towards renewable energy driving technological advances.

While progress is made towards reducing the carbon intensity of the global economy (including Australia), overall the pace of technological progress is broadly similar to the Current Trajectories case. Alongside identical population assumption, this translates to similar economic output levels to current trajectory over the forecast period.

Figure 40 GDP y/y Growth, Current Trajectories Case vs. Sustainable Growth Case: Australia



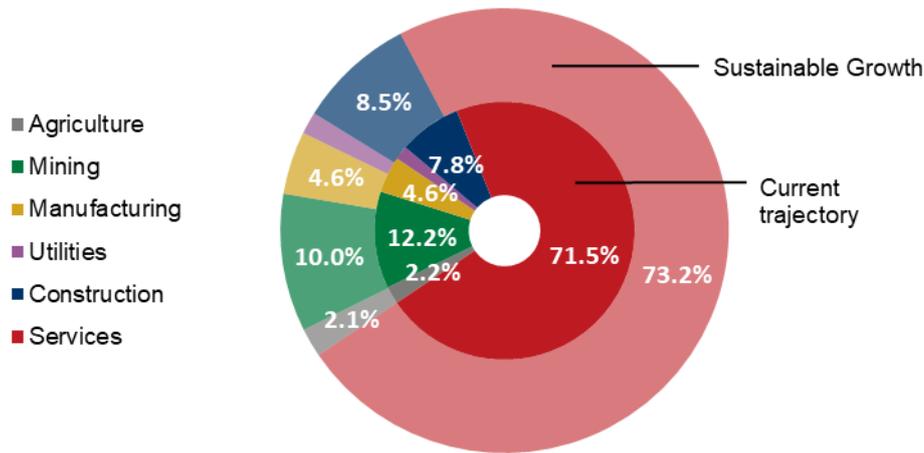
Source: BIS Oxford Economics/ Haver Analytics

7.3. Sector breakdown

Breaking down the sectors, mining GVA is expected to take the sharpest leg down of all the sectors relative to the current trajectory case. The shift away from fossil fuels including coal, oil and gas, to greener energy sources disproportionately impacts the mining sector. But there is some offset from the non-fuel commodities; iron ore, rare earths and other minerals.

On the flipside, construction and services GVA both accrue greater shares of total GVA in the sustainable growth case. Construction is set to benefit from the stronger decarbonisation pathway. Higher investment in greener energy sources and supporting infrastructure is expected to boost the aggregate sector, offsetting declining in construction activity in more emissions-intensive sectors. The services sector also sees an increase in its share relative to the current trajectories case.

Figure 41 Industry Share of Total GVA (FY53): Sustainable Growth Case vs. Current Trajectories Case

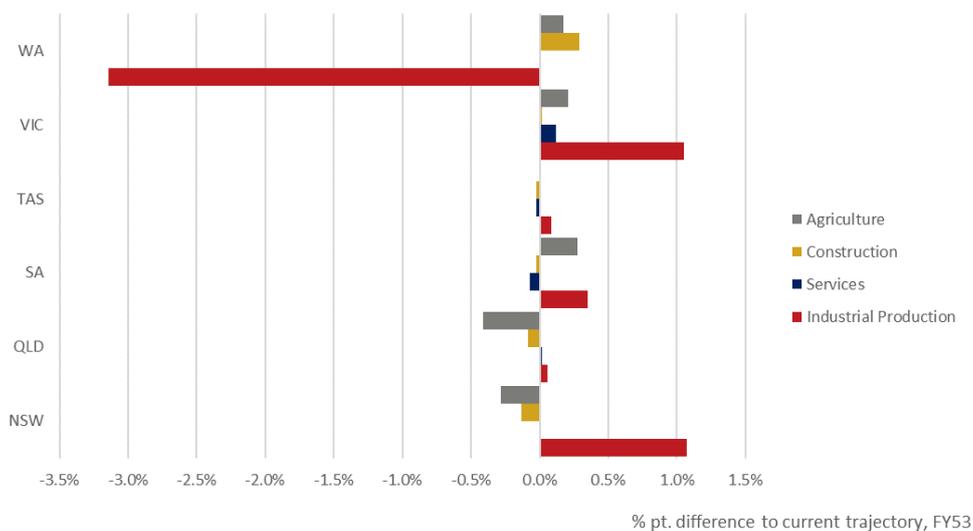


Source: BIS Oxford Economics

Industry Composition across states

The relative shift in industry compositions in this scenario, relative to the current trajectories case, is magnified at the state level. Therefore, as shown in **Figure 42**, the fall back in mining GVA materialises as a strong composition shift in industrial production away from WA, with proportionate gains in VIC and NSW (where manufacturing accounts for the majority of industrial production activity) to balance. There are very marginal movements across the states for other sectors compared to the current trajectory, which is unsurprising as the overall output in this scenario is unchanged from the current trajectory case. The composition shift away from mining dominates the narrative in this case.

Figure 42 Percentage Point difference in state composition between Sustainable Growth case and Current Trajectories case (FY53), by industrial sector



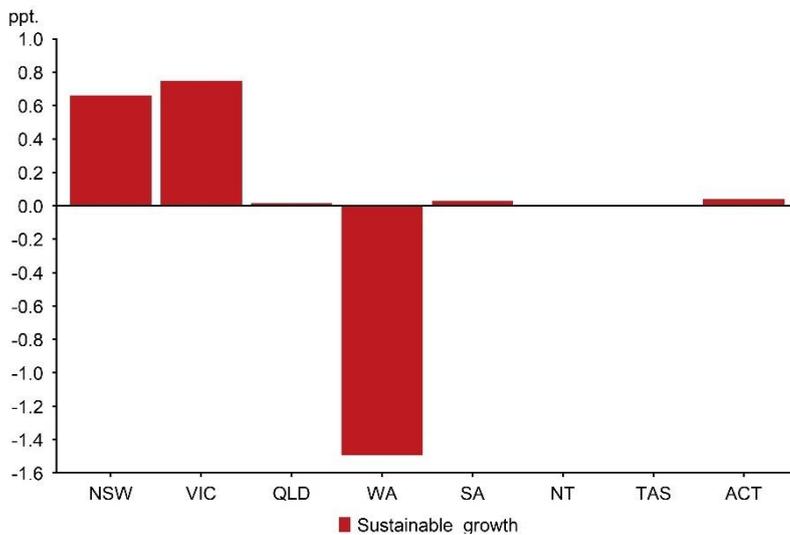
Source: BIS Oxford Economics/ ABS

7.4. State comparison

The distributional impact on the states flows down from the changes in the sectoral composition. This means WA is set to see the largest decline in its share of national GDP, relative to the current trajectory case. This is due to mining making up a substantial share of the West Australian economy, which will be disproportionately impacted.

On the other hand, New South Wales and Victoria are less exposed to the transition away from emissions-intensive energy sources, since other sectors, particularly services make up the largest share of each states' economy. Queensland's share remains broadly unchanged in the sustainable growth case, with a more balanced weighting of services (which are relative beneficiaries) and mining (a relative loser).

Figure 43 Percentage Point Change in State Composition of GDP from Current Trajectories Case to Sustainable Growth case by FY53



Source: BIS Oxford Economics/ ABS

8. Rapid decarbonisation case

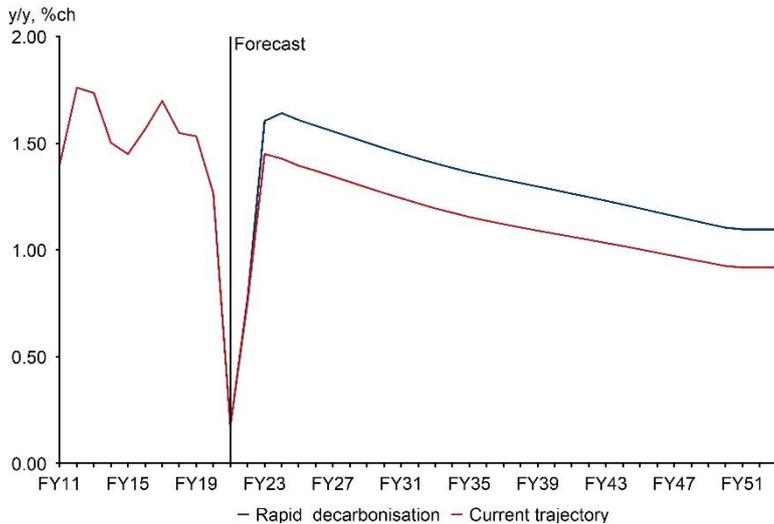
- **The rapid decarbonisation case sees higher population flows, with faster economic growth domestically encouraging increased NOM inflows. Technological progress is faster than baseline, underpinned by higher global and domestic investment trajectories and more ambitious decarbonisation objectives. Both contribute to a stronger profile for economic output over the forecast period, around \$435 billion stronger than baseline by 2053.**
- **Services is the biggest relative winner, lifting its share of GVA as the boost to population flows disproportionately flows through to lifting the sector's share. With the stronger decarbonisation objectives, this leads to mining share falling relative to baseline.**
- **WA and QLD suffer the largest negative swings in their shares of GDP, a consequence of the weaker mining sector outlook compared to the current trajectory case. NSW and VIC accrue the largest gains from the higher population flows and increased services share.**

The high growth case is characterised by stronger population growth, faster technological progress (including more rapid progress in the energy consumption transition) and a more rapid pace of investment growth (both globally and nationally).

8.1. Demographics

In this scenario, Australia's population growth is increased relative to the baseline. In the short term, the profile is largely unchanged from the baseline, although there is a slightly faster reopening of international borders. The biggest deviation from the current trajectories case is from FY23 onwards. With stronger economic growth globally and domestically, inwards migration is encouraged due to better employment prospects. This results in the long run level of national net overseas migration is increased by around 56,000 persons each year.

Figure 44 Population Growth, Current Trajectories Case vs. Rapid Decarbonisation Case: Australia



Source: BIS Oxford Economics/ ABS

The stronger profile for net overseas migration lifts annual population growth by around 0.2 percentage points over the forecast period. By FY53, the national population is forecast to sit at 39 million persons, approximately 2.31 million stronger than in the baseline case.

Distributing the positive shock to national population growth, we expect the states who have historically relied most on NOM for population growth to see the largest proportional boosts to their populations over the forecast period. This means New South Wales, Victoria and South Australia should accrue the largest incremental gains to their population growth, relative to the baseline. States such as Queensland, who rely more so on net interstate migration inflows, are anticipated to see more modest gains from the boost to NOM.

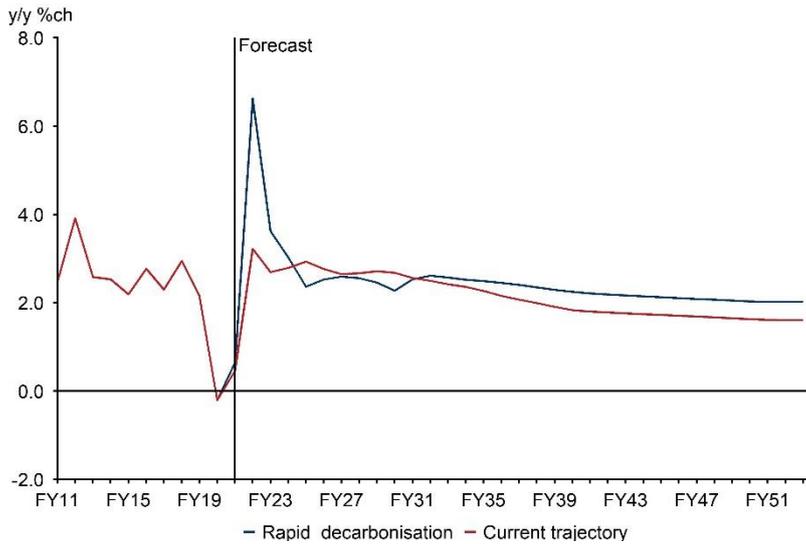
8.2. Macroeconomic outlook

In the very near term all of the upside risk surrounding COVID-19 materialise. The vaccine rollout is quicker than currently anticipated, and new variants are well-controlled, which enables a faster re-opening of the international border. Households feel confident about the outlook, and as a result they spend down a significant proportion of the wealth they have accumulated since March 2020, which provides a substantial boost to growth in the near term.

Over the long run, supply side fundamentals dominate the outlook. Consistent with a positive shock to population, we expect the rapid decarbonisation scenario to see stronger labour supply growth. A stronger profile for technological progress should propel labour productivity higher, placing upwards pressure on real wages over time. The combination of stronger labour supply growth and higher labour productivity should underpin higher economic growth over the forecast period.

In the rapid decarbonisation scenario, we assume a faster pace of technological progress. This is consistent with a global and domestic economy that has increased investment trajectories, higher decarbonisation objectives and faster progress made to reduce the commodity and emissions intensity of output globally. Faster technological progress leads to greater labour and capital productivity, supporting stronger economic growth over the forecast period. Greater labour productivity places upwards pressure on real wages, in turn incentivising firms to invest further, ultimately increasing productivity growth further and accelerating technological progress.

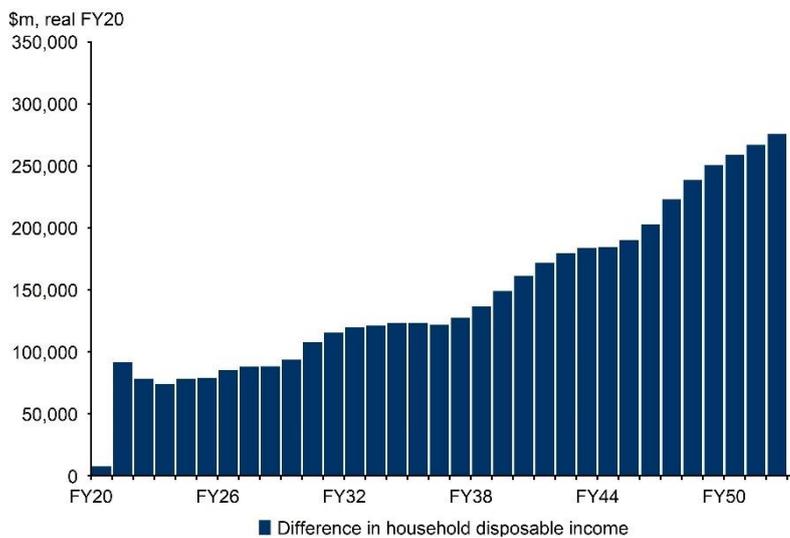
Figure 45 GDP y/y Growth, Current Trajectories Case vs. Rapid Decarbonisation Case: Australia



Source: BIS Oxford Economics/ Haver Analytics

Household disposable income also tracks higher as stronger labour productivity, stronger real wages and higher economic growth, results in higher income growth over the forecast period. By 2053, real household disposable income is forecast to finish around \$275 billion higher than the Current Trajectories Case in real FY20 terms.

Figure 46 Change in Household Disposable Income: Rapid Decarbonisation Case vs. Current Trajectories Case



Source: BIS Oxford Economics

Relative to the Current Trajectories Case, the Australian dollar sits higher. This structural shift is largely due to higher commodity prices, itself the result of a faster pace of technological progress driving higher global GDP growth and therefore aggregate consumption. This leaves Australia’s non-fuel exports higher and is more than enough to offset the softer profile for non-fuel exports due to a faster shift away from emissions-intensive fuels. These factors lead the AUD to sit at 0.84 in the rapid decarbonisation case, compared to 0.80 in the Current Trajectories Case.

8.3. Sector breakdown

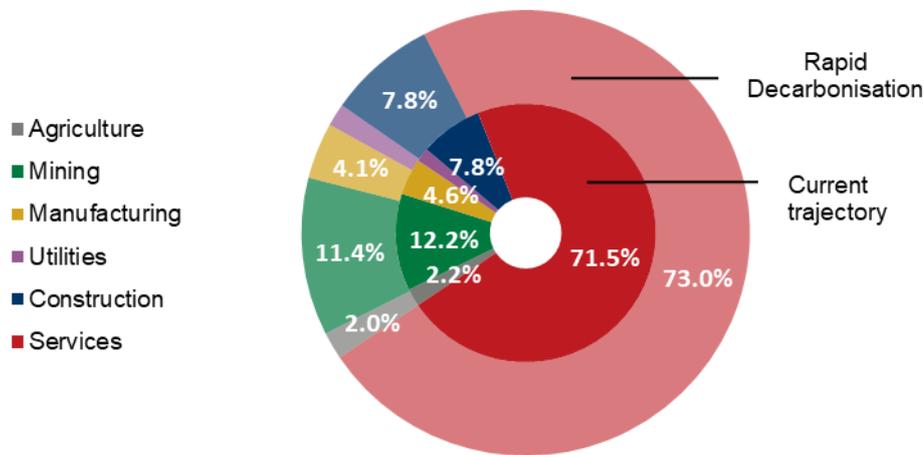
In this scenario, the mining sector is a relative loser. In an aggressive investment environment, which underpins faster pace of technological progress, commodity intensity improves (less of a 50

commodity is required to develop the same level of output). As a result, mining’s share of total output declines, despite in level terms mining GVA sitting higher than the Current Trajectories Case due to stronger global growth and consumption. Further, more ambitious decarbonisation objectives in Australia results in a faster shift away from emissions-intensive fuel commodities, particularly coal and gas (production which comes under Mining GVA) towards renewable electricity generation (which sits within Utilities GVA). This places further downward pressure on domestic demand for commodities, compounding the decline in mining share of total GVA.

Manufacturing also sees its share of the total GVA decline relative to the Current Trajectories Case. This represents an acceleration in the long-run trend decline in manufacturing share of GVA, as the stronger profile for real wages lifts real labour costs and more than offsets increased demand for manufacturing due to higher population. Crucially, the relatively slow development of hydrogen as a fuel source (which is accounted for in manufacturing) does not provide an offset to this trend.

Services GVA is a relative winner. This is consistent with a stronger profile for household disposable income growth and faster pace of technological progress, accelerating the long-run trend of services increasing its share of time. For the remainder of the sectors, their shares of the total remain unchanged compared to the Current Trajectories Case.

Figure 47 Industry Share of GDP (FY53): Rapid Decarbonisation Case vs. Current Trajectories Case



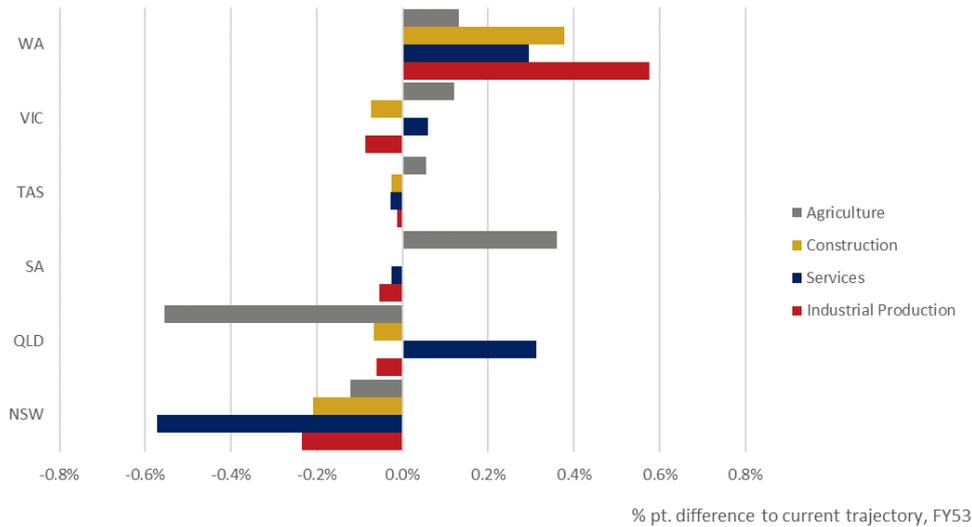
Source: BIS Oxford Economics

Industry Composition across states

The stronger global demand for raw materials (clean fossil fuels, metals and minerals) in the rapid decarbonisation scenario results in somewhat counterintuitive shifts in the distribution of output across the states. Overall, mining is a relative loser in this scenario, with its share of output in the long run lower than in the current trajectories case. Within the sector, WA’s share of mining increases moderately, as a result of the state’s concentration in metals and cleaner fossil fuels. In contrast, NSW, and to a lesser extent QLD see a decline in their share; this reflects NSW’s near-complete concentration on thermal coal mining (QLD’s mining sector sees some offset from metallurgical coal, which remains in demand as a result of rising steel demand domestically and globally).

As a secondary effect of the growth in mining, we expect to see an acceleration in mining-related construction and services, resulting in WA gaining a greater share in these sectors as well. NSW sees a moderate decline in its share of services as an offset to this.

Figure 48 Percentage Point difference in state composition between Rapid Decarbonisation case and Current Trajectories case (FY53), by industrial sector



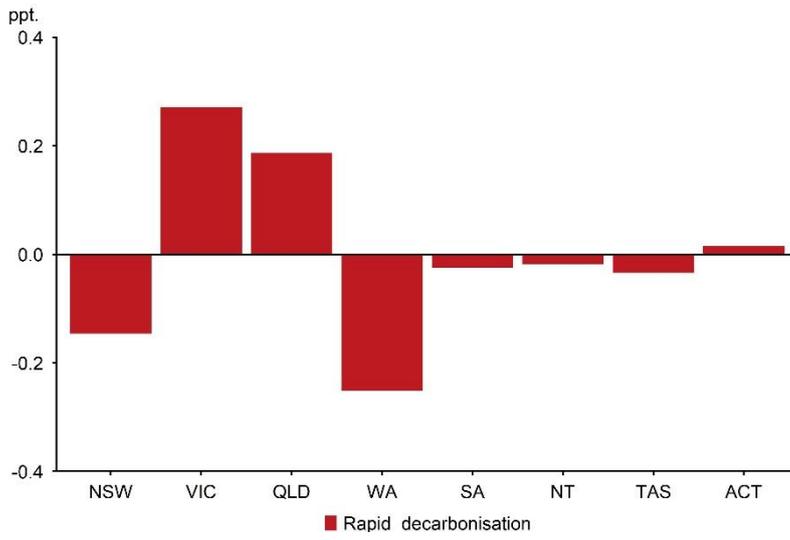
Source: BIS Oxford Economics

8.4. State comparison

In comparing the states, Victoria sees the largest increase in its share of GDP in the rapid decarbonisation case relative to the current trajectories case. This is largely due to the state accruing the largest boost from the stronger NOM, and a lack of dependence on mining. Queensland also sees its share of GDP increase compared to the Current Trajectories Case, as the state sees stronger NIM inflows due to the boost to national NOM mean more migrants eventually settle in Queensland (as has occurred historically).

NSW and WA are expected to see the largest negative swing in share of national GDP. Although NSW accrues a boost to NOM, the flow on impact of this is NIM outflows disproportionately drags on the state to the benefit of states like Queensland, and to a smaller extent Victoria. But overall, the change in NSW's share of national output is small, reflecting the ebb and flow impact of migration. Western Australia suffers the largest decline in share of GDP, primarily as a result of the decline in the absolute amount of mining activity; notwithstanding the relative resilience of demand for iron ore and other metals, this scenario incorporates a faster trajectory for productivity improvements, which relatively weigh on demand for all commodities (with a concentration on fossil fuels).

Figure 49 Percentage Point Change in State Composition of GDP from Current Trajectories Case to Rapid Decarbonisation Case, FY53



Source: *BIS Oxford Economics*

9. Export superpower case

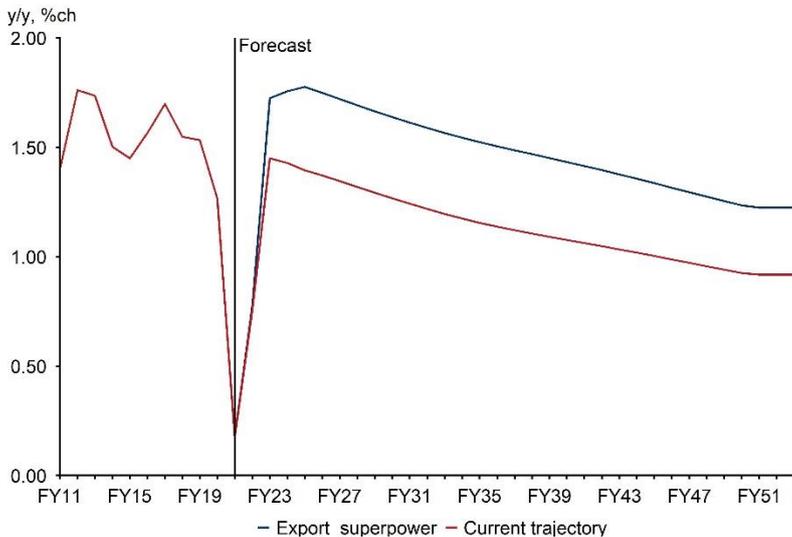
- **The export superpower case sees Australia become a global leader in combating climate change, aided by policy targeting net zero by 2040 and using its competitive advantages to develop a substantial hydrogen industry. This helps Australia outperform globally, attracting stronger population inflows.**
- **With increased investment globally and Australia capturing a greater share of this, faster technological progress is achieved enabling the development of the new industry, driving productivity gains and boosting real wages.**
- **The construction sector is a relative winner, propelled by the massive investment in infrastructure necessary to decarbonise across the board and construct a hydrogen exporting industry. Services also disproportionately gains from the population flows, while the mining sees the largest loss to share of gross output, as the economy rapidly transitions away towards clean energy.**
- **NSW, VIC and QLD see gains to their shares of national GDP, boosted by higher population flows and the emergence of the hydrogen industry (within their larger shares of manufacturing GVA). WA sees a significant negative swing in its share due to hard hit mining sector making up a substantial share of its economy.**

The export superpower case is characterised by the highest profiles for investment (public initially then private), strong exports and higher population growth for Australia relative to global. This scenario also has the strongest decarbonisation pathway with the fastest technological progress.

9.1. Demographics

In the export superpower case, Australia becomes a global leader in climate action, targeting net zero emissions by 2040. With strong policy support aiding substantial renewable energy competitive advantages, Australia can facilitate the emergence of a significant hydrogen production industry – for domestic consumption and exporting. This helps the Australian economy outperform globally, increasing the attractiveness of Australia as a destination for migration. The job opportunities associated with the nascent industry, increases the demand for skilled labour. Relative to the Current Trajectories Case, we expect a lift in the profile for net overseas migration by 100,000 persons p.a. to 350,000 each year over the forecast.

Figure 50 Population Growth, Current Trajectories Case vs. Export Superpower Case: Australia



Source: BIS Oxford Economics/ ABS

The stronger profile for NOM boosts Australia’s population growth rate in this scenario by approximately 0.3-0.4 percentage points p.a. over the forecast period. By 2053, this leaves Australia’s estimated resident population around 4.12 million persons larger than in the current trajectory case.

The largest beneficiaries of the boost to NOM is expected to be New South Wales and Victoria. These states have had the greatest reliance on overseas migrants in recent years with their dominant state economies’ making for attractive destinations. States such as Queensland, who are also expected to attract a substantial portion of the investment in production and export hubs (due to their competitive strengths¹¹), should also see material inwards flows of skilled migrants as the industry scales up.

9.2. Macroeconomic outlook

Similar to the Rapid Decarbonisation case, this case assumes that all of the upside risk around the recovery from COVID-19 materialises.

The positive shock to population growth driven mostly by NOM in this case provides a boost to labour supply growth. Importantly, demand for labour increases as well, particularly for skilled migrants as the public sector increases investment to foster the early stage development of the hydrogen industry.

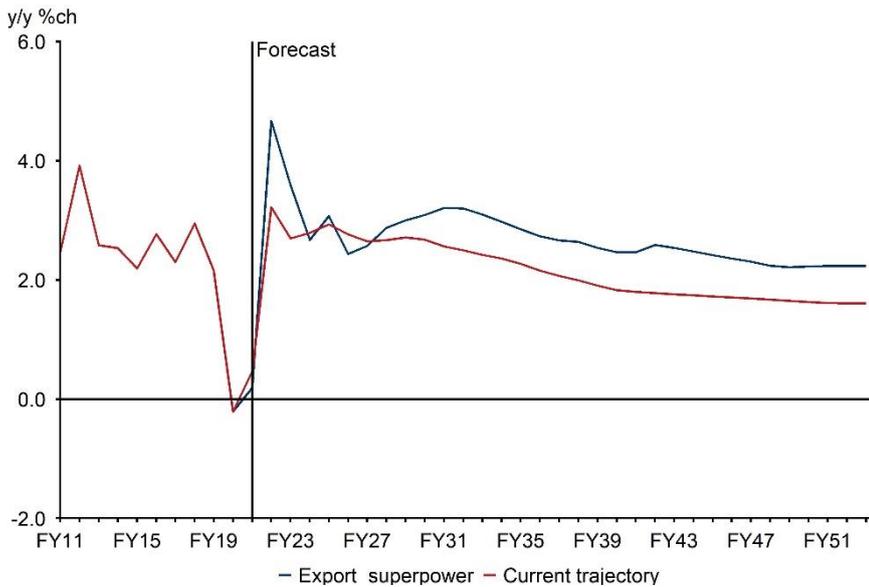
In line with the strongest global decarbonisation pathways (~<1.5°C warming), a decisive shift towards hydrogen technology (that is government-led initially) and increased investment, we have assumed the greatest pace of technological progress. This underpins greater labour and capital productivity, driving higher economic growth. An indirect impact of higher labour

¹¹ See Appendix D for more detail on competitive advantages of states in hydrogen production and exporting.

productivity is upwards pressure on real wages and an incentive for firms to invest, which helps boost productivity growth further as the capital stock becomes more advanced.

The positive productivity shock from increased investment and rapid technological progress, underpins stronger real wages growth over the latter half of the forecast period. Increased labour supply combined with the positive shock to productivity drive a stronger supply side path for economic growth longer term.

Figure 51 GDP y/y Growth, Current Trajectories Case vs. Export Superpower Case: Australia

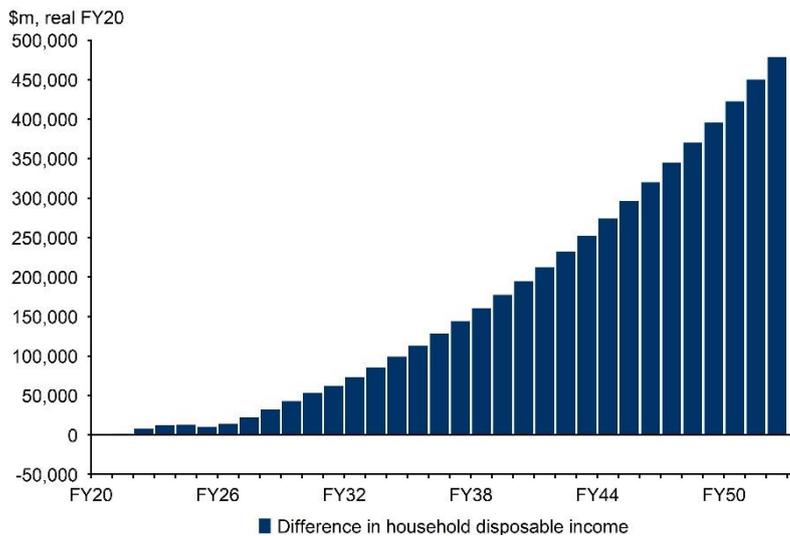


Source: BIS Oxford Economics/ Haver Analytics

To facilitate the successful creation of a large hydrogen industry, significant investment is required. This is expected investments in infrastructure necessary for production at scale e.g. renewable electricity generation, pipelines, electrolysers, in addition to export infrastructure e.g. export hubs, storage and transportation. The potential to retrofit existing gas exporting, transmission and distribution infrastructure is anticipated to be key in scaling the industry, using the blending hydrogen with natural gas to generate demand while the export opportunities grow. With the industry in its infancy, public investment is assumed to take the lead, while it is not currently commercially viable. Later over the forecast horizon, private investment is anticipated take the reins as it becomes more cost competitive, supporting higher investment and economic growth profiles than the Current Trajectories Case.

Household disposable income would be anticipated to record material gains in the export superpower case, relative to the current trajectories case. This is underpinned by increased labour productivity, helping to drive greater income growth over the forecast period. By 2053, household disposable income finishes around \$480 million higher than Current Trajectories Case in real FY20 terms, up 19%.

Figure 52 Change in Household Disposable Income: Export Superpower Case vs. Current Trajectories Case



Source: BIS Oxford Economics

The AUD sits higher in the export superpower case, relative to the Current Trajectories Case. With Australia’s new hydrogen exporting industry and strong global consumption and activity, this places upwards pressure on the exchange rate. In this case, the AUD sits at USD 0.87, compared to USD 0.80 in the Current Trajectories Case.

9.3. Sector breakdown

In the export superpower, we expect material changes in the sectoral composition of the economy.

An important consideration for incorporating the impact of the new hydrogen industry is how it will be classified. According to the Australian Bureau of Statistic’s current classification of industries¹², the hydrogen sector is expected to come through in ANZSIC Division C – Manufacturing. Within the sector, this includes the production of hydrogen for use as an important domestic industrial feedstock, as well as manufacturing of hydrogen for use in energy needs (both domestic and through exports). In absolute terms, the manufacturing sector ends notably higher than current trajectory. In relative terms, the sectors’ share of gross output holds steady compared to baseline, reversing the downward trend that has been seen since the 1970s.

Another requirement for the development of a large-scale hydrogen industry is substantial expansions in renewable electricity generation, necessary to feed the electrolyzers to split hydrogen from water¹³. Rapid pace of electrification on the demand side and the positive population shock all contribute to greater demand for electricity. With the substitution away from emission-intensive electricity production towards renewables and the need to meet stronger demand profile for electricity, utilities GVA sees its profile boosted. However, utilities GVA share of total GVA shrinks over the forecast period, as the use of energy per unit of production continues to decline.

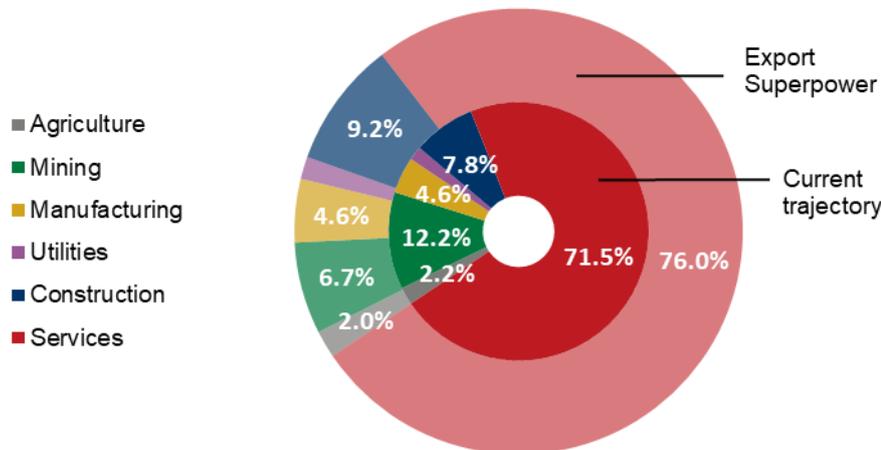
Construction sector GVA is a relative winner in this case, its share reaching 9.2% by FY53, compared to a fall to 7.8% in the Current Trajectories Case. Greater population growth underpins higher incremental demand for infrastructure, while the massive investment necessary to develop the hydrogen industry lifts engineering construction activity. Productivity gains propel the sector further as fuel costs ease.

¹² See Appendix D for more detail.

¹³ In this case, it is assumed to be grid-connected renewable electricity generation that powers the electrolyzers.

Much of the gains of construction are set to come at the expense of the mining sector. In the export superpower case, global and domestic policy embarks on the strongest decarbonisation pathway, leading to the fastest phasing out of fossil fuels. This is reflected in a materially lower profile for mining GVA, relative to the Current Trajectories Case. Note, that this does not lead to mining GVA falling to zero. There are still components of the sector that will continue to be strong contributors for the Australian economy, including Australia's largest export, iron ore.

Figure 53 Industry Share of Total GVA (FY53): Export Superpower Case vs. Current Trajectories Case



Source: BIS Oxford Economics

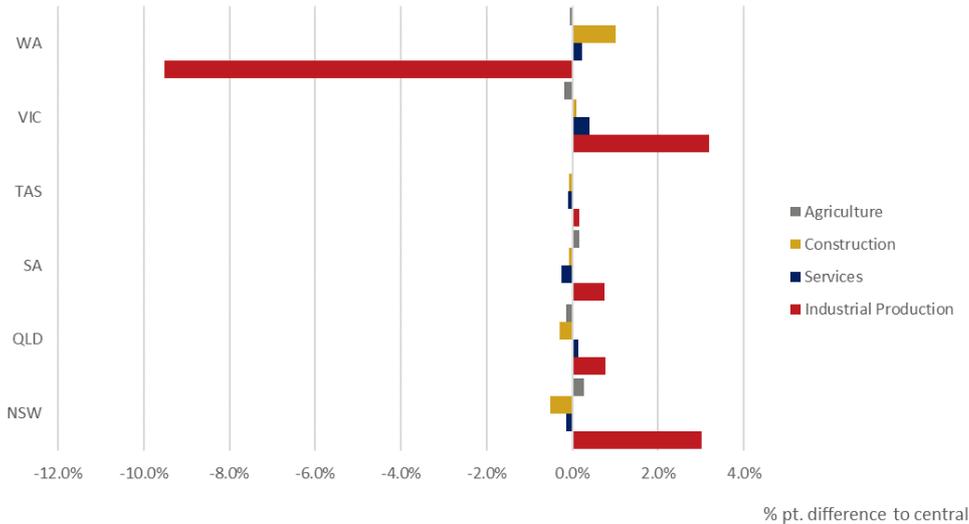
The positive population shock contributes to a stronger profile from services GVA, with its share of total GVA increasing at a faster pace than in the Current Trajectories Case. The faster pace of technological progress and stronger income growth compared to the current trajectories case accelerates the long-run trend for services GVA share increasing over the forecast period.

Industry Composition across states

The change in composition across states for industrial production is the key theme of this scenario. Underlying this is the structural makeup of manufacturing to mining across the states. The marked transition in the renewable energy generation mix, which in aggregate manifests as a shift away from mining output towards manufacturing output, results in a noticeable fall in WA's share of industrial production towards NSW, VIC and QLD, where manufacturing comprises a relatively greater share. As in the rapid decarbonisation case, strong global demand lifts non-energy related mining but the fall in energy-related mining far outpaces this for the Export Superpower scenario.

There are minimum compositional shifts across states for the other sectors, as the sub-sectoral shifts within industrial production dominate the narrative in this scenario.

Figure 54 Percentage Point difference in state composition between Export Superpower and Current Trajectory (FY53), by industrial sector



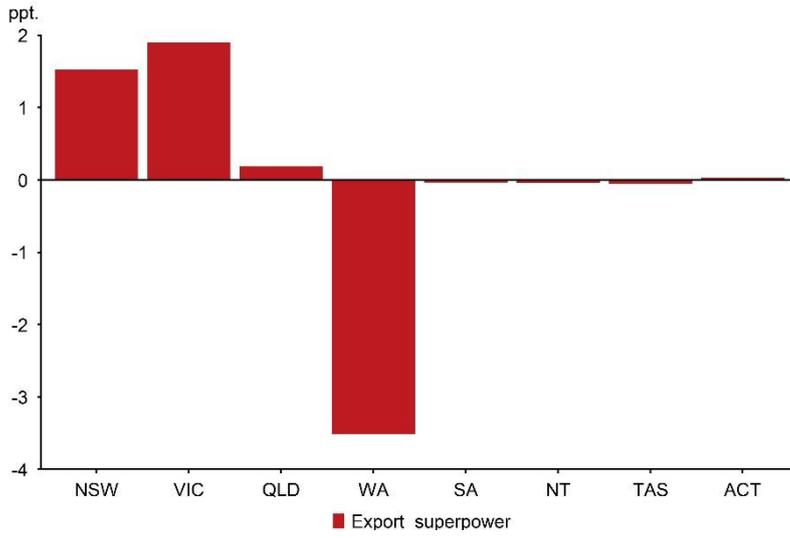
Source: BIS Oxford Economics

9.4. State comparison

NSW and VIC are the biggest beneficiaries in the export superpower case. The boost to population growth accrues in large part to these two states, as they have typically captured the bulk of NOM, a trend that is expected to continue, although NIM outflows provides a small drag in NSW. Further, both states have larger manufacturing presences than the other states. Since hydrogen production is currently classified in the ABS' Division C – Manufacturing, this means the creation of the new hydrogen industry contributes to NSW and VIC increasing their share of national GDP.

Queensland sees a small gain in its share of national GDP, due to a boost from stronger population flows through both NOM and NIM. The state is expected to accrue much of the stronger investment in hydrogen production since its well placed to take advantage of its abundant renewable energy resources and proximity to export markets in Asia. With mining GVA declining significantly in the export superpower case, this translates to WA losing share of national GDP. But given the very high value added that mining generates in the other cases, the impact on WA's economy is more modest. Employment is impacted much less, as the mining sector is capital-intensive, and the development of a hydrogen export sector that accrues to the state's manufacturing sector, provides a jobs-intensive offset. Nevertheless, state income is lower, equalising the contribution to national income between WA and the east coast states.

Figure 55 Percentage Point Change in State Composition of GDP from Current Trajectories Case to Export Superpower Case, FY53



Source: BIS Oxford Economics

Appendix A: Oxford Economics GEM Model and Australia State Forecasts

This section provides an overview of Oxford Economics Global Economic Model and Cities & Regions model which underpin our Australia macro and State forecasts.

Global Economic Model

The Oxford Global Economic Model (GEM) is the most widely used commercial International Macro Model, with clients including international institutions, Ministries of Finance and central banks around the world, and a large number of blue-chip companies. In addition, the GEM is used internally within Oxford Economics, for both baseline forecasting and simulating alternative scenarios for the world economy and individual economies.

The GEM has constantly evolved over the past three decades, reflecting continuous interaction between the Global Economic Model and changing conditions in the policy sphere, private sector, and global institutions. It is intended for use both by Oxford Economics and by clients to produce forecasts for a wide range of international macroeconomic and related variables, and for “what-if” scenario analysis. Clients can produce forecasts using the model either with a detailed internal forecasting exercise or simply by taking the Oxford Economics baseline and adjusting a small number of key inputs/assumptions. Scenario analysis can focus on the expected impact of a particular event or policy change or cover a wider range of alternative outcomes for stress testing.

It has long been one of Oxford Economics’ guiding principles that many of the most important and interesting macroeconomic issues are inherently international. Globalization means that policy makers and analysts must form judgements about developments in their domestic economy and in the economies of countries with which they have trade and financial ties. For instance, a shift in US monetary policy has global repercussions; fossil fuel and commodity price shocks are significant source of terms of trade movements in Europe; governments increasingly collaborate over monetary, fiscal and environmental policies. These stylized facts imply that single country econometric models, which treat world trade, world prices and exchange rates as exogenous, are not best suited to analysing some of the most important issues of interest to financial and business economists.

The root cause of this integration is the massive increase in trade and capital flows between countries in the post-war period, and Oxford Economics’ client base is testament to the growth in interest in international issues. With offices throughout the world, in the UK, elsewhere in Europe, the US and Asia, Oxford Economics aims to combine access to local information and expertise with a global outlook to provide a truly international service. The Oxford Global Economic Model reflects this priority, as coverage of the major trading countries has deepened and widened.

The current Oxford Model improves on previous vintages by incorporating descriptions of 80 individual countries. The model is “well-behaved” in the sense that it has a coherent long-run equilibrium embedded which the model will tend to converge to in the long run for a wide range of sensibly calibrated shocks.

It maintains the tradition of allowing for significant cross-country differences in economic structure, but ensures that those differences truly reflect economic, as opposed to economic model-builders’, idiosyncrasies. Where possible, and it is possible in the majority of cases, the functional form for equations is left the same across countries. The exceptions chiefly reflect examples where countries are heavily dependent on particular sectors such as oil and emerging market countries where Foreign Direct Investment (FDI) plays a major role in the economy. Where the data allow, some countries have more detail on trade, distinguishing fuel and non-fuel and modelling profit and dividend receipts.

Parameters across countries differ, and this means that different countries exhibit different behaviour in response to shocks (although economy structure also accounts for variations). Now, however, tracing the root cause of these differences, and attributing them to underlying behaviour or structure, is much simpler. For instance, real wage rigidity is higher in some countries than others, and specific coefficients in wage and price equations reflect this. Unemployment will tend to rise further and faster in these countries in response to an adverse demand shock, even though the functional form of wage and price equations is identical across countries.

Structure of the GEM

Very broadly, the Oxford Global Economic Model is Keynesian in the short-run and monetarist in the long-run. This means that increased demand will lead to higher output and employment initially, but eventually this feeds through into higher wages and prices. Given an inflation target, interest rates have to rise, reducing demand again ('crowding out'). In the long run, output and employment are determined by 'supply side' factors. Interactions between countries through trade, exchange and interest rates, capital flows and oil/commodity prices are modelled in detail.

Within this theoretical framework, the structure of each country in the Oxford Global Economic Model can be generalized as follows:

- Consumption - function of real income, wealth and interest rates.
- Investment - 'q' formulation with accelerator terms.
- Exports - depend on world demand and relative unit labour costs.
- Imports - depend on total final expenditure and competitiveness.
- Real wages depend on productivity and unemployment relative to NAIRU.
- Prices are a mark-up on unit costs, with profits margins a function of the output gap.
- Monetary policy endogenised. Options include Taylor rule, fixed money and exchange rate targeting.
- Exchange rate determined by uncovered interest parity (UIP) in the short run and equilibrium exchange rates in the long run.
- Expectations are generally adaptive, with an option to use forward-looking expectations on a model-consistent basis for certain key financial variables.
- Countries are linked in the Oxford Global Economic Model via:
 - Trade (Exports driven by weighted matrix of trading partners' import demand).
 - Competitiveness (IMF relative unit labour costs where available, relative prices elsewhere).
 - Interest Rates and Exchange Rates.
 - Commodity Prices (e.g. oil, gas and coal prices depend on supply/demand balance; metal prices depend on growth in industry output).
 - World Price of Manufactured Goods.

Country model detail

The structure of each of the country models is based on the income-expenditure accounting framework. However, the models have a coherent treatment of supply. In the long run, each of the economies behaves like the classic one sector economy under Cobb-Douglas technology (production function). Countries have a natural growth rate, which is determined by capital stock, labour supply adjusted for human capital, and total factor productivity. Output cycles around a deterministic trend, so the level of potential output at any point in time can be defined, along with a corresponding natural rate of unemployment.

Firms are assumed to set prices given output and the capital stock, but the labour market is characterized by imperfect competition. Firms bargain with workers over wages but choose the optimal level of employment. Under this construct, countries with higher real wages demonstrate higher long-run unemployment, while countries with more rigid real wages demonstrate higher unemployment relative to the natural rate.

Inflation is a monetary phenomenon in the long run. All of the models assume a vertical Phillips curve, so expansionary demand policies place upward pressure on inflation. Unchecked, these

pressures cause an unbounded acceleration of the price level. Given the negative economic consequences of this (as seen in the 1970s in developed economies and more recently in some emerging markets), most countries have adopted a monetary policy framework which keeps inflation in check. The model mirrors this, by incorporating endogenous monetary policy. For the main advanced economies, monetary policy is underpinned by the Taylor rule, captured using an inflation target, such that interest rates are assumed to rise when inflation is above the target rate, and/or output is above potential. The coefficients in the interest rate reaction function, as well as the inflation target itself, reflect assumptions about how hawkish different countries are about inflation. (A by-product of this system is that scenarios under fixed interest rates only make sense in the short-run. A scenario which imposes a fixed interest rate, and therefore assumes a lack of monetary policy, in conjunction with a vertical Phillips curve, would result in accelerating - or decelerating - inflation after several years.)

Demand is modelled as a function of real incomes, real financial wealth, real interest rates and inflation. Investment equations are underpinned by the Tobin's Q Ratio, such that the investment rate is determined by the return relative to the opportunity cost, adjusted for taxes and allowances. Countries are assumed to be "infinitely small", in the sense that exports are determined by aggregate demand and a country cannot ultimately determine its own terms of trade. Consequently, exports are a function of world demand and the real exchange rate, and the world trade matrix ensures adding-up consistency across countries. Imports are determined by real domestic demand and competitiveness.

Expectations

The Oxford Global Economic Model standard mode assumes adaptive rather than forward looking expectations because we believe that introducing expectations on the basis of economic theory is more advantageous than using the forward-looking assumption ubiquitously. There is disagreement among economists about whether forward looking expectations are consistent with observed data, which become even more acute in light of the difficulties with obtaining accurate data on expectations for model-building purposes. Instead, we generally adopt adaptive expectations, which are introduced using a framework in which expectations are formed using the actual predicted values from the model. Exogenous variables are assumed to be known a priori. Where appropriate, the model does introduce expectations implicitly and explicitly, therefore accounting for how and the extent to which agents respond to information about changes in fundamentals. An example of this includes our derivation of exchange rate forecasts which implicitly capture expectations: in the short run, the exchange rate is driven by movements in domestic interest rates relative to the US, therefore accounting for uncovered interest rate parity. Another example is our use of a variable for forward guidance to capture expected movements in interest rates. In addition, there is an option to use forward-looking expectations explicitly on a model-consistent basis for certain key financial variables.

Modelling the macro outlook for states

Forecasts at the state level are built up on an industry basis, to accurately incorporate state characteristics relative to the national picture.

To produce state level forecasts, we therefore begin by modelling national level forecasts for value added and employment for each industry, by combining the macroeconomic forecasts outlined above with an input-output framework to quantify the impact of changes in final demand and intermediate demand on each sector. For example, developments in public administration will be closely related to government spending and the retail sector is influenced by consumer spending.

The latest available data for each State and City is collected from the Australian Bureau of Statistics. All data is subjected to numerous checking procedures to ensure accuracy and timeliness. All sub-national data is aligned to national aggregates.

The forecasts and data produced above are fed into Oxford Economics' suite of sub-national models to produce forecasts for each State. These models predominately adopt a top-down approach, and flow from the macro level to the State. Forecasts for value added and employment by industry at the State level are produced by a set of equations that take account of the historical relationship between growth and productivity trends in each industry in each State compared with the performance of the industry at the national average. This means the States with the strongest forecast will be those who have an advantageous industrial structure (i.e. a relatively high concentration of activity in an industry which are expected to perform strongest in Australia), and those for which there is evidence that the State has a particular competitive advantage in a particular sector (this is illustrated by the historical data showing a stronger performance in an industry in the State than nationally).

The State forecasts produced by this 'demand side' approach is reviewed and adjusted where necessary to ensure they are consistent with long run supply side considerations, including demographic change (which incorporates official population projections) and labour market efficiency. Household incomes are influenced by demographic and employment trends, and consumer spending and retail sales by income trends.

Appendix B: BIS Oxford Economics vs. Centre for Population forecasts

BIS Oxford Economics produces its forecasts for population, using death rates from the ABS and our own assessments of total fertility rates to form a picture for natural increase, while our own assessments of Net Overseas and Net Instate migration (NOM & NIM) are also formed in-house. For NOM, we consider both recent trends and economic drivers of inflows by major type of migrant (students, temporary workers and permanent migrants), linking these flows to domestic and international and economic conditions. For NIM, we consider historic trends and local economic conditions, particularly the relativities in the labour market which we see as a major driver of migration regionally.

In previous economic forecasts, ABS Series B assumptions for birth rates and death rate were used to form a projection for natural increase. Instead, in-house assessments of birth rates are now used, which incorporates cyclicity in the short term relating to changes in uncertainty and economic conditions, a particularly important consideration given the size of the COVID-19 shock. Since the ABS Population Projections have not been updated recently, we will compare our population forecasts to those produced by the Centre for Population 'Population Statement' in December 2020. Note, BIS Oxford Economics population forecasts were most recently updated in March 2021. The assumptions underpinning the Centre for Population's 'Population Statement' can be summarised as:

- **NOM national:** International arrivals and departures remain low through to late 2021. Economic conditions in source countries of international students leads to reduced demand. Softer labour market conditions in coming years reduces the demand for skilled migrants. Demand for extended travel (e.g. working holidays) remains low. Departures by Australian citizens and permanent residents to take jobs overseas is lower. In the long-run, net overseas migration is assumed to be 235,000 persons per year.
- **NOM state:** State arrivals and departures estimated based on historical and forecast trends that add to the national total.
- **NIM:** assume NIM levels declines by 15% in FY21, before increasing by 8% in FY22, followed by recovery to 20-year average by FY24. Assumes all in and out flows decline by 15% in FY21, except for Victoria migration which remains unchanged (more people leaving Victoria than compared with other states).

10.1. Comparison of assumptions for NI, NOM and NIM

NI

We anticipate a softer profile for NI over the next ten years. Most of the divergence is in fertility rates from FY22 onwards¹⁴. Both forecasts assume rates around 1.6 in FY21, however our baseline view expects fertility rates to rebound in FY22 to 1.7 as stabilising economic and health conditions encourage the resumption of backlogged family plans, before moving towards its long-term settling point around 1.65 by FY24.

In comparison, the Population Statement assumes a longer cycle where fertility rates fall further in FY22, rebound and then remain higher over the following five years before slowly falling towards the end of the decade. One possible factor that may be contributing to differences in the

¹⁴ It is worth noting that the difference in NOM also has implications for NI.

length of the cycle is economic conditions have broadly improved between the Population Statement in December and our latest forecasts in March.

NOM

For NOM, we are generally more optimistic for the trajectory of NOM over the next ten years. Our forecast sees national NOM fall to -80,000 in FY21, broadly similar with the Population Statement (-71,600). Beyond this, our baseline view anticipates NOM will reach 70,000 in FY22, 245,000 by FY23 and remaining thereafter. In comparison, the Centre of Population expects -21,600 in FY22, 95,900 in FY23 and returns gradually to their assumed long-run NOM level of 235,000 by FY29. This represents a materially more pessimistic outlook for NOM than our forecasts.

Several factors lead us to differ in our assessment of NOM. Firstly, we assess that there is a greater stock of students who are looking to come to Australia but have been unable to, in addition to Australia's relatively favourable economy and health pictures. Both factors bode well for a quicker resumption of NOM and importantly back to recent trend levels. Secondly, there have been areas of labour market stress with skilled labour shortages starting to appear. Since December, demand has also been stronger for specialist, skilled labour. This is expected to be positive for NOM when borders are gradually reopened. Although demand for extended travel (i.e. working holidays) is currently low, a stockpile appears to be building. With Australia's outperformance, economically and on the health front, this is supportive of return to strong NOM when borders reopen.

In terms of the state distributions of NOM, comment on shares of total:

- NOM shares for NSW and SA largely similar.
- VIC's NOM share is materially lower than the Centre for Population's projections.
- QLD has a stronger NOM share in our forecast.
- WA has a marginally higher NOM share in our population projections.

NIM

There are material differences in the distribution of NIM across the states and territories. It is worth noting that different profiles for NOM and NI would be expected to contribute to divergences in the levels of NIM, all other things equal. In terms of broad assumptions of directions of NIM, both sets of forecasts are similar i.e. NSW sees NIM net outflows, QLD receives NIM net inflows. The exception is WA where we expect modest net inflows, and the Centre for Population expects a small net loss of interstate migration. Again, these could be a result of different NI and NOM assumptions. However, provisional regional internal migration data for Q3 2020 (released after release of Population Statement) already shows positive NIM for WA, and had been improving in the previous 12 months, suggesting that the Centre for Population net outflow is too pessimistic.

10.2. Implications for population projections

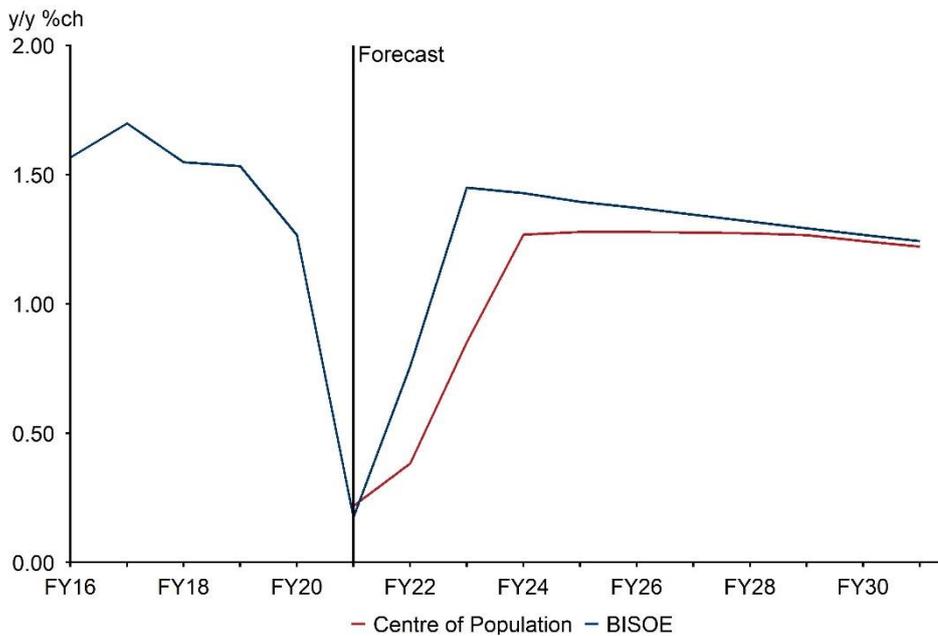
The charts below compare population growths for the states for our projections with the Centre for Population forecasts.

At the national level, our forecasts for total population growth is higher for most of the forecast period, due to higher assumed levels of NOM, although lower natural increases provide some counterforce. Growth rates converge around FY28 and remain broadly similar beyond this. By FY31, our estimated resident national population sits approximately 450,000 persons higher than the Centre for Population's forecasts (1.6% higher).

Across the states, the key points of comparison are:

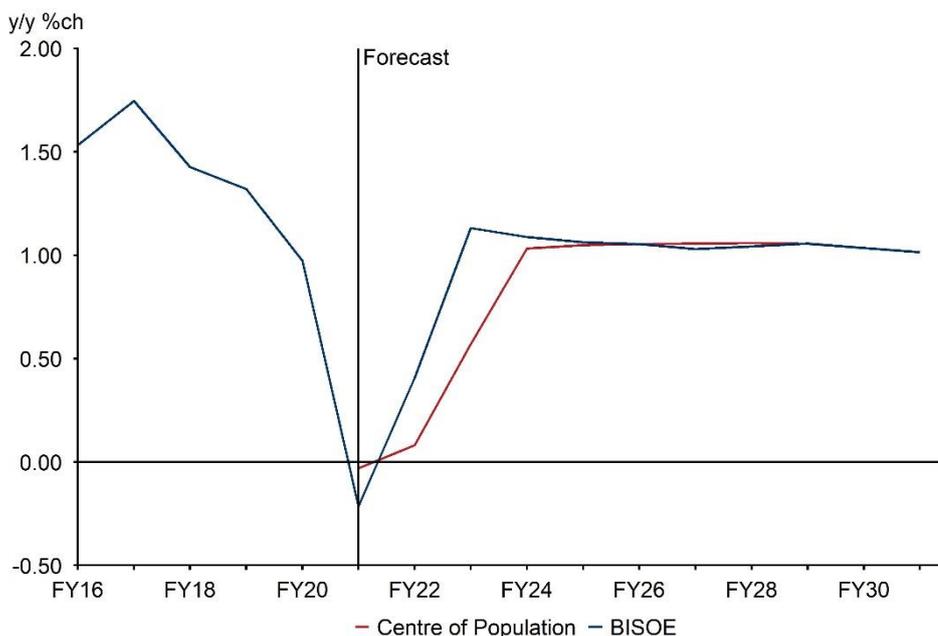
- In the near term, our projected growth for NSW is stronger, before converging to almost an identical rate by FY24. This is largely due to higher NOM, with equally stronger NIM outflows providing an offset. By FY31, our NSW population is only 71,000 persons higher (0.8%)
- For VIC, our forecast is lower by around 89,000 persons by FY31 (1.1% lower). Although our near term growth forecasts are stronger (driven by NOM), the Centre for Population assumes VIC captures stronger shares of NOM and NIM over the rest of the period.
- For QLD, our population growth forecasts over the period are higher throughout. This is due to higher assumed levels of NIM near term, and higher levels of NOM in the long run.
- For SA and WA, our projections are higher throughout due to higher levels of NOM and NIM, although population growth rates in SA converge later in the decade.

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: Australia



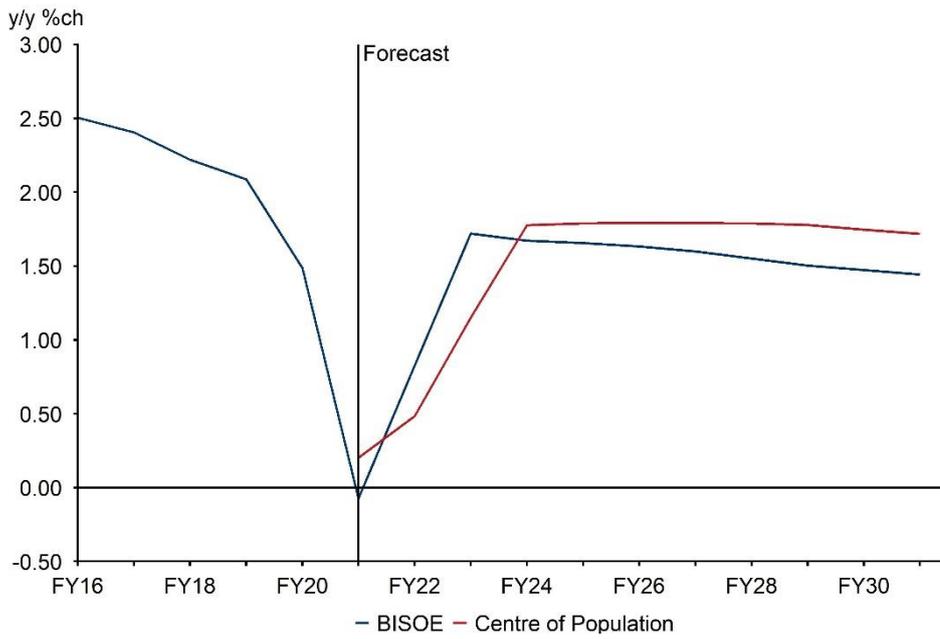
Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: NSW



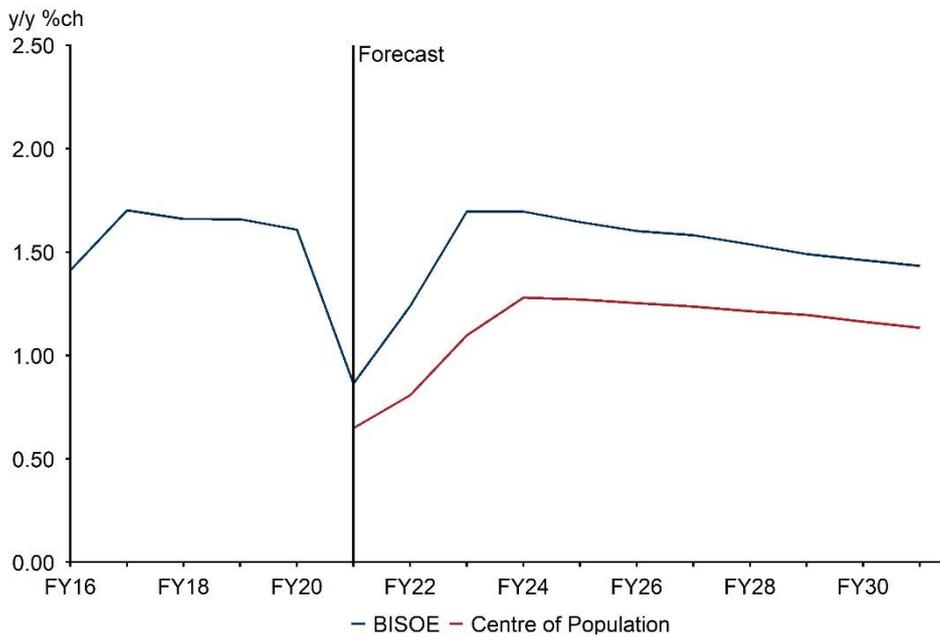
Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: VIC



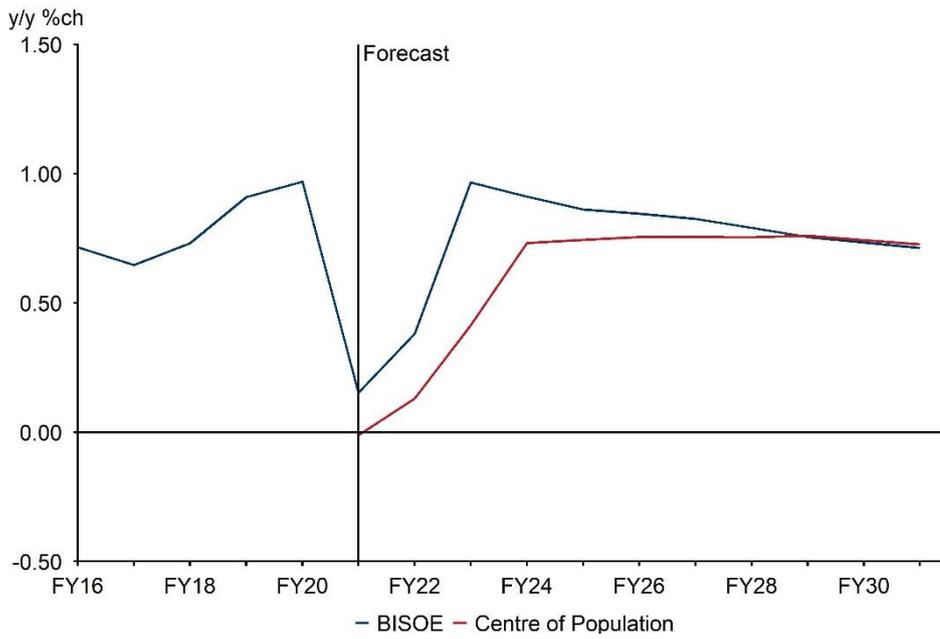
Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: QLD



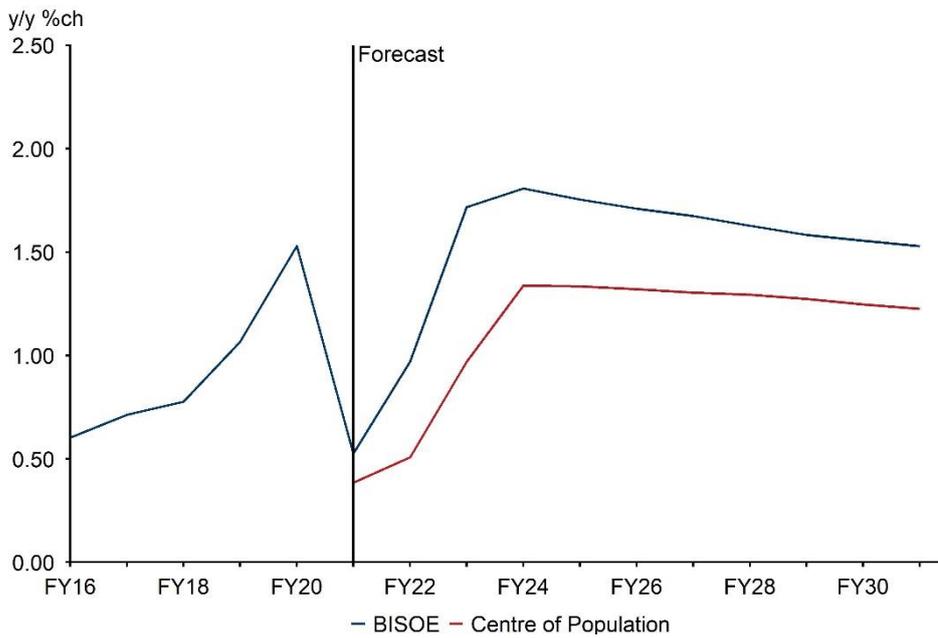
Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: SA



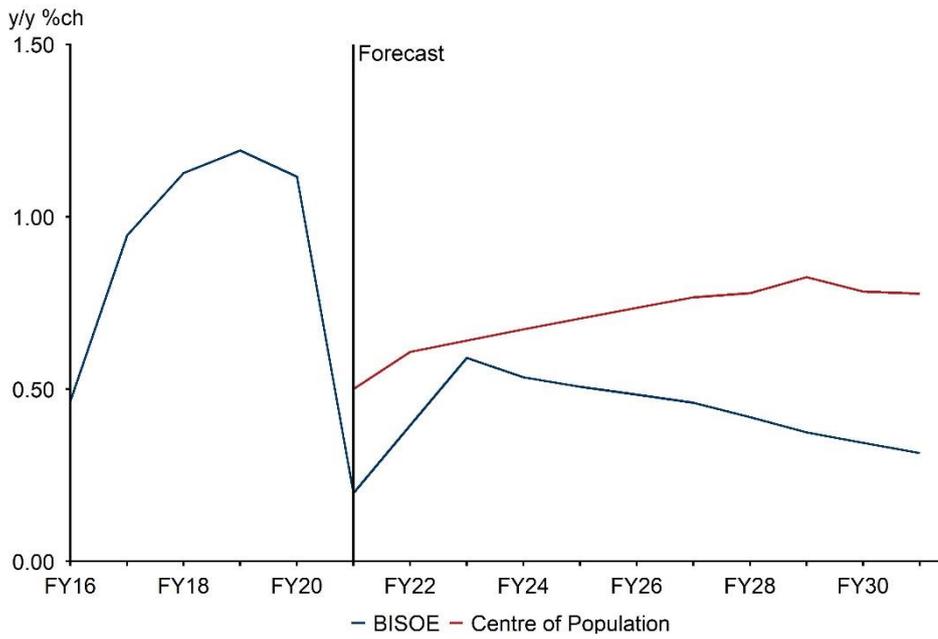
Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: WA



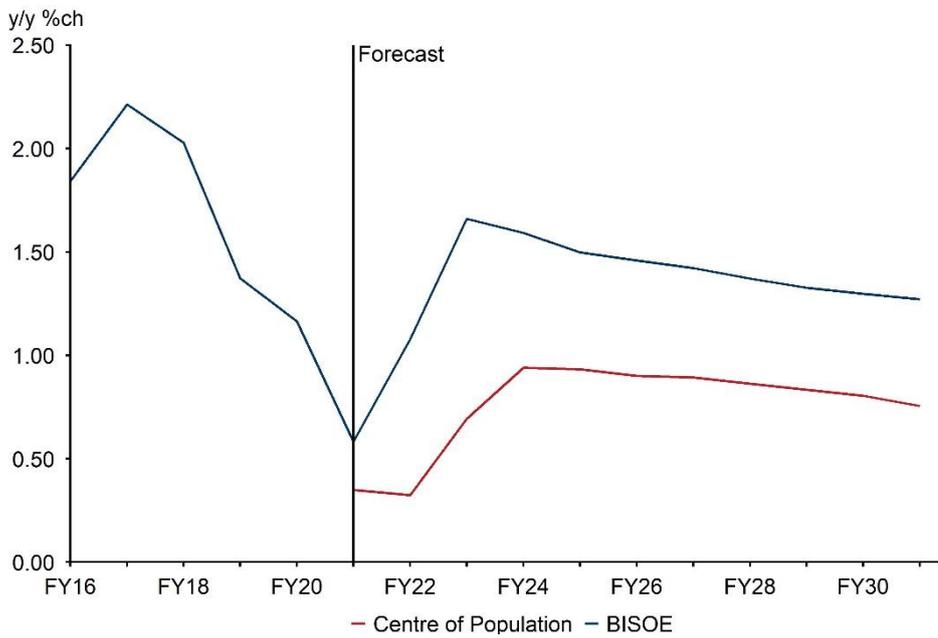
Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: TAS



Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Figure: Population Y/Y% Change, Centre for Population vs. BIS Oxford Economics: ACT



Source: BIS Oxford Economics/ Australian Bureau of Statistics/ Centre for Population

Appendix C: Comparison with other forecasts

We use forecasts produced by state Treasury departments to benchmark our projections, and we focus our assessment on Gross State Product (GSP) as a common metric.

The table below compares our projections to the treasury department for each state, for all years possible. Note these numbers are all financial year figures. We note the following key differences:

- We have a similar view on the outlook for NSW, although we are slightly more optimistic through FY21 and FY2. This is likely to stronger population growth assumptions based upon inspection of NSW Treasury population forecasts in the Mid-Year Review.
- We are also more optimistic about the outlook for VIC through FY21. This is likely due to economic conditions having improved materially since the November Budget released, particularly with the downside risks fading.
- Although we are modestly more positive on QLD's outlook in FY21, we are more pessimistic through FY22 and FY23, before converging to the same growth in FY24. Since the December budget release conditions have come in more strongly than expectations. This may mean growth in FY22 would be coming off a higher base and will likely moderate as a result.
- Over the next two years, we have more moderate GSP growth profile for SA than the state treasury, which may reflect recent data having come in more positively and the risks tilted more firmly to a more balance position with the commencement of vaccine rollout since the Budget release. In this vein, our projection for FY21 is much stronger than the SA Treasury.
- We are broadly more optimistic on the near-term outlooks of the smaller states, TAS, NT and the ACT, and less optimistic on the outlooks in the medium term (with the exception of NT).

Table: Current Trajectories Case projections v. state treasury projections, GSP, % y/y

		2021	2022	2023	2024
NSW	BISOE	0.4	2.7	2.2	2.4
	State Treasury	-0.8	2.5	2.3	2.8
VIC	BISOE	-0.8	5.5	3.5	3.3
	State Treasury	-4.0	7.8	3.3	3.0
QLD	BISOE	0.9	2.2	2.6	2.8
	State Treasury	0.3	3.5	2.8	2.8
SA	BISOE	2.2	1.9	1.6	2.0
	State Treasury	-0.8	4.3	3.0	3.0
WA	BISOE	1.0	2.7	3.2	3.4
	State Treasury	2.0	2.8	1.3	1.5
TAS	BISOE	2.2	2.2	2.1	2.0
	State Treasury	-1.5	0.8	3.8	3.0
NT	BISOE	3.1	2.7	1.8	1.9
	State Treasury	-0.1	1.5	2.1	-0.8
ACT	BISOE	3.5	2.1	1.5	1.9
	State Treasury	2.0	2.8	2.8	3.0

For NSW, WA, TAS, forecasts drawn from state's mid-year update

For remainder, forecasts drawn from 2020-21 state/territory budget

Forecast Accuracy

Oxford Economics forecast performance has been marginally closer to actuals than the panel average, sitting at 0.9% pt average absolute forecast divergence (2000-20), while the panel average has been 1.0 % pt.

Real growth in Australia averaged 2.5% p.a. over this period.

Oxford Economics			
Forecast performance compared			
2000 - 2020			
<i>(average absolute forecast divergence for real GDP growth)</i>			
	Oxford Economics	Average*	Actual Average Growth
World	1.1	1.1	2.7
US	1.0	0.9	1.8
Australia	0.9	1.0	2.5
Japan	1.4	1.5	0.6
Eurozone	1.1	1.3	0.9
UK	1.1	1.1	1.4
China	1.6	1.6	8.6
Germany	1.3	1.6	1.0
France	1.1	1.2	0.9
Italy	1.3	1.4	0.0
India	1.8	1.8	6.6
Brazil	1.8	1.8	2.0
Canada	1.4	1.5	1.5

**Average contains: OECD, IMF, Consensus, EIU, IHS Global Insight forecasts*

FY20 Actuals vs. Forecast

The below table shows a comparison of our previous September projections to the full year actual GDP growth for FY20 that has since become available. As shown in the table, our forecasts were broadly in line with actuals for the period, marginally underestimating the decline.

Table: September 2020 projections vs. Actual, GDP, % y/y

	Sep-20 Forecasts	Actual
GDP Growth	-0.16%	-0.21%

Source: BIS Oxford Economic/ Haver Analytics

Appendix D: Framework for Hydrogen Scenario

The export superpower case represents an entirely new alternative case to previous editions, assessing in part the impact of the development of a commercial-scale, hydrogen production and exporting industry. To provide clarity on how we modelled the nascent industry, we have provided further details on the modelling framework we used.

ABS Classification of Hydrogen

With the industry in its infancy and the expectation of substantial growth over the course of the forecast period, it is important to ensure it is mapped correctly within current economic indicators. According to the ABS 'Australian and New Zealand Standard Industrial Classification (ANZSIC)¹⁵, it is clear that the appropriate GVA category classification is under Division C – Manufacturing. Within the manufacturing category, this captures:

- Hydrogen manufacturing and other gas variants that may be used for transport and storage e.g. ammonia.
- Hydrogen, fuel cell, hybrid, or electric vehicle manufacturing.

Notably, the substantial investments in renewable electricity generation necessary to feed the electrolyzers would be classified in the ANZSIC Division D – Electricity, Gas, Water and Waste Services. In assessing the profiles for GVA in the alternative cases, it is important to understand these classifications.

Timing of scaling up hydrogen industry

The expected trajectory for the scaling up of the hydrogen industry can be broadly split into two stages. The first stage, running over the next decade, will see the public sector drive much of the investment into hydrogen until cost competitiveness improves (¹⁶) and key export market demand develops. Through 2025, likely actions to develop the industry include pilot, testing and demonstration projects and continue investing in developing cost-competitive production technology. From the government, this will likely mean providing green financing to these projects through groups such as CEFC, ARENA, rather than outright operation or development. Over the first stage, production of hydrogen is expected to be modest, growing steadily. Demand will mostly be accommodated by domestic demand¹⁷ with additional exporting projects making up the remainder. During this period, the market rewards for this investment will be extremely limited (if present at all). As such, the private sector is highly unlikely to undertake the substantial investment required to develop the sector, and government support will be vital to getting the industry off the ground.

The second stage sees the hydrogen industry accelerate significantly, underpinned by export demand for hydrogen and a shift in production technology to make the sector commercially viable. In AEMO 2021 IASR, the assumed profile sees domestic demand approximately equal to

¹⁵ See

<https://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/D9AB3BD5751C3C52CA257B9500133B9D?opendocument>

¹⁶ See CSIRO GenCost report released with AEMO 2021 IASR <https://aemo.com.au/en/newsroom/news-updates/draft-2021-inputs-assumptions-and-scenarios-report-released>

¹⁷ In this case, domestic demand is assumed to be driven by displacement of natural gas and diesel. For natural gas, this means blending hydrogen into the natural gas network, and eventually through segmentation, hydrogen displaces natural gas altogether. For diesel, this means displacing its use in long-distance trucking and rail.

export demand until 2040, before export demand expands substantial over the rest of the forecast period.

Geographic distribution of production, investment, and exporting

As of 2021, almost all states and territories have announced a hydrogen roadmap or strategy, making it clear that governments understand the potential opportunities for exporting hydrogen. While domestic demand is assumed to be delivered from near the regional load centre (likely within each state), some areas will naturally have competitive advantages in the exporting of hydrogen. These locations with nearby regional load centres and quality exporting access and infrastructure will likely be developed as Hydrogen Hubs.

Based on guidance from AEMO, potential hydrogen export ports would be in Newcastle and Port Kembla (NSW), Gladstone and Townsville (QLD), Port Bonython and Cape Hardy (SA), Bell Bay (TAS) and Geelong and Portland (VIC)¹⁸. WA does not feature in this list since the focus is on the NEM regions.

Most states are expected to attract significant investment in this case, although some concentration is anticipated in QLD, VIC and NSW given the largest end user demand for green hydrogen, access to renewable, export infrastructure and access to key export markets. Nonetheless, with much of the funding in the earlier stages coming from the Federal government and various clean energy investment vehicles, investment will still be attracted to promising projects across most of the country.

¹⁸ The list of assumed hydrogen hubs represents a NEM-focused sample from the possible locations details in the Australian Hydrogen Hubs Study by *Arup*. See here <http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/nhs-australian-hydrogen-hubs-study-report-2019.pdf>

Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AEMO	Australian Energy Market Operator
ANZSIC	Australia & New Zealand Standard Industry Code
CAGR	Compounded Annual Growth Rate
FY	Financial year, beginning 1 st July
GDP	Gross Domestic Product
GSP	Gross State Product
GVA	Gross Value Added
NI	Natural Increase
NIM	Net Interstate Migration
NOM	Net Overseas Migration
NSW	New South Wales
NT	Northern Territory
% Pt.	Percentage point
QLD	Queensland
SA	Southern Australia
TAS	Tasmania
VIC	Victoria
WA	Western Australia
%pts	Percentage points