



**OECD Economic Surveys**

# **Australia**

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**OVERVIEW**

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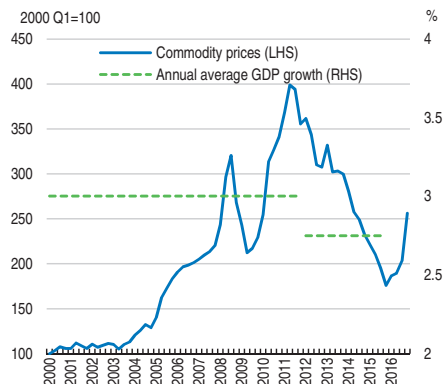
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## Executive summary

- *Supporting rebalancing with macroeconomic policies*
- *Sustaining growth by bolstering the environment for business innovation*
- *Addressing inequality and ensuring economic rebalancing delivers more inclusive growth*

## Supporting rebalancing with macroeconomic policies

### Commodity prices and GDP growth



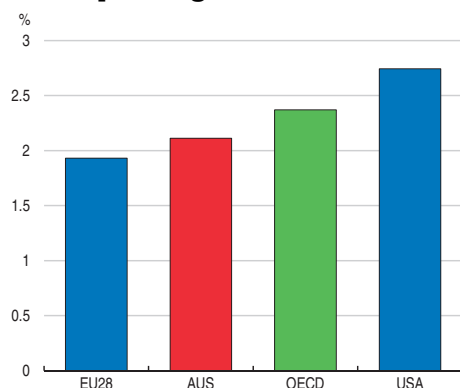
Source: OECD ADB; RBA.

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Australia's economy has enjoyed considerable success in recent decades, reflecting strong macroeconomic policy, structural reform and the long commodity boom. Living standards and well-being are generally high, though challenges remain in gender gaps and in greenhouse-gas emissions, and further challenges arise from population ageing. The economy is now rebalancing following the end of the commodity boom, supported by macroeconomic policies and currency depreciation. The strengthening non-mining sector is projected to support output growth of around 3% in 2018 and spur further reduction in the unemployment rate. Low interest rates have supported aggregate demand but are also ramping up risk-taking by investors and driving house prices and mortgage lending to historical highs.

## Sustaining growth by bolstering the environment for business innovation

### R&D spending as a share of GDP



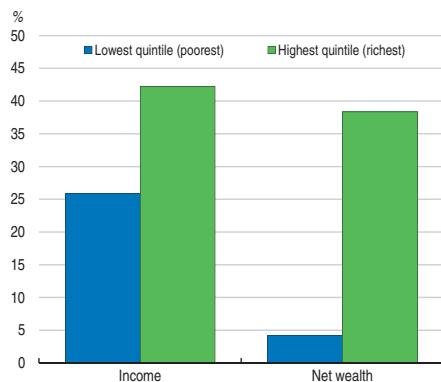
Source: OECD MSTI database.

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Improving competition and other framework conditions that influence the absorption and development of innovation are key for restoring productivity growth. Innovation requires labour and capital markets that facilitate new business models. Productivity growth could be boosted through stronger collaboration between business and research sectors in R&D activity. The government's reform programme, notably the *National Innovation and Science Agenda*, is providing welcome impetus to reform.

## Addressing inequality and ensuring economic rebalancing delivers more inclusive growth

### Real increase of household income and wealth, 2004-14



Source: ABS.

StatLink <http://dx.doi.org/10.1787/888933456618>

Australia's adjustment to the end of the commodity boom has not been painless. Unemployment has risen, and there are increasing concerns about inequality. In addition, large socioeconomic gaps between Australia's indigenous community and the rest of the population remain. Developing innovation-related skills will be important for the underprivileged and those displaced by economic restructuring, and can help reduce gender wage gaps.

MAIN FINDINGS	KEY RECOMMENDATIONS
<b>Macroeconomic and financial-market regulation policies</b>	
Low interest rates have fuelled high house prices and generated substantial mortgage borrowing	Maintain tight macro-prudential measures Facilitate housing supply increases through improved planning regulation
There is fiscal space available to support the economy if required	Use all policy levers to support the economy if downside risks materialise, relying more heavily on fiscal policy.
Banking remains highly concentrated, potentially compromising competition and making Australia vulnerable to “too big to fail” risks	Reduce banks’ implicit guarantees by developing a loss absorbing and recapitalisation framework
<b>Fiscal reform</b>	
Global commodity swings can have large budgetary effects	Consider a spending ceiling to contain expenditure growth in booms and targeting debt in the long term Create stabilisation funds using resource revenues, or make greater use of existing funds, to insulate the budget from commodity price changes
Change the tax mix to better support growth	Further shift from corporate income taxes and inefficient taxes, raise the Goods and Services Tax and land taxes Make the R&D Tax Incentive more effective, for instance by combining an eligibility threshold with an increase in the expenditure cap
Maintaining quality public services given low growth in public expenditure is a challenge	Encourage more innovation in public services by opening up procurement to more bidders and further development of digital government services Reduce the number of support schemes for innovative SMEs
<b>Boosting productivity through a more innovation-friendly business environment</b>	
Business framework conditions could better support the absorption and creation of innovation through stronger competition and resource allocation	Improve competition law, notably by strengthening the definition of abuse of dominant position Adjust insolvency legislation Increase labour mobility, for instance by lower interstate differences in education and training programmes Encourage market entry by innovative business. Use competition policy tools to combat resistance by incumbents and adjust sectoral regulation quickly as new firms and industries emerge Facilitate the entry of a fourth operator in mobile telephony via a spectrum auction
Research-business collaboration is weak and decision making in the innovation system fragmented	Put a greater weight, as envisaged, on collaboration in university funding and develop a more coordinated approach to industry placements for research students to strengthen the linkages between research and business sectors Implement the common approach across public-sector research organisations for assessing research outcomes and impacts Develop a more integrated, “whole-of-government” approach to science, research and innovation and consolidate innovation support programmes
<b>Helping output growth and inclusiveness, deepening skills</b>	
Inclusiveness is being eroded	Avoid freezing welfare pay outs as part of fiscal restraint so as to not compromise inclusiveness Continue developing an investment approach to welfare policy that focuses on vulnerable groups where the returns to policy are greatest
Skills for innovation are weak	Widen the scope of subsidies for innovation-related subjects beyond STEM (e.g. innovation-related arts disciplines)
<b>Environmental sustainability</b>	
New greenhouse-gas reduction targets have been set	Strengthen the recently introduced safeguard mechanism should the Emissions Reduction Fund require additional support to achieve greenhouse-gas reduction

## Assessment and recommendations

- *Macroeconomic developments and near-term prospects: post-boom adjustment continues*
- *Monetary and financial-market policy: coping with low interest rates*
- *Fiscal consolidation, tax and spending reform*
- *Encouraging business productivity and innovation through framework conditions*
- *Encouraging productivity and innovation through R&D policy*
- *Addressing inequality, enhancing inclusiveness and deepening skills*
- *Tackling environmental challenges: progress in greenhouse-gas emission policy*

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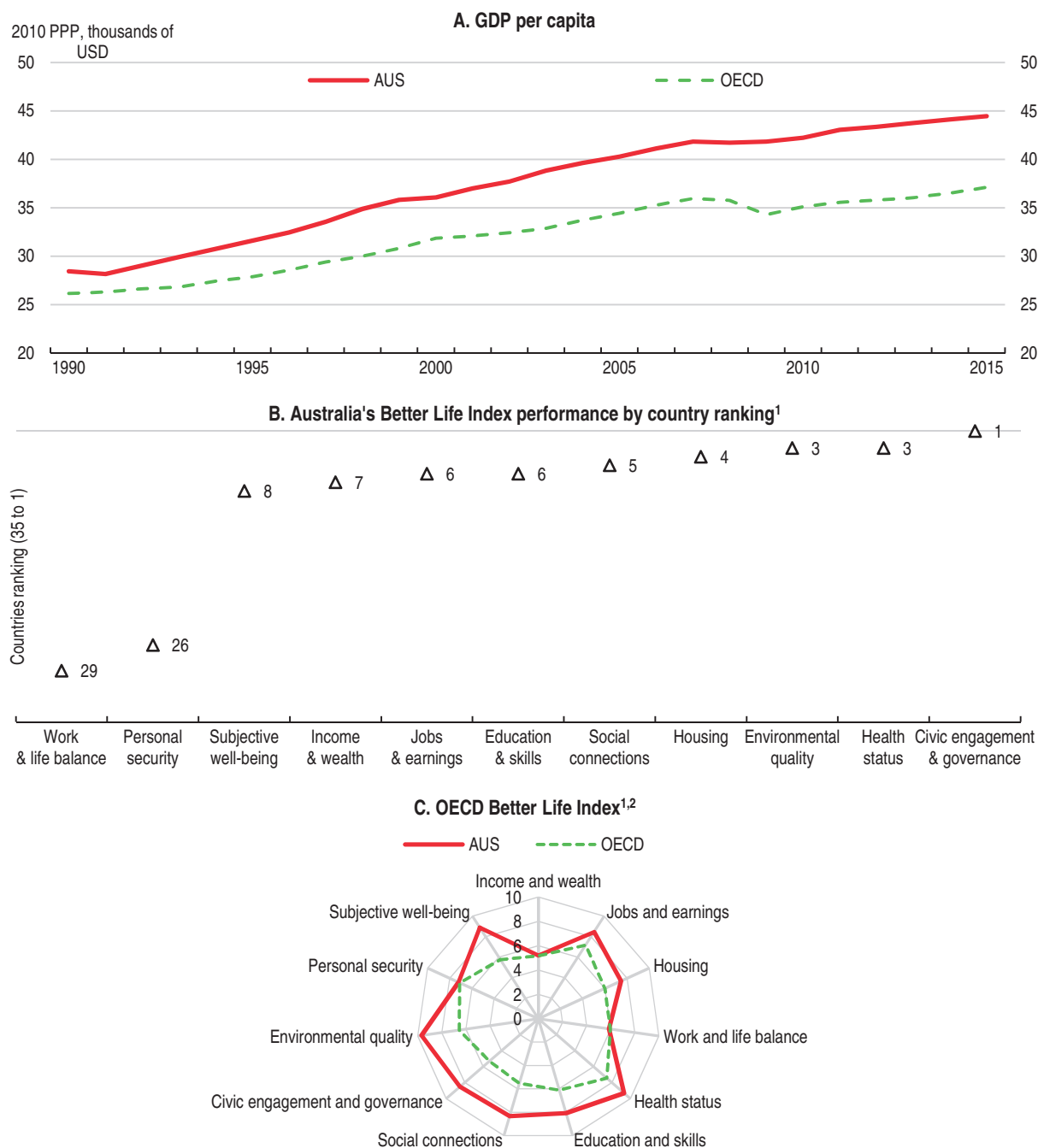
Following an impressive 25 consecutive years of output growth, Australia's gross domestic product per capita is high and the country generally ranks favourably in well-being (Figure 1). Despite the end of the global commodity super-cycle, the economy continues to perform well. The rebalancing of economic activity from commodity investment to other activities is well advanced, facilitated by monetary and fiscal policies, currency depreciation, and flexible labour and product markets.

However, Australia's economy shares the global risk of a "low-growth trap". Along with many OECD countries, productivity growth has slowed since its peak in the 1990s (Figure 2) but remains in line with its longer term average. Despite encouraging recent productivity growth, population aging (the number of Australians over 65 years of age will more than double by 2055) means the country's growth prospects depend crucially on strong productivity growth which, in turn, requires greater capacity for absorbing and generating new innovations. This is the subject of this Survey's in-depth examination of innovation and related policies and the focus of a recent government initiative (the *National Innovation and Science Agenda*; Australian Government, 2015a).

Furthermore, inclusiveness has been eroded. The Gini coefficient has been drifting up and households in upper income brackets have benefited disproportionately from Australia's long period of economic growth. Real incomes for the top quintile of households grew by more than 40% between 2004 and 2014 while those for the lowest quintile only grew by about 25% (Figure 3). Strong growth has pulled the incomes of households with wage earners further ahead of households reliant on transfers or pensions, which dominate the lower end of the income distribution. Furthermore, recent economic development has been strongly skill biased – partly because scale effects have amplified returns to some already high-paid segments of the labour market – widening the wage distribution. This partly explains the increasing share of income going to the very top end of the income distribution. In addition, large socioeconomic gaps between Australia's indigenous population (Box 1) and the rest of the population remain and there is room to reduce gender imbalance (Figures 3 and 4).

Against this background the main messages of this Survey are:

- Strong macroeconomic and financial-sector institutions and policies have supported strong economic growth and high living standards.
- Merely maintaining long-run average productivity growth jeopardises this success; a renewed emphasis on structural reforms in particular those that help boost Australia's capacity to absorb and generate innovation is required.
- Widening income inequalities and longstanding issues of inclusion (notably Australia's indigenous population) call for an ongoing emphasis on policies to ensure equitable opportunities for engaging in the labour market through skills acquisition and active labour market policies, especially policies that address these concerns while also enhancing productivity.

Figure 1. **GDP per capita is high and well-being indicators compare favourably**

1. Each well-being dimension is measured using one to three indications from the OECD Better Life Indicator set with equal weights.

2. Indicators are normalised by re-scaling to be from 0 (worst) to 10 (best).

Source: OECD (2016), OECD National Accounts Statistics (database); OECD (2016), "Better Life Index 2016", OECD Social and Welfare Statistics (database).


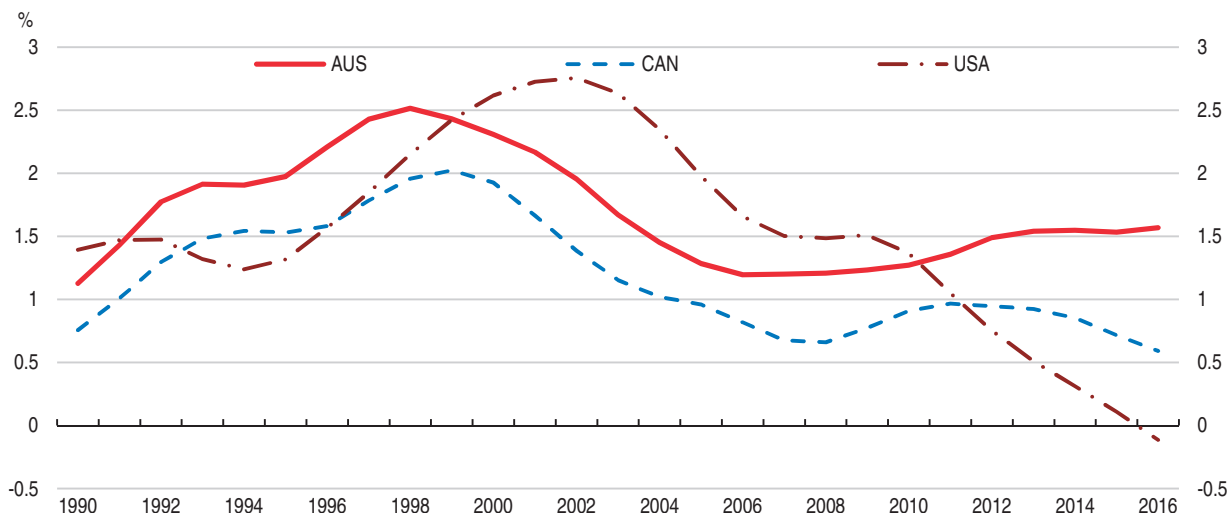
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Figure 2. **Productivity growth has slowed**Labour productivity growth (per hour worked)<sup>1</sup>

1. Data smoothed by the Hodrick-Prescott filter.

Source: The Conference Board (2016), The Conference Board Total Economy Database, May 2016.

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### Box 1. **Progress on closing the outcome gaps between the indigenous population and the rest of the population**

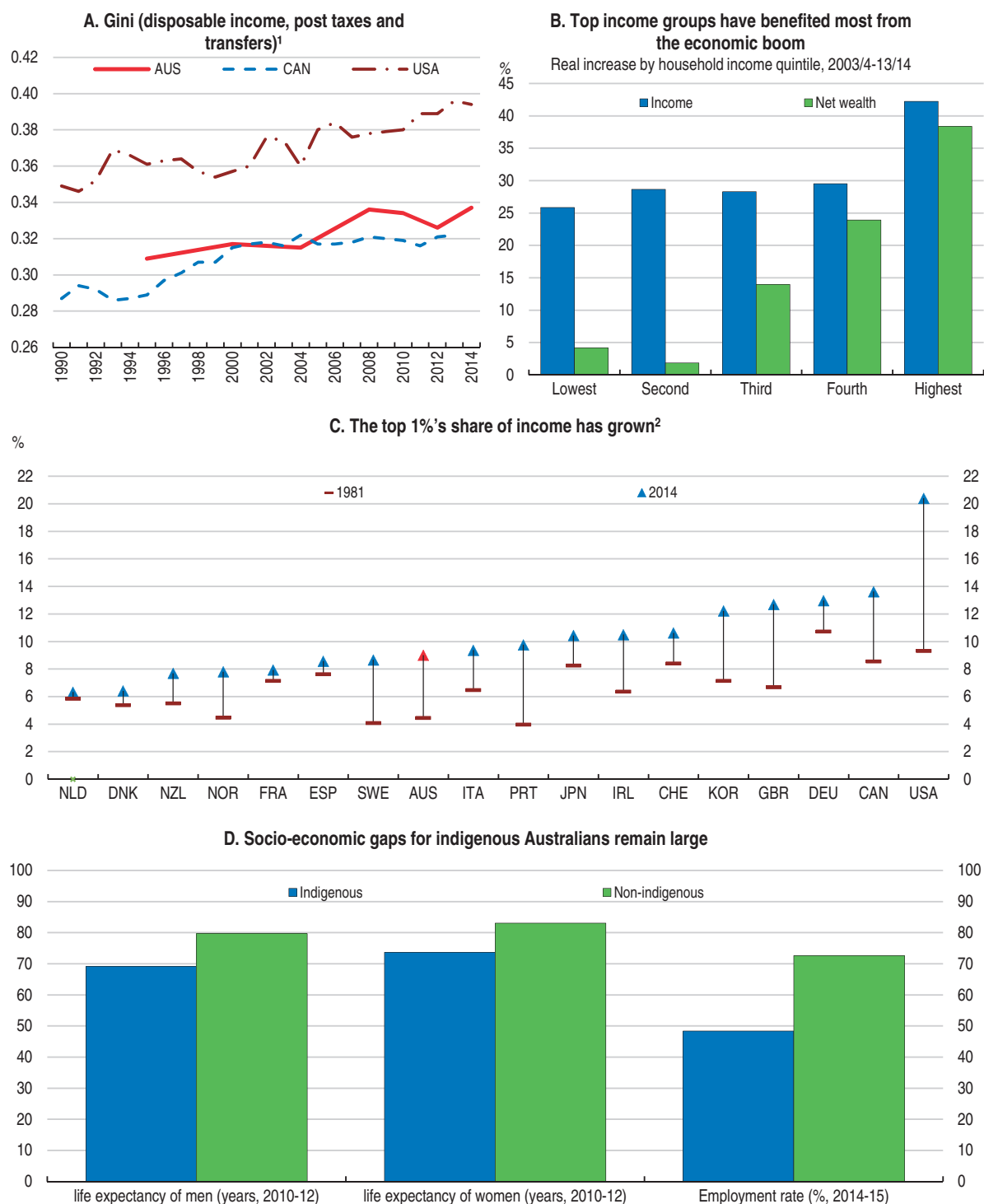
Indigenous Australians account for around 3% of the total population, but around 45% of the population in rural and remote areas. Addressing indigenous disadvantage is a priority across all levels of government in Australia, with targets agreed and set by the Council of Australian Governments to improve outcomes. The policy function at the Federal level sits within the Prime Minister's department and the Prime Minister delivers an annual update to Parliament on the extent of progress made, in the Closing the Gap report. Progress is generally reported based on the extent to which the difference in outcomes for indigenous compared to non-indigenous Australians has been reduced.

The 2016 Closing the Gap report indicated:

- targets on track: halving the gap in child mortality by 2018; and halving the gap in Year 12 attainment by 2020
- targets not on track: closing the gap on life expectancy; halving the gap in employment by 2018; closing the gap between indigenous and non-indigenous school attendance; and halving the gap for indigenous children in reading, writing and numeracy (although four of the eight measures are on track)
- it is too early to gauge whether the target will be met for 95% of all indigenous four year olds to be enrolled in early childhood education by 2025.

The Productivity Commission's annual report on indigenous disadvantage (Productivity Commission, 2016) also highlights that progress towards better socio-economic outcomes remains mixed. The report also draws attention to the lack of rigorously evaluated programmes in the area of indigenous policy.

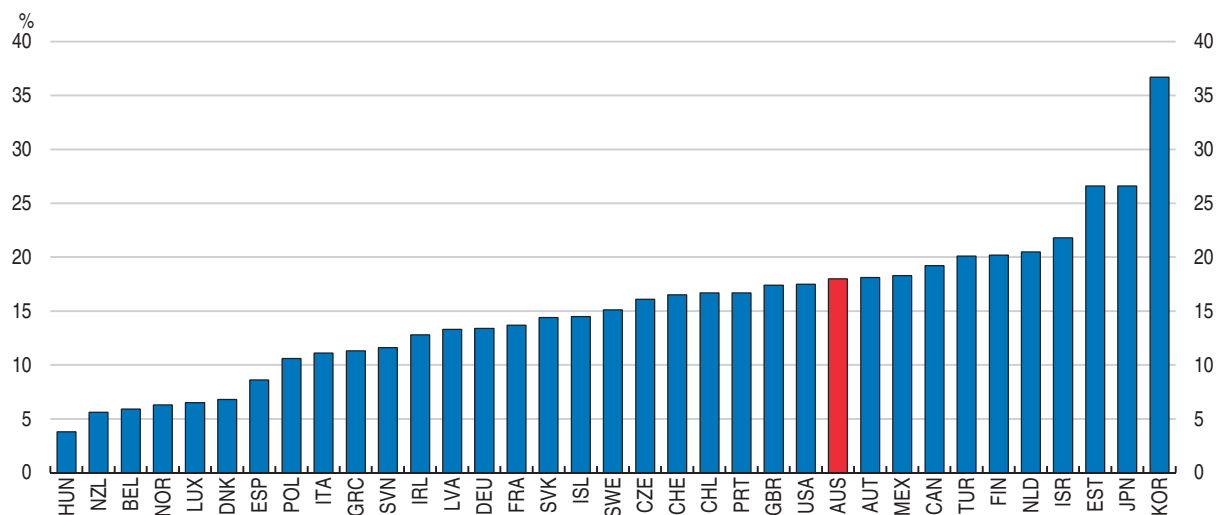
Figure 3. Inequality has been rising



1. The Gini coefficient is based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive, and it ranges between 0 in the case of perfect equality and 1 in the case of perfect inequality. New income definition applied for 2012 onwards (for United States, 2013 onwards).

2. Shares of top 1% incomes in total pre-tax income, 1980 – 2014 (or closest available period). For further details, <http://wid.world/>. Source: OECD (2016), OECD Income Distribution database; ABS (2016), 6523.0 – Household Income and Wealth, Australia, 2013–14; WID.world (2016), The World Wealth and Income Database; Australian Department of the Prime Minister and Cabinet (2016), Closing the gap: Prime Minister's Report 2016; ABS (2016), 4714.0 – National Aboriginal and Torres Strait Islander Social Survey, Australia, 2014–15.

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Figure 4. **Australia's gender wage gap is larger than many**Gender wage gap<sup>1</sup>, 2014 or latest

1. The gender wage gap is defined as the difference between male and female median wages divided by the male median wages.

Source: OECD (2016), OECD Gender Data Portal.

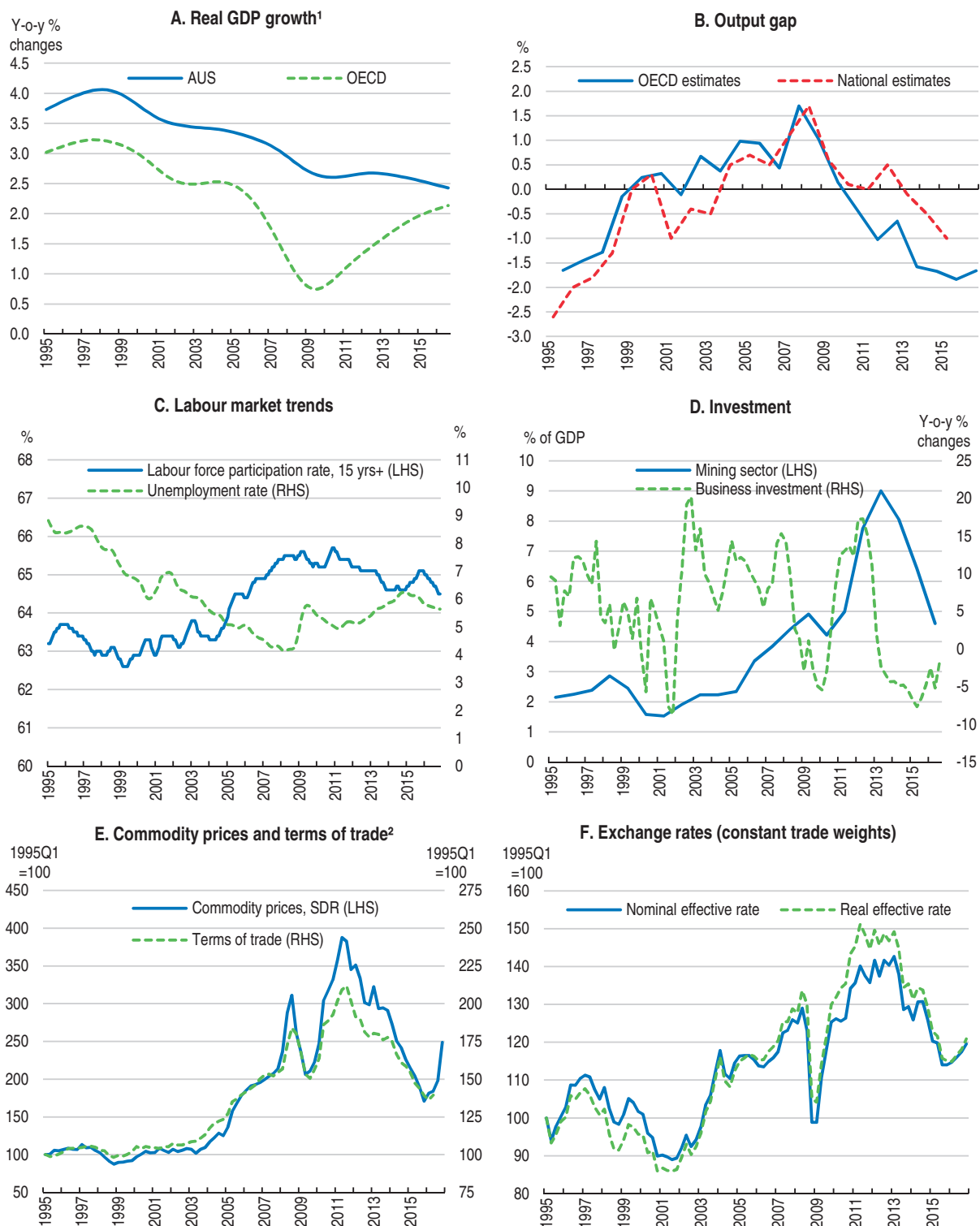
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## Macroeconomic developments and near-term prospects: post-boom adjustment continues

Australia's output growth remained resilient during the global financial crisis thanks to a prompt macroeconomic policy response, high commodity prices and a resilient financial system (Figure 5). The significant economic adjustment to the commodity super cycle, which has dominated cyclical development over the past decade or so, has proceeded relatively smoothly (Figure 5). There have been large falls in resource-sector investment, from 9% of GDP towards 4.5%, and falls in resource-sector employment, partly because several large multi-year construction projects have reached, or are close to, completion. In addition, declines in global commodity prices from their peak in 2011, notably for iron ore and coal, have curtailed plans for new investment and prompted cost-cutting by producers, although commodity prices have increased in recent times. As in many other developed economies, Australia now faces the risk of low growth and lacklustre private-sector investment due to pessimistic expectations and weakening global trade.

Markets have been redeploying resources and reducing macroeconomic tensions reasonably effectively so far, helped by flexibility-oriented policy settings for labour and capital, and by supportive macroeconomic policy. Exchange-rate depreciation has proven a key channel, spurring non-resource-sector exports, such as inbound tourism (Figure 6). The reallocation of labour resources is echoed in state-level employment trends, with strong employment growth in New South Wales and Victoria countering low growth in the resource-rich states of Queensland and Western Australia. Net international migration has proved a shock absorber in Australia, as the influx of labour during the commodity boom has been reversing (Figure 6).

Consumer-price inflation and wage growth remain subdued. Consumer-price inflation has been below the Reserve Bank of Australia's (RBA's) medium-term target range of 2-3% for several quarters. Also, inflation expectations and nominal-wage growth have trended

Figure 5. **Output growth has weakened, unemployment is up, investment is down**

1. Data smoothed by the Hodrick-Prescott filter.

2. Terms of trade is the ratio of export and import prices.

Source: OECD (2016), OECD Analytical database; ABS (2016), 6202.0 – Labour Force, Australia; ABS (2016), 5204.0 – Australian System of National Accounts, 2014-15; ABS (2016), 5206.0 – Australian National Accounts: National Income, Expenditure and Product, Jun 2016; Reserve Bank of Australia; The Australian Treasury.


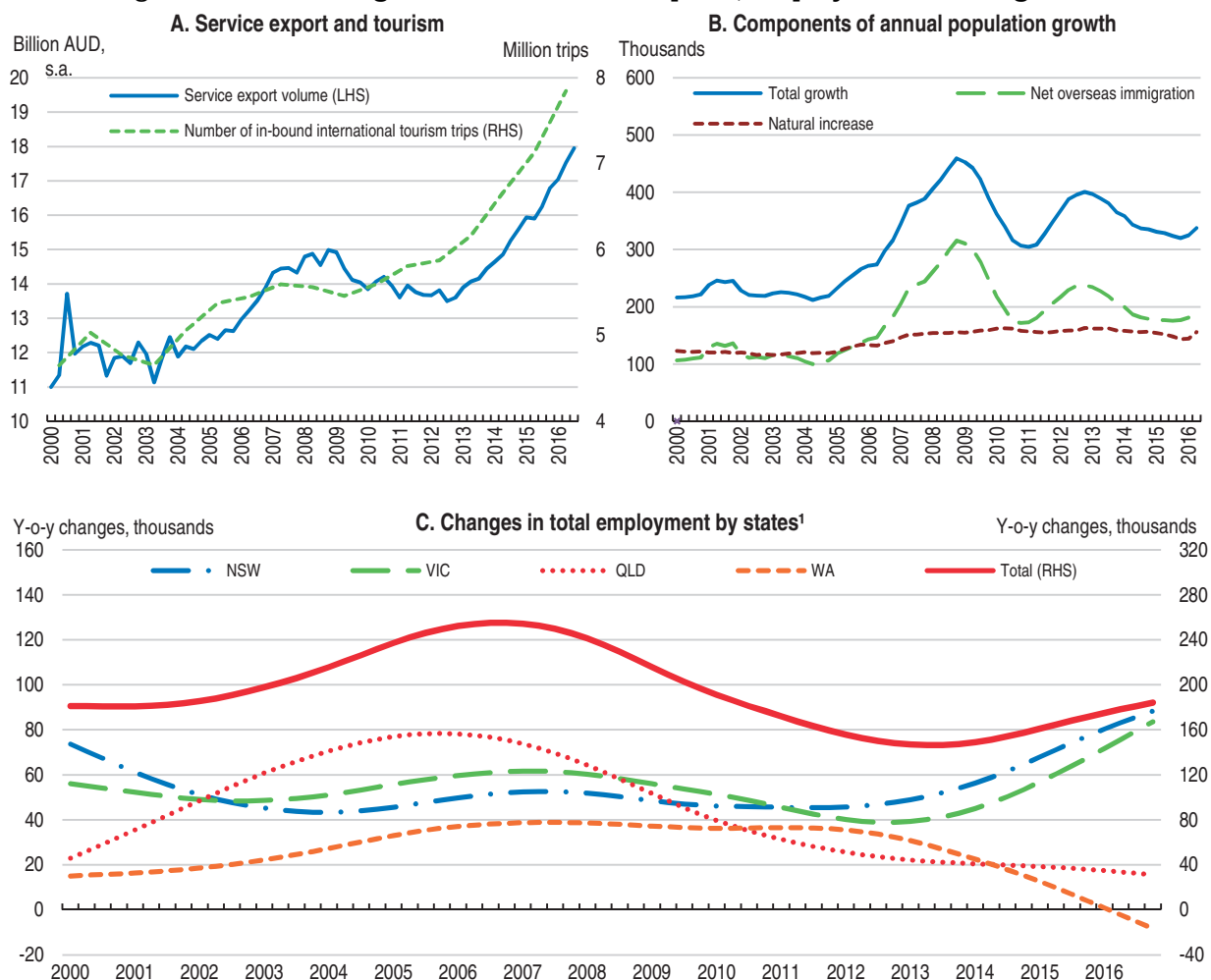
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Figure 6. Rebalancing is seen in services exports, employment and migration



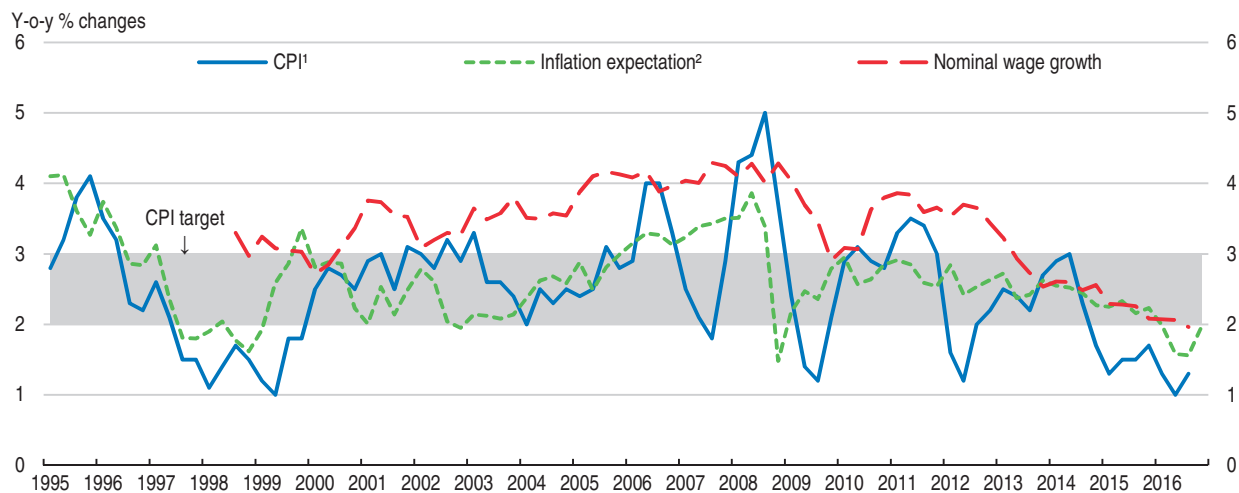
1. Data smoothed by the Hodrick-Prescott filter.

Source: ABS (2016), 5302.0 – Balance of Payments and International Investment Position; ABS (2016), 5249.0 – Australian National Accounts: Tourism Satellite Account; ABS (2016), 3101.0 – Australian Demographic Statistics; ABS (2016), 6291.0.55.003 – Labour Force, Australia, Detailed, Quarterly, Nov 2016.

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down (Figure 7). Wage growth has been at record lows partly because of ongoing slack in the labour market, including in part-time employment where many employees wish to work longer hours. In addition, the share of part-time employment continues to rise.

Subdued nominal GDP growth has been weighing on revenues, making it harder to reach the government's fiscal goals (see below). Australia has a sizeable current account deficit though this is expected to narrow in the coming years. Economic risk from the persistent current account deficit is not considered large because a large proportion of foreign-held debt is either denominated in Australian dollars or is hedged against exchange-rate fluctuations (Figure 8). Australia's total debt burden has been steadily increasing, however it remains middle ranking in international comparison (Figure 9). Also, the Australian government only issues in Australian dollars. Household debt, while relatively high, is concentrated in high income households, and matched with rising asset values and low interest rates. Debt servicing to income ratios remain low (see discussion on macroprudential measures below).

Figure 7. **Consumer-price inflation and wage growth are slowing**

1. Excludes interest and tax changes.

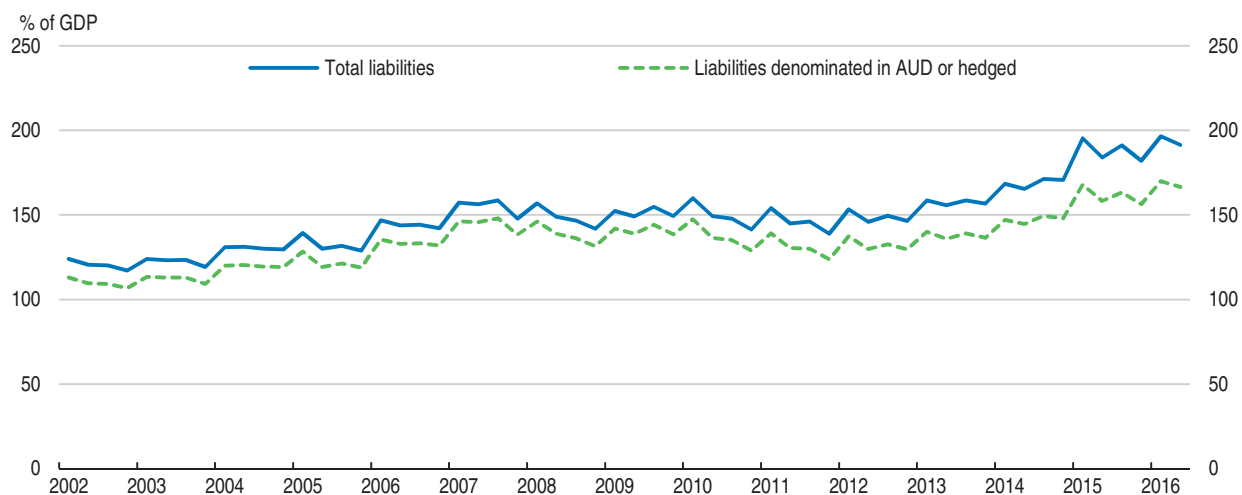
2. Average annual inflation rate implied by the difference between 10-year nominal bond yield and 10-year inflation indexed bond yield.

Source: Reserve Bank of Australia (2016); ABS (2016), 6345.0 – Wage Price Index, Australia, Sep 2016.

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Figure 8. **Australia's gross foreign liabilities continue to grow but remain largely denominated in AUD or are hedged**

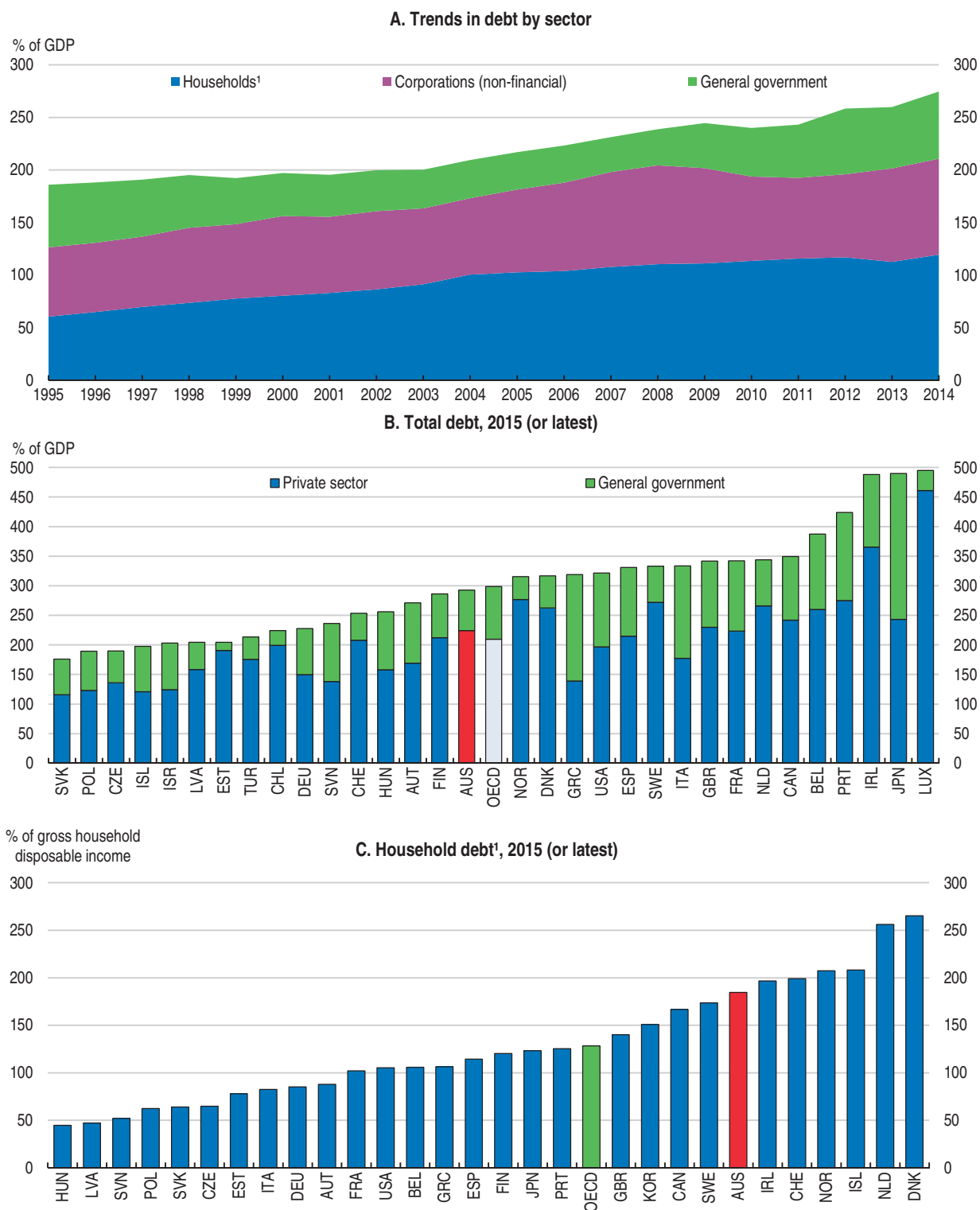

Gross foreign liability stocks



Source: Reserve Bank of Australia.

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Looking forward, OECD projections anticipate a slow pick-up in activity in the medium-term. The OECD Economic Outlook of autumn 2016 projected output growth for 2016 and 2017 of a little over 2½ %, rising to 3% for 2018 (Table 1). Since the projection was finalised, data releases showed that the economy shrank by 0.5% in Q3 of 2016. However, this outcome is expected to mean annual growth will only be slightly slower than in the projection given the largely temporary factors, including unseasonal factors behind the Q3 result. Sectoral shifts in investment will continue. The projections incorporate further shrinkage in mining investment, though at a slower pace, and a continued rise in

Figure 9. **Total debt has increased and household debt is above average**StatLink  <http://dx.doi.org/10.1787/888933456701>

non-commodity investment. Record low interest rates, currency depreciation and favourable business conditions on other fronts will support the investment. New liquefied-natural-gas (LNG) production following the completion of new facilities will continue to boost exports. Employment growth in non-mining activities will bring further declines in the rate of unemployment and support aggregate household income, and boost consumption. The pick-up in activity is not expected to generate significant inflationary pressure due to remaining economic slack.

**Table 1. Macroeconomic indicators and projections**

Annual percentage change, volume (2014 prices)

	2013	2014	2015	2016	2017	2018
	Current prices (billion AUD)			(projected)		
<b>GDP</b>	1,560	2.8	2.4	2.7	2.6	3.1
Private consumption	856	2.8	2.7	2.7	2.6	3.0
Government consumption	281	0.9	3.5	3.7	1.7	2.0
Gross fixed capital formation	431	-1.9	-3.1	-0.2	-0.9	1.5
Housing	73	6.9	10.0	7.7	6.0	3.5
Business	309	-4.8	-6.4	-4.7	-3.2	0.5
<i>of which mining</i> <sup>1</sup>	115	-8.5	-17.3	..	..	..
Government	50	3.5	-5.0	9.6	-2.4	2.5
Final domestic demand	1,568	1.2	1.3	2.2	1.6	2.5
Stockbuilding <sup>2</sup>	0	0.1	0.0	-0.9	0.0	0.0
Total domestic demand	1,568	1.2	1.3	1.3	1.6	2.4
Exports of goods and services	318	6.9	5.9	7.1	7.0	7.1
Imports of goods and services	326	-1.1	1.8	-0.2	1.9	3.8
Net exports <sup>2</sup>	-8	1.6	0.8	1.4	0.9	0.6
<b>Other indicators</b> (growth rates, unless specified)						
Potential GDP	..	2.8	2.6	2.5	2.4	2.3
Output gap <sup>3</sup>	..	-1.7	-1.8	-1.7	-1.5	-0.8
Employment	..	0.7	1.9	1.6	1.3	1.6
Unemployment rate	..	6.1	6.1	5.7	5.5	5.3
GDP deflator	..	0.2	-0.6	0.3	1.9	1.8
Consumer price index	..	2.5	1.5	1.3	1.8	2.1
Core consumer prices	..	2.4	2.1	1.6	1.7	2.1
Household saving ratio, net <sup>4</sup>	..	9.0	7.1	8.0	7.8	7.4
Trade balance <sup>5</sup>	..	0.1	-1.6	..	..	..
Current account balance <sup>5</sup>	..	-2.9	-4.8	-3.5	-2.5	-1.9
General government fiscal balance <sup>5</sup>	..	-2.3	-1.8	-2.6	-2.0	-1.5
Underlying government fiscal balance <sup>3</sup>	..	-1.5	-1.5	-1.8	-1.2	-1.1
Underlying government primary balance <sup>3</sup>	..	-0.8	-0.9	-1.3	-0.7	-0.5
General government gross debt <sup>5</sup>	..	42.1	44.3	45.4	45.1	44.6
General government net debt <sup>5</sup>	..	-13.1	-14.3	-11.4	-8.9	-6.9
Three-month money market rate, average	..	2.7	2.3	2.0	1.8	2.3
Ten-year government bond yield, average	..	3.7	2.7	2.2	2.0	2.3

1. Data are based on a financial year.

2. Contributions to changes in real GDP, actual amount in the first column.

3. As a percentage of potential GDP.

4. As a percentage of household disposable income.

5. As a percentage of GDP.

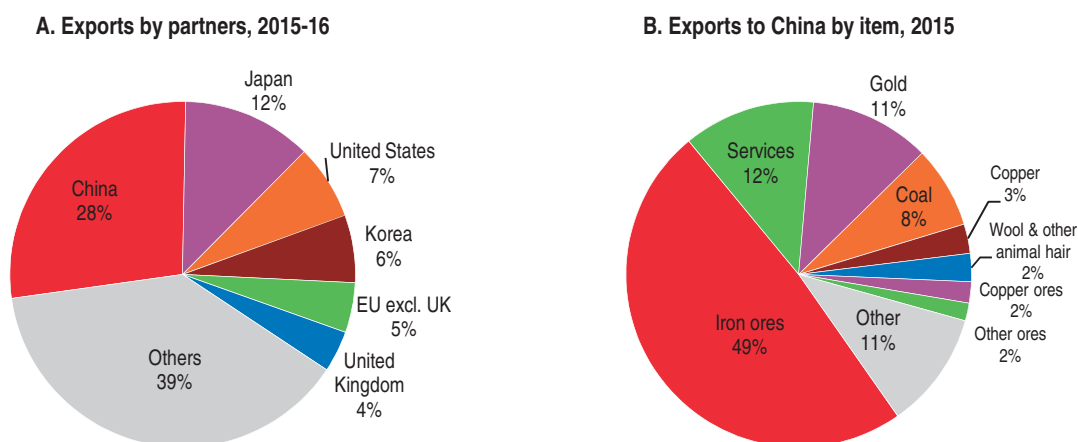
Source: OECD (2016), OECD Economic Outlook: Statistics and Projections (database); Australian Bureau of Statistics.



There are several risks to this central scenario with implications for potential output and productivity:

- Trade-related uncertainties are a key element in Australia's risk profile. Developments in global demand and prices for iron ore and coal will be critical, particularly demand for these commodities in China (Figure 10). Aggregate demand in China is also of growing importance for Australia's trade in services, notably in tourism as China's middle class grows.
- Non-commodity investment growth may not pick up as expected. Capital-expenditure and non-residential building-approval data have yet to show a clear positive trend (Figure 11). However, business-credit growth has been picking up, potentially signalling stronger investment ahead (see discussion below).

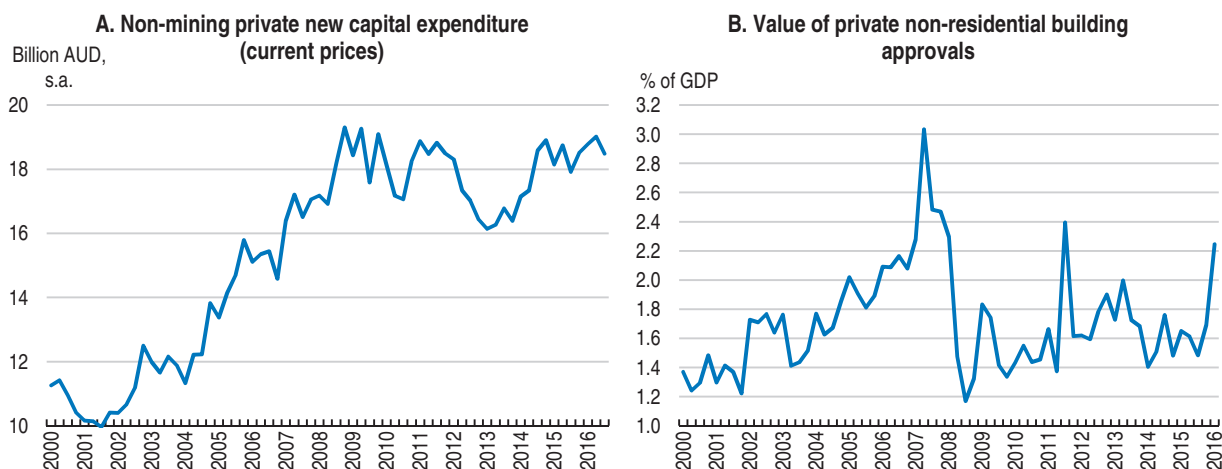
Figure 10. **China is Australia's largest trading partner**



Source: Australian Department of Foreign Affairs and Trade.

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Figure 11. **Non-commodity investment has yet to pick up**



Source: ABS (2016), 5625.0 – Private New Capital Expenditure and Expected Expenditure; ABS (2016), 8731.0 – Building Approvals; OECD (2016), Analytical Database.

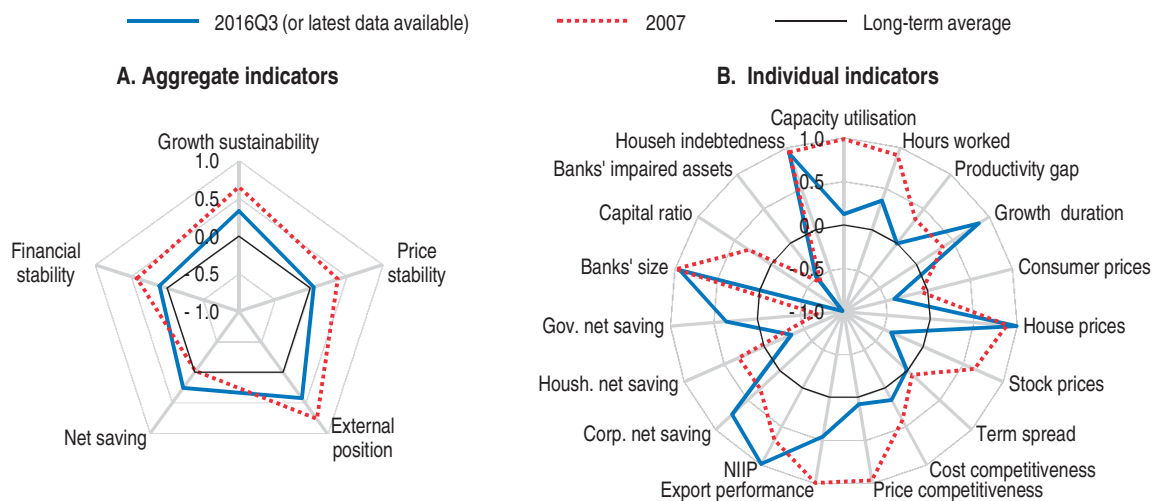
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- Shifts in US monetary policy, uncertainties about Brexit, rising protectionism and revisions to China's exchange rate policy, may catalyse global exchange-rate volatility that could affect Australia's trade.

Indicators suggest there is some risk of downturn (Box 2), with several potentially destabilising events possible (Table 2). Threats to stability from overheating in terms of output or inflation has lessened in recent years (Figure 12, Panel A). However, macro-financial indicators underline the threat from the housing market, with house prices and related indicators (house indebtedness, bank size, Figure 12, Panel B) pointing to continued vulnerability. Any impact will most likely be through aggregate demand than financial instability. Although there are a number of factors likely to mitigate the systemic impact of these vulnerabilities, including large aggregate mortgage prepayment buffers and recently tightened macro-prudential measures, a fall in house prices and or demand could have significant macroeconomic implications. Specifically, the market may not ease gently but develop into a rout on prices and demand with significant macroeconomic implications. Externally, Australia, as always, is exposed to the vagaries of global commodity markets and this might include a renewed plunge in prices (or, positively, a strong resurgence). Australia's iron ore production is among the lowest cost in the world and therefore comparatively insulated from such developments, however its coal sector is relatively


Figure 12. **Macro-financial vulnerabilities have eased since the global financial crisis**

Deviations of indicators from their real time long-term averages (0), with the highest deviations representing the greatest potential vulnerability (+1), and the lowest deviations representing the smallest potential vulnerability (-1)<sup>1</sup>



1. Each aggregate macro-financial vulnerability indicator is calculated by aggregating (simple average) normalised individual indicators. Growth sustainability includes: capacity utilisation, total hours worked as a proportion of the working-age population (hours worked), difference between GDP growth and productivity growth (productivity gap), and an indicator combining the length and strength of expansion from the previous trough (growth duration). Price stability includes: headline and core inflation (consumer prices), the average of house prices-to-rent ratio and house prices-to-income ratio (house prices), stock market index (ASX200) adjusted by nominal GDP (stock prices), and the difference between long-term and short-term government bond interest rates (term spread). External position includes: the average of unit labour cost based real effective exchange rate (REER), and consumer price based REER (cost competitiveness), relative prices of exported goods and services (price competitiveness), ratio of exports to export markets (export performance) and net international investment position (NIIP) as a percentage of GDP. Net saving includes: government, household and corporate net saving, all expressed as a percentage of GDP. Financial stability includes: size of banking sector as a percentage of GDP, Tier 1 capital ratio, banks' impaired facilities to loans and advances, and household debt-to-disposable income ratio.

Source: OECD calculations based on OECD (2017), OECD Economic Outlook: Statistics and Projections (database); Australian Bureau of Statistics; Reserve Bank of Australia; Australian Prudential Regulation Authority; Thomson Reuters Datastream.

StatLink  <http://dx.doi.org/10.1787/888933456737>

### Box 2. Predicting downturn in the Australian economy using the OECD's resilience database

The OECD's database of vulnerability indicators (Hermansen and Röhn 2015; Röhn et al., 2015) can be used to assess the risk of downturn. The database comprises over 70 indicators across six categories of vulnerability (five domestic, one international). Echoing a number of recent *Surveys* (e.g. 2016 *Economic Survey of the United States*), statistical methods can be used to develop leading indicators of past downturns and recessions.

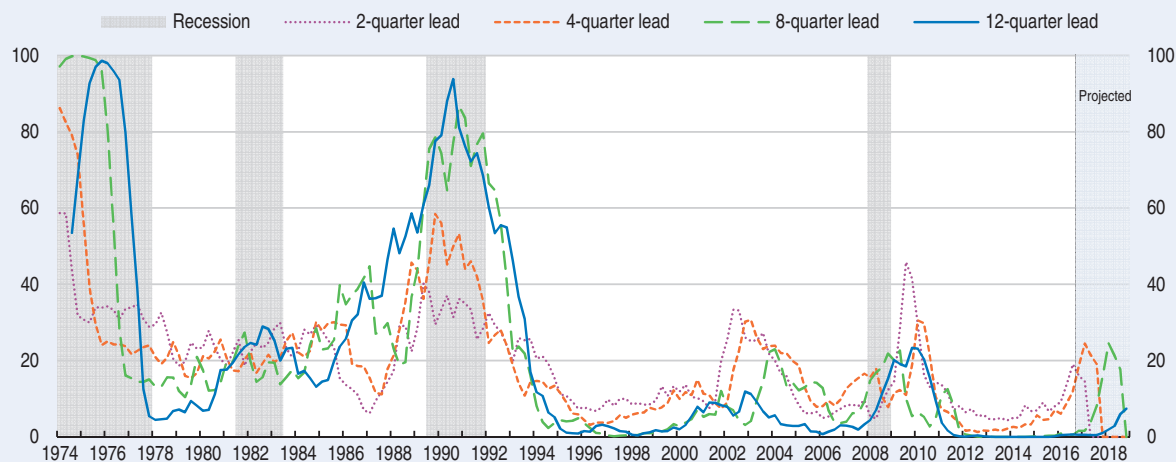
Four downturns (not all are recessions as they do not fulfil the usual definition of at least two consecutive quarters of falling output) were identified for Australia in the period spanned by the resilience data (which begin in the mid-1970s). Principal components analysis was used to develop a single-number leading indicator. The most powerful elements proved to be those in the category of “spillovers, contagion and global risks”, such as global asset market prices and global credit growth. This fits in with Australia's strong linkage to global markets. The leading indicator was then used to estimate the downturn probability at different time horizons (Figure 13).

As similar exercises for other countries have found, the indicator developed from the resilience database is not very accurate. It predicts two of Australia's four previous downturn events quite well (in Figure 13, the indicators are performing well if they peak around the beginning of a downturn). However it does not predict the second downturn and flags problems in the run up to the global financial crisis but is inaccurate on the timing.

Bearing in mind the limited accuracy, the emergence of peaks in the most recent data suggests there is a non-negligible risk of downturn.

Figure 13. Recent data suggest there is some risk of a downturn

In-sample downturn probabilities, 3 components



Source: OECD calculations.


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Table 2. **Extreme vulnerabilities for the Australian economy**

Vulnerability	Possible outcome
Dramatic house-price correction	A large drop off in house prices could cut household consumption and increase mortgage defaults
Renewed plunge in global iron ore and coal prices	Further cost-savings and retrenchment of investment among mining companies with impact on jobs and incomes

more exposed as its production is distributed across the cost curve. Interaction of downside scenarios is likely to exacerbate the negative macroeconomic outcomes. For instance, a negative external shock could lift unemployment sharply which would result in significant fall in consumption and rising mortgage stress and falling house prices.

The economy is well positioned to handle shocks such as those described in Table 2. The speed and strength of the rebalancing processes in response to the end of the commodity boom auger well for the economy's shock-absorbing capacity. In addition, Australia has more reserve capacity for monetary and fiscal stimulus than many other OECD economies (see discussion below).

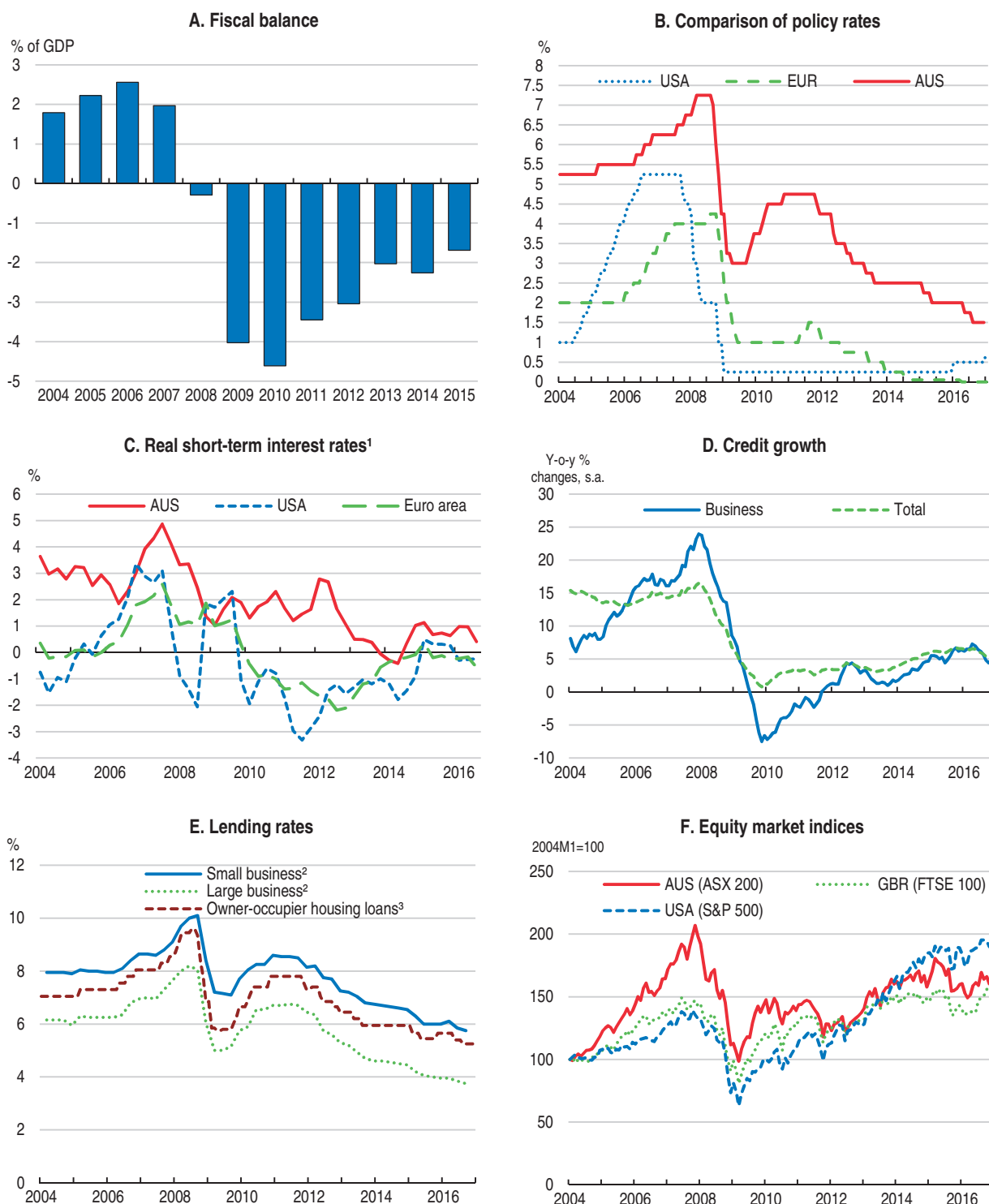
### Monetary and financial-market policy: coping with low interest rates

As in many other economies, monetary policy has been the principal tool for supporting aggregate demand in recent years. This partly reflects that fiscal policy has focused on curbing deficits following the large fiscal expansion during the global financial crisis and consequent rise in public debt (Figure 14). Monetary stimulus has been consistent with the RBA's medium-term inflation target band of 2% to 3% (Figure 7), as inflation has been low, and interest rates are higher in Australia than in the United States or the euro area (Figure 14).

Unless downside risks materialise, the current supportive stance of monetary policy remains appropriate at present, particularly in the absence of inflationary pressures. However, a side effect is a risk that accommodative policy may be increasingly distorting financial markets and, especially, house prices (which have risen to very high levels). Eventually, rates will need to be normalised, but the timing and pace will depend on developments in growth, employment, inflation, and the housing market.

### Macro-prudential measures are helping contain housing-loan growth

House prices and household debt have reached unprecedented highs (Figure 15), in part because policy-rate cuts have lowered debt servicing costs (most housing loans are set at variable interest rates). In real terms, house prices have increased by 250% since the mid-1990s. Furthermore, the ratio of house prices to incomes has undergone further increase in recent years, straining affordability, especially for first-time buyers in Sydney. Foreign demand for housing, while a contributing factor, does not appear to have had a substantial impact on price growth. There are signs that the housing market is cooling. Recent data indicate price growth has eased in most urban centres, reflecting in part a substantial supply response – dwelling approvals and investments have increased substantially in recent years (Figure 15). However, the significant increase in Australia's house prices and price to income ratios remains. A continued rise of the market, fuelled by both investor and owner-occupier demand, may end in a significant downward correction that spreads to the rest of the economy.

Figure 14. **Monetary policy remains accommodative, while fiscal deficits are declining**

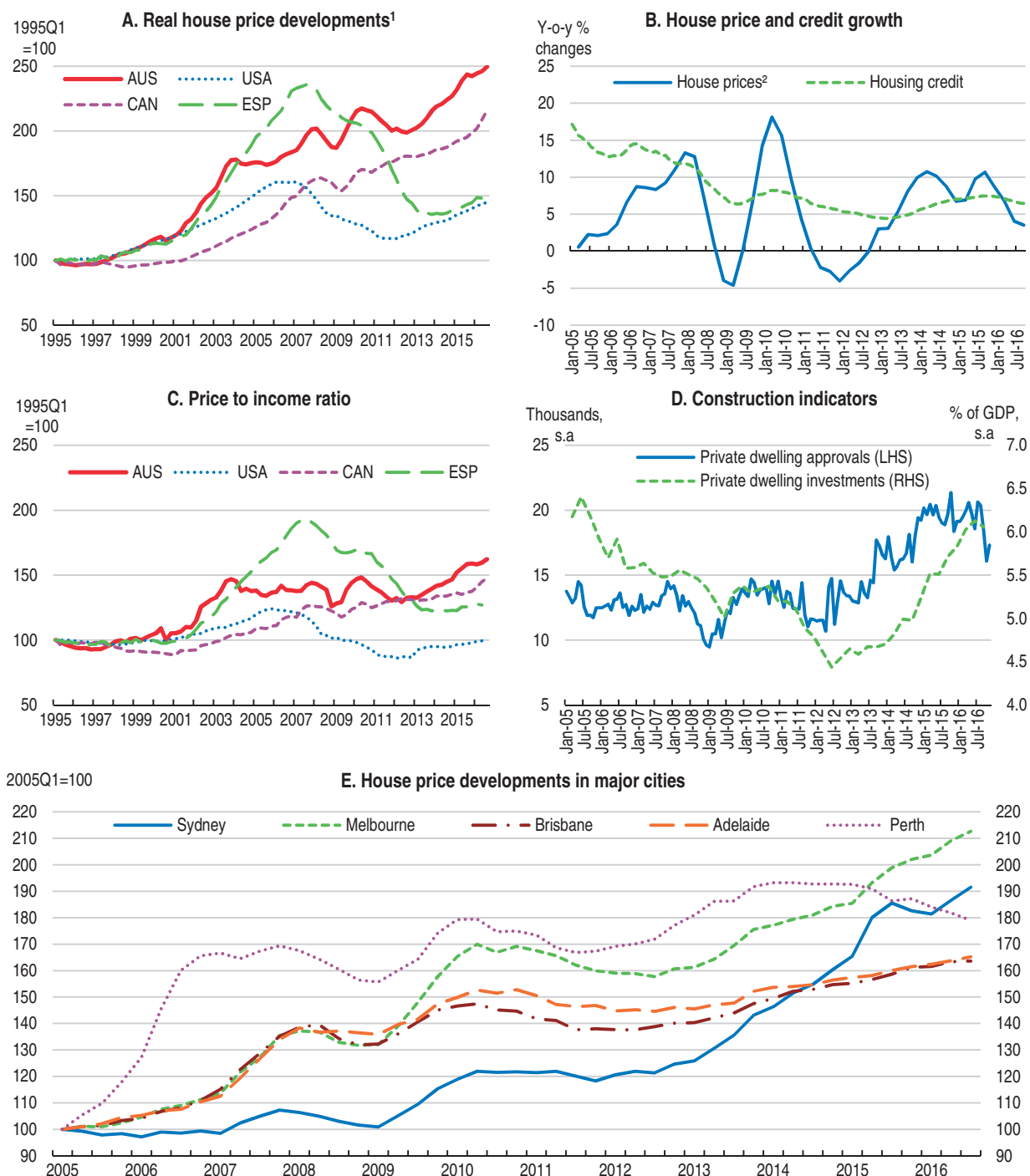
1. Average three-month money market rate adjusted by CPI.

2. Weighted-average rate on credit outstanding.

3. "Standard" rates which apply to housing loans with facilities such as the option to redraw or make early repayments.

Source: Reserve Bank of Australia (2016); OECD (2016), OECD Analytical Database; Thomson Reuters.


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Figure 15. **Housing market indicators show hints of a slowdown**

1. Deflated using the private consumption deflator from the national account statistics.

2. Weighted average of eight capital cities.

Source: OECD (2017), OECD Analytical House Price database; ABS, 8731.0 – Building Approvals, Australia; ABS, 5206.0 Australian National Accounts: National Income, Expenditure and Product; Reserve Bank of Australia; ABS, 6416.0 – Residential Property Price Indexes: Eight Capital Cities, Sep 2016.

StatLink  <http://dx.doi.org/10.1787/888933456768>

As recommended in the previous Survey (OECD, 2014a), the authorities have deployed “macro-prudential” measures to cool mortgage lending and reduce risks (Box 3). Measures include pressure on banks to limit growth of mortgage lending to those purchasing for investment purposes (see Table 3 and Annex, below). These augment institution-by-

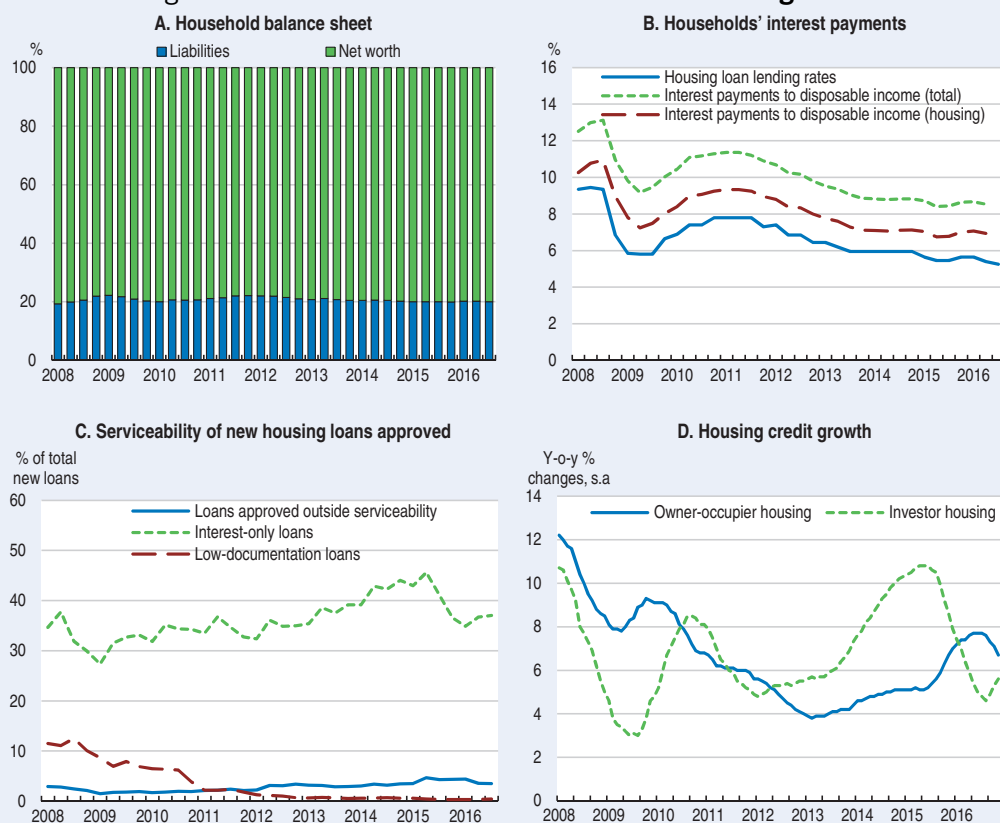
### Box 3. The macroprudential measures taken in 2014

In response to concerns about the level of risk being taken on by banks and households, the Australian Prudential Regulation Authority (APRA) announced measures in December 2014 to reinforce sound housing lending practices (APRA, 2014). These measures focus on:

- the extent of higher-risk mortgage lending – for example, high loan-to-income loans, high loan-to-valuation (LVR) loans, interest-only loans to owner occupiers, and loans with very long terms
- the pace of growth in investor housing lending – in particular portfolio growth materially above a threshold of 10 %
- interest rate buffers and floors used in loan serviceability assessments – in APRA’s view, these should incorporate an interest rate buffer of at least 2 % above the loan product rate, and a floor lending rate of at least 7 %, when assessing borrowers’ ability to service their loans.

These measures, coupled with increased mortgage risk weights for Internal Rating Based (IRB) banks (i.e. used by major banks), have seen investor credit growth slow and an improvement in the quality of credit being extended in the mortgage market (Figure 16).

Figure 16. Indicators of costs and risks in housing credit



Source: ABS (2017), 5232.0 – Australian National Accounts: Finance and Wealth, Sep 2016; Australian Prudential Regulation Authority; Reserve Bank of Australia.

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Table 3. **Past OECD recommendations on monetary and financial stability**

Topic and summary of recommendations	Summary of action taken since 2014 <i>Survey</i>
Improve the functioning of the housing market	
Continue intensive monitoring of the housing market; maintain deep micro-prudential oversight and consider using macro-prudential tools to bolster credit safeguards and signal concern	Use of macro-prudential measures has begun (alongside continued deep micro-prudential oversight). For instance, investor lending by banks has been limited to 10% growth annually
Facilitate housing supply in particular through planning-regulation reform at state and territory level	State-level planning-regulation reform continues
Examine competition and credit issues in the financial sector	
Reduce banking sector privileges. Consider reducing banks' implicit guarantees, tackling risk-weighting advantages in mortgage lending, improving credit databases	Risk weightings on mortgage lending were raised in July 2015 for banks that use the internal ratings-based models

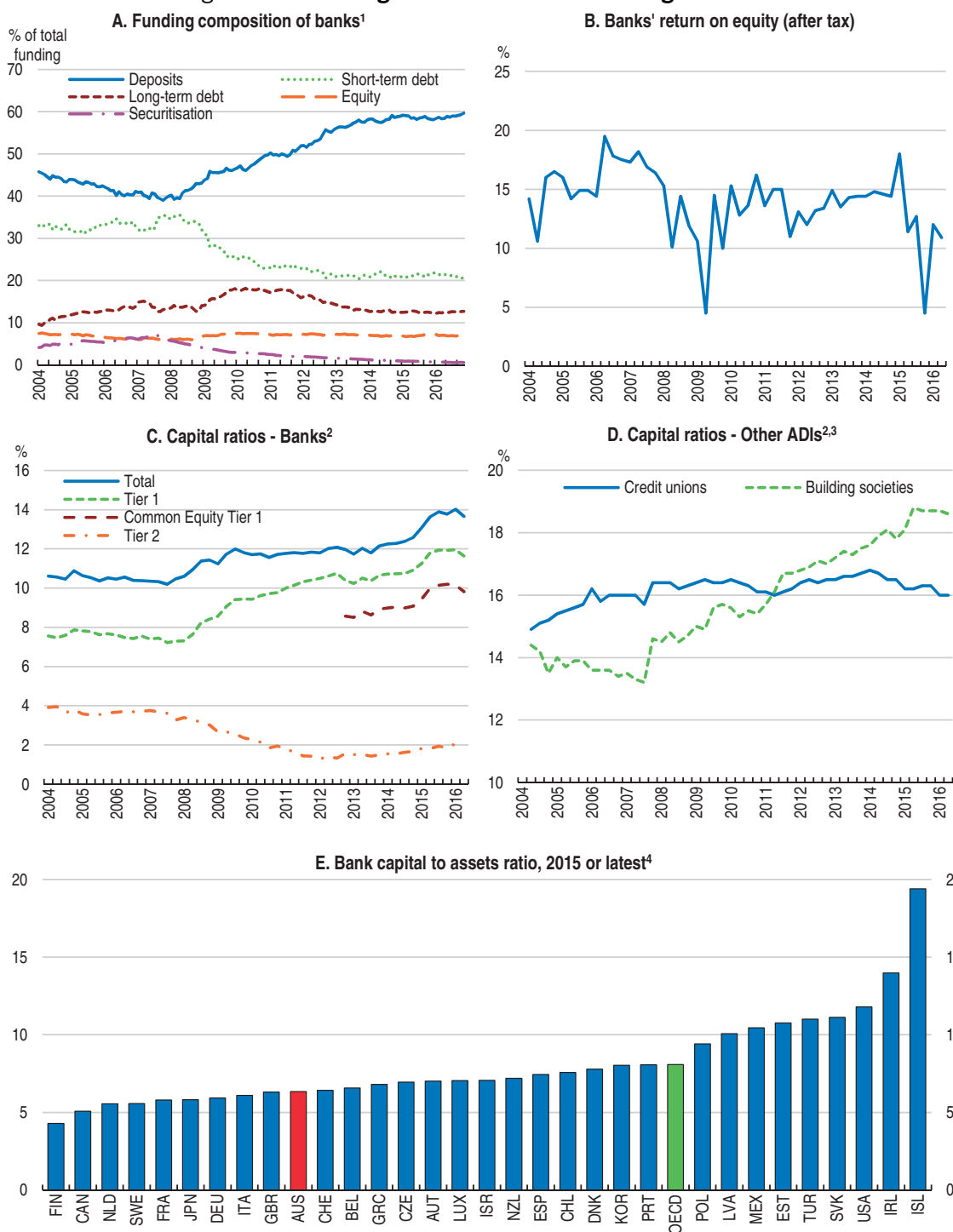
institution scrutiny of mortgage lending (“micro-prudential” policy), which in the Australian context is an effective approach because the four major banks account for a large share of mortgage lending (around 80% in the first quarter of 2016 according to data published by the banking regulator, APRA). Demand-side measures, such as macro-prudential tools, should continue to play a role with careful attention to distributional consequences for households. As recommended in past *Surveys* (Table 3), supply-side measures, including planning-regulation reform, can also help ease market pressure over the longer term.

### **Resilience and competition issues in banking**

The global financial crisis did not lead to systemic bank failures in Australia but, as elsewhere, prompted tighter regulation and alteration in banking practices. Banks have shifted their funding composition away from short-term debt and towards deposits (Figure 17). Furthermore, a recent report by the banking regulator (APRA, 2016) indicates that capital ratios have reached the thresholds recommended by the Financial System Inquiry (“Murray Inquiry”) (Australian Government, 2014). However, APRA’s report notes that banks must continue increasing their capital ratios to at least maintain, if not improve, their relative positioning. The Murray Inquiry underscored that strengthening bank resilience should also include new measures to limit the costs to the public in the event of bank failure. Specifically, it recommended the establishment of a loss absorbing and recapitalisation framework in line with international developments to allow effective resolution with limited risk to taxpayer funds. This approach has been endorsed by the government and APRA is developing detailed implementation.

The Murray Inquiry’s call for stronger resilience also reflects concerns that four major banks have substantial market share in many financial services (especially retail services), an issue that has been raised in previous *Surveys*. Bolstering resilience can reduce the banks’ implicit guarantees, which put them in an advantageous position in providing financial services. Concern about the strength of banking regulation has prompted efforts to identify and eliminate advantages for banks in regulatory technicalities. On this front, there has been welcome progress with the reduction in major banks’ advantages over other lenders that use the standardised model of risk assessment in the mortgage market arising from differences in mortgage risk weights (see Table 3).



Figure 17. **Banking-sector resilience is being bolstered**

1. Short-term debt and long-term debt are adjusted for movements in foreign exchange rates. Short-term debt includes deposits and intragroup funding from non-residents.
2. Percentage of risk-weighted assets; break in March 2008 due to introduction of Basel II for most ADIs; break in March 2013 due to the introduction of Basel III for all ADIs.
3. ADI refers to an authorised deposit-taking institution, meaning a body corporate authorised under section 9 of the Act, to carry on banking business in Australia (e.g. a bank, building society or credit union).
4. The ratio of bank capital and reserves to total assets, which are not risk weighted.

Source: Australian Prudential Regulation Authority; Reserve Bank of Australia; World Bank.

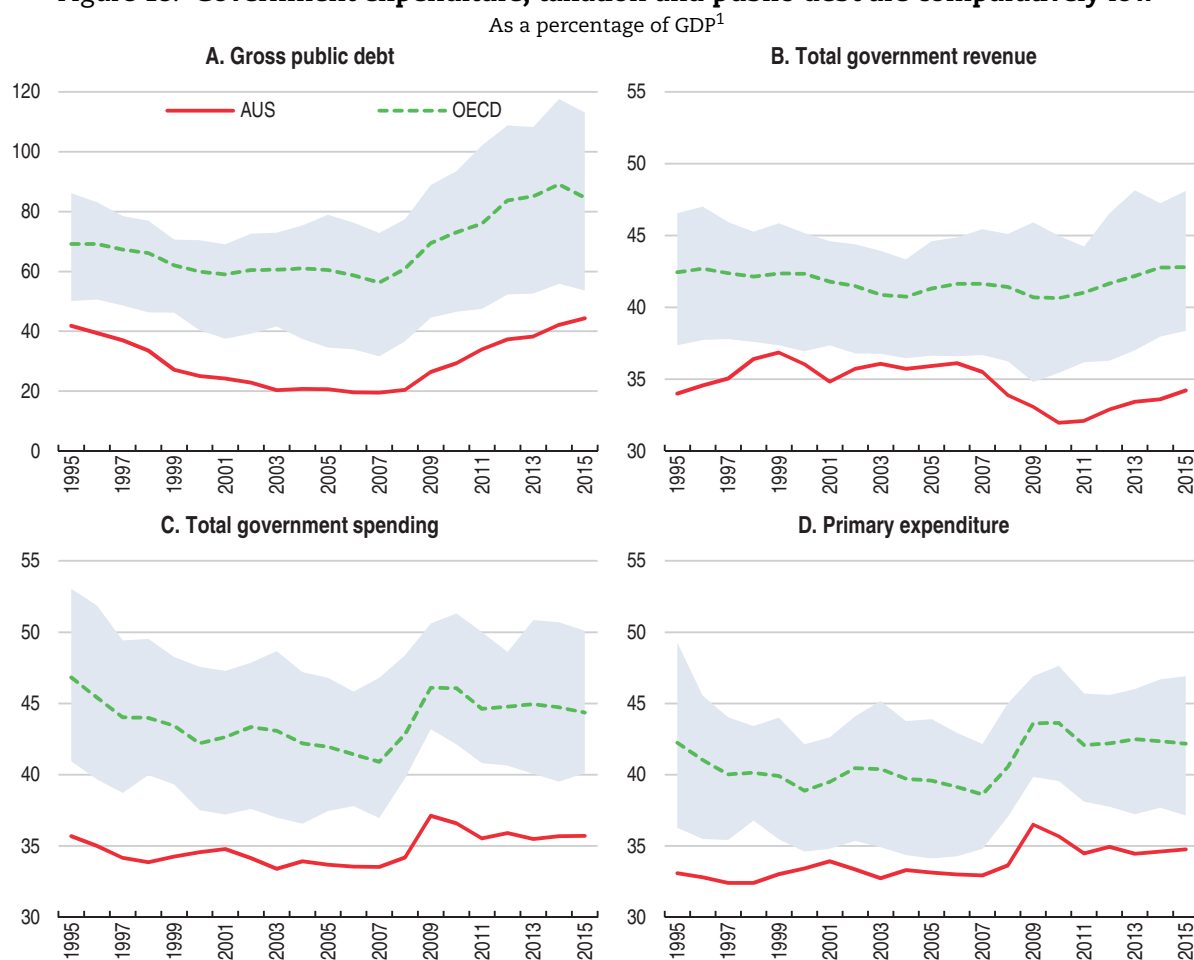
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## Fiscal consolidation, tax and spending reform

Compared with other OECD countries, Australia's tax burden, public spending and public debt are low (Figure 18). Following the global financial crisis, the authorities provided timely fiscal support that helped Australia avoid a recession (one of the few OECD countries to do so). Since then the fiscal deficit has been unwinding, though somewhat slowly (Table 4 and Figure 19). The federal deficit in financial year 2015-16 was 2.4% of GDP, which is below its peak of 4.2% but not low enough to bring a fall in the debt-GDP ratio.


Australian fiscal policy is guided by a broad rule of achieving a balanced budget (or surpluses) in the federal budget “over the cycle”. State governments do not substantially affect the overall fiscal stance because their balances are comparatively small. The current government has adopted an operational goal of reaching a federal budget surplus of 1% of GDP “as soon as possible” (Australian Government, 2016a), which is more than sufficient to put the debt-GDP ratio on a downward track. Simulations suggest that a budget surplus of 1% after 2021-22 would bring the ratio to 25% of GDP by 2025-26 and close to zero by 2040 (Figure 20). Australia's balanced-budget/surplus guidance reflects a longstanding preference for achieving low debt burdens.

Figure 18. **Government expenditure, taxation and public-debt are comparatively low**



1. Data represent general-government accounts (i.e. including sub-national government accounts). The shaded area denotes the 25th to 75th percentile range of available data for OECD countries. OECD is a simple average of data for available countries.

Source: OECD (2016), OECD Analytical Database.

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**Table 4. Fiscal indicators**  
Per cent of GDP

	2013	2014	2015	2016 <sup>1</sup>	2017 <sup>1</sup>	2018 <sup>1</sup>
<b>Spending and revenue</b>						
Total revenue	33.6	33.4	33.9	33.8	34.0	34.1
Total expenditure	35.6	35.7	35.7	36.4	36.1	35.7
Net interest payments	0.6	0.7	0.6	0.6	0.6	0.6
<b>Budget balance</b>						
Fiscal balance	-2.0	-2.3	-1.8	-2.6	-2.0	-1.5
Cyclically adjusted fiscal balance <sup>2</sup>	-1.2	-1.4	-0.8	-1.7	-1.2	-1.1
Underlying fiscal balance <sup>2</sup>	-1.5	-1.5	-1.5	-1.8	-1.2	-1.1
Underlying primary fiscal balance <sup>2</sup>	-0.9	-0.8	-0.9	-1.3	-0.7	-0.5
Federal budget balance <sup>3</sup>	-1.2	-3.1	-2.4	-2.4	-	-
<b>Public debt</b>						
Gross debt	38.3	42.3	44.5	45.4	45.1	44.6
Net debt	-15.4	-13.1	-14.4	-11.4	-8.9	-6.9

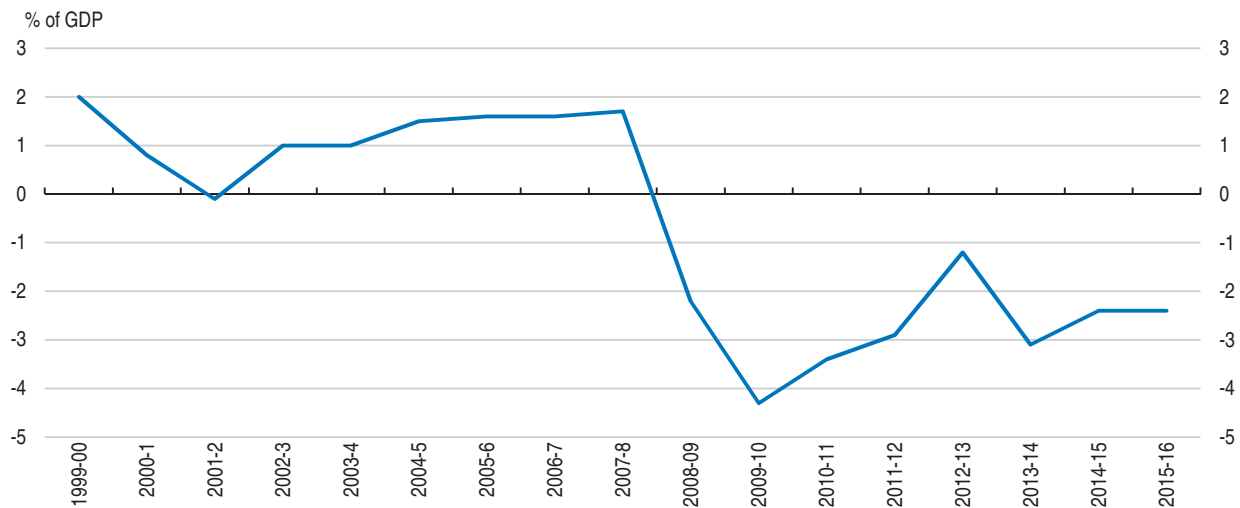
1. Projections.

2. Per cent of potential GDP. The underlying balances are adjusted for the cycle and for one-offs. For more details, see OECD Economic Outlook Sources and Methods.

3. "Underlying cash balance", which equals to receipts less payments, less net Future Fund earnings. Fiscal year basis (i.e. 2015 data refer to 2014-15).


Source: OECD (2016), OECD Economic Outlook: Statistics and Projections (database); Government of Australia, Budget papers.

**Figure 19. Consolidation in the federal-government budget**  
Federal budget balance<sup>1</sup>



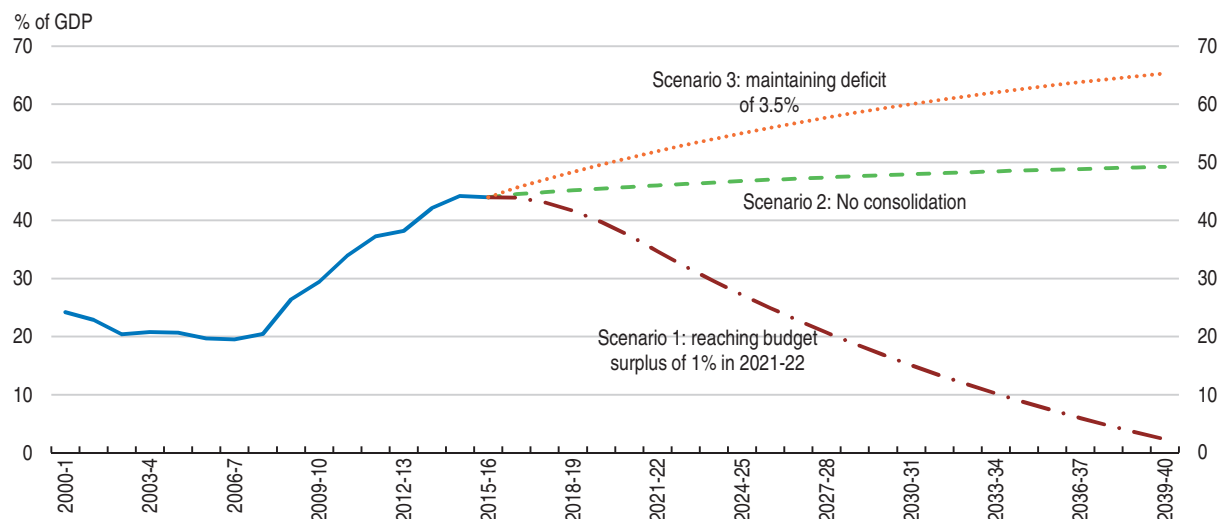
1. "Underlying cash balance", which equals receipts less payments, less net Future Fund earnings.

Source: Government of Australia, Budget papers.

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Slow progress in reducing the federal deficit reflects the tendency for federal budget outcomes to fall short of targets. This is despite active measures and consolidation due to bracket creep. Personal income tax thresholds are not automatically indexed in Australia; which provides leeway for discretionary adjustment of the tax schedule as part of structural reforms. Discretion on threshold updating may also serve, at times questionably, to help resolve budget imbalances. The weak pace of consolidation in large part reflects disappointing nominal GDP growth. Also, some policy initiatives have involved sizeable multi-year spending commitments, including a lift in the base-rate of the pension and

Figure 20. **Under the government's operational goal the debt-to-GDP ratio will be put on a downward track**



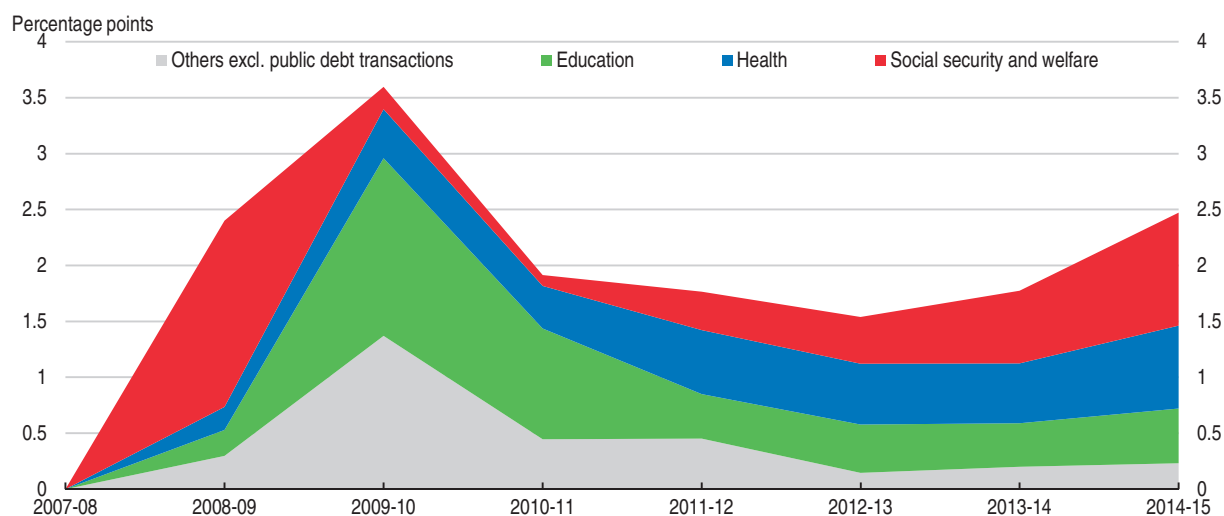
Note: These debt projections use a simple model that uses various deficit trajectories and projection of GDP growth to calculate debt-to-GDP ratios looking forward. The model does not explicitly incorporate the channels of interaction between deficit profiles and GDP, nor structural influences on deficit developments and GDP growth, such as the impact of population ageing.  
Source: OECD calculations based on OECD Analytical Database and Government of Australia.

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increased commitments on hospitals and schools funding. Such commitments have meant spending as a share of GDP has remained above pre-crisis levels (Figure 21). Over the next few years, spending commitments will be boosted by the ongoing implementation of a reform of support systems for the disabled (the National Disability Insurance Scheme, NDIS, see below) and higher defence spending.

Figure 21. **Increases in public spending compared with pre-crisis levels**

Additional general government expenses by purpose as a share of GDP, relative to the levels of 2007-8



Source: ABS (2016), 5512.0 – Government Finance Statistics, Australia, 2014-15.

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Australia's fiscal position is strong and the current fiscal stance is appropriate given the outlook. According to a recent cross-country study (Fall and Fournier, 2015), debt could begin reducing output growth between 70-90% of GDP. This implies Australia, with gross debt at 44%, still has a significant margin to absorb shocks and actively stimulate growth. Indeed, the government could run a substantially larger deficit for some time without coming close to the limits suggested above (Figure 20). In this context, should the downside risks materialise, the authorities should actively use fiscal policy to support the economy, as they did in 2008-09. The more financial and global the shock, and the closer monetary policy is to the zero-lower bound, the stronger the case for using fiscal policy, particularly if the exchange-rate does not respond. Though fiscal stimulus would delay the return to a balanced budget and raise public debt, it would be unlikely to jeopardise fiscal sustainability or generate financial market turmoil. Moreover, it would take some pressure off expansionary monetary policy and thereby reduce the risk of financial market distortions. Automatic stabilisers should be allowed to operate. Additional stimulus, if required, should look as far as possible to investments that can be quickly dispersed and also lift aggregate supply and growth potential.

The ramping up of spending commitments during the commodity boom suggests that medium-term fiscal discipline could benefit from a spending ceiling or a longer-term debt anchor (as suggested in recent IMF analysis). This could help guide the use of fiscal space and provide a guard against Australia's longstanding vulnerability to excessive fiscal expansion during commodity booms. An alternative, or additional, approach would be to institute federal- and state-level stabilisation funds (or make greater use of existing funds, such as the Future Fund), as recommended in previous Surveys (see Table 5, below), and following the approach of some other commodity producers (such as Alberta (Canada), Chile, and Norway).

**Table 5. Past OECD recommendations on maintaining fiscal prudence and ensuring efficient tax and public spending**

Topic and summary of recommendations	Summary of action taken since 2014 <i>Survey</i>
Strengthen mechanism that aid fiscal discipline	
Prioritise medium-term fiscal consolidation to rebuild fiscal buffers in light of Australia's exposure to external risk. Consider establishing a stabilisation fund	Federal budget consolidation remains ambitious, deficit outcomes have fallen short of goals. No progress has been made in widening the use of stabilisation funds
Tax reform	
Rebalance the tax mix; shift away from income and transaction taxes Make greater use of efficient tax bases such as the Goods and Services Tax and land tax	Tax measures in the 2016-17 budget envisage further reduction in the rate of corporate tax and further measures to combat base erosion and profit shifting in corporate taxation (see Table 6). The Government has added GST to the online purchase of digital products and service and is introducing legislation to add GST to low-value imported goods. As regards making greater use of land tax (and less use of inefficient taxes), so far only one jurisdiction, Australian Capital Territory, has embarked on a major reform. The reform is increasing land taxes, reducing transfer duties on conveyances and abolishing insurance taxes
Improving the federal-state system	
Reform state financing: reduce grant conditionality further, instigate state-level tax reforms to enhance funding autonomy Address federal-state responsibilities: improve co-ordination and co-operation and in health care in particular, consider a reallocation of responsibilities	No major initiative

### Improving the tax system

Taxation has been receiving welcome policy attention. The tax mix remains tilted towards direct taxes, especially on corporates, that can hurt growth. Measures addressing this issue form part of the tax reforms that are a central theme of the current government's economic policy. Detailed measures were outlined in the 2016-17 Budget proposals (Table 6), the elements of most structural significance are:

- Corporate income tax rate cuts (as part of the “Ten Year Enterprise Tax Plan”), initially for small businesses with eventual extension to all businesses. Australia's standard rate of corporate tax is 30%, which is high in international comparison. Proposals also include an increased tax discount for unincorporated small business.
- Further measures to combat corporate tax avoidance, including the establishment of a tax avoidance taskforce.
- A superannuation reform package, comprising reduced tax concessions for high-income earners and more generous tax treatment for low income earners.

However, the tax system could be improved in some respects:

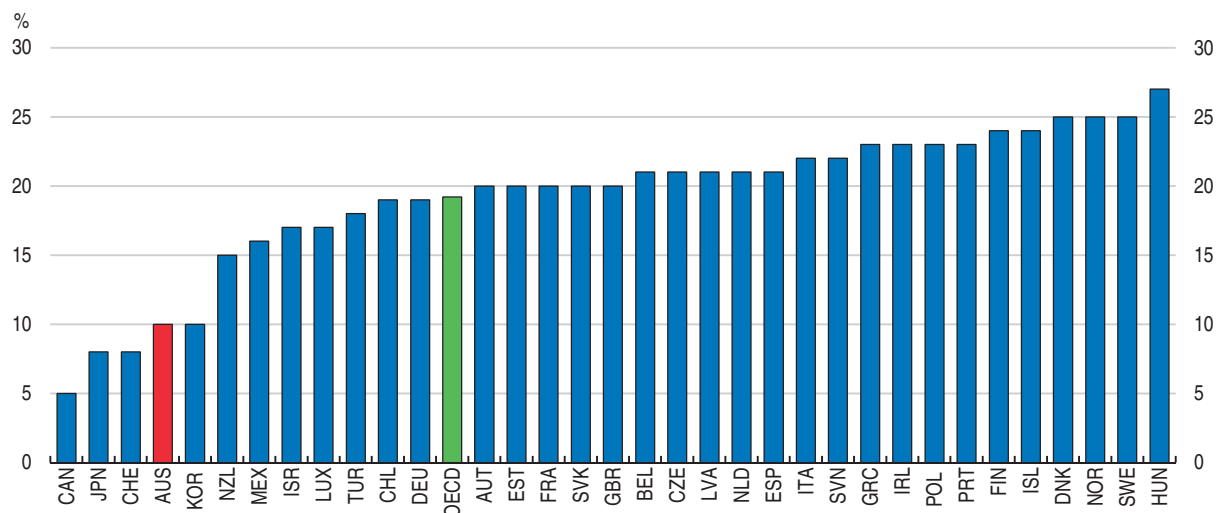
- There has been no progress on a major tax reform that makes greater use of value added tax (the Goods and Services Tax, GST) and little progress in land-tax reform, both moves long recommended in OECD Surveys and discussed widely in Australia (Figure 22). As GST revenues are currently passed to the states, such reform would require some reshaping of federal-state financial arrangements. To the extent the Australian GST is less progressive compared to the personal-income taxes, reform would also need to address poverty and income distribution issues, perhaps by adjusting welfare policies.

**Table 6. Selected tax measures proposed in the 2016-17 Budget**


“Ten-year Enterprise Tax Plan”	Key details
Corporate income tax rate cuts led by further cuts for small business	The overall goal is reduction of the corporate tax rate (currently 30% for large business and 28.5% for small business) to 25% over 10 years. The process will include further cuts in the concessionary rate for small-businesses along with progressive increases in the cut-off threshold for eligibility to the concessionary rate, until it applies to all businesses
Increased Tax Discount for small business	For unincorporated small businesses eligibility for the tax discount will be expanded to those businesses with turnover less than AUD 5 million (compared to AUD 2 million currently) and increased to 8% (compared to 5% currently) for the 2016-17 income year. The discount will increase over time, in line with reductions in the corporate tax rate, from 8% to 16% 2026-27
“Tax integrity” measures	
Superannuation Reform Package	<p>Legislation to implement a suite of reforms to better target the superannuation tax concessions, and improve the flexibility and integrity of the superannuation system has passed parliament. This includes:</p> <ul style="list-style-type: none"> <li>• Caps on transfers into the retirement phase of the superannuation system under concessional tax arrangements</li> <li>• Lower ceilings on tax concessions in the contribution phase</li> <li>• Introduction of a new tax offset in pensions (the Low Income Superannuation Tax Offset)</li> <li>• Tax deductions for personal superannuation contributions</li> </ul>
Corporate tax integrity measures	<ul style="list-style-type: none"> <li>• Establishment of a tax avoidance taskforce</li> <li>• Introduction of a diverted profits tax</li> <li>• Amending Australia's transfer pricing rules to give effect to the OECD's transfer pricing recommendations</li> <li>• Stronger protection for tax whistle-blowers</li> <li>• Further measures to close loopholes in tax arrangements under the consolidation regime</li> <li>• Implementation of the OECD's hybrid mismatch rules to reduce multinationals' exploitation of differences in tax treatment across jurisdictions</li> </ul>

Figure 22. **The standard rate of Goods and Services Tax is low in international comparison**

Standard rates of Value Added Tax/Goods and Services Tax, 2016



Source: OECD Tax Database.

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- State level taxation still involves a number of inefficiencies and distortions, particularly heavy use of transactions taxes in real estate (greater use of recurrent taxes on residential property would be preferable), substantial exemptions in payroll taxes and a multitude of small-scale charges and fees. Replacing these inefficient taxes with a higher GST and greater use of land tax, for example, would improve economic performance. In Australian Capital Territory a substantial shift away from inefficient taxes towards land tax is underway but progress in other jurisdictions is limited (see Table 5 and Annex).

### **Efficiency enhancing reforms in public expenditure**

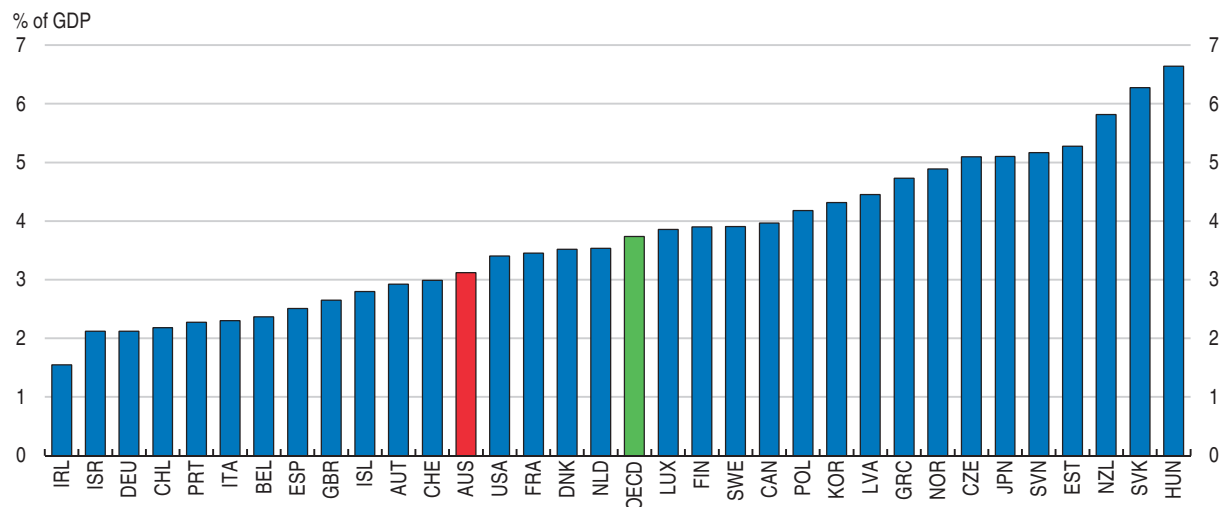
Continued efforts to innovate economies and to find efficiency gains in public spending could strengthen public finances, raise the quality of public services and increase the effectiveness of welfare and transfer payments. Government spending should, in addition, be redirected towards additional public investments with substantial long-term returns, particularly economic infrastructure that is partnered with the private-sector (Figure 23). To ensure long-term returns, cost-benefit analysis should play a prominent role in project selection.

As detailed in Chapter 1 of this Survey, alterations to the public procurement system are planned that widen the field of prospective bidders to bring more innovative solutions to public service provision. Additional steps could, for instance, include further shifts to outcome rather than output criteria, thus providing greater leeway on how services are delivered. Further development of digital government services could also help. In addition, making public data more widely available for commercial and research use could support more general research and development.

Support for small and medium enterprises (SMEs) should also be scrutinised (Chapter 1). Australia has around 340 innovation-related schemes, most aimed at SMEs. Strong review and reform mechanisms are important, as is making firms aware of the available support. Size-based policies, by definition, involve cut-off points that can

Figure 23. **Australia's government investment is below the OECD average**

Government investment as a share of GDP, 2015 or latest



Source: OECD (2016), OECD Analytical Database; OECD (2016), OECD Government at a Glance (database).

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dissuade firms from transitioning to larger scales of operation. With the current government adding more size-based support (in tax as well as subsidies), the risk of distortions and inefficiencies may become substantial. In addition, Australia has a track record of prolonged subsidies for “sunset” industries or for new production facilities in economically deprived areas. The termination of subsidies on car production plants in Australia removed one of the most prominent and longstanding examples. However, the authorities continue to resort to industry subsidy.

### Encouraging business productivity and innovation through framework conditions

Progress in structural reform in recent decades has significantly improved policy settings for the business environment on many fronts. However, as other countries have been improving their settings, Australia's advantage has been eroded (Figure 24). This Survey's in-depth chapters highlight the importance of more intensive generation and adoption of innovation for future productivity growth, issues which are also prominent in the government's *National Innovation and Science Agenda* (NISA, see Box 4). The *Agenda* endeavours to make a number of incremental changes which, together, can make a significant change.

#### Improving framework conditions to boost innovative capacity

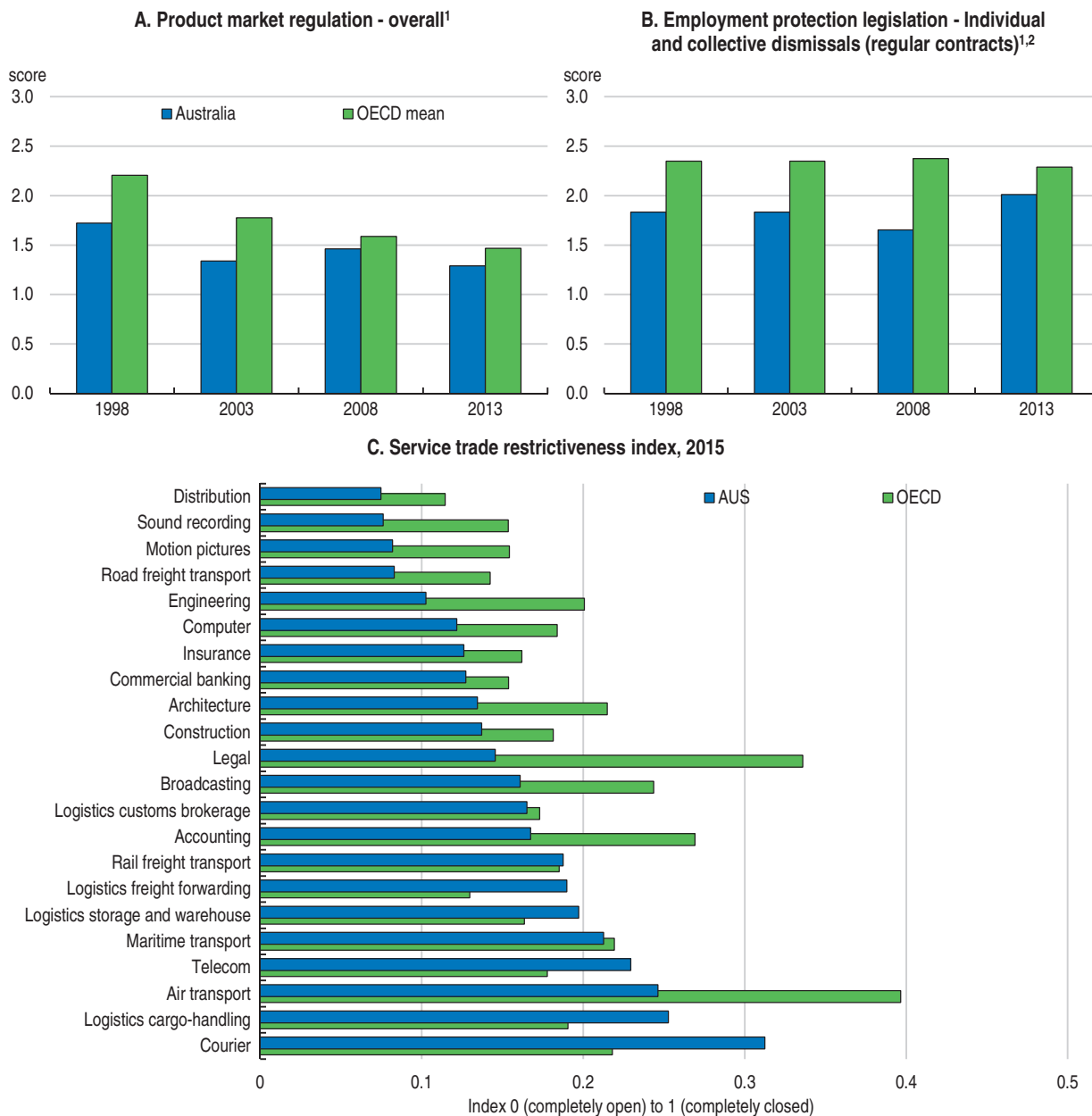
Rapid and widespread assimilation of advances in the global frontiers of know-how and technologies are key to sustaining high productivity. This process can be substantially bolstered by efficient resource allocation and competitive markets as this boosts the number of businesses operating at, or close to, these frontiers. Chapter 1 underscores the importance of the following:

- Continued follow up on the Competition Policy Review (the “Harper Review”, Australian Government, 2015b).



**Figure 24. Australia's advantage in lighter regulations has been eroded**

OECD indicators on product market regulation, employment protection legislation and service trade restrictiveness index



1. Scores potentially range from zero to 6 and increase with restrictiveness.

2. Weighted sum of sub-indicators concerning the regulations for individual dismissals (weight of 5/7) and additional provisions for collective dismissals (2/7).

Source: OECD (2015), "Economy-wide regulation", OECD Product Market Regulation Statistics (database); OECD/IAB, Employment Protection Database, 2013 update; OECD (2015), Services Trade Restrictiveness Index.

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- Reducing barriers to labour mobility. Large distances between major urban centres make labour mobility more costly and aggravate skill mismatch. Further reduction in labour-market frictions generated by interstate differences in education and vocational qualifications would help, as would measures that assist household mobility. Reduced skill mismatch can also improve job opportunities and reducing unemployment; a "win-win" measure in inclusiveness and productivity.

#### Box 4. The National Science and Innovation Agenda

The *National Innovation and Science Agenda* (NISA) was announced on the 7th of December, 2015. The Agenda is built on four pillars:

- *Culture and capital*: focuses on rewarding entrepreneurialism and supporting innovative start-ups by improving the availability of finance. Initiatives include tax treatments to encourage small businesses to take risks and innovate. Working in partnership with the private sector, the government has established the CSIRO Innovation Fund and the Biomedical Translation Fund to back high potential ideas.
- *Collaboration*: seeks to incentivise greater collaboration through changes to university funding formulas, providing investment in research infrastructure and an introduction of a national impact and engagement assessment framework.
- *Talent and skills*: aims to support young Australians to create and use digital technologies, expanding opportunities for women in the field of Science, Technology, Engineering and Mathematics and encouraging more entrepreneurial and research talent from overseas.
- *Government as an exemplar*: commits the public sector to lead by example in becoming more innovative in how services are delivered and how public data should be shared. Also part of this, the government has established Innovation and Science Australia as an independent advisory board responsible for researching planning and advising the Government on all science, research, and innovation matters.

The authorities have implemented, or are on track to implement, all measures in the first wave of NISA. Also, the second and third waves of NISA have been outlined, which will focus on new ways of attracting private sector investment and infrastructure for science and simplify the way businesses interact with government by removing unnecessary regulatory measures.

More information can be found at <http://innovation.gov.au>.

- Encouraging a positive process of “creative destruction” through firm entry and exit, as this keeps more businesses closer to knowledge frontiers. Past reforms have reduced the regulatory burdens for establishing a business. Regarding firm exit, proposals to lighten insolvency regulation as part of the NISA reform are encouraging. Barriers to firm growth may also be an issue; SME support policies can inadvertently create disincentives to growth beyond a certain size, for instance.
- Working towards intellectual property (IP) arrangements that provide incentives to innovate and allow access to knowledge and technology. As Australia both creates intellectual property and is a net importer of innovation, interest lies in balanced protection of intellectual property policy. Meanwhile attention should be paid to the efficiency of domestic IP arrangements (a special regime for SMEs has not proven very effective, for instance).

#### **Expanding access to low-cost, high-speed information and communication technology (ICT)**

Widespread access to low cost, high-quality mobile telephony and broadband internet is important for the development and diffusion of many of today’s innovations and for narrowing the digital divides within society. As in many other countries, a multiple-operator system has been operating for some time, but nevertheless requires continued attention by

regulators to keep up to speed with technological and market developments. Australia faces particular challenges in extending provision to rural and remote areas. While expensive, ensuring good ICT access in these areas, potentially brings wide benefits including improvements in public health, social engagement and education. In fixed-line technology, the wholesaler (National Broadband Network) needs to address concerns that it is not lowering its prices sufficiently quickly as the market develops. In mobile telephony, stronger encouragement of new entrants to retail markets, for instance via policy on the sale of mobile spectrum, would be welcome. Australia currently has only three mobile telephony operators and there is a growing view among international experts that the presence of a fourth operator raises competition significantly (OECD, 2014b). Allowing mobile operators access to the towers being installed for broadband in rural areas would be one practical step to improve choice and make the mobile market more attractive for new entrants.

### ***The regulatory response to disruptors has so far been broadly positive***

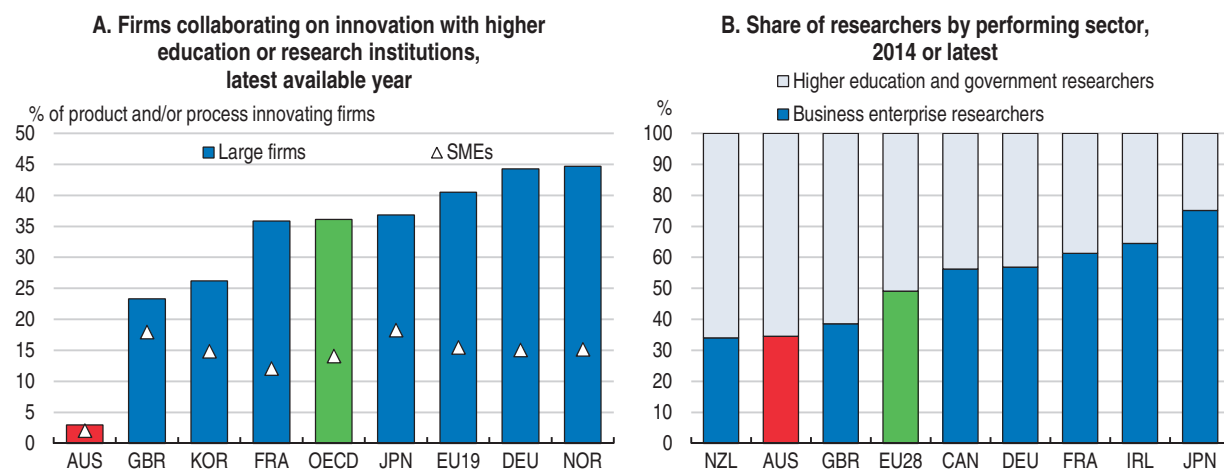
Echoing global developments, Australia is experiencing a surge in “disruptive” innovations, particularly business-model innovations based on internet platforms. So far the authorities’ response has been broadly positive, endeavouring to reshape regulation to accommodate new players while ensuring neutrality of treatment. State-level governments are establishing “cohabitation” arrangements between ride-sharing and taxi services. However, ideally the regulation ought eventually to converge to a common framework both ride-sharing and taxi services. Local governments’ regulatory response to new accommodation services via companies such as Airbnb has varied widely. As experience deepens with issues such as anti-social behaviour by short-term renters, efforts should be made to identify the most effective regulatory approaches and encourage convergence to them. More generally, barriers to disruption in general framework conditions should be addressed. In particular, competition policy should counter undesirable defence strategies by incumbents. Where tax issues arise from disruption, fair treatment should be sought for incoming enterprises firm and incumbents. The considerations are not always straightforward, as illustrated in the different tax position of those renting out short-term accommodation and hoteliers.

## **Encouraging productivity and innovation through R&D policy**

### ***Strengthening collaboration between business and the research sector***

Collaborative research is an important channel for the commercialisation of publicly funded research and knowledge transfer, helping to ensure public returns to support for domestic research. Australia performs poorly on this front (Figure 25). This reflects little priority to collaboration in performance metrics of academics; weak mobility between research and business sectors (including industry placement programmes); and issues in university management of IP. Australia could learn further from international examples of research hubs, such as the Waterloo “triangle” of education, research and innovation in Canada (OECD, 2016a).

Reforms underway, mainly as a part of NISA, attempt to address these issues. A new simplified funding system for university research began operating in early 2017, in which federal block grants for research are determined solely by income from two categories, competitive grants and other sources (including business); these two categories are now given equal weight. One consequence of the reform is that publications will no longer feature in the funding formula (Watt, 2015). The change is intended to increase

Figure 25. **Collaborative research is limited**

Source: OECD (2015), OECD Science, Technology and Industry Scoreboard 2015; OECD (2016), Main Science and Technology Indicators: Volume 2015/2.

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universities' incentives to collaborate. The reform also aims to make government competitive grants to universities more responsive to applicants' needs. Notably, it moves the Australian Research Council Linkage Projects to a continuous application and assessment process, rather than one round per year, and introduces a fast-track decision-making process (Australian Government, 2015, 2016). Moreover, additional steps are envisaged towards making IP arrangements more effective. These include changes in the funding arrangements for universities from 2017, requiring universities to list their patents generated by publicly funded research on a central information platform (Source IP) and to use simplified contracting arrangements, if requested by collaborative partners.

Regular assessment of funding programmes can help ensure that increased collaboration on research does not come at the expense of quality. The government should also proceed with the development of the new "impact assessment" framework, which facilitates assessment of university research performance in terms of non-academic impact and "engagement" with end-users of research. This will complement the national evaluation framework for the quality of university research. Overall, these reforms go in the right direction in helping create a more collaborative culture between researchers and business and help Australia better translate research knowledge into commercial outcomes. However, there is still scope for improvement, in particular:

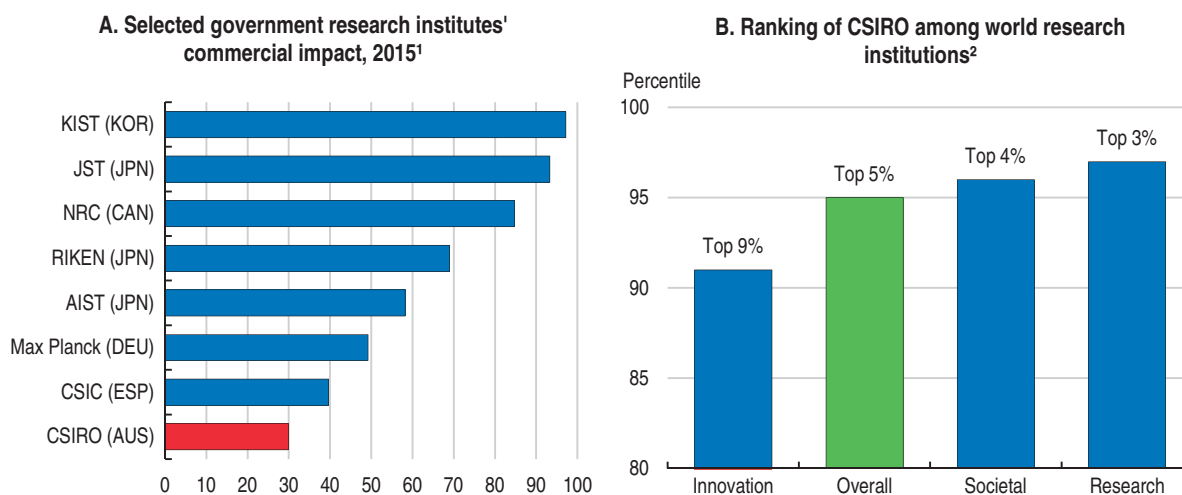
- Estimates suggest that only 13% of the firms registered under the R&D Tax Incentive (discussed below) are involved in business-focussed collaboration programmes funded by the government (Watt, 2015). Take-up could be increased by implementing simple and flexible governance arrangements, which would reduce unnecessary delays in the negotiation and formalisation of agreements for collaborative research. Greater stability in the menu of programmes and closer monitoring of outcomes would also support higher take-up.
- More effective management of IP created by the universities through the further development and wider use of simplified IP contracts is critical for knowledge exchange and collaboration on the exploitation of IP.

- The mobility between research and business sectors is low (Figure 25). There is room to increase the scope and scale of industry placement programmes for higher degree research students through the introduction of a nationally consistent approach, as recommended by a recent review by the Australian Council of Learned Academies (McGagh, 2016). Plans to revise appointments and promotions in universities, in particular so that individuals who spent time in business are not disadvantaged in the selection processes go in the right direction.

### **Achieving greater commercial impact from research in public research institutions**

The leading public-sector research agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), performs well in many respects, but lags behind in terms of commercial impact according to some measures (Figure 26). CSIRO has moved to a more comprehensive and consistent impact evaluation approach in recent years, which is welcome. However, impact evaluations conducted so far have been retrospective. Progress is also required for future impact planning. This is particularly important in view of the larger focus given, compared to the past, on the commercial outcomes under CSIRO's new long-term strategy (CSIRO 2015; The Senate, 2015). It is important that planning and evaluation processes assess the wider impact of commercialisation, including the effect on research excellence and the societal impact.

Figure 26. **Commercial impact could be strengthened**



1. "Commercial impact" is an indicator of how often basic research originating at an Institution has influenced commercial R&D activity, as measured by academic papers cited in patent filings. The selection of institutes is based on comparable annual budget size.
2. "Innovation" measure consists of innovative knowledge (scientific publication output from CSIRO cited in patents) and technological impact (percentage of the scientific publication output cited in patents). "Societal" measure consists of web size and domain's inbound links. "Research" measure consists of output, collaboration, research excellence, leadership and talent pool.

Source: Reuters (2016), Top 25 Global Innovators – Government; Scimago Lab (2016), Scimago Institutions Rankings.

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A new fund (the *CSIRO Innovation Fund*), announced as part of NISA, was launched at end-2016 by the government to support co-investment in new spin-off and start-up companies created by CSIRO and other research institutions and universities (Australian Government, 2015a). This is a positive initiative in view of the critical role of capital for start-ups. It should also foster greater research-industry collaboration. Investments to be made by the *CSIRO Innovation Fund* however need to favour projects with large commercialisation and

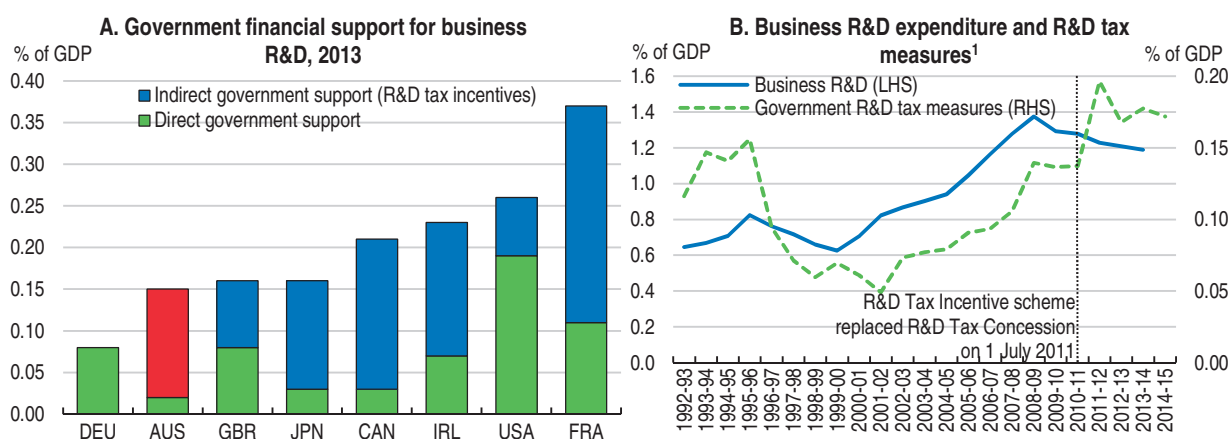
productivity-enhancing potential. The government is also transitioning to a common approach for assessing the outcomes and impacts of funded research. This should increase the effectiveness and efficiency of the public-sector research agencies.

### **Fine-tuning the R&D Tax Incentive**

Analysis of the R&D Tax Incentive (Incentive) in Chapter 2 of this Survey uncovers the challenges in achieving good returns to this form of support. Australia relies heavily on tax incentives, as distinct from grants (Figure 27). Since the introduction of the Incentive in 2011 (which replaced another scheme), participation has increased rapidly, with fiscal costs exceeding forecasts (Australian Government, 2016c). Business R&D intensity data have not so far echoed this development, possibly because of other influences, especially the end of the mining boom. This trend has to be watched, however. The government has initiated a welcome review of the Incentive, with a first assessment (Ferris et al., 2016) circulated for public consultation. This review sensibly proposes fine-tuning the system rather than wholesale change. Areas for improvement include:

- Evidence suggests that only around 10-20% of the total R&D registered under the Incentive is additional (Australian Government, 2016c). Ferris et al. (2016) conclude that the Incentive “falls short of its stated objectives of additionality and spillovers”. Measuring and strengthening additionality is difficult and can increase complexity, and compliance and administrative costs. One reform option, suggested by Ferris et al., is the introduction of an intensity threshold (i.e. a minimum amount of R&D expenditure as a proportion of business expenses for eligibility to the Incentive) for recipients of the non-refundable component of the Incentive (larger firms), complemented by an increase in the existing expenditure threshold. Comprehensive analyses are required to assess additionality, as well as the trade-off between increasing additionality and complexity (Appelt et al., 2016).
- The efficiency and effectiveness of the Incentive hinge on careful monitoring of integrity risks and the introduction, if necessary, of tighter, well-targeted compliance measures.

Figure 27. **Tax support plays an important role in R&D policy and the cost is rising rapidly**



1. 2011-12 was a transitional year in which some firms accessed the R&D Tax Concession while others accessed the R&D Tax Incentive. Source: Australian Department of Industry, Innovation and Science (2016), The Australian Government's 2016-17 Science, Research and Innovation Budget Tables; OECD (2015), OECD Science, Technology and Industry Scoreboard 2015.



- The Incentive's eligibility criteria are principle-based rather than highly specific. This approach can adapt to changes in the nature of R&D activity, but can also be open to misinterpretation, highlighting the need for clear and consistent interpretation of the eligibility criteria by the authorities. The recent review of the Incentive recommends the development of new guidance (including plain-language summaries and case studies) to increase clarity about the scope of eligible activities and expenses (Ferris et al., 2016).
- The upward risks to the Incentive's costs could be further managed by strengthening provisions for the existing expenditure threshold, so that it also applies to "connected entities", and/or by introducing additional caps (BDO, 2016). For instance, a cap on the refundable tax credit could be considered, while assessing carefully its potential trade-off with additionality.
- Compliance costs could be reduced by adopting a single application process for accessing the R&D tax credit. Currently, companies first register the R&D activities and then make the claim for tax return.
- Industry-research collaboration could be encouraged more, perhaps through an R&D tax premium or by adding criteria relating to collaboration in the current programme.

### ***Improving the governance framework for innovation policy***

Australia's science, research and innovation system is complex, with the involvement of several federal government departments and numerous councils, committees and boards. State governments are also involved in policy development and programme design. Federal government investment in research and innovation is spread across 15 portfolios, with their own research and innovation programmes and multiple agencies delivering such programmes (Cutler, 2008). In a welcome step, a new independent board, *Innovation and Science Australia* (ISA), was established in 2016 to provide "strategic, whole-of-government advice on all science, research and innovation matters" (Australian Government, 2015a). ISA could also promote collaboration, as it will be working directly with the industry and community sectors. Its achievements in delivering such outcomes should be closely monitored and evaluated; greater coordination should not come at the expense of the diversity of innovation activities, which would constrain the responsiveness of the innovation system to evolving needs. Some consolidation of the numerous (around 150) small research funding programmes and agreements would also help focus innovation policy.

### ***Strengthening the monitoring and evaluation of innovation programmes***

High quality evaluation and performance measurement of innovation programmes is important for efficient and effective policy, facilitating adjustment in the menu of measures towards better outcomes. Good practice principles underscore that evaluations should be based on independent and transparent assessment; their findings are made public; and that they are accompanied by effective mechanisms for policy learning to ensure that the findings of evaluation are guiding future decision-making (OECD, 2015). The system should incorporate both *ex-post* and *ex-ante* evaluations (Appelt et al., 2016; OECD, 2014c).

There have been some welcome initiatives, including the *Evaluation Strategy for 2015-19* of the Department of Industry, Innovation and Science, which provides a framework to guide evaluation and performance measurement (Australian Government, 2015c). The strategy incorporates evaluation across a programme's lifecycle and envisages both prospective and retrospective evaluations. A core goal of the framework is to improve the data available to assess the impacts and outcomes of all programmes.

Table 7. **Past OECD recommendations on framework conditions for business**

Topic and summary of recommendations	Summary of action taken since 2014 Survey
Promote competitive markets and cut red tape	
Concentrate on broad support for business: prioritise corporate tax rate cuts, reduce regulatory burdens and tax avoidance	Further corporate tax cuts are underway. The campaign to reduce regulatory burdens continues
Improve infrastructure investment	
Ensure robust and transparent cost-benefit analysis Simplify infrastructure investment processes Improve public-private partnership processes	Infrastructure Australia has been enhanced through online publication of project assessments and new governance arrangements. It has also published a new audit and infrastructure planning documentation and maintenance of an infrastructure priority list New national guidelines on transport assessment and planning have been issued An infrastructure financing unit to develop financing solutions has been announced
Work towards better transport	
Simplify and harmonise road and rail regulation across states Bring in a road-freight pricing scheme Consider reforming arrangements for managing and funding road infrastructure	Reforms of heavy vehicles are underway including consideration of regulation and charging of heavy vehicles and road administration and funding
Improve energy-sector efficiency	
Harmonise interstate regulation Continue privatisation Remove ceilings on retail electricity prices Bring in smart meters	Energy-sector-efficiency reforms are underway, entailing the harmonisation of regulatory frameworks, privatisation; strengthening of competition in retail electricity prices; and, the introduction of demand side initiatives such as the roll out of smart meters

## Addressing inequality, enhancing inclusiveness and deepening skills

### ***Innovation policy can play an important role in tackling social issues***

Innovation policy in Australia already incorporates considerations of the “wider good” by backing research with potential for significant social return, such as research in many areas of health care and innovations in education. Additional measures could be taken, for instance re-evaluation of innovation support programmes and greater recognition of low-tech or low-cost innovation that bolsters inclusivity. Incorporating innovation-based schemes in the support system for Australia’s indigenous communities may yield particularly significant returns, given the very wide socioeconomic gaps with the rest of the population. In addition, ensuring that policy measures regarding broadband and mobile services improve services in areas with indigenous communities in particular would lessen disadvantage arising from digital divides. This would also open more avenues for ICT-based support, for instance in online education and training.

### ***Some progress in welfare policy is being made***

As emphasised in previous Surveys, the overall architecture of Australia’s welfare system is sound. The fiscal demands of the welfare system are comparatively light, which helps keep tax wedges on labour low, supporting employment and competitiveness. The strong emphasis on encouraging transition from welfare to work incentives and activation schemes (run through the Australian Government funded network of private employment service providers) helps limit the number of non-working households dependent on transfers (OECD, 2014a). A renewed emphasis on programmes of support for indigenous job seekers should be a focus to address the gap in employment participation by indigenous and non-indigenous Australians.



Progress is being made on a number of fronts in welfare policy (Table 8). A plan for significant increase in paid parental leave was re-evaluated. Also, as recommended in the previous *Survey*, the government has prioritised child care by announcing a new child care package. In addition, a new programme will offer unemployed youth intensive pre-employment training and short internships (4 to 12 weeks), providing wage subsidies for employers. Moreover, the government will cease the carbon tax compensation for the new recipients of welfare benefits, given the abolition of this tax in 2014, and direct the freed-up resources to the National Disability Insurance Scheme (NDIS). Consideration should be given to also end the compensation for existing welfare recipients. The government will further review over the next 3 years around 90 000 (out of a total more than 800 000) Disability Support Pension (DSP) recipients to assess their capacity to work, with a third of the reviews to include a medical assessment (Australian Government, 2016a). The focus on beneficiaries with a high risk of ineligibility for DSP payments is welcome.

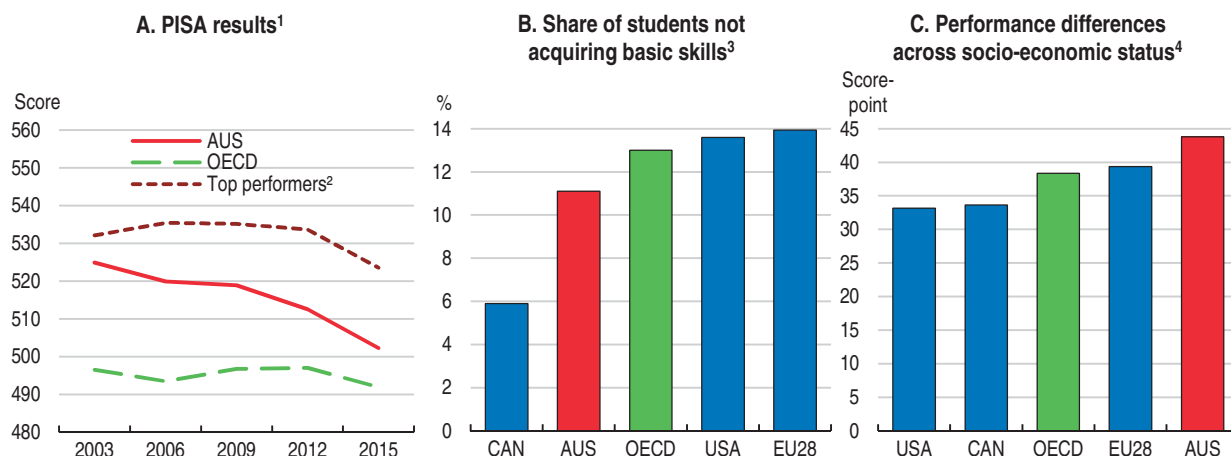
In addition, a new “investment approach” to long-term welfare dependency has begun, illustrating an openness to innovative solutions by the government. Welfare data have been used to identify three groups at risk: young parents, young carers, and young students. Targeted measures will be used to support these groups to transition to employment. Actuarial evaluations will be used to evaluate the effectiveness of interventions and to determine whether an intervention should be scaled up, continued or concluded.

As welfare spending represents a significant share of outlays, particularly at the federal level, it is frequently a target for budgetary measures. While efforts to seek efficiency gains are welcome, the authorities should avoid measures, such as freezes on indexing welfare payouts, so as not to compromise inclusiveness.

### **General improvement in Australia’s education system continues**

Education indicators point to an above-average, though not top-ranking, performance. Australian 15 year-olds perform comparatively well in the OECD’s PISA tests of reading, mathematics and scientific proficiency and the share of students lacking basic skills is well below that in many other advanced countries (Figure 28). However, performance in PISA tests has declined and differences by socioeconomic background are large (Figure 28). The 2016-17 budget devotes additional funding (of around AUD 1.2 billion between 2018 and 2020) to schools, which is needs-based and contingent on reform to improve student outcomes, including through improving literacy and numeracy, and teaching quality (Australian Government, 2016a). Additional needs-based funding is provided for students with a disability. Early childhood education and training is being boosted through the implementation of in the *Jobs for Families* initiative, which, for instance, is piloting schemes for families where accessing mainstream childcare is not practicable.

In higher education, subsidised student loans (repayment of the loans is income contingent) have been available (since 2009) for courses providing vocational educational and training qualifications; the loans were previously only available for bachelor-level degrees (OECD, 2014a). In principle, this measure has given a welcome boost to vocational education and training, which helps provide skills to innovative sectors. However, in recent years significant problems with the fee system (VET FEE-HELP) have emerged. In particular, inadequate checks on the quality of providers have prompted the emergence of operators selling poor quality courses to students.

Figure 28. **Australia is falling behind leading countries in PISA results**

1. Average of reading, mathematics and science. Science scores are available from 2006.

2. Average of Canada, Finland, Japan and Korea.

3. Share of low achievers (below Level 2) in all three subjects (science, reading and mathematics).

4. Score-point difference in science associated with one-unit increase on the PISA index of economic, social and cultural status.

Source: OECD, PISA 2015 Database; OECD (2016), PISA 2015 Results (Volume I): Excellence and Equity in Education.

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Table 8. **Past OECD recommendations on employment, health and welfare**

Topic and summary of recommendations	Summary of action taken since 2014 <i>Survey</i>
Encourage employment	
Improve early childhood education and care (ECEC) to help parents combine work and family life	Additional support for child care has been announced
Improve benefit settings to encourage employment in particular in the disability support system	A new Disability Employment Services model has been designed with implementation intended for 2018
Improve employment services: strengthen funding-performance links, stream claimants more	A new employment services program ( <i>Jobactive</i> ) is operating that aims to help job seekers to find and keep a job
Maintain labour-market flexibility and address supply constraints through migration	
Make negotiation requirements more flexible for new business operations	No major initiative, other than in relation to greenfields agreements for new business operations, where the government has made legislative amendments that provide a new optional six month negotiation timeframe when parties cannot reach agreement
Reform sector-specific labour regulation in negotiated agreements	
Health care, disability and disadvantage	
In health, increase preventative care, improve services for the elderly and mentally ill, promote primary care	Initiatives in health-care policy include: <ul style="list-style-type: none"><li>● Trialling a programme ('Health Care Homes') that promotes primary care</li><li>● Increased dementia research and suicide prevention trials</li><li>● More patient choice and consultation for home-care services for the aged</li><li>● Ongoing implementation of disability care and services (the National Disability Insurance Scheme (NDIS))</li></ul>
Disability support pension. Reduce complexity of the disability system, make it more person-centred	
Welfare	
Better target superannuation (pension) tax concessions	Legislation to implement a suite of reforms to better target the superannuation tax concessions, and improve the flexibility and integrity of the superannuation system has passed parliament
Improve services for those with multiple disadvantages	

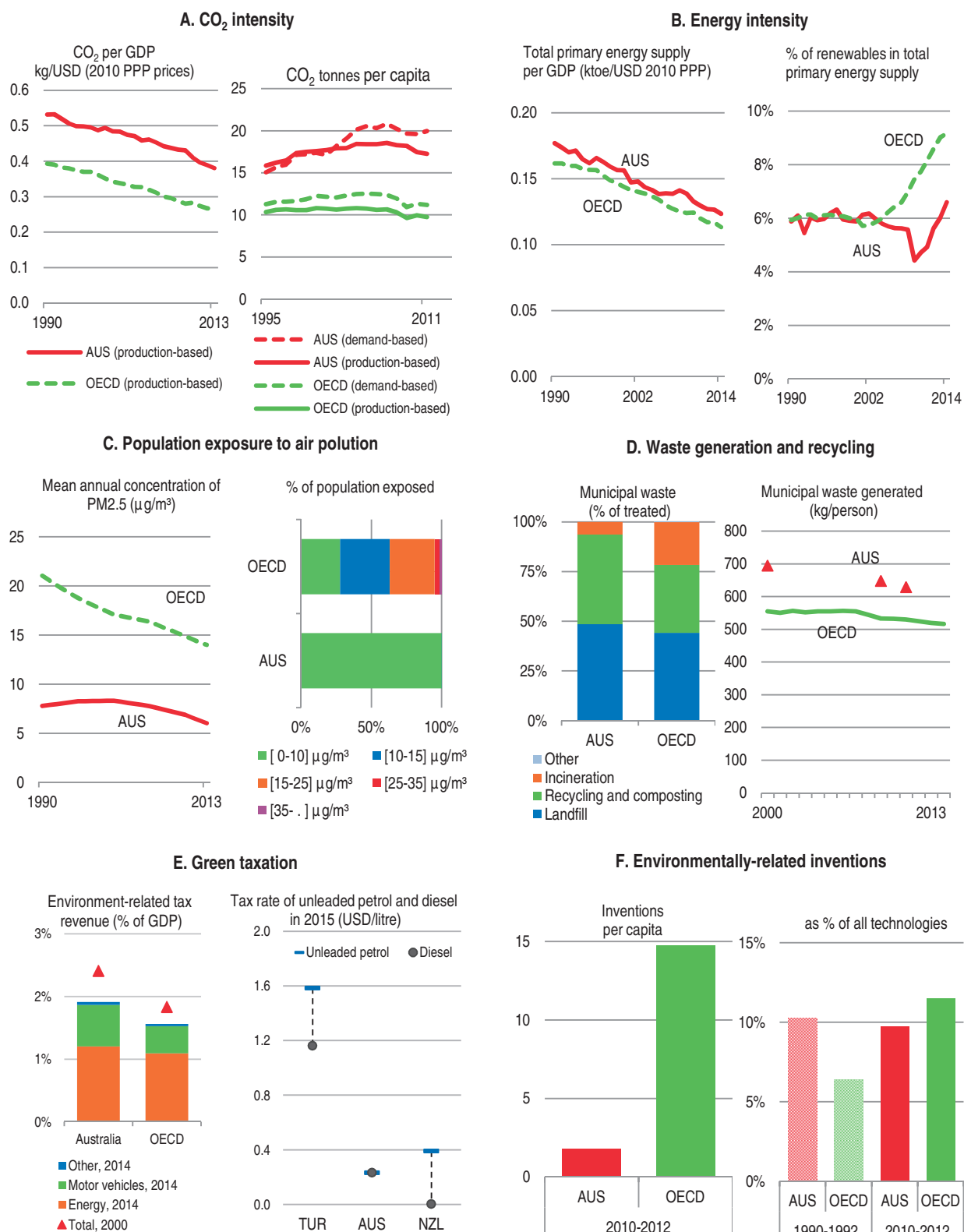
Similar to other OECD countries, Australia's education policy favours science, technology, engineering and maths (STEM) skills on the basis that these are key for productive and innovative sectors. NISA continues this approach with programmes to increase primary and secondary students' interest in ICT, to promote STEM skills (for instance by expanding prizes for science) and to encourage women in science. However this approach downplays the importance of other subjects in providing skills in innovative and productive sectors, such as innovation-related arts disciplines. It also overplays the returns to taking STEM subjects, given the career prospects for tertiary-level graduates in some STEM some sub-categories are not strong. Improving the depth and timeliness of information on employment outcomes across different subjects and across providers would help fine-tune policy and student choices. Innovation-relevant skills and university-business linkages can be boosted through encouraging students to take "entrepreneurship" courses as part of their degrees.

### **Tackling environmental challenges: progress in greenhouse-gas emission policy**

Australia's carbon intensity of production is around one-third greater than the OECD average, and per capita emissions are 50% higher – though in other respects air quality is generally good (Figure 29). These high emissions relate more to the energy mix than to energy intensity, which is somewhat above the OECD average but improving. Renewables, currently mostly from hydroelectric generation, have picked up but still account for only a small share of energy production compared with the OECD average. Australia's new greenhouse-gas (GHG) reduction target, in accordance with the Paris Agreement 2015, includes reducing GHG emissions by 26-28% below 2005 levels by 2030, which according to official estimates translates to an emission level of about 440 million tonnes of CO<sub>2</sub>-equivalent (CO<sub>2</sub>-eq) by 2030 (Australian Government, 2015d; Figure 30).

Greenhouse-gas reduction centres on the Direct Action Plan, which was initiated in 2014 following the repeal of the Emissions Trading Scheme, a carbon-credit and purchase system. Under the centrepiece Emissions Reduction Fund, emitters receive payment for emission reductions, rather than paying to emit. Using a reverse auction, the authorities select emission-reduction projects from a pool of proposals submitted by emitters (such as energy producers). The authorities then contract with emitters to buy the selected projects' emission reductions on delivery. The three auctions conducted up to April 2016 have resulted in a commitment to purchase a total of 143 million tonnes CO<sub>2</sub>-eq with a value of AUD 1.7 billion, implying an average emission-reduction cost of AUD 11.9 per tonne. The government aims for a total commitment of AUD 2.6 billion, which, if the same average price results from the remaining auctions, will represent a commitment to purchase about 210 million tonnes CO<sub>2</sub>-eq.

The Emission Reduction Fund, in principle, can achieve the same emission-reduction outcomes as alternative economic mechanisms, such as a carbon tax or a cap-and-trade system. However, it entails fiscal expense rather than increased revenue. Also, as the Fund focuses on specific emission-reduction projects, rather than total emissions, it does not strongly guarantee achievement of Australia's commitments. To tackle this, a "safeguard mechanism" has been operating since July 2016, as supported by the 2014 Survey (Table 9). The mechanism discourages large industrial facilities from exceeding a historical emission baseline, to counter the risk that emission reductions paid for under the Emission Reduction Fund are "undone" by emissions elsewhere. Should emitters exceed baseline

Figure 29. **Green growth indicators for Australia**

Source: OECD (2016) Green Growth Indicators (database). For detailed metadata, <http://stats.oecd.org/wbos/fileview2.aspx?IDFile=02a134e1-c3ec-4c5c-9a05-4ebb41a60539>.


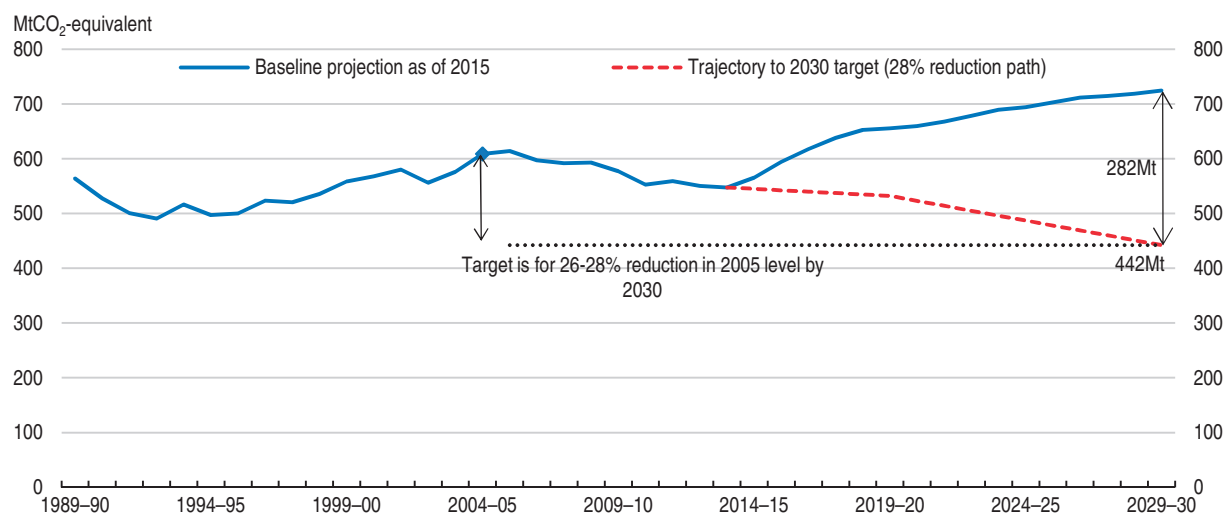
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Figure 30. **Australia's greenhouse-gas emission reduction is now focused on the target for 2030**

Source: Australian Department of the Environment (2015), Australia's emissions projections 2014-15; Energetics (2016), Modelling and analysis of Australia's abatement opportunities; OECD, Greenhouse gas emissions (database).

StatLink  <http://dx.doi.org/10.1787/888933456919>

Table 9. **Past OECD recommendations on environment policy**

Topic and summary of recommendations	Summary of action taken since 2014 <i>Survey</i>
Achieve greenhouse-gas emission targets:	
Ensure the proposed Emission Reduction Fund is efficient through: i) robust measurement and verification methods; and ii) implementation of a safeguard mechanism that prevents offsetting emissions elsewhere in the economy	A safeguard mechanism has been operation since July 2016. Key features include: • Net emission baselines have been set for about 140 large emitters based on the highest emissions from 2009-10 to 2013-14 • A facility struggling to meet its baseline can purchase carbon credits from other facilities
Make transport policy greener	
Enact the proposal to index excise duty on retail fuel, expand other use-based vehicle charges and extend public transport	Indexing of the fuel excise tax to the Consumer Price Index was reintroduced in November 2014 Plans to reform road-user charging, initially for heavy vehicles, are progressing
Continue strong commitment to water reform	
Complete the Murray-Darling Basin Plan	The seven-year implementation phase (which began in 2012) continues

emissions, they can purchase carbon credits from other facilities. The safeguard therefore has an element of a cap-and-trade system and in future it could play a more active role in emission reduction. This may prove an attractive option in the event that emission reductions beyond those brought about by the Direct Action Plan are needed to achieve Australia's commitments. More generally the price of carbon emissions in Australia is low, with large shares of emissions in industry, electricity, agriculture and fisheries are not priced at all. This weakens the incentives to cut carbon in a cost-effective manner (OECD, 2016b).

Changes are underway to reduce grant-based support and increase equity and debt support for green innovation. These involve a new fund, the Clean Energy Innovation Fund, which will make loans or take equity stakes in companies engaged in commercialising emerging technologies. The authorities envisage that this fund will take over much of the role currently played by the Australian Renewable Energy Agency, which provides grants to companies. The Clean Energy Finance Corporation which provides loans for the installation of established clean-energy technologies will continue with its current role. The shift away from grants towards loan and equity support means more fiscal “return” to support but might mean there is less early stage support.

Road-based transport is dominant in Australia and so incorporating environmental considerations in regulation and taxation that relate to vehicle use is particularly important. Inflation indexing on retail-fuel excise has been re-introduced, a welcome move that will end erosion of the real value of fuel taxation and help boost the level of environmental taxation (Figure 29). Room for further improvement in fuel taxation remains. Currently, Australia charges the same excise per litre on diesel and gasoline, which is a superior approach to that of those countries where excise on diesel is less than that on gasoline. However, as argued in an OECD working paper (Harding, 2014), in light of diesel’s additional disadvantages, notably in terms of local air pollution, the optimal excise on diesel ought to be above that for petroleum. As underscored in the 2014 *Survey*, charges for car use rather than car ownership should be the central pillar of policy, and would provide further justification to reform the various state-level taxes relating to car ownership. In a welcome development, the authorities are pressing on with plans to reform road-user charges, beginning with heavy trucks.

Water resources (the subject of in-depth review in the 2008 *Survey*) are a key constraint for agriculture. Drought conditions have, in the past, threatened the supply of water to Sydney, which now has a wind-powered desalination plant as reserve supply (WaterNSW, 2016). Groundwater depletion and salinity are problems in the Murray-Darling basin, the principal river system, but since basin management techniques have been introduced groundwater levels have recovered in some areas since the 1990s (Smerdon et al., 2012).

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