



AUSTRALIA

SELECTED ISSUES

September 2015

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AUSTRALIA

SELECTED ISSUES

August 6, 2015

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**Asia and Pacific
Department**

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ARE AUSTRALIA'S HOUSE PRICES OVERVALUED?

House prices in Australia have increased strongly over the past two decades, including by comparison internationally. Thus house prices are often argued to be overvalued. Many counter-arguments have been put forward for why such measures are flawed. We argue that house prices are moderately stronger than consistent with current economic fundamentals, but less than a comparison to historical or international averages would suggest.

Argument: House prices have risen faster in Australia than in most other countries, suggesting, ceteris paribus, overvaluation

1. Australia's real house prices have risen significantly faster than OECD average over the past two decades. After growing broadly in line with real GDP per capita from 1960-90, Australian real house price inflation picked up sharply in the mid-1990s, exceeding income growth by a wide margin (Figure 1, panel 1). As a result, the house price-to-income ratio rose sharply, despite the terms-of-trade boom that boosted Australian incomes over the past decade, also exceeding the average increase among OECD countries (Figure 1, panel 2). In view of the strong price increases, many common measures of housing valuation based on deviation from long run historical trends, such as price-to-rent and price-to-income ratios, suggest overvaluation of about 20-25 percent (see Figure 1 and OECD, 2015; IMF Housing Watch, 2014).

2. Household debt-to-income ratios have also risen. The household debt-to-income ratio tripled from 47 percent in 1990 to a historic high of 154 percent in 2014 (though high internationally, it is broadly in line with comparators such as the UK, Canada, and New Zealand). The household debt-to-income is a key variable from a financial stability and macroeconomic risk perspective as this reflects the risks borne by households and the possible amplification of house price declines to the macro economy (see paragraph 24 for further discussion of these effects).

Counter argument 1: House prices are in line on an absolute basis

3. Using differences from averages across countries of house prices changes to derive estimates of over- or under-valuation is problematic. One reason is that it assumes that the starting period was an equilibrium. It could be, for example, that house prices were particularly low in Australia at the starting point, and thus a faster increase represents "catch-up" not "overshooting". One way around this problem is to compare on the basis of actual house prices rather than changes in house prices.

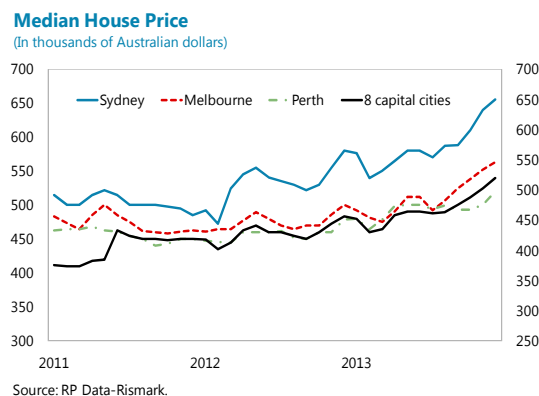
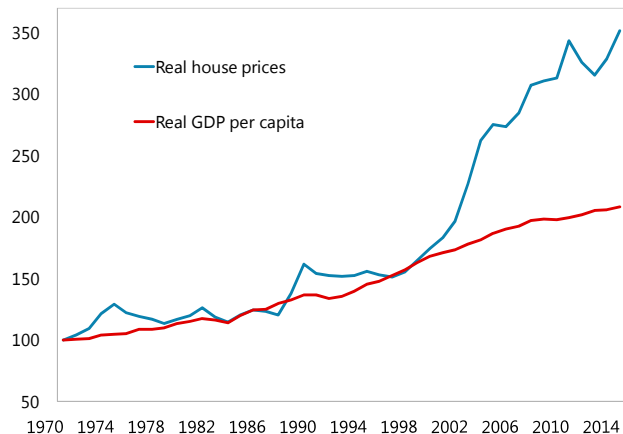


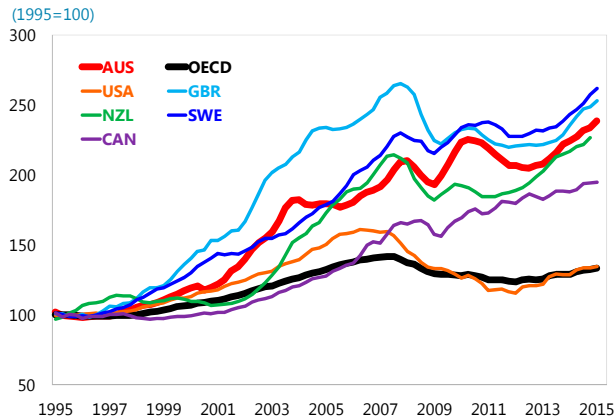
Figure 1. Rapid House Price Growth

House price inflation has greatly exceeded income growth...



...and has exceeded the OECD average

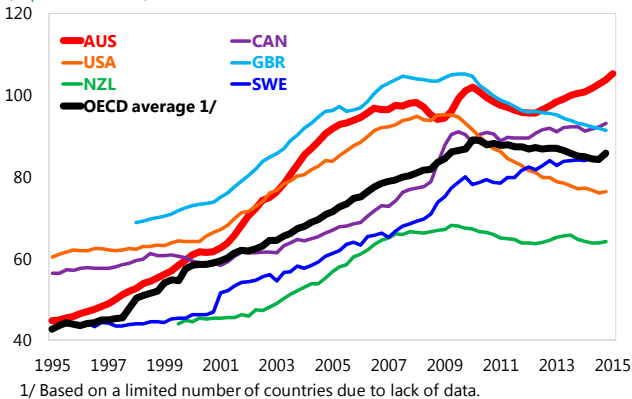
Real House Prices vs OECD



Along with rising house prices, household debt has also increased to historic highs

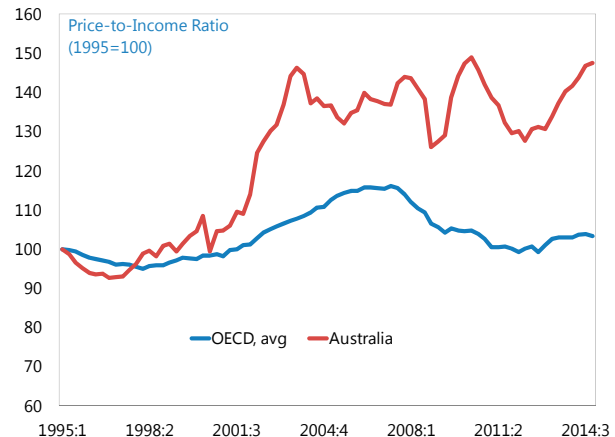
Household Debt

(In percent of GDP)

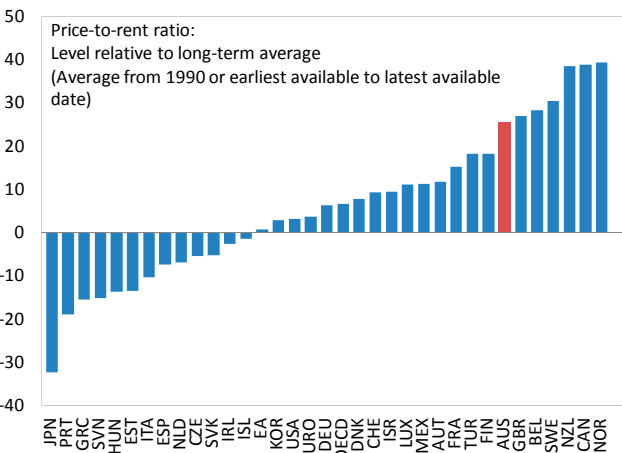


1/ Based on a limited number of countries due to lack of data.

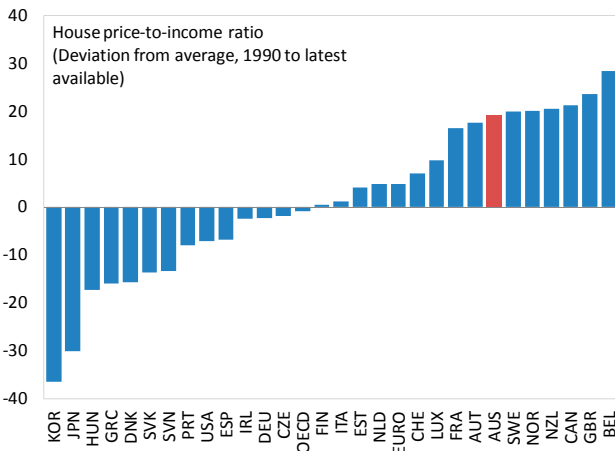
...and the house price-to-income ratio has risen.



Using the deviation from historical price-to-rent averages suggest overvaluation



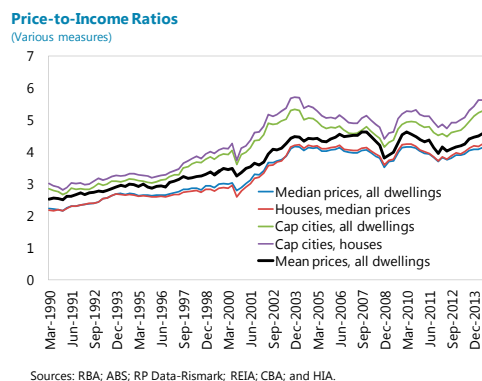
...as does the price-to-income ratio.



Sources: RBA; APRA; ABS; OECD; Haver Analytics; and IMF Staff calculations.

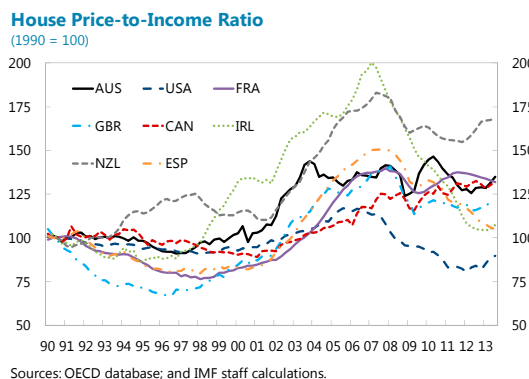
4. House price-to-income ratios have been rising for all measures.

Nationally, house prices correspond to between 4 to 6 times income, depending on which housing type is used (see chart). However, housing markets vary significantly not only across borders but also within countries.¹ Prices in urban (capital cities) and coastal areas tend to be higher than the rest of the country, but the rise in the price-to-income ratio has been broadly consistent across the country. Jääskelä and Windsor (2011) argue that housing is a superior good as households have been prepared to spend proportionally more on housing as their incomes increased. In this context, house prices may rise faster than incomes, and result in a rising price-to-income ratio over time. As a result, affordability has deteriorated for some segments of the population and the proportion of first-time home buyers is shrinking (see Senate Economic References Committee, 2015).



5. International comparison of absolute price-to-income ratios.

Comparisons of price-to-income ratios are difficult owing to different national definitions of housing coverage and household disposable income. Fox and Finlay (2012) show that comparing equivalently defined price-to-income ratios across countries, Australia's experience appears to be broadly in line with those of other advanced economies. Using OECD data shows a similar picture, where the Australian price-to-income ratio has risen above OECD average, but broadly comparable to comparator countries.



Bottom line: Price-to-income ratios have risen across all measures in Australia and are now near historic highs. However, international comparisons of price-to-income ratios suggest that Australia is broadly in line with comparator countries, although significant data comparability issues make inference difficult.

¹ In the case of the US housing downturn in the Global Financial Crisis, some of the largest downturns occurred in the cheapest regions and, in that context, house price growth may be a better predictor than house price levels.

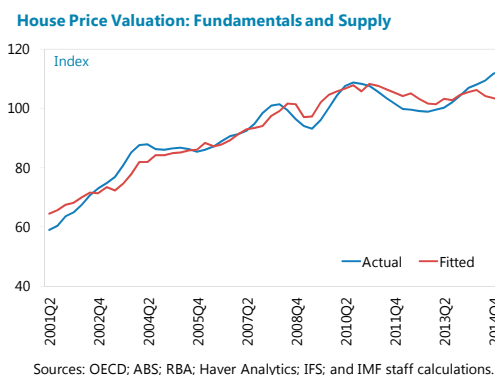
Counter argument 2: *The equilibrium level of house prices has also risen sharply*

6. The equilibrium levels of house price and household debt have risen owing to financial liberalization and disinflation. Another reason why comparing changes in house prices across countries is problematic, even if they were in equilibrium at the start, is that the equilibrium may have changed. Over the past two decades, financial liberalization, lower inflation and lower nominal (and real) interest rates have facilitated easier access to credit and increased the serviceability of higher levels of debt, leading to higher levels of indebtedness and higher house prices relative to incomes. As nominal (and real) interest rates have declined over a sustained period, household debt as a share of disposable income has increased (see Figure 3, panel 1). Housing demand was also boosted through lower interest margins of mortgage banks, and increased finance availability. For instance, Ellis (2006, 2013) argues that financial deregulation led to greater mortgage market competition and product innovation. OECD (2011) finds that a lower down payment requirement is associated with higher homeownership among previously credit constrained households. Moreover, OECD (2011) finds that 30 percent of the house price increases in OECD countries can be attributed to financial deregulation.

7. House prices and economic fundamentals. A more analytical way of looking at the equilibrium level of house prices is to model and estimate the main driving sources of house prices in a period where the transition was largely complete (e.g. 2000-14). This approach can include both fundamental economic demand and supply factors, and then calculate the gap between the actual house prices and their predicted values from the economic model. For this purpose, a broad range of models are used: time series approaches using economic fundamentals as explanatory variables, user cost of housing and statistical filters. It should be recognized, however, that analyzing equilibrium levels of house prices using economic models is still difficult and inherently imprecise and thus results should be interpreted with a large degree of caution.

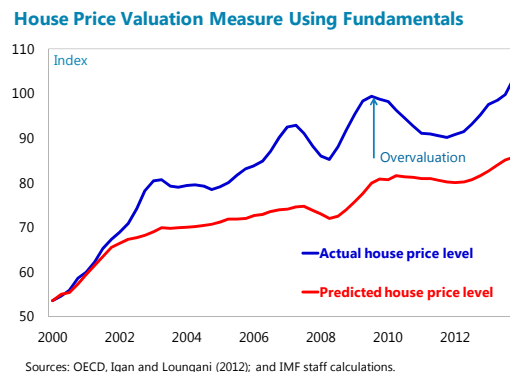
8. Econometric approaches to assess the level of house prices. Two different time-series econometric approaches are used to analyze house prices in relation to economic fundamentals.

- Following the approach in Caldera Sanchez and Johansson (2011), house prices are modeled with income, dwelling stock, and credit as explanatory variables, representing both demand and supply factors in driving house prices (*Model A* - see Appendix 1A for details). Using quarterly data from 2000-2014, the results suggest that a moderate house price gap around 5-10 percent has opened up in recent years (see chart).



- Using time-series data, changes in equilibrium real house price changes are modeled as a function of real disposable income, working-age population, equity prices, and the level of short- and long-term interest rates, aiming to capture major demand factors (*Model B*: see

Igan and Loungani, 2012, and Appendix 1B for further details). Using this approach with data going back to 1970 results in a relatively poor fit and suggests that house prices are around 24 percent stronger than economic fundamentals would support, depending on econometric specification (see Table 1). However, as discussed above, housing and financial markets have changed significantly over this period owing to structural reform in the 1980-90s, making property market developments in the 1970-80s less informative. A more appropriate time period for estimation, arguably, is using data from 2000 onwards, a period where the transition to lower interest rates and financial liberalization has been completed. Using this shorter time frame yields suggest that house prices are around 17 percent stronger than consistent with economic fundamentals (see text chart).²



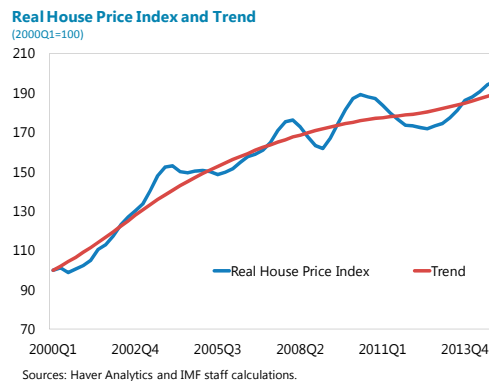
- User cost approach.** Another method to assess house prices is to apply the concept of user cost of housing. The user cost approach compares the relative costs of owning a home versus renting it by adding up the discounted costs of each alternative over the period for which a house is expected to be owned (see Appendix 2 for details). User costs are affected by a range of factors, including the direct cost of owning a home such as the real interest rate (after tax deductions), operating and maintenance costs, property taxes. The cost of owning a home is also affected by expectations of future house prices, but also significantly by the tax system treatment of housing. In Australia, owner-occupied housing is exempt from the capital gains tax and the tax treatment of investment in rental property, and particularly from highly geared investment, also imply significant incentives for housing investment (see SIP on Tax Reform). Following the calibration in Fox and Tulip (2014) for the Australian economy, the user cost approach results in a housing price overvaluation ranging from 0-19 percent, depending on expectations of future house price increase.³ The results of the user cost model are also sensitive to changes in the assumption of real mortgage rate variability (see Figure 3).⁴

² Ellis (2005) places the transition period towards higher household debt and house prices after 2000, noting that the transition was gradual.

³ Fox and Tulip (2014) use proprietary data on prices and rents for matched properties, whereas these estimates are based on house prices and rental yields in capital areas.

⁴ Fox and Tulip (2014) use the long-term expectations of real house price increases of 2.4 percent (average from 1955) to find owning a house is about as expensive as renting. They note, however, that using the average over the past decade of 1.7 percent results in house prices being overvalued by 19 percent.

- Trend approach.** One can also take an agnostic view on the trend level of house prices, but just assess where they are cyclically (i.e. without taking a view on whether the trend value is too high or low) based on HP-filter type cycles.⁵ Using this approach and applying the HP-filter to real house prices for the period 2000-14 results in an overvaluation of 4 percent (see text figure).



9. How can one relate household debt to house prices? The link between the real interest rate and the debt/income ratio can be illustrated in a general equilibrium framework (see, for example Walentin, 2013), where lower real rates support a higher debt ratio. One can also extend the user cost model, discussed above, to illustrate the effects of lower real interest rates on household debt (see Figure 3 and Appendix 2 for details). Using this approach, a permanent decline in real interest rates of one percent suggests a change in the debt ratio in the range of 10-20 percent although the effects are non-linear (see Figure 3). Thus, in this highly stylized context, the nominal and real interest rate assumption has considerable implications for the equilibrium level of indebtedness (see also Ellis, 2006).

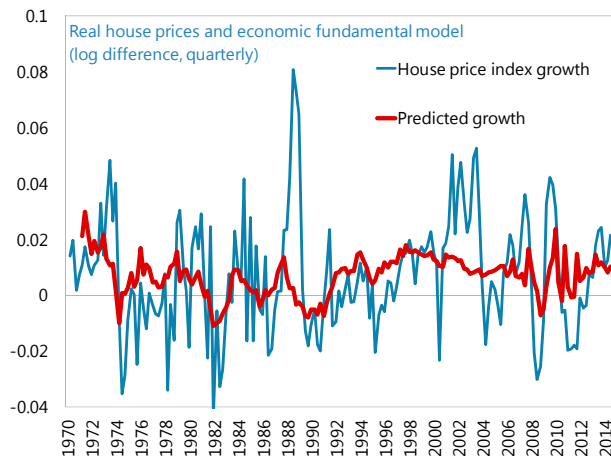
10. The trends of lower interest rates, higher house prices and household debt are closely interrelated. However, the fact that higher house prices and household debt can largely be explained does not imply that it is sustainable in the long-term. Sustainability would depend on the evolution of variables such as the nominal interest rate, income growth and expectations of real appreciation.

Bottom line: Lower nominal and real interest rates and financial liberalization are key contributors to the strong increases in house prices over the past two decades. The various house price modeling approaches indicate that house prices are moderately stronger (in the range of 4-19 percent) than economic fundamentals would suggest.

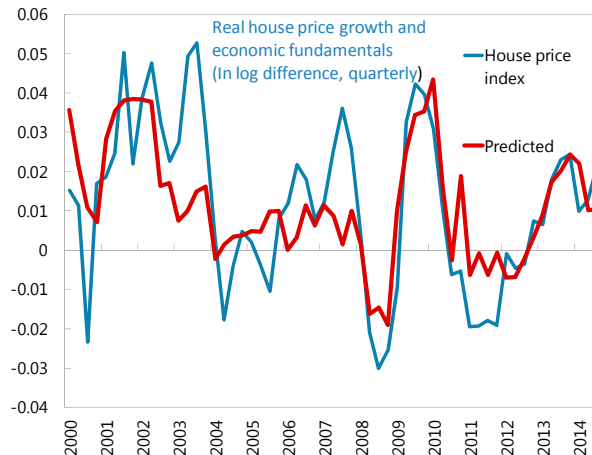
⁵ The smoothing parameter is set at 1600.

Figure 2. Fundamental Measures of House Valuation

Fundamentals model (Model B) is a relatively poor fit since 1970...

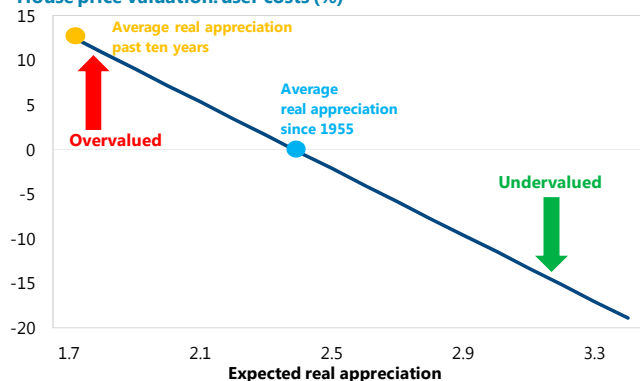


...but better explanatory power since 2000.



The user cost model is sensitive to alternative assumption regarding future expected house appreciation and interest rates.

House price valuation: user costs (%)



The various approaches suggest that house prices are moderately stronger than economic fundamentals would suggest.

House Prices and Economic Fundamentals

Model	2000-2014
(In percent)	
Time series approaches	
Model A: Demand and supply factors	9
Model B: Economic fundamentals	17
User cost	0 - 19
Filter approach	4

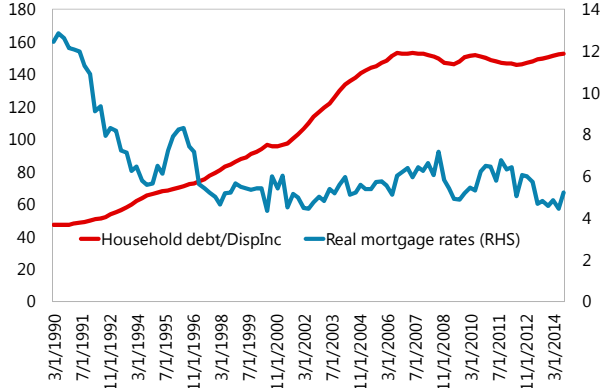
Sources: OECD; IFS; Igan and Loungani (2012); and IMF staff calculations.

Figure 3. Macroeconomic and Supply Factors in House Valuation

Nominal and real interest rates have declined sharply since the early 1990s....

Real Mortgage Interest Rates and Household debt

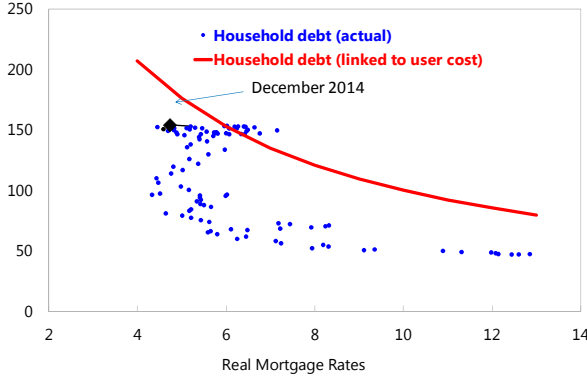
(Real interest in percent; household debt in percent of disposable income)



Lower interest rates have supported higher debt.

Real Mortgage Interest Rates and Household Debt

(Percent of disposable income)



Low construction activity in Sydney (NSW) in the 2000s have contributed...

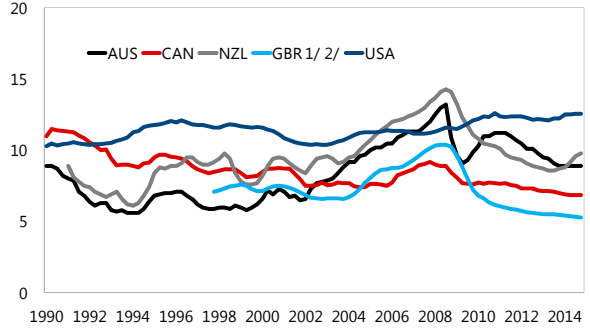
Total private sector dwelling unit building approvals (12-month moving average)



...allowing the interest payments to income ratio to remain broadly stable and in line with comparators.

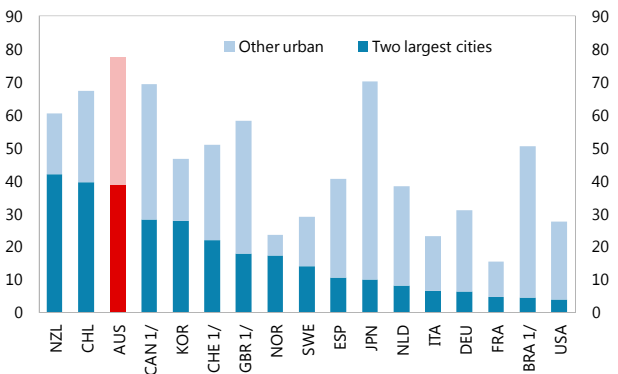
Household Debt Service to Disposable Income

(In percent; quarterly)



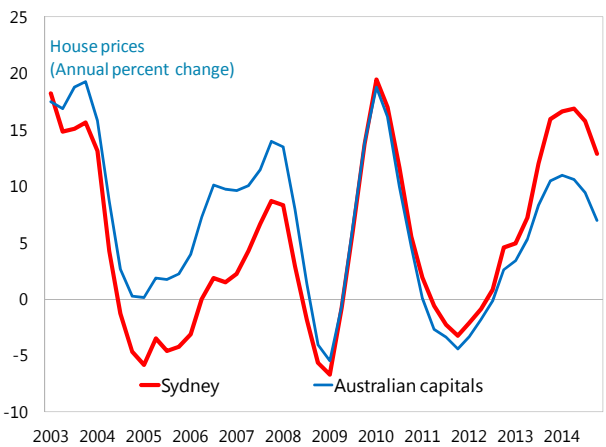
1/ Includes nonprofit institutions serving households.
2/ Debt service measured as interest payments.

Australia is highly urbanized, with large share of population in Sydney and Melbourne



1/ Measured as urban agglomeration.

...to rapid house price increases in Sydney recently.

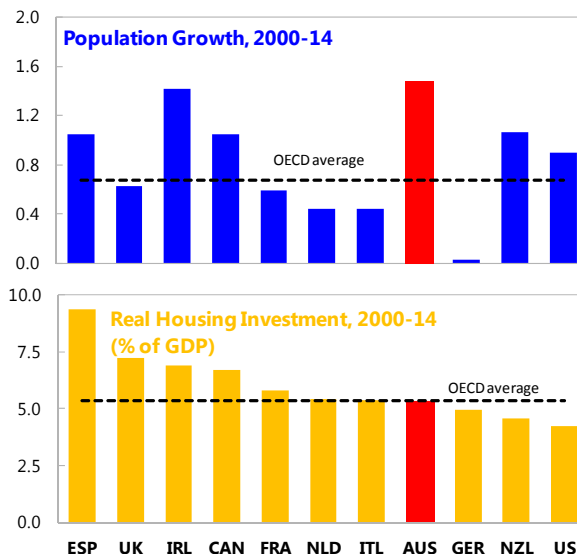


Sources: RBA; ABS; Haver Analytics; RBNZ; Eurostat; Federal Reserve Board; UN Demographic Yearbook 2011; and IMF Staff calculations.

Counter argument 3: High prices reflect low supply

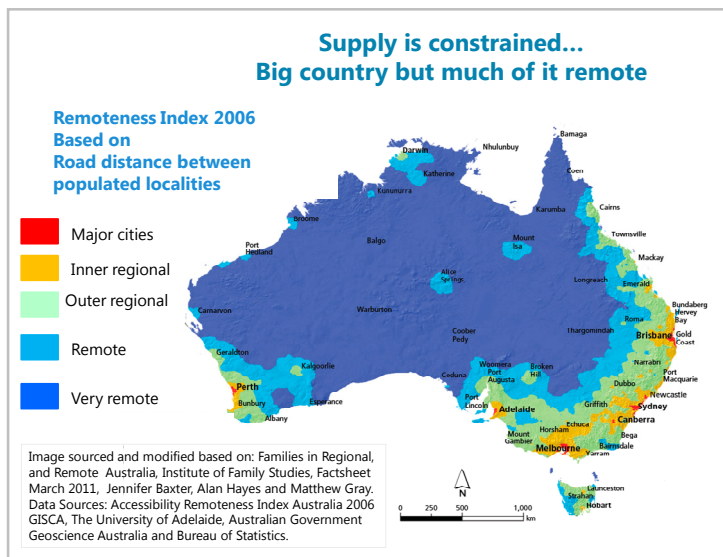
“A country with this much land, it ought to be cheap to get a roof over your head” Gov. Stevens, February 2015

11. Housing supply has not kept up with demand. Australia’s population has grown rapidly since 2000, and much faster than the OECD average. However, residential investment has remained stable around 5 percent of GDP for much of the past two decades, only in line with OECD average (see text chart). Vacancy rates have also remained relatively low since 2006, compared with the 1990s (see Kent 2013).



Sources: OECD, Haver Analytics, and World Development Indicators.

12. While Australia is sparsely populated, much of the country is remote, and the population is highly urbanized. As city prices are typically higher than rural, countries with high degrees of urbanization tend to have higher house prices on average (see Figure 3). Supply of housing tends to be inelastic as geographic conditions, such as limited available land for high density housing and lack of infrastructure can restrict housing supply in certain areas, causing house prices to increase rapidly. The supply response to higher house prices has also been relatively slow in Australia (see OECD 2011), but there are signs that housing completions have increased recently.⁶



13. In addition to geographical constraints and household preference, housing supply has been constrained by policy factors. In a recent paper, Hsieh et al (2012) highlights the complexity of planning process; provision and funding of infrastructure; land ownership and geographical constraints; and public attitudes

⁶ A preference for low density housing and declining household size may also be factors in explaining house prices (see Kent, 2013).

towards infill development as key factors in explaining the sluggish supply response. For instance, turning farmland into higher density housing typically takes about 6 years. Against this background, policy reforms can increase supply, including through designing and enforcing efficient land-use regulations; and providing complementary infrastructure and other public services.

14. Housing construction is currently at record levels, stimulated by high house prices, low interest rates, reducing the existing supply shortages in some areas. It is estimated that close to 200,000 dwelling units will be added in 2015, with high-density housing accounting for around a quarter of new approvals. Data from the National Housing Supply Center study (2011) suggest that the most significant cost in greenfield and brownfield development is construction costs, although the cost of land is also important, particularly in Sydney. At the same time, construction costs have remained relatively muted and not risen nearly as fast as house prices (see Richards, 2008).

15. A slow supply response to rising demand in some areas mitigates house price overvaluation concerns, but does not rule out large adjustments. While supply constraints do suggest that equilibrium property prices have risen, they do not rule out that demand is excessive, nor that it could fall sharply. House prices in Australia have varied by more than can be explained by the relatively stable deviation between population and housing supply. The UK, for example, had little supply response in the housing boom of the 2000s, but still saw a 20 percent fall.

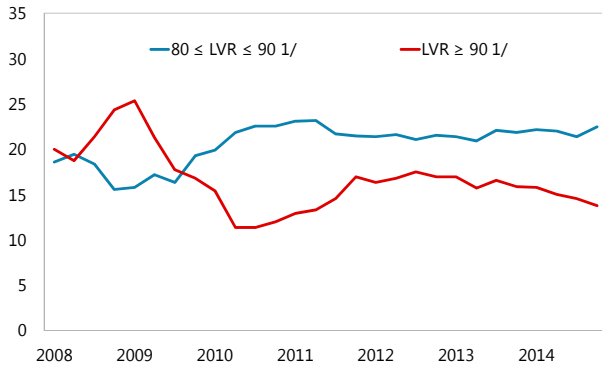
Bottom line: *housing supply does indeed seem to have grown significantly slower than demand, reducing (but not eliminating) concerns about overvaluation.*

Figure 4. Financial Stability and Housing Lending Standards

LTV standards are not deteriorating for owner-occupied houses...

Banks' Housing Loan Characteristics: Owner-occupiers

(In percent of new loan approvals)

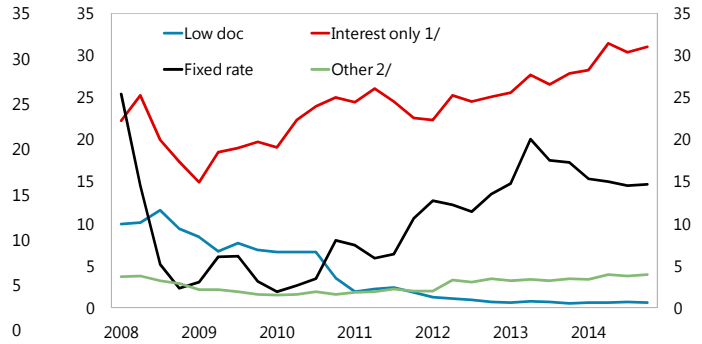


1/ LVR = loan-to-valuation ratio

...and low doc loans have declined, although interest only loans have been rising.

Banks' Housing Loan Characteristics: Owner-occupiers

(In percent of new loan approvals)

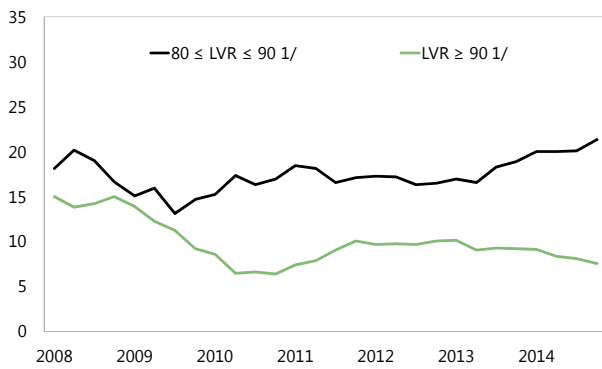


1/ Data are backcast before December 2010 to adjust for a reporting change by one bank.
2/ Includes loans approved outside normal policies, and other non-standard loans.

High LVR in investor housing has remained broadly stable...

Banks' Housing Loan Characteristics: Investors

(In percent of new loan approvals)

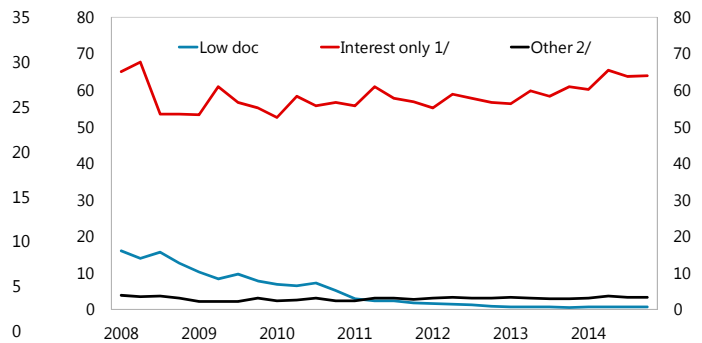


1/ LVR = loan-to-valuation ratio.

...but interest-only loans dominates investor lending.

Banks' Housing Loan Characteristics: Investors

(In percent of new loan approvals)

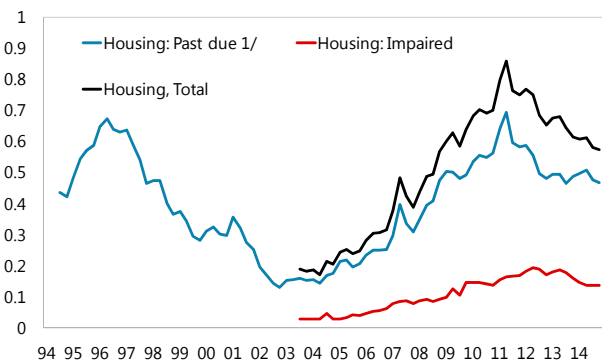


1/ Data are backcast before December 2010 to adjust for a reporting change by one bank.
2/ Includes loans approved outside normal policies.

Non performing housing loans have remained very low...

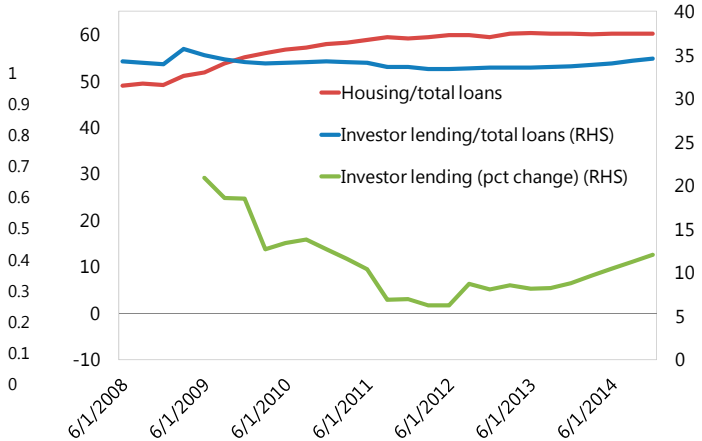
Asset Quality: Banks' Non Performing Assets

(In percent of loans by type)



1/ 90+ days past due, but well secured.

...but the banking sector exposure to housing has risen, and the growth in investor loans has picked up.



Sources: APRA and IMF staff calculations.

Counter argument 4: It is just a Sydney problem, not a national one

16. Property prices in Sydney have risen sharply in the post-GFC period. In the first half of 2015, property prices increased by 16 percent y on y in Sydney, compared with 10 percent in other capital cities. The median price over A\$760,000 in Sydney corresponds to around nine times income, also the highest among capital cities. According to the Moody's (2015), the average household now spends 35 percent of household income on monthly mortgage repayment. However, some of the increase in Sydney house prices represents a catch-up given that prices in Sydney were largely stagnant in the between 2003-09 compared to other capital cities.⁷



17. Investor activity is a key driver of house prices in Sydney. New investor loans have doubled in recent years, with low interest rates and strong competition among lenders stimulating investor lending growth, especially in Sydney. The RBA (2015) observes that investor housing loan approvals in New South Wales have increased by almost 150 per cent over the past three years and accounts for almost half the value of all housing loan approvals in that state.

18. Foreign demand for housing in Sydney is also a factor that may have supported house price increases. Gauder et al (2014) note that foreign purchases appear to be most concentrated in new, high-density dwellings in inner-city Sydney and Melbourne that tend to be relatively expensive. Foreign investment has remained broadly stable at a national level over the past decade but has picked up recently.

Bottom line: *The two most populous cities, Sydney and Melbourne, have seen strong house price increase in recent years, including in the investor segment. A sharp downturn in the housing market in these cities could be expected to have real sector spillovers, pointing to the need for targeted measures –including investor lending–to reduce the risks related to a housing downturn.*

⁷ Full analysis of housing valuation in Sydney would require analyzing fundamental determinants of house prices and beyond the scope of this note.

Counter argument 5: *There are no signs of weakening lending standards or speculation***19. Mortgage lending has grown strongly, but lending standards seem largely to have been maintained** (Figure 4).

- **LTV ratios are stable.** The proportion of high LTVs for both investor and owner occupied housing lending has remained steady (see Figure 4). The estimated average loan-to-value ratio on existing loans is around 58 percent (see Moody's 2015).
- **Asset quality remains strong.** Non-performing loans have been historically, and remain, low. Mortgage loans are full-recourse, which implies that the mortgage holder is legally responsible for the loan amount regardless of default or repossession of the property by the lender. Non-performing loans for commercial property are higher, and peaked in 2010 at 6 percent, but have fallen back to 2 percent since then. For evidence of default behavior of Australian mortgages, see Read, Stewart and La Cava (2014). The share of low-documentation loans has declined (Figure 4) and these are essentially no longer offered due to consumer responsible lending law changes.
- **Mortgage buffers have increased.** Australia's mortgage structures encourage the early repayment of mortgages as lenders typically do not impose penalties on households who pay down their variable-rate mortgages. When mortgage interest rates are lowered, borrowers often continue their mortgage payment at the same level so that greater principal payments are made and buffers are therefore built automatically as interest rates are lowered. Balances in mortgage offset and redraw facilities are estimated to be 15 percent of the outstanding stock of housing loans or over two years of scheduled payments at current interest rates (Figure 5).
- **Debt is concentrated among high-income households.** Household housing assets and financial assets are respectively around three times and twice bigger than household debt. Only a small number of indebted households (around 4 percent) currently have debt which exceeds assets. Households in the top two income deciles held around 70 percent of mortgage debt and only 10 percent of mortgage debt was held by households in the bottom two income deciles and these tended to be older households with typically smaller mortgages and higher net asset holdings (Figure 5).⁸

⁸ There are distributional and generational aspects to changes in housing prices and rents (see Richards, 2008).

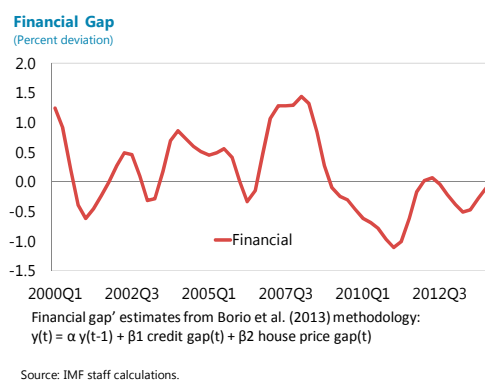
- **But lending standards need to be maintained.** Byres (2015) highlighted evidence of non-prudent lending standards in a recent APRA survey of lending institutions, including treatment of income, interest buffers and interest-only loans.

20. There is no sign of a generalized credit boom and estimates of credit gaps are small.

Using financial gap estimates from Borio et al. (2013) methodology, yields small gaps. Following the policy tightening by APRA and RBA in 2003-04, credit growth to owner-occupied and investor lending slowed.

21. However, some specific areas of concern have emerged. Investor credit has picked up

sharply lately, largely focused in Sydney, with the majority in interest-only lending (driven by tax benefits). House prices in Sydney, partly as a result, have increased sharply, and are now up by more than 30 percent since 2011. Against a backdrop of already high house prices and household debt, continued rapid house price inflation, especially in Sydney, could give rise to expectations-driven, self-reinforcing demand dynamics, accompanied by price overshooting and excessive risk taking by banks.



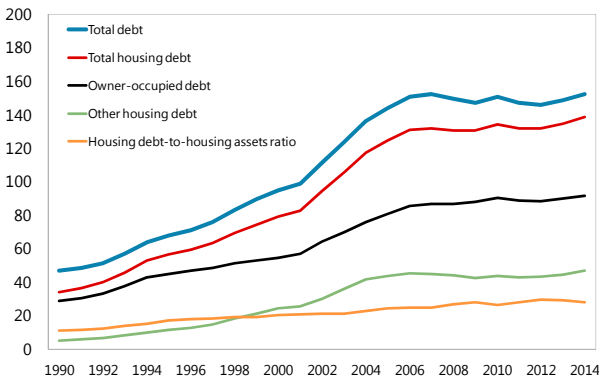
Bottom line: While lending standards overall seem not to have loosened, the growing share of investor and interest only loans focused on the highly-buoyant Sydney market, is a pocket of concern.

Figure 5. Households Have Large Buffers

Housing dominates household liabilities

Households' Liabilities

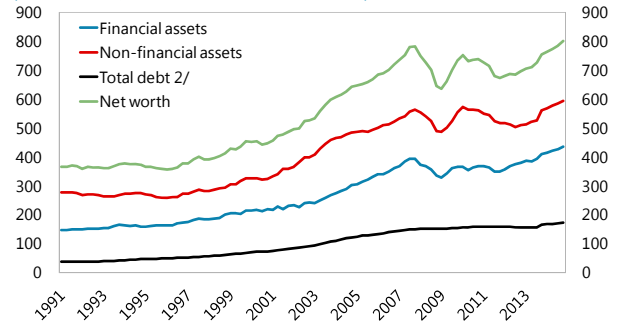
(In percent of households' gross disposable income)



... but household wealth vastly exceed debt.

Real Household Wealth and Debt 1/

(Per household; in thousands of Australian dollars)



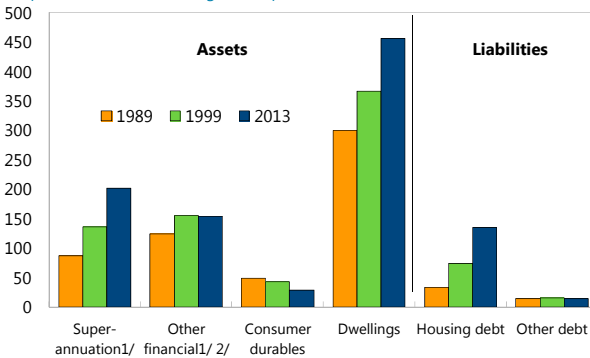
1/ In 2010/11 dollars, deflated using the household final consumption expenditure implicit price deflator.

2/ Household debt excludes the debt of unincorporated businesses.

Housing wealth dominates other assets and liabilities.

Households' Assets and Liabilities

(In percent of households' gross disposable income)

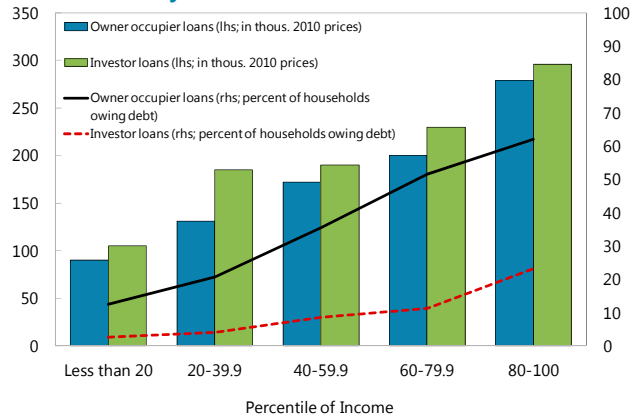


1/ Includes unincorporated enterprises.

2/ Includes deposits, shares & other equity, and all other financial assets.

Debt is concentrated among high income households.

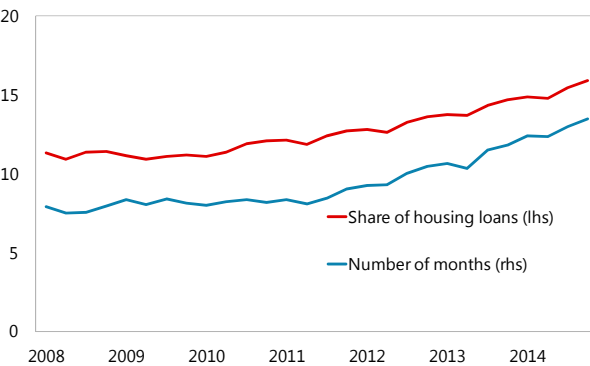
Indebtedness by Household Income



With low interest rates, household are building buffers....

Aggregate Mortgage Buffers

(In share of housing loans and number of months)

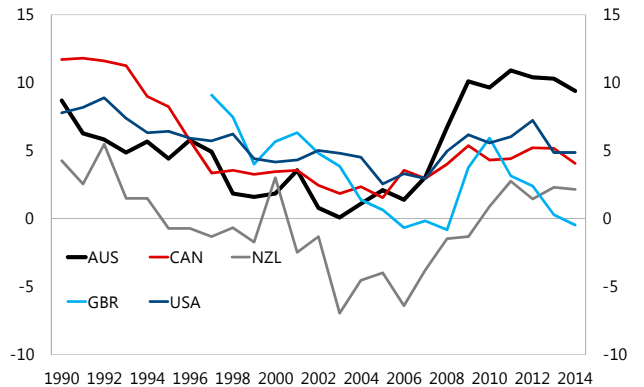


1/ Data are backcast before December 2010 to adjust for a reporting change by one bank.

...and the savings ratio remains high.

International Comparison: Household Saving Ratio

(In percent of GDI)

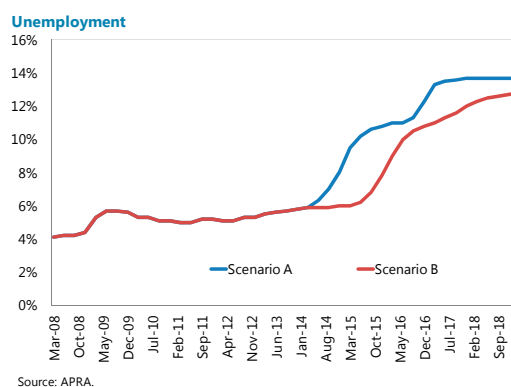
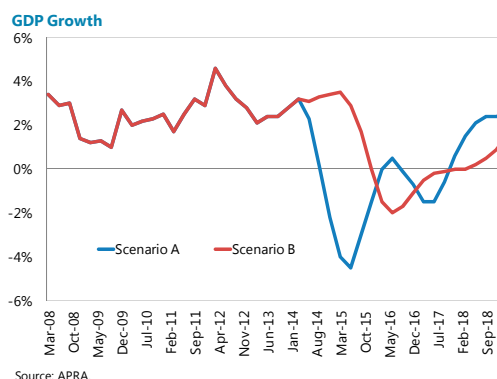


Sources: ABS; RBA; APRA; RP Data-Rismark; Country statistical offices; Haver Analytics; and IMF staff calculations.

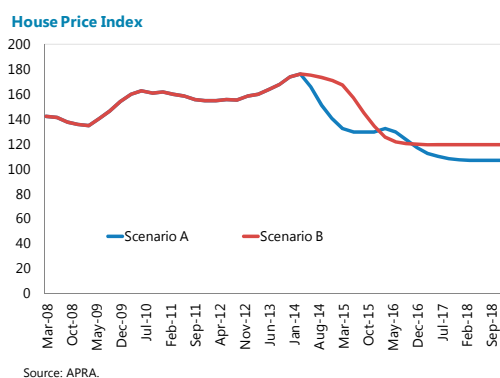
Counter argument 6: Even if they are overvalued, it doesn't matter as banks can withstand a big fall

22. APRA recently concluded a stress test of the Australian banking system, focused on housing. APRA considered two severe tail macroeconomic stress scenarios, developed in collaboration with the Reserve Bank of Australia (RBA) and the Reserve Bank of New Zealand (RBNZ).

- **House price bust (Scenario A).** A housing market decline, prompted by a sharp slowdown in China, where Australian GDP growth declines to -4 percent, unemployment increases to over 13 percent and house prices fall by a cumulative 40 percent.
- **Higher interest rates (Scenario B).** In the face of strong growth and emerging inflation, the RBA raises the cash rate significantly. Global growth subsequently weakens and a sharp drop in commodity prices leads to increased uncertainty and volatility in financial markets. This leads to higher unemployment and higher borrowing in Australia and a significant fall in house prices.



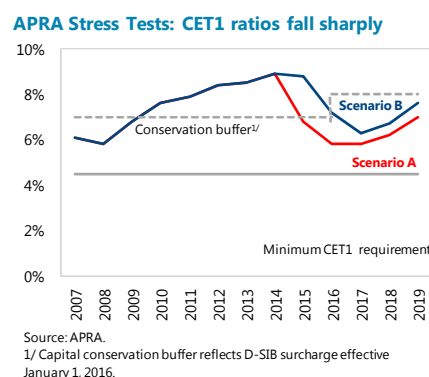
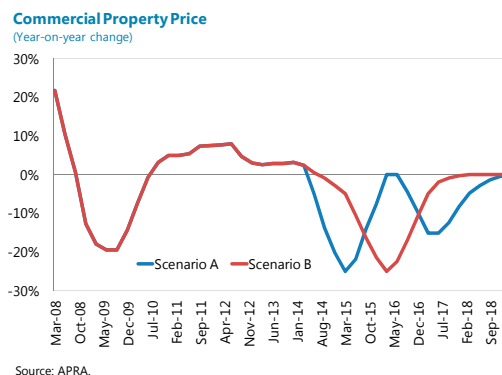
23. The banking sector would remain solvent, but unlikely to function well. In each scenario banks face an increase in funding costs, decline in credit quality and credit losses, with a significant adverse impact on profitability and declines in capital ratios. Losses on residential mortgages accounted for around one-third of total credit losses. These aggregate losses contributed to a material decline in the capital ratio of the banking system. Starting the scenario at 8.9 percent, the aggregate Common Equity Tier 1 (CET1) ratio of the participant banks fell by around 3 percentage points. All banks remained above the minimum CET1 capital requirement of 4.5 per cent. However, losses on housing were greater than the capital held for housing for the Internal Ratings Based (IRB)-model banks and almost all banks would use capital conservation buffers and face constraints on dividend and bonus payouts. In such circumstances banks would face funding constraints and likely curtail lending. This would likely exacerbate an already extremely difficult macroeconomic situation.



24. Even abstracting from the impact on banks, a sharp fall in house prices would likely have major macroeconomic effects. This would operate through many channels (see DeBelle, 2004). For example:

- **Wealth effects:** households would cut consumption as their housing wealth falls. Dvornak and Kohler (2003) find wealth effects of around 3 cents on the dollar.⁹ For example, a 10% fall in house prices would reduce household wealth by some 30 percent. Applying a typical elasticity, in an admittedly partial equilibrium framework, GDP would fall by around 1 percent, cumulatively.
- **Investment:** Investment and employment in housing would decline. Although dwelling investment has been tightly range bound, between, 4 and 6 percent of GDP over the past decades, a slowdown would be expected to have an adverse impact economic activity.

Bottom line: While bank capital levels are likely sufficient to keep them solvent in the event of a major fall in house prices, they are not enough to prevent banks making an already extremely difficult macroeconomic situation worse.



⁹ Windsor et. al (2013) find that the removal of credit constraints (consumption rises with home prices due to households' ability to borrow more, given more valuable collateral), and the related buffer-stock savings argument (higher home prices act as a form of precautionary savings for low-saving households, allowing them to increase spending).

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Appendix 1A. Model A – Time-Series Model Including Supply Factors

Following the approach in Caldera Sanchez and Johansson (2011), house prices are modeled in a long-run framework, with per capita income, dwelling stock, working age population ratio, credit and long-term interest rates as explanatory variables, representing both demand and supply factors in driving house prices. The quarterly estimation period covers 2001-14.

$$HPI_t = \alpha_0 + \alpha_1 \text{IncomePC} + \alpha_2 \text{HousingStock} + \alpha_3 \text{Credit} + \alpha_4 \text{WorkPop} + \alpha_5 \text{InterestRate}$$

where HPI is the log real house price index (OECD); IncomePC is the log real income per capita (ABS, national accounts); HousingStock is the lagged stock of housing (RBA); log real credit to the private sector (Haver), WorkPop is the ratio of working age population to total population (ABS), and InterestRates is the nominal long term interest rate (IFS).¹⁰

The regression (OLS) results are as follows:

Dependent Variable: LRHP				
Method: Least Squares				
Date: 05/28/15 Time: 13:53				
Sample (adjusted): 2001Q1 2014Q4				
Included observations: 56 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-25.1743	6.945491	-3.62456	0.0007
LRGDPPC	1.086637	0.553155	1.964434	0.055
LHSTOCK(-4)	-2.72587	0.780221	-3.49372	0.001
LRPCRED	0.325403	0.175796	1.851022	0.0701
WAPRATIO	28.3602	12.5347	2.262535	0.028
LTIR	0.020073	0.011039	1.818397	0.075
R-squared	0.9451	Mean dependent va	4.514702	
Adjusted R-square	0.93961	S.D. dependent var	0.160498	
S.E. of regression	0.039442	Akaike info criterion	-3.52704	
Sum squared resid	0.077782	Schwarz criterion	-3.31004	
Log likelihood	104.7571	Hannan-Quinn crite	-3.44291	
F-statistic	172.1482	Durbin-Watson stat	0.278079	
Prob(F-statistic)	0			

The explanatory variables generally have the expected sign and are statistically significant. Higher incomes have a positive impact on house prices; a higher housing supply negatively affects house prices; higher private sector credit and working age population ratio have a positive impact on house prices. A positive sign on long-term interest could signal expectations of higher income in the future, which could impact house prices positively.

¹⁰ The order of integration is the same for all variables, albeit with varying levels of significance.

Appendix 1B. Model B - Time-Series Model using Economic Fundamentals

Following Igan and Loungani (2012), real house price changes are modeled as a function of changes in affordability, real disposable income per capita, working-age population, equity prices, and the level of short- and long-term interest rates. The following quarterly regression is estimated for the period 2001-2014:

$$\Delta HPI_t = \alpha + \beta_1 A_{t-1} + \beta_2 \Delta YPC_t + \beta_3 \Delta WAP_t + \beta_4 EQ_t + \beta_5 i_t^s + \beta_6 i_t^l + \beta_7 ConstCost + \varepsilon_t$$

where ΔHPI is the change in real house prices over the last quarter (capital cities), A is affordability level of housing in the previous period, measured by (the log of) the ratio of house prices to income per capita; ΔYPC is the change in real income per capita over the last quarter; ΔWAP is the change in working-age population over the past year; Δsp is the change in stock prices over the year before last and i_t^s and i_t^l are short and long-term interest rates, respectively; $ConstCost$ is the real cost of construction.¹¹ The periods over which the changes are calculated are chosen such that the transmission of changes in these variables would have enough time to have an impact on house prices.

The regression equation is estimated using ordinary least squares (OLS).

Source	SS	df	MS	Number of obs	59
				F(7, 51)	7.38
Model	0.012661793	7	.001808828	Prob > F	0
Residual	0.012492343	51	.000244948	R-squared	0.5034
				Adj R-squared	0.4352
Total	0.025154136	58	.000433692	Root MSE	0.01565

hpi	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
lnafford1	-0.0727	.0231643	-3.14	0.0030	-0.1192 -0.0262
dlnypc	1.0307	.451608	2.28	0.0270	0.1240 1.9373
stir	-0.0138	.0025826	-5.34	0.0000	-0.0190 -0.0086
ltir	0.0087	.0045543	1.91	0.0620	-0.0005 0.0178
dlneq1	0.0352	.0171953	2.05	0.0460	0.0007 0.0698
dlnwap	2.9587	1.195417	2.48	0.0170	0.5588 5.3586
dlncons	0.0964	.0482841	2.00	0.0510	-0.0005 0.1933
_cons	-1.5310	.4820586	-3.18	0.0030	-2.4988 -0.5632

¹¹ Data sources are described in Igan and Loungani (2012).

The explanatory variables generally have the expected sign and are statistically significant. Affordability is negatively related to the change in prices and change in income per capita enters the equation with a positive sign. There is also a positive and significant relation between house price changes, equity prices, construction costs, and population growth. On the interest rates, there is a negative coefficient on short term interest rates (reflecting higher cost of mortgages) as expected, but a positive sign on long-term interest rates. A positive relationship may emerge if higher longer term rates signals an improved economic outlook which may stimulate housing markets.

To arrive at an estimate of overvaluation, it is assumed that house prices were in equilibrium in 2000 (after the transition to lower inflation and interest rates) the house price index is set to 100. Using the predicted house price changes from the regression analysis, index values are computed from that date onward. To assess whether house prices are in line with the economic fundamentals of the model, the actual index value is compared to the predicted one and the difference between the two values labeled as the estimated price gap.

Appendix 2. User Cost and Household Debt

User cost equilibrium in the housing market occurs when the expected cost of owning a house equals that of renting. In this context, overvaluation is defined by the actual price being greater than that calculated with the user cost. In equilibrium (using the definitions in Fox and Tulip, 2014):

$$P^* = \frac{Rent}{(r + c + d + s - \pi)}$$

where P^* is the “fundamental” value of housing; r is the real interest rate; c is running costs such as repairs and insurance as proportion of price; s is transactions costs averaged over the period of ownership as proportion of price and π is the expectation of real appreciation on a constant quality basis.

Australia: User Cost of Housing and Household Debt

Model parameters

M	Rental payments as a share of income	0.2	Source: ABS (2013)
LTV	Average loan-to-value ratio	0.578	Source: Moodys (2015)
c	Running costs such as repairs insurance as a percentage of price	0.015	Source: Fox and Tulip (2014)
d	Depreciation	0.011	Source: Fox and Tulip (2014)
s	Average transaction costs	0.007	Source: Fox and Tulip (2014)
pi	change in constant quality prices	0.017	Source: Fox and Tulip (2014)
r	Real mortgage rate	[0.02-0.14]	

Following the approach in Alsterlind et al (2014), one can link the user cost model to household debt, $\frac{D_t}{Y_t^d}$, where D is debt and Y is disposable income. Manipulating the household debt-to-income ratio identity by the price-to-rent ratio and the inverse:

$$\frac{D_t}{Y_t^d} = \frac{Rent}{Y_t^d} \times \frac{D_t}{P_t} \times \frac{P_t}{Rent}$$

Assuming households aim to maintain a constant loan to value ratio, $\frac{D_t}{P_t}$, one can obtain a link between the price-to-rent ratio and the debt ratio:

$$\frac{D_t}{Y_t^d} = k \frac{P_t}{Rent}$$

where $k = \frac{Rent}{Y_t^d} \times \frac{D_t}{P_t}$.

With the user cost model, one can obtain a link between user cost and the long-term debt ratio:

$$\frac{D_t}{Y_t^d} = \frac{k}{(r + c + d + s - \pi)},$$

The chart in Figure 3 is computed with the assumption that renters spend about 20 percent of their income on housing (see ABS, 2013), and an average loan-to-value ratio of 58 percent (see Moodys, 2015).

SUSTAINING INCOME GROWTH IN AUSTRALIA¹

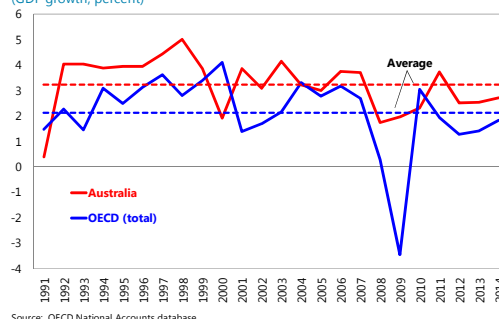
- Even with nearly 1 percent productivity growth in the baseline, medium term income and output growth will be significantly weaker than in the past.
- Input growth will be restricted by aging pressures and limits to capital accumulation, making it necessary to lift TFP growth, which has dropped sharply.
- There are no low hanging fruit. Australia is at the or near the frontier on several dimensions of competitiveness, and reform momentum has faded, making the task of lifting productivity more difficult.
- Targeted reforms in specific areas where Australia trails the frontier can help push productivity and sustained growth in living standards.

A. Overview

1. Australia has enjoyed uninterrupted growth over the past 2 decades and counting, and has outperformed its advanced economy peers.

Compared to the OECD as a whole, Australia's GDP growth over the last 24 years has been a full percentage point (about 50%) higher on average. Per capita GDP growth averaged 1.8 percent over 1990-2014, and income growth was even higher, near 2 percent, thanks to record high commodity prices and advantageous terms of trade.

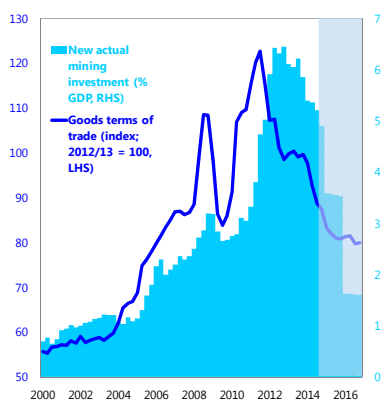
Australia has grown well above the rate of peer countries (GDP growth, percent)



2. But the broad impulses that drove sustained growth in output and incomes in the past have now waned.

- Comprehensive structural reforms in the 1980s and 1990s helped propel Australia to the top ranks among advanced economies. This was reflected in strong productivity growth in the 1990s and early 2000s, which has now reversed course.
- In the 2000s, strong growth in demand for resources, particularly from China coupled with rising commodity prices drove mining sector investment to record highs. (LNG capacity was also installed, which should lead to Australia being the world's largest LNG exporter in the coming years). Now, mining sector investments have tailed off as expected,

Mining Sector Growth Impulse is Declining



¹ Prepared by Adil Mohommad.

and projects are entering the production and export phase of operations. However, at the same time as mining sector investments are unwinding, the price of their output has fallen much more sharply than expected reflecting the increase in global (including Australian) supply but also a slowdown in residential investment in China which has lowered the demand for steel.

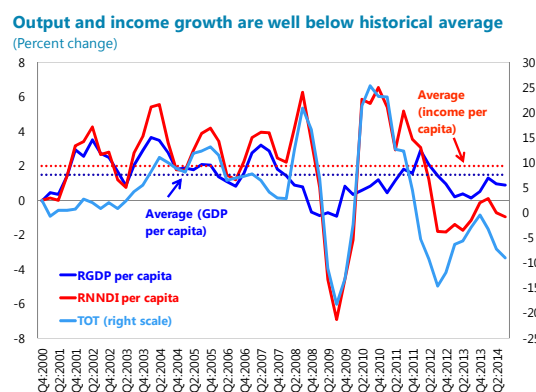
- Further, the non-mining economy has not picked up sufficiently to take up the slack.

3. Going forward, output and income growth will likely weaken. Continued slower productivity growth combined with gradually weakening labor force participation (as the population ages) will likely reduce potential output growth. Incomes will grow even slower than output, especially in the nearer term, as the terms of trade comes off further from its record high. Thus Australian living standards are unlikely to grow as fast as in the past.

4. Boosting productivity growth will be the key to maintaining high growth in living standards. Though Australia compares favorably with other advanced economies on measures of efficiency and competitiveness, there are still lags relative to the frontier in some areas. Convergence to the productivity frontier will have to accelerate in order to maintain past rates of output and income growth. This will need a focus on further reform measures to boost competition, enhance inputs, and foster innovation, while recognizing potential difficulties in convergence to the productivity frontier.

B. Stylized facts: Strong growth in the past, but weakened outlook

5. Output and income growth is significantly weaker than in the past. Over 2000-2014, real GDP growth averaged 3 percent, real GDP per capita growth averaged 1.5 percent, while real net national disposable income (RNNDI) per capita (adjusting output growth for terms of trade effects) grew even faster at 2 percent, supported by historically high prices for key Australian commodity exports. However, as mining investment has begun its anticipated decline, and terms of trade have fallen sharply, per capita GDP, and income growth in particular, have fallen well below long run averages. Indeed, RNNDI per capita has been falling since 2012.

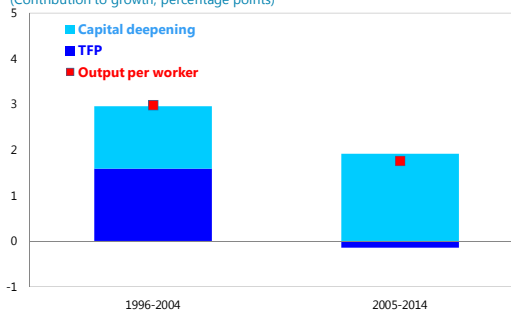


6. Productivity growth has slowed sharply.

- **Labor productivity (LP) growth has weakened in the past decade.** LP growth decomposition reveals that unlike in the 1990s, growth over the last decade has been driven by capital deepening (mostly mining sector related) rather than total factor productivity (TFP) growth.

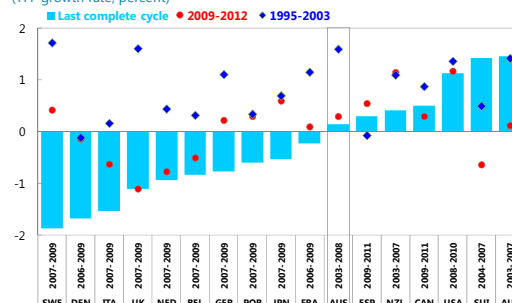
- **TFP growth has decelerated sharply over the past decade.** While historically Australia has out-performed other advanced economies (AEs), recent TFP growth trends in Australia are in line with the more general decline in TFP growth among AEs. TFP growth was among the highest in the late 1990s and early 2000s, but has slowed sharply since then. Over the last complete productivity cycle (2003-08), TFP growth declined to near zero, though this is still a better performance than many peers (particularly the major European economies). However, since the last cycle, TFP growth in Australia has not recovered and remains near zero² (partly reflecting the impact of the mining and utilities sectors; which involve investment lags that reduce measured productivity).

Labour productivity is being driven capital accumulation
(Contribution to growth, percentage points)



Source: ABS Market sector industries output per worker and TFP indices; and Staff calculations.

Productivity growth has fallen sharply since the 1990s
(TFP growth rate, percent)



Source: OECD Productivity Database.

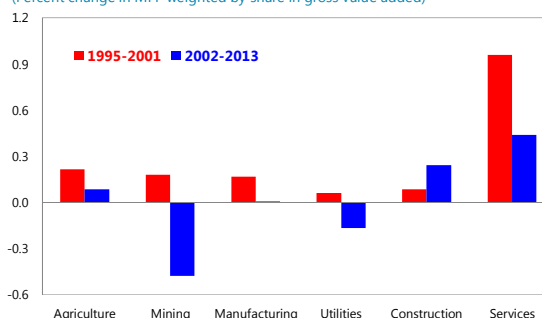
7. Trends specific to mining, and one-off factors have also been held responsible.

Some commentators (Topp et al, 2008) have pointed to high profitability in mining driven by record high commodity prices, leading to mining of marginal deposits and driving lower productivity. Commodity prices also spurred large investments in mining not matched by output growth, and in agriculture and utilities, drought conditions led to lower output and measured TFP.

8. The slowdown in TFP growth was broad-based, and not limited to mining and utilities.

All sectors, apart from construction, saw weaker TFP growth between 2002-13 compared to 1995-01. Eslake and Walsh (2011) construct a labor productivity measure excluding mining and utilities, and show that the decline in productivity in the 2000s was broad-based: "...the decline in labour productivity in the mining and utilities sectors accounts for less than 10% of the decline in overall market sector productivity growth over the past decade". While mining and utilities TFP growth turned negative, it fell to zero in the

The decline in productivity growth is broad-based
(Percent change in MFP weighted by share in gross value added)



Source: ABS 16-Market Sector Gross Value Added (GVA), hours worked basis MFP data.

² For the 16 market sectors covered by Australian Bureau of Statistics (ABS), 2014 multifactor productivity growth was 0.2 percent on an hour worked basis for 2014, and -0.13 percent on a quality adjusted hours worked basis.

manufacturing sector, and halved in the services and agriculture sectors. For the manufacturing sector, the productivity slowdown over the last cycle is ascribed mainly to input lags in petrochemicals and metal products industries, and increased labour intensity, input cost pressures, and challenges in measuring quality improvements in food and beverages. In the current incomplete cycle, the rate of decline in manufacturing MFP has slowed (Productivity Commission 2013).

C. Baseline scenario of medium-term potential growth

9. Against this backdrop, our baseline projections suggest that Australia’s potential growth will be significantly lower in the future (though still higher than peers). Our estimates are constructed using a standard production function framework, with a Cobb-Douglas function of capital and labour, and Hicks-neutral total factor productivity. This allows us to take expected trends in mining sector productivity and demographic changes explicitly into account. That said, there are necessarily uncertainties particularly with regard to projecting productivity growth. Thus we also consider other methodologies (including HP-filtering, and a multivariate Kalman-filter model).

10. Potential growth will stay well below 3 percent over the medium term. Under the baseline, potential growth peaks at

just over 2¾ percent in the initial years, supported by rising mining TFP growth, but then subsides to just over 2½ percent as this effect wears off. On average, output growth is 2.7 percent, of which a third (0.9 percentage points) comes from TFP growth, a little over a third from labour, and the rest from capital. In 2020, growth is thus around 25 percent lower than the historical rate of growth of around 3-3¼ percent.

Table 1. Potential Growth - Baseline Estimates

	2015	2016	2017	2018	2019	2020
Potential growth	2.8	2.8	2.8	2.6	2.6	2.6
Capital growth contribution		0.8	0.8	0.8	0.8	0.8
Labour growth contribution		0.9	1.0	0.9	1.0	1.0
TFP growth		1.1	1.0	0.8	0.8	0.8
Non-mining contribution		0.4	0.4	0.5	0.6	0.7
Mining contribution		0.7	0.6	0.3	0.2	0.1
Capital stock growth		2.4	2.4	2.5	2.5	2.5
Labour growth		1.4	1.5	1.4	1.5	1.5
WAP		1.7	1.7	1.6	1.6	1.6
LFPR		65.1	65.0	64.9	64.8	64.7
NAIRU		5.6	5.6	5.7	5.7	5.7

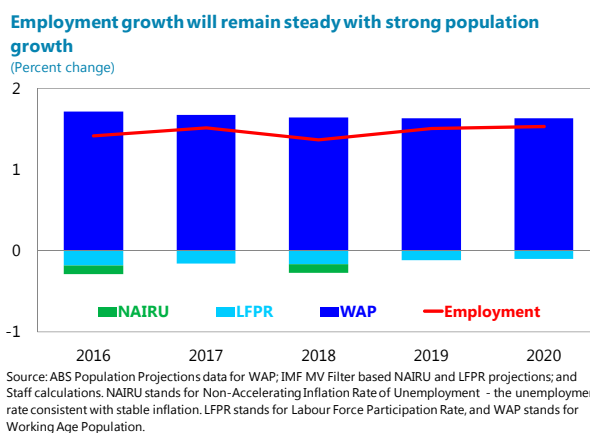
Source: Staff calculations.

11. Potential growth could be even lower. Lower commodity prices could lead mining sector export growth to be weaker than expected (25% weaker than the baseline), and non-mining TFP growth could be more in line with the average over the last complete cycle (close to zero). The combined effect could push potential growth to around 2 percent (compared to around 2½ percent in the baseline).

12. The assumptions underpinning the baseline estimates are as follows.

Labour: The labour input is taken as the number of employed persons. The key elements in projecting this variable are (i) working age population (ii) labour force participation rate (LFPR), and (iii) the equilibrium rate of employment. The product of these three items provides an estimate of the stock of employed workers each year over the forecast horizon (2016-20).

- Working age population is calculated as the sum of all persons 15 years and more of age, based on the ABS Population Projection time series (based on historical assumptions on fertility, mortality, and net migration). ABS data show working age population growth declining gradually from 1.7 to 1.6 percent over the medium term.
- LFPR in Australia has declined in recent years, as mining investment related activity has unwound. Over the medium term aging pressures are expected to gradually depress LFPR. Our assumptions on LFPR are derived from cohort-wise regression estimates of LFPR trends by gender and age which yields a forecast of LFPR declining from 65.1 to 64.7 percent over the projection period.³
- Equilibrium unemployment (NAIRU) is also estimated based on the MVF model. The estimates show NAIRU stays relatively steady at around 5.7 percent (and hence relatively steady equilibrium employment over the medium term).
- Overall, labour input growth remains fairly steady at 1½ percent, in line with growth in working age population.⁴



Capital stock: The flow of capital input is taken to be proportional to changes in the stock of “productive capital”, defined as aggregate real capital stock excluding households (including government, financial, and non-financial corporations). Growth of the capital stock can be expressed as the difference between the investment-to-capital ratio and the rate of depreciation.⁵ Based on Australian data for non-financial corporations (as a proxy for aggregate productive capital), average investment-capital ratio is around 6 percent over 1990-2014, and the rate of depreciation is around 3.5 percent. Assuming these long run average values hold over the medium term suggests a growth rate of capital around of 2.5 percent, and is somewhat higher than Treasury forecasts of between 1.8 – 2.3 percent.⁶

³ These results are derived using the IMF Research Department’s Multivariate Filter (MVF) model. The MVF model is a statistical (Kalman) filter model that uses information from actual growth, inflation, and unemployment to estimate the output gap, potential growth, and equilibrium unemployment (NAIRU – Non Accelerating Inflation Rate of Unemployment, which is a level of unemployment consistent with stable inflation). As a consistency check, the model imposes the estimated potential growth on a simple production function, where the labour input evolves according to an econometric gender-cohort-wise LFPR model. The Appendix presents details on cohort and gender-wise LFPR trends from the regressions (IMF 2015a).

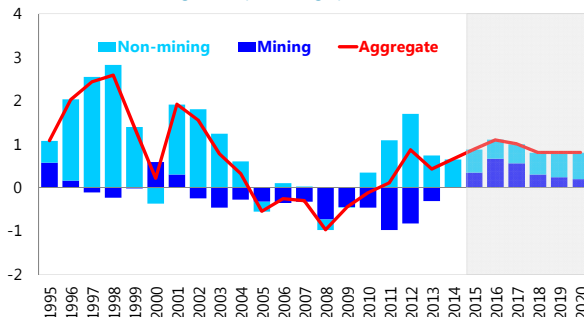
⁴ Given the uncertainty around estimates of NAIRU, a rate of 5.5 percent is also plausible, but does not change the results qualitatively.

⁵ $K_{t+1} = I_{t+1} + (1-\delta)K_t \Rightarrow \frac{\Delta K_{t+1}}{K_t} = \frac{I_{t+1}}{K_t} - \delta$, where I is investment, K is capital stock, and δ is the rate of depreciation.

⁶ The rate of investment growth consistent with capital stock growth of 2.5 percent is 2 percent, in line with Consensus investment growth forecasts of 1.9 percent over 2016-2020.

Total Factor Productivity: There are inherent difficulties in projecting TFP growth given measurement issues and the possibility of breakthrough innovation disrupting the link with past performance. However, for some sectors such as mining, it is possible to say with some degree of confidence that measured TFP growth will recover as investment lags from large new mining projects fade and exports gather pace. For other sectors, such as manufacturing, which has dwindled as a share of the economy, it seems reasonable to assume that re-establishing a high productivity manufacturing sector is a difficult task, and the past is a reasonable indicator of the future. With this in mind, the following assumptions are made regarding TFP growth:

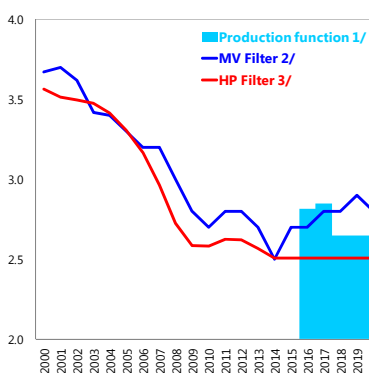
Mining sector productivity growth will recover in the near term
(Contribution to MFP growth, percentage points)



Source: ABS 16-Market Sector Gross Value Added (GVA) based MFP and GVA data; and staff calculations. Contributions to GVA-based MFP growth are calculated by weighting sector MFP growth by share in gross value added.

- Mining sector TFP growth is assumed to rise in proportion with the projected real growth in mining exports⁷, under the assumption that the export phase will use inputs less intensively than the construction phase⁸. The contribution of mining to TFP (proxied by mining sector TFP growth weighted by sector share in value added – around 10 percent) is high in the near term, and falls off by 2020 as the export growth effect fades.
- The contribution of the non-mining sector to aggregate TFP growth is assumed to rise from 0.4 percent in 2016 (in line with measured 16 market sector TFP growth in 2013) to 0.7 percent in 2020, in line with historical aggregate TFP growth over 1995–2013 of 0.66 percent.⁹
- Under these assumptions, aggregate TFP growth touches 1.1 percent in 2016, declining to 0.8 percent in 2020, as the lift from mining fades, but is offset by an increase in non-mining TFP growth to a long run average rate.

Potential growth estimates lie in a narrow range
(Percent change)



1/ Methodology as detailed in this paper.
2/ IMF Multivariate Filter Model, using information from Consensus Forecasts on medium term growth and inflation.
3/ 4-quarter average of annualized Q/Q growth in filtered real GDP. Forecasts are assumed to equal last actual value.

⁷ Resources and Energy Quarterly (September 2014), Bureau of Research and Energy Economics (BREE).

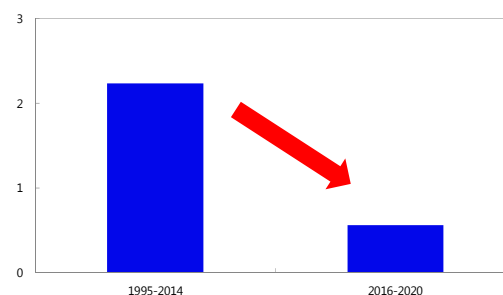
⁸ We assume between 70–75 percent of output growth is measured TFP growth.

⁹ The average non-mining TFP growth contribution of 0.5 percent over the medium term is in-line with the contribution of this sector over 2003–2013 to aggregate TFP growth.

13. Statistical filters give a similar picture. By way of comparison, the IMF’s Multivariate Filter model for output gap and potential growth¹⁰ shows average potential growth in the medium term of 2¾ percent. The filter shows an initially rising path of potential growth before declining in 2020. But unlike the production function estimates this approach does not factor in the likely TFP growth profile in the mining sector. A standard HP-filter shows trend growth in the region of 2.5 percent, taking an average of the filtered growth series over the 2013–2014. Both techniques show a sustained slowdown in potential growth from rates at or above 3½ percent in the early 2000s to below 3 percent in 2007/2008. There is some confidence to draw from the fact that a disaggregated inputs and productivity based view gives results fairly close to those from purely statistical techniques, both suggesting a slowing down of potential growth in a relatively tight range of between 2½ - 2¾ percent. However, as noted above, there are uncertainties in projecting productivity growth, and known weaknesses in the statistical methods (such as the end-point problem of the HP-filter, which is addressed to some extent by the MVF model with use of medium term of forecasts of key variables).

14. The slowdown has implications for future income growth. In the baseline, estimates of actual growth consistent with closing the output gap in the medium term, and terms of trade implied by projected import and export prices suggest that RNNDI per capita growth will average 0.5 percent in the medium term, well below the historical average of nearly 2¼ percent over 1995–2014.

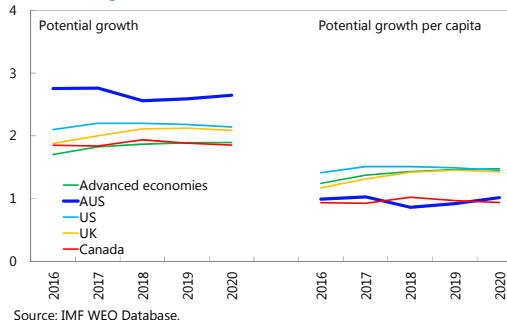
Disposable income growth will weaken significantly
(Real net national disposable income per capita growth; average)



Source: ABS data; and Staff calculations.

15. Addressing the slowing in output and incomes will require faster TFP growth. There are limits to input-led growth, stemming from the downward pressure on labour force participation from aging, and difficulties in sustaining high investment rates over extended periods. For example, generating growth of 3¾ percent with no additional TFP growth than in the baseline and unchanged assumptions about labour would need capital accumulation of around 4 percent a year. This rate of accumulation is consistent with an investment ratio of 7½ percent, which was only observed around the peak of the mining investment boom and is difficult to replicate.

Potential growth is still high compared to other advanced economies
(Percent change)



Source: IMF WEO Database.

16. Despite the slowing, Australia still compares favorably with its peers. GDP growth over 2016–2020

¹⁰ The estimate presented here is a variant of the model that uses information from actual output, inflation, and unemployment, and Consensus forecasts of inflation and growth to address the end-point problem with statistical filtering. For details on the filtering methodology, see IMF (2015a).

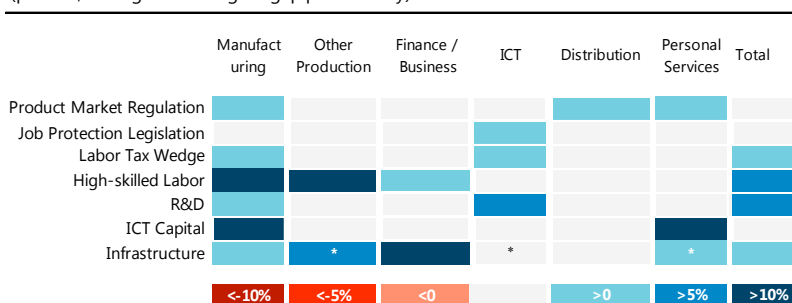
at 2.7 percent on average is well above the advanced economies average of 1.9 percent. In per capita terms, given the strong population growth rate, GDP growth is more in line with other AEs, around 1.5 percent over the medium term. Should TFP growth not materialize as projected in the baseline (and come out lower, or near zero), then potential output will be in line with other AEs, though on the lower end in per capita terms.

D. Can additional reforms stimulate higher growth?

17. Big reforms in the past had a sizeable impact on productivity. A recent IMF paper¹¹ shows that over 1970 – 2007, sizeable reductions in regulatory burdens (product and labour market regulations), investment in infrastructure, and increased expenditure on R&D, ICT capital, and use of skilled labour had strong positive effects on TFP in Australia.¹² For

the economy as a whole, the biggest increases in TFP were due to skilled labour and R&D spending, followed by infrastructure and reduction in labour market distortions. In individual sectors, manufacturing benefited from skilled labour and ICT capital, as well as from R&D, and product and labour market reforms; “other production” (including primary industries and utilities) and finance/business services benefited from skilled labour; ICT sector benefitted from R&D, job protection legislation, and labour tax wedge related reforms; the distribution sector from product market regulation reforms; and personal services from ICT capital and product market regulation reforms. It is noteworthy that infrastructure exerted a significant and large effect across several sectors.¹³ The results not only underscore benefits of past reforms, but also highlight areas that may require additional reform effort to boost productivity, such as in distribution.

Australia: The Medium-Term Impact of Structural Reforms on TFP
(percent; average technological gap per industry)



Note: The results show the cumulative 5-year level gains on TFP. Blue indicates a positive and statistically significant impact of the reform. For instance, an R&D shock leads to a cumulative increase in aggregate TFP level by about 6 percent after 5 years. The impact is assessed for an average technological gap per industry.

Other production includes Agriculture, Forestry, Fishing, Mining, Quarrying, Electricity, Gas, and Water-related industries. * indicates an unconditional impact of the shock.

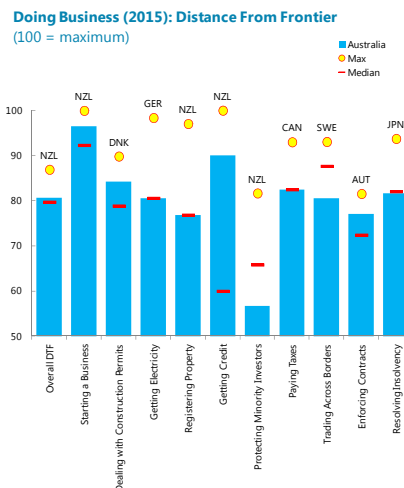
¹¹ “The New Normal: A Sector-level Perspective on Productivity Trends in Advanced Economies”, IMF (2015b). The paper includes a discussion of the sector-specific impact of reforms in product market regulation, job protection legislation, labour market inefficiencies, infrastructure, R&D spending, ICT capital intensity, and skilled labour use on TFP. See Appendix for more details.

¹² Data input and model results for Australia provided by Aleksandra Zdzienicka and Jovana Slijivancanin (both SPR).

¹³ The literature generally does not identify low investment in such productivity enhancing inputs as R&D, skilled labour, infrastructure, and ICT capital as inhibiting productivity growth in Australia (Dolman 2009), but it also does not rule out the potentially positive impact on TFP growth from additional investments in future (Eslake and Walsh, 2011).

18. Australia is already among the world’s most advanced economies on measures of competitiveness.

Though its rank on overall Ease of Doing Business slipped somewhat from 5 in 2005 to 7 in 2015, it remains close to the global frontier for starting a business and getting credit. It is at or above the median on most other indicators, barring protecting minority investors, and trading across boundaries. More generally, policy and institutional settings in Australia are sound and of a high quality.



Sources: World Bank Doing Business database. Country sample includes Austria, Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, U.K., and U.S.

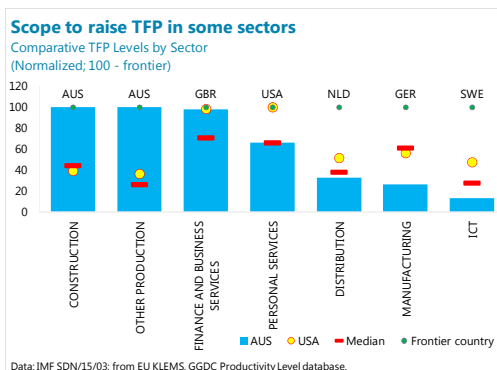
19. Thus, there are no more “low hanging fruit” type reforms left.

With Australia having already implemented key reforms in the 1980s and 1990s, and being already positioned at or near the frontier on several dimensions of competitiveness, the task of generating sustained productivity growth through additional reforms is much harder. It will require identifying narrower and targeted reform measures aimed at specific sectors and specific problems.

20. At the same time, reform momentum has slowed. According to some commentators, not only has the momentum slowed, but has also been replaced with “productivity stifling” regulation and legislation that has eroded productivity growth, and “progress has stalled or even reversed in some policy areas” (Garnaut 2005, Eslake and Walsh 2011, Banks 2012). There is also a view that reforms of the 1990s drove a one-time shift in the level of TFP, rather than a permanent change in the growth rate, hence the decline in TFP growth is a reflection of the fading impact of the major structural reforms of the past.

21. Meanwhile, other advanced economies have made progress towards the frontier.

For instance, many more advanced economies are now at the frontier in starting a business (Germany, Italy, Japan, Netherlands, New Zealand, Norway, and Spain), and some have improved property registration and resolving insolvency (Denmark and France) over the past decade. The continuing attractiveness of Australia as a business destination may therefore not be guaranteed.



Data: IMF SDN/15/03; from EU KLEMS, GGDC Productivity Level database.

22. There are some areas where Australia lags behind the world’s best.

Taking a more detailed look at these areas of weakness can suggest areas where improvements can be made, not only to boost productivity but also growth more broadly.

23. TFP levels lag behind in some sectors. In 2007, Australia was at the frontier²⁵ in construction, “other production” (including primary and extractive activities), and finance and business services (along with the U.S.), but lagged in manufacturing, ICT, and distribution (domestic trade, storage, and transport) activities. Though dated, these data suggest there is some room for catch-up in productivity levels in some areas – though there are comparative advantage arguments that may explain the gaps, and convergence to the frontier may not be guaranteed merely due to large gaps (see Appendix). For instance, the share of manufacturing has steadily declined in Australia, and it may be difficult to rekindle a manufacturing sector that is able to compete with countries at the frontier. However, it should be possible to improve productivity in the distribution sector.

24. The distribution sector may benefit from reforms. The econometric evidence shown above suggests that the reforms generally have had little or no impact on TFP in this sector. While the lack of evidence on direct effects may be explained by lack of targeted reforms, it also suggests that there was an absence of spillover effects from reforms more generally, which are observed in other sectors (for example, the methodology records no major reforms in the area of high skilled labour for the “other production” sector, but the evidence shows a strong positive impact on TFP from high skilled labour related changes). This suggests additional focus on reform efforts in the distribution sector, covering both transport and domestic trade.

25. Infrastructure investment may help to improve transport sector efficiency. Existing infrastructure is under pressure particularly in urban areas, ports, and water quality; according to some estimates, Australia has an infrastructure deficit of around \$80 billion.²⁶ Particularly in areas with high density exhibiting pressure on urban infrastructure, targeted new spending could help reduce efficiency losses related to congestion effects and wear-and-tear. Addressing infrastructure needs through efficient investment and appropriate asset regulation will help raise the economy’s capacity over the medium term.

26. Australia is in a good position to use public investment to boost infrastructure. The policy debate in Australia regarding infrastructure is focused on private sector financing and recycling existing infrastructure assets. At the same time, it has also been shown that debt-financed infrastructure investment has been can have large benefits in conditions where the cyclical position is weak, government debt levels are low, and institutional settings are strong,²⁷ enabling efficient conversion of infrastructure funds to useful public assets. For a country like Australia, where

²⁵ This analysis is taken from IMF 2015b, based on EU KLEMS sectoral TFP growth and Groningen Growth and Development Centre (GGDC) Productivity Level databases (Inklaar and Timmer, 2008). The frontier is defined by the country-sector pair with the highest TFP level in 2007 (=100). Other country-sector pairs are normalized relative to the frontier. The EU KLEMS Growth and Productivity Accounts provide data up to 2007 on TFP growth across 72 industries. The EU KLEMS project ran from 2003 to 2008, and will not be updated further. The GGDC 1997 benchmark dataset provides sectoral TFP levels relative to the U.S.

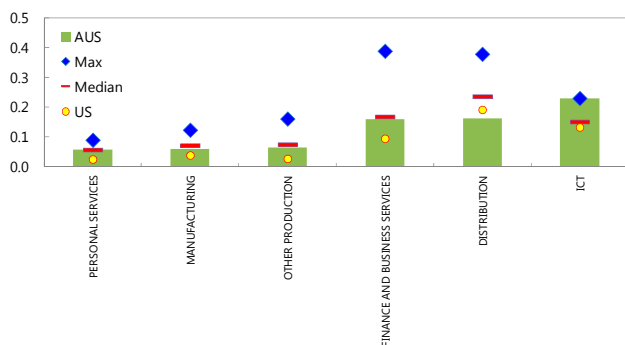
²⁶ Submission to the Productivity Commission Inquiry into Public Infrastructure, Australian Government, Office of the Infrastructure Coordinator (December 2013).

²⁷ World Economic Outlook (IMF, October 2014), Chapter 3.

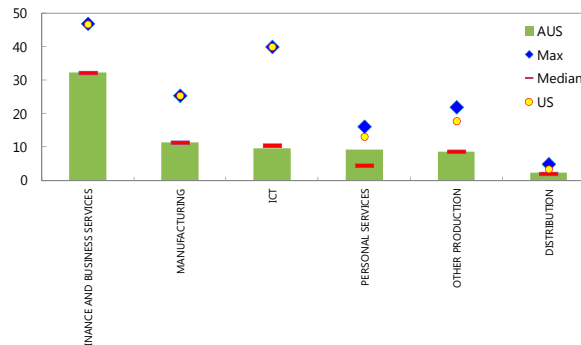
conditions appear well suited for debt financed public investment, the multiplier could be quite high; a one percentage point of GDP increase public spending could raise output by as much as 2.6 percent over the medium term, with limited impact on debt. In addition, by relieving congestion in high density urban areas, public investment may also help crowd in private investment and relieve the housing supply constraint. A program for greater public investment may include not only new projects, but also greater spending on maintenance.

Figure 1. Regulation, Skills, ICT, and R&D Indicators Across Sectors and Countries (2007) 1/

Upstream Product Market Regulations by Sector 1/
(Index)

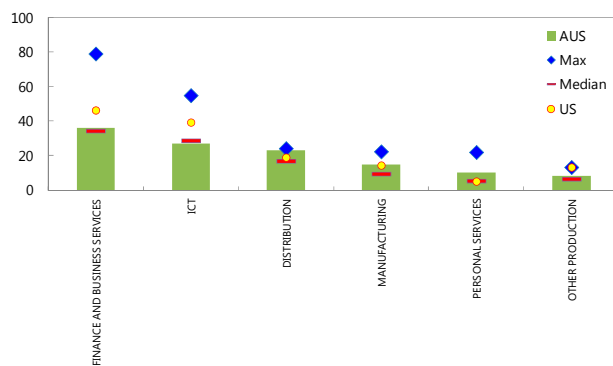


Share of High Skilled Workers by Sector
(Percent hours worked)

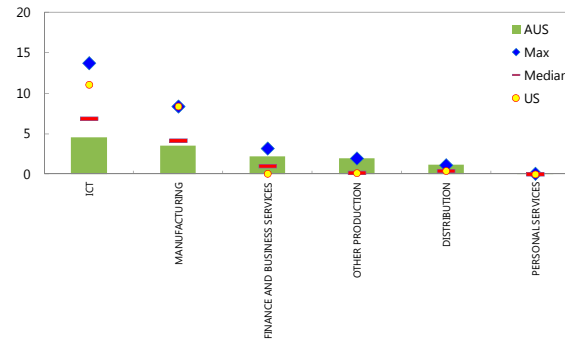


1/ High index value indicates more anti-competitive regulations in selected upstream non-manufacturing sectors.

Share of ICT Capital by Sector
(Percent, compensation to capital services)



R&D Spending by Sector
(Percent of value added)



1/ These charts are based on calculations for IMF 2015b. Underlying data are drawn from EU KLEMS; Indicators of Regulation Impact (OECD); ANBERD database (OECD). Other production includes Agriculture/Fishing/Forestry; Mining/Quarrying; and Electricity/Gas/Water Supply. Countries in the sample include Australia, Austria, Denmark, Germany, Italy, Japan, Netherlands, Spain, Sweden, and the U.S.

27. Enabling factors for technology absorption and innovation could improve further.

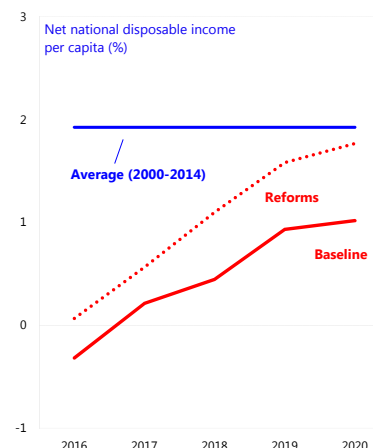
Compared to frontier of advanced economies, Australia lags noticeably in the use of skilled labour, being at or near the median (and significantly below the U.S., the frontier or near frontier country in this dimension) across all sectors barring personal services, where it lies above the median (Figure 1). R&D spending is below the median in manufacturing and ICT sectors, and well below the U.S. The

share of ICT capital lags in finance and business services and the ICT sector. On product market regulation, Australia generally performs well, having fewer anti-competitive regulations than other advanced economies, but more than in the U.S.²⁸ In some sectors like retail trade, restrictions on retail hours, parallel imports, location of outlets etc may be reducing efficiency in sectors like distribution, and could be relaxed further.

28. Fiscal policy can also assist growth by reforming the tax mix²⁹. For example, Australia's company tax rates are higher than the OECD average, and bringing them in line with the OECD average would have a limited revenue impact. More generally, moving towards a structure that is less reliant on direct taxes should in theory help reduce distortions, both to work effort and to corporate investment.

29. Modest improvements in TFP growth relative to the baseline could boost incomes substantially. As an illustration, closing half the TFP level gap that has opened between US and Australian sectors relative to 1995, over the next 10 – 15 years, could raise TFP growth to $1\frac{1}{4}$ – $1\frac{1}{2}$ percent over the medium term³⁰, compared to the baseline estimate of 0.9 percent (i.e. an increase of about 50%), pushing GDP growth to near 3 – $3\frac{1}{4}$ percent, compared to $2\frac{1}{2}$ – $2\frac{3}{4}$, i.e. an increase of about 20%. As a consequence, income growth would rise closer to the 2 percent long run average over the medium term. These improvements can come from better resource allocation. It is estimated that similar to other advanced economies, Australia can increase TFP levels between 7 – 9 percent by eliminating allocative inefficiencies over the next 10 years (IMF 2015).

Reforms required to boost future income



30. Even so, income growth is unlikely to hit past highs, even with plausibly higher TFP growth. Given weaker projected terms of trade, achieving 2 percent growth in per capita disposable income in the medium term will require twice as much TFP growth as assumed in the baseline (close to 2 percent per year), a rate not consistently observed in Australia's past.

²⁸ The level of regulations appears higher in the ICT sector. This seems to be on account of 100% state ownership of the largest postal and basic courier service provider, as well as barriers to entry in providing basic postal services. However on account of Australia's large size and remoteness of locations, this market structure may be warranted.

²⁹ See "Australia – Options for Tax Policy and Federal Fiscal Relations Reform" on pages 48-73.

³⁰ This is derived using the EU KLEMS database, 2007 sectoral TFP growth indices (1995=100) for U.S. and Australia, as follows. Baseline sectoral indices of TFP are constructed by "growing" ABS 16-market sector TFP indices by the average growth rate for each sector recorded over 2003-2013. A counterfactual index is then constructed by grossing up the baseline index by the ratio of the index for US and Australia in 2007 for a particular sector, in effect assuming no gap widening since 1995. Finally, a "reform scenario" index is constructed assuming each sector closes half the gap between the baseline and the counterfactual index over a period of 10-15 years. Shares in gross value added are used to compute aggregate TFP growth under reforms.

31. A number of specific reform measures are already being implemented or considered in Australia, which should boost productivity. These include:

- **Competition policy.** The Competition Policy Review (March 2015) recommends several product market reform measures including removing restrictions on retail trading hours, restrictions on pharmacy ownership and location, and on parallel imports that increase costs for Australian consumers.
- In addition, the report recommends measures in the transport sector (including more cost effective road pricing and harmonization across jurisdictions), a review of the intellectual property regime, as well as planning and zoning restrictions on land, taxis and ride sharing, and product standard restrictions that may inhibit imports.
- Australia is considering signing the WTO Government Procurement Agreement (currently one of five OECD countries not signatory to it), and maintains public sector procurement preferences, including local content policies including at the sub-federal level. These should be phased out, which should help improve the efficiency of public service delivery.³¹
- **Education and Skills, Infrastructure, and Innovation.**³² A number of reform measures have been initiated in response to identified weaknesses in these areas. These include:
 - Improving education and training through establishment of regulators to oversee quality of vocational education, uncapping of Commonwealth support for domestic undergraduate students to make it more demand driven (a number of measures were announced in the 2015/16 Budget to reform the higher education sector including deregulation of student fees), and establishment of tertiary education standards body to maintain education quality. This would help address the relatively large gap with respect to share of skilled workers noted above.
 - Improving infrastructure development frameworks, enhancing PPPs with improved demand and supply forecasting and contract standardization, and move to levying user charges on roads.
 - Boosting innovation with measures to enhance collaboration between universities, researchers and businesses.
- **Workplace Relations.** The Australian government has commissioned an inquiry into the workplace relations framework, with a view to addressing job creation, efficiency, business investment, employment flexibility, and issues related to equity and fairness in pay, and maintenance of a relevant safety net. It is notable that while business perceptions of Australia's relative labour market efficiency score it below the average for Anglo-countries, and the OECD average on some indicators, OECD measures of regulatory stringency show Australia is relatively less stringent compared to other countries.³³ Yet, perceptions of business can influence behavior and a review of this nature may help improve perceptions.

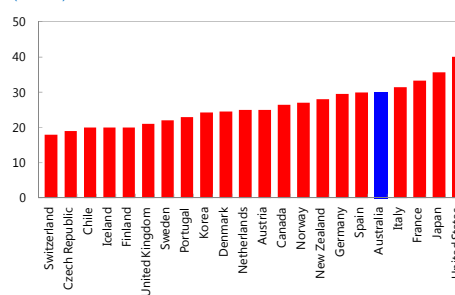
³¹ Australia Trade Policy Review, WTO 2015; Banks (2012).

³² For a summary of some of the measures that are proposed and under implementation, see OECD Economics Department Working Paper No 1025, Feb 2013.

³³ Workplace Relations Framework: The Inquiry in Context", Productivity Commission Issues Paper 1, January 2015.

- Tax Reform.** The authorities are conducting a review of tax policy, which offers an opportunity to consider growth promoting and efficiency enhancing measures that may be implemented through the tax system, such as shifting away from reliance on direct taxes, and addressing any tax related disincentives to productive investment, such as a relatively high company tax rate compared to the OECD average.

Corporate tax rates are among the highest in OECD (Percent)



E. Conclusions

32. Australia’s growth and income performance in the past nearly two and a half decades has been remarkable, but slowing. The high growth was a result of both wide-ranging reforms leading to structural improvements and the commodity boom. Aggregate TFP growth, however, has declined markedly and remains near zero.

33. Output and income growth are unlikely to pick up to previous rates over the medium term under a baseline scenario. Even factoring in the likely pick up in mining TFP growth, potential growth is likely to fall to about 2 ½ percent in the medium term (or to 2 percent under a plausible downside scenario), significantly lower than the historical average of about 3-3 ¼ percent. Per capita net national disposable income growth will likely be even weaker as the terms of trade come off further from their historic highs.

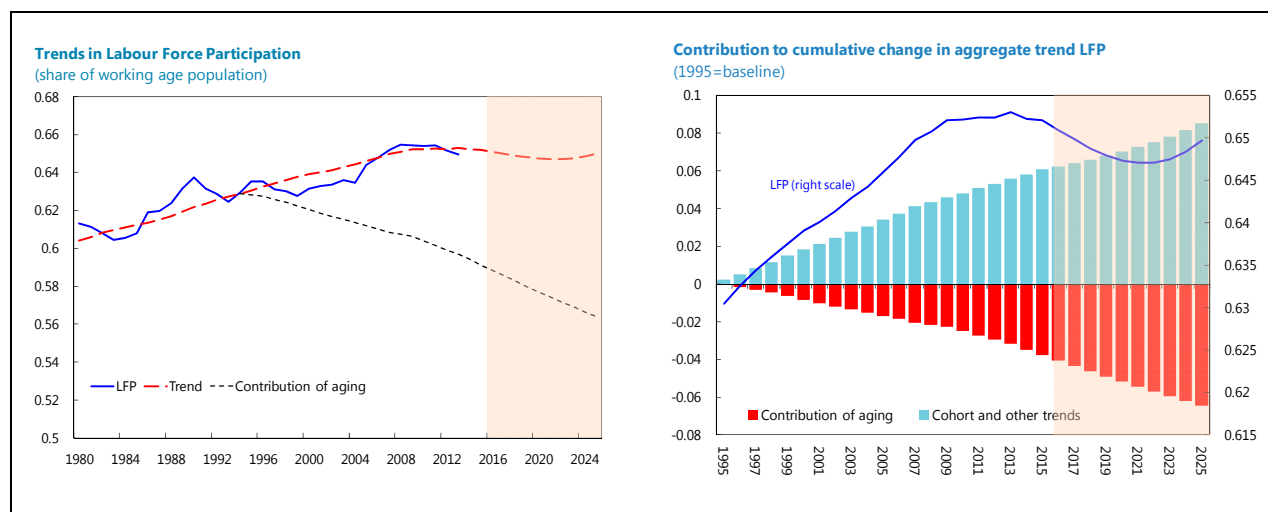
34. There is scope for increasing productivity, thus boosting incomes and growth, but it is limited given Australia is already near the global frontier. Higher productivity would raise output and income growth. But raising productivity substantially is likely to be challenging given the gradual waning of manufacturing, persistent productivity gaps in key sectors such as distribution, Australia’s position at the frontier in several sectors and efficiency dimensions, the generalized slowdown in advanced economies, difficulties in catching up with the frontier, and no obvious “big-bang” reform measures at hand.

35. Thus a strong recovery in reform momentum is critical. Encouragingly, the task of identifying and evaluating reforms is already underway with consideration being given to several reform measures aimed at boosting competition in retail and other services, encouraging more innovation and interface between business and research, enhancing labour skills through improved vocational training, tax reform, bridging the infrastructure gap, and improving workplace relations. Following through on these reforms, and continuing to identify and implement new reforms, will be critical for Australians to continue to enjoy the improvement in living standards that they have been used to.

Appendix—Technical Notes

I. Trends in Labour Force Participation

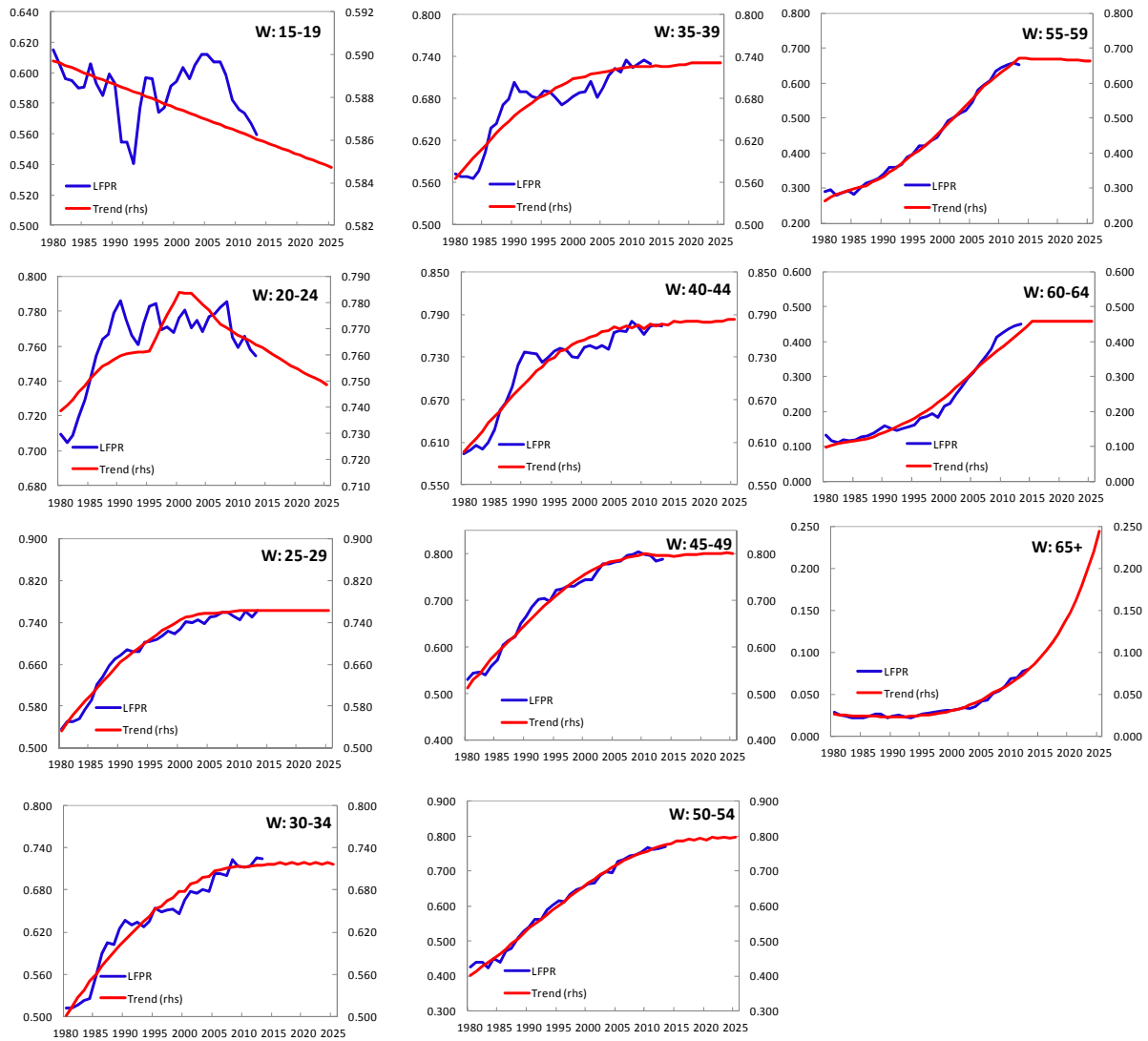
The charts below and overleaf show trends in LFPR across gender and age cohorts, as well as the long run trend projected participation rate that takes various demographic effects into account. The chart on the left shows that aging will exert a downward pressure on labour force participation (LFP) over the medium to long term. The chart on the right shows that forces from aging will be offset by cohort related and other trends. For instance, a key offsetting factor observed in Australia is rising participation among women in all but the youngest two age cohorts.



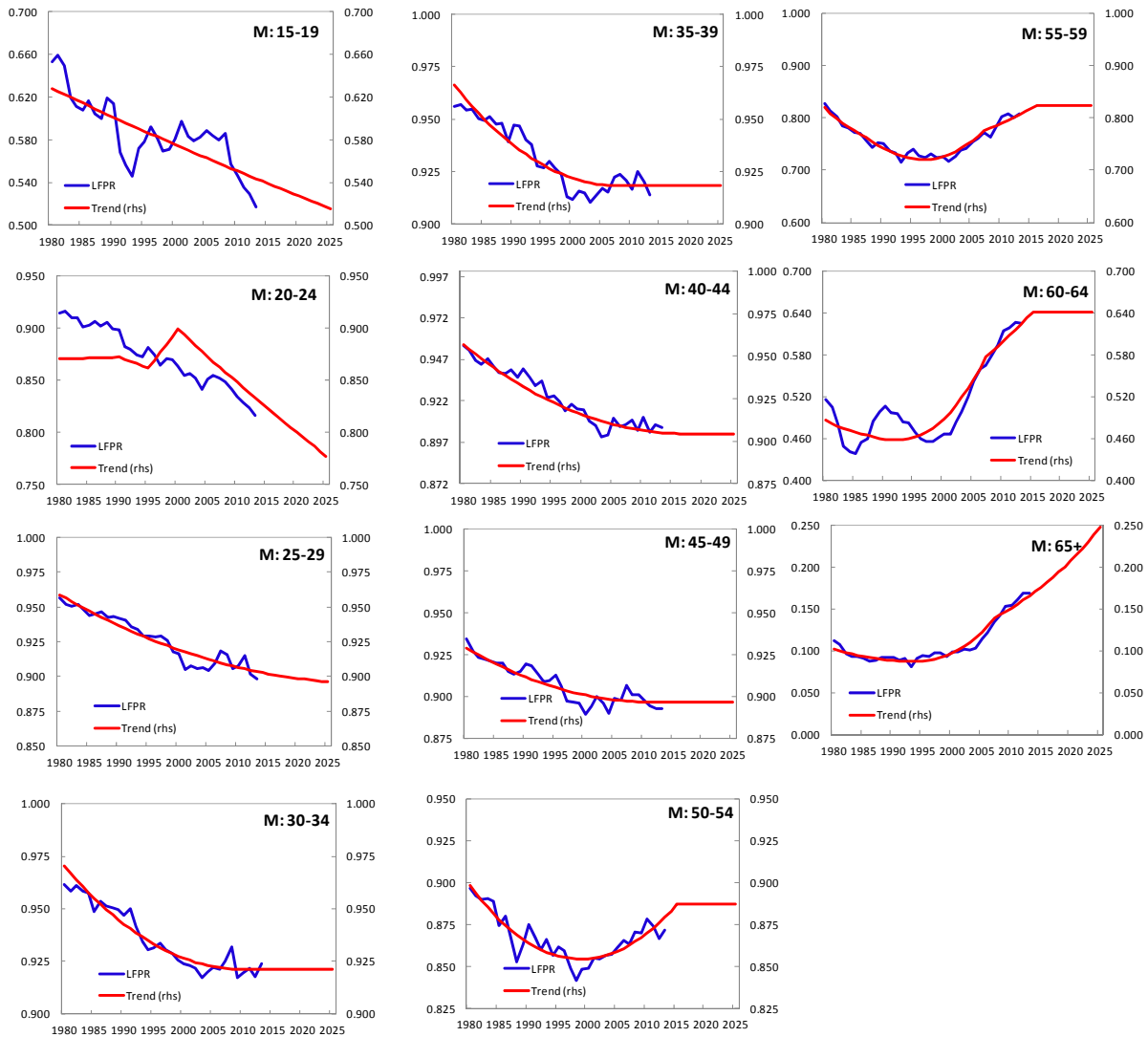
Increased participation among older male cohorts and among females generally over the past few years has helped to keep participation rates relatively stable. Breaking down the projected trend participation by gender and cohort, some trends that stand out are:

- Participation rates for women in all cohorts above 25 year olds have risen steadily over time. There is some sign of stabilization, and even slowing, in some of the cohorts.
- Participation rates among women below 25 have been declining
- Men's participation rates generally prevail higher than women, but have been declining among the young (below 29), and among those between 35-49 years old.
- In contrast, participation among men above 50 has been rising steadily.

Labor Participation Cohorts: Women



Labor Participation Cohorts: Men

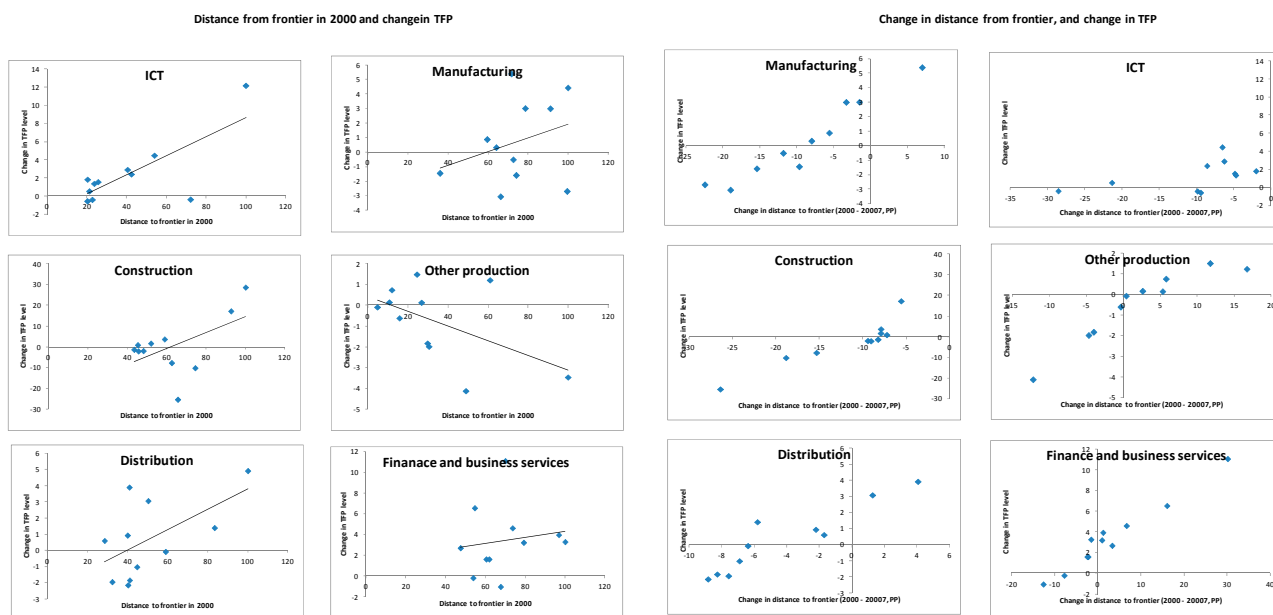


II. Changes in TFP levels and in relative distance to frontier among selected advanced economies and aggregate industry groups.

Using data from IMF 2015, the scatter plots below graph (i) changes in TFP over 2000-2007 against distance from the frontier in 2000, and (ii) changes in TFP against changes in distance from frontier over the same period. Distance from frontier = 100 if a country-sector pair is at the frontier (and lower for those behind the frontier). TFP levels are calculated as described in the text.

The figures suggest that over 2000-2007 (i) country-sectors far from the frontier in 2000 did not necessarily show big increases in TFP levels, and (ii) even when TFP growth is positive, distance from the frontier may increase. In many cases, increase in TFP levels was higher for countries closer to the frontier (such as in ICT, manufacturing, construction and distribution), and near zero or negative for those considerably distant from it (left panel). Moreover, even in cases where TFP growth is positive, distance from the frontier can still widen (barring the case of financial and business services, and other production, where by and large the distance shrinks with TFP increase; right panel).

The pattern observed in the scatter plots are consistent with numerous explanations, such as comparative advantage, country-specific factors impeding catch-up growth, factors specific to the observation period, etc. For our purposes, it helps to serve as a cautionary note in interpreting distance from the frontier in 2007 as ready space for productivity improvements.



III. Medium term impact of selected reforms on sectoral TFP levels in Australia

The results presented below are based on the following panel regression:³⁴

$$tfp_{i,j,t+k} - tfp_{i,j,t} = \beta_0 + \beta_{11}S_{A,j,t} + \beta_{12}S_{i^*,j,t} + \beta_2 S_{A,j,t} * tfpgap_{A,j,t} + \beta_3 tfpgap_{i,j,t} + \beta_4 \Delta tfp_{L,j,t} + \beta_5 X_{i,t} + \alpha_1 D_i + \alpha_2 D_j + \alpha_3 D_t + \varepsilon_{i,j,t}$$

where cumulative changes in TFP for each industry j over k periods are expressed as a function of reform shocks S (specific to Australia, and to other countries i^*), reform shocks interacted with Australia's TFP gap from the frontier in industry j at time t), the distance to the frontier, TFP growth at the frontier L , and other control variables including country, industry, and year dummies.

Reform shock episodes are identified as a significant change (in absolute terms) of a structural indicator above a certain threshold. In particular, a change below one standard deviation of the average annual change is considered for product and labor market regulations, and labor tax wedge and an increase above two standard deviation for R&D, ICT capital, and high-skilled labor.³⁵ Under these assumptions, reforms episodes for Australia are identified as below.

Identified shock episodes to reform variables for Australia

	Manufacturing	Other Production	Finance/Business services	ICT	Distribution	Personal Services	Total
Product Market Regulation							1987, 1991-2003, 2005, 2007
Job Protection Legislation							2007
Labor Tax Wedge							2006
High-skilled Labor			1987, 1988	1987, 1988			
R&D	1991, 1992, 1994, 1997, 2000, 2001, 2003, 2007			1994, 1997, 2000, 2001, 2003, 2007			
ICT Capital	1971, 1974, 1982, 1984, 1986, 1992, 1995, 1996, 1997, 2000, 2007	1974	1989, 1994, 1995, 1997, 2007	1971, 1974, 1982, 1984, 1986, 1989, 1995, 1996	1978		
Infrastructure							1972, 1973, 1974, 1982, 1994

Data are taken from OECD, EU KLEMS, and ANBERD databases, while infrastructure is taken as a principal component of roads, phone lines, and electricity generation capacity. The labour tax wedge is taken from the OECD Taxing Wages database, measured as percent of taxes and transfers paid in the share of total labour costs. The sample includes 23 market industries from 11 advanced economies over 1970-2007.³⁶

³⁴ For details regarding this section, refer to the Technical Appendix, IMF (2015b).

³⁵ Product and labour market regulations and infrastructure do not change much over time, hence a major reform is assumed when the indicator is below (above in the case of infrastructure) one standard deviation.

³⁶ Countries include Australia, Austria, Denmark, Finland, Germany, Italy, Japan, Netherlands, Sweden, United States, and United Kingdom.

The results for Australia show that a decrease in product market regulation leads to an increase in TFP level in manufacturing, distribution, and personal services-related industries. A lower labor tax burden can have a positive TFP impact in Manufacturing and ICT-related industries. An increase in knowledge-based economy and investment in infrastructure are in general associated with higher TFP. For instance:

- ICT capital had by far the largest economy-wide TFP impact. A large increase in the ratio of ICT capital to total capital services (above 0.3 percent) leads to a cumulative increase in TFP of 22 percent for total economy after 5 years.
- An increase in the ratio of skilled labour to total labour ratio (above 17 percent) is associated with an increase of 6.5 percent in TFP levels after 5 years.
- An increase in the ratio of R&D spending to industry value added (10 percent) leads to an increase in aggregate TFP levels by about 6 percent after 5 years.
- An increase in the infrastructure indicator (2 percent) leads to an increase in TFP levels by nearly 4 percent after 5 years.

These results not only highlight that previous major reforms have had a significant impact on TFP, but also suggest that certain areas may benefit from more targeted reform efforts, such as the distribution sector. Australia’s greater distance from the frontier in the distribution sector, as described in the main text, may also be a reflection of the lack of reform impact.

Medium-Term Impact of Structural Reforms (percent change in TFP levels)

	Manufacturing	Other Production	ICT	Distribution	Finance Business	Personal Services	Total
Product Market Regulation	1.7	0.0	0.0	2.9	0.0	4.4	0.0
Labour Market Regulation	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Labour Tax Wedge	2.0	0.0	4.6	0.0	0.0	0.0	3.0
High-skilled Labor	17.6	15.6	0.0	0.0	3.4	0.0	6.5
R&D	3.3	0.0	6.4	0.0	0.0	0.0	6.2
ICT Capital	44.6	0.0	0.0	0.0	0.0	13.9	22.7
Infrastructure	1.7	5.0	0.0	0.0	12.5	0.5	3.8

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OPTIONS FOR TAX POLICY AND FEDERAL FISCAL RELATIONS REFORM¹

A. Introduction

1. Australia's streak of nearly a quarter-century of uninterrupted growth has left public finances in a solid position. The net debt-to-GDP ratio of the consolidated general government (i.e. the Commonwealth, states, and local authorities) fell from *plus* 23 percent in 1994 to *minus* 7 percent in 2007.² The country has also weathered the global financial crisis (GFC) relatively well, with supportive macroeconomic policies and the China-induced boom in mining investment underpinning the economy during this period.

2. However, fiscal consolidation after the GFC is proving challenging. Fiscal deficits have returned, and net debt has risen to 15 percent of GDP by 2013/14. The end of the mining investment boom and sharp declines in prices for key exports (especially iron ore) have led to a slowdown of GDP growth, declining incomes, and eroding revenues, while efforts to cut back spending have met with political resistance.

3. In this context, the authorities are conducting reviews of their tax policy and federal fiscal relations. Both themes are closely interrelated, both from an economic as well as a political economy viewpoint. Reforms in these areas can help improve growth prospects of the economy, which will need to shift away from reliance on commodity-driven investment and growth. At the same time, comprehensive reforms can lay the groundwork for meeting longer-term fiscal challenges. They can be calibrated to be revenue neutral or achieve some net revenue gains to support fiscal consolidation. However, any reform package is likely politically difficult to agree on, and would require broad political consensus.

4. Key issues that successful tax and federal fiscal reforms need to tackle are:

- *Taxing efficiently.* An efficient tax system not only minimizes unwanted distortions, thus increasing investment, employment, productivity and growth (Johansson et al, 2008), but also administrative costs for the state and compliance costs for taxpayers.
- *Boosting employment.* This implies the reduction of disincentives to work, and of the cost of creating jobs.

¹ Prepared by Alex Pitt.

² "States" refers to states and territories.

- *Promoting investment.* In a more globalized economy with more mobile factors of production (especially capital), maintaining an attractive investment environment is key for ensuring continued growth.
- *Ensuring fairness.* At the same time, care needs to be taken that technological and other factors that tend to increase inequality do not lead to entire segments of the population being left behind. This implies that tax and transfer systems need to be equipped to support those who cannot work, or whose work does not earn them a sufficient income.
- *Environment.* Taxation is an effective way to reduce negative externalities (e.g. to conserve natural resources and promote health) while raising revenue that otherwise may have to be raised in a way that is detrimental to overall welfare (taxing a ‘bad’ versus taxing a ‘good’).
- *An efficient state.* Not only are the costs of administering the tax system an important factor, but also the incentives created by the federal fiscal system that the Commonwealth and states face to deliver public services efficiently and to a high standard.
- *Raising adequate revenue.* Reforms will need to ensure that adequate revenue is raised, and should ideally facilitate further adjustments in the longer-term future to meet increasing spending needs arising from ageing (primarily pensions and healthcare costs, though these are projected to increase only modestly over the next 15 years—see Australian Government, 2015a) as well as potential demands for better public services, e.g. in education and infrastructure.

5. This paper analyzes key taxes and features of Australia’s tax and federal systems, and offers reform options. It is beyond the scope of this paper to examine each of the more than 100 taxes levied in Australia, or offer more than an indicative quantification of each reform option. Its aim is to discuss key features—including the main revenue earners as well as some of the more distortive elements—of Australia’s current tax and federal fiscal relations system, and offer interrelated reform options. The remainder of this paper is organized as follows: Section B discusses salient features of the Australian tax and federal fiscal system, Section C offers six reform modules, each comprising a number of individual measures, and Section D concludes.

B. Features of Australia’s Tax and Federal FISCAL System

General Observations

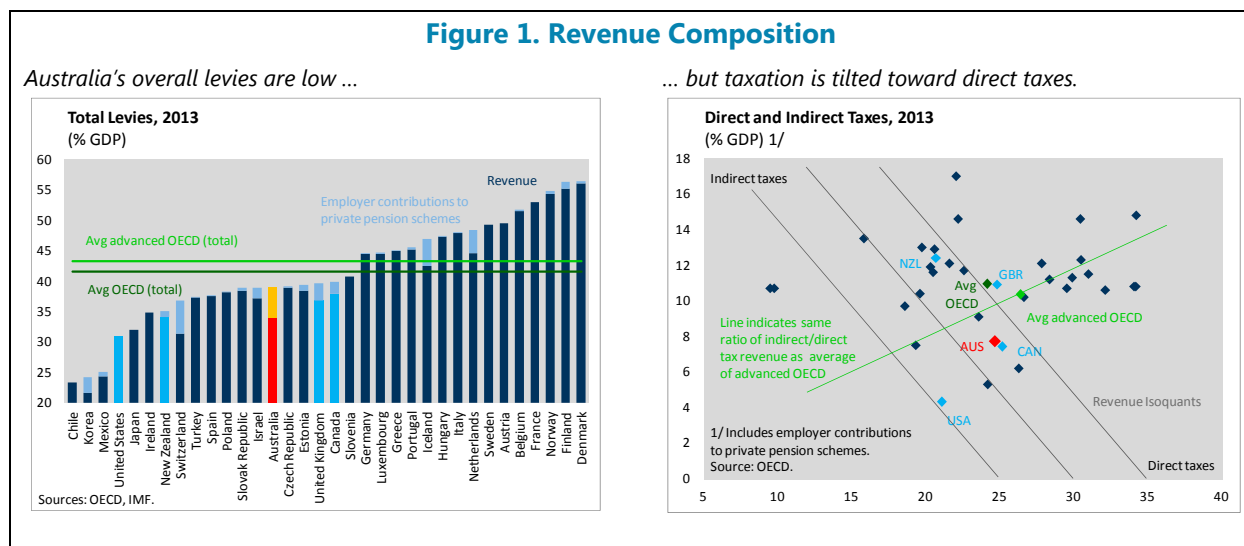
While imposing an overall smaller burden on the economy than in most other advanced economies, Australia’s tax and levy system is skewed toward relatively inefficient direct taxes.

6. Australia’s overall burden of government levies, at 39 percent of GDP, is comparably low. Its total levy-to-GDP ratio is $4\frac{3}{4}$ percentage points lower than the average of advanced-economy peers (Figure 1). This includes employer contributions to private pension schemes, which are compulsory and thus akin to a tax, at least from the employer’s viewpoint, even if the payment does not accrue to the government or a public social security fund (some companies may make higher contributions to private pension schemes than required by law as part of their compensation packages—however, this is likely to be an overall relatively small amount.)

7. Six taxes generate 2/3 of total general government tax revenue, and 10 taxes over 90 percent. While there are over 100 taxes (Australian Government, 2010), the largest revenue earners are the personal income tax, the corporate income tax, the goods and services tax (GST), property and payroll taxes (including state payroll taxes and taxes on superannuation contributions), and fuel excises.

8. Revenues are skewed toward direct taxes. While the overall level of direct taxes as a percentage of GDP is broadly comparable to other OECD economies, revenue from indirect taxes on goods and services is low. Therefore, Australia's revenue policy uses the space that its overall relatively low revenue burden provides largely to reduce indirect taxes.

9. Direct taxes on labor and capital are generally less efficient than indirect taxes. A wide body of literature, including the Australian government's 2010 Henry Tax Review and the Australian Government's recent Tax Discussion Paper, suggests that direct taxes on labor and capital (though not on immovable property) lead to larger economic distortions than indirect taxes (see also Johansson et al, 2008) and are most harmful to growth. The 2010 Henry Tax Review estimates that of the large revenue earners, insurance, payroll, and corporate income taxes generate relatively large marginal welfare losses, while the GST is the most efficient tax (land taxes are also efficient, but do not generate large revenues). It also notes that in Australia, the number of taxpayers using professional help filing their taxes is relatively high.



Key Taxes

Personal income and corporate tax rates are comparably high, but personal income tax revenue is undermined by large tax expenditures. The GST rate is low and productivity average.

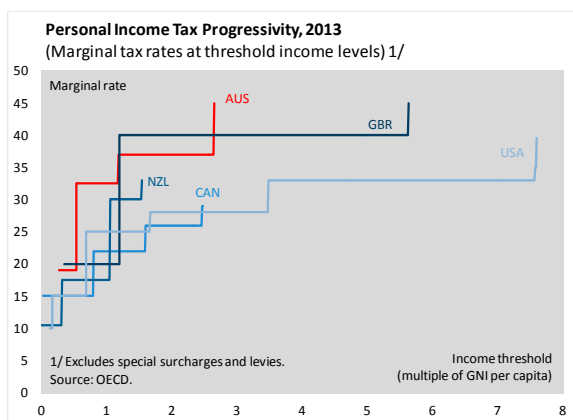
Taxation of Individuals

10. Personal income tax revenue in Australia is below advanced economy peers (Figure 2). At the same time, tax rates are fairly progressive, with a top marginal rate of 45 percent (in addition,

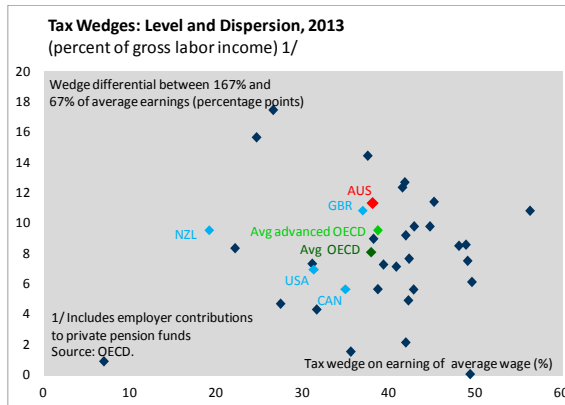
a temporary 2 percent budget repair levy was introduced in 2014/15) that sets in at a level of income (270 percent of GNI per capita) that is relatively low compared to OECD peers. However, there are significant exemptions and concessions, most notably the exemption of owner-occupied houses from capital gains tax (CGT; which is integrated into the personal income tax), the concessional CGT treatment of the sale of investor houses if owned for more than one year (the same as for other investment, e.g., equity), and the concessional taxation of employer superannuation (i.e. pension fund) contributions and of superannuation returns. The resulting tax expenditures are estimated by the Australian Treasury at over 4 percent of GDP in 2015/16.

Figure 2. Personal Income Taxation

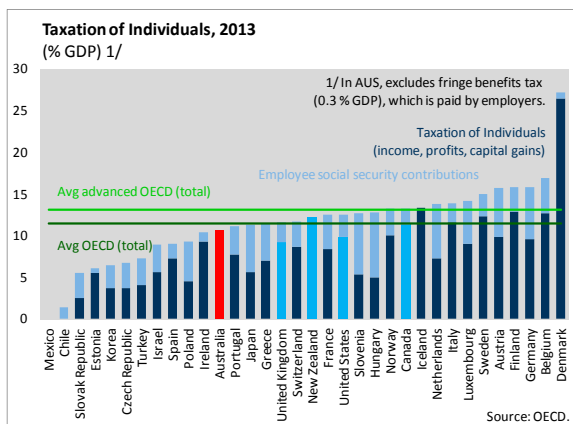
Although tax rates are relatively high and progressive ...



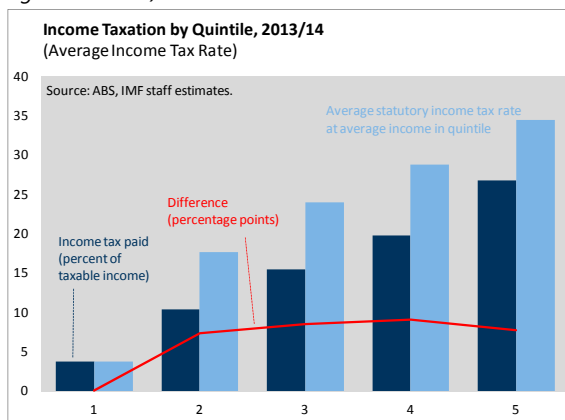
... and the tax wedge is close to the OECD average but more progressive...



... total personal income tax revenue is below average, ...



... in part due to significant exemptions (which benefit higher incomes).



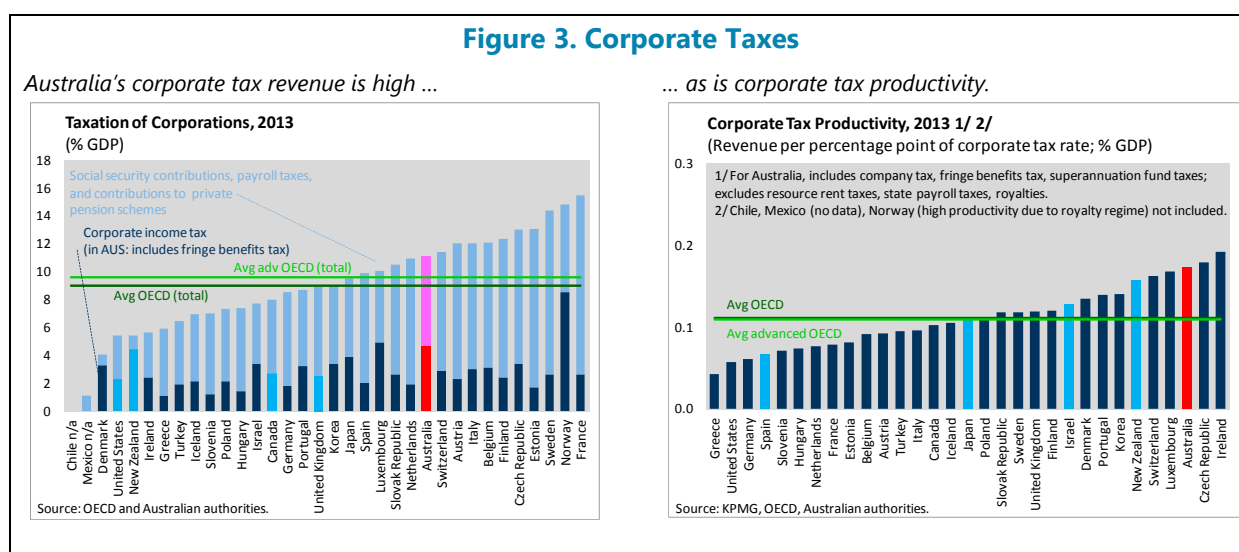
11. Many countries provide special tax regimes to support homeownership and savings for retirement (Boxes 1 and 2). While there may be good socio-political and economic reasons (e.g., promotion of homeownership as a social goal, or raising the national savings rate) for such policies, such special treatment can create significant economic distortions (some of which are indeed intended, though others are not), and are often costly in terms of foregone tax revenue.

While estimates of distortions and the amount of tax expenditure are often of limited reliability due to the difficulty in quantifying behavioral responses to changes in policy, the broad estimates by the Australian Treasury indicate that they are substantial. However, beyond the direct fiscal cost effect, the support for homeownership also has an impact on the real estate market, and, together with superannuation subsidies, affect the progressivity of the tax system.

Taxation of Corporations

12. Australia relies to a significant extent on corporate taxes and levies (Figure 3). They represent 11¼ percent of GDP (including employer contributions to superannuation funds which do not accrue to the government), well above the advanced OECD average even if natural resource rent taxes and royalties are not taken into account. Corporations pay a number of taxes:

- *Company tax (4½ percent of GDP in 2013/14)*. At 30 percent, Australia’s company tax rate is above the average of advanced OECD (26.5 percent). The productivity of this tax is also well above the advanced OECD average, contributing to one of the highest shares of corporate tax revenue among advanced economies.
- *Employer contributions to superannuation funds (5 percent of GDP)*. Currently, the compulsory contribution rate is 9.5 percent of gross salaries/wages, but is scheduled to rise to 12 percent by 2025/26. These contributions are subject to a 15 percent tax in superannuation funds. While not a tax accruing to the government, these levies nonetheless represent a de facto tax to employers.
- *Fringe benefit taxes (¼ percent of GDP)* are levied on certain benefits employers provide to their employees or their employees’ associates, for example the use of company cars for private purposes.
- *State payroll taxes (1½ percent of GDP)*. States levy payroll taxes which, however, do not flow into specific social security funds but contribute to states’ general revenue. Moreover, these taxes are not broad-based, and can exempt large numbers of employees (Australian Government, 2015b).



Box 1. Housing and the Tax/Transfer System

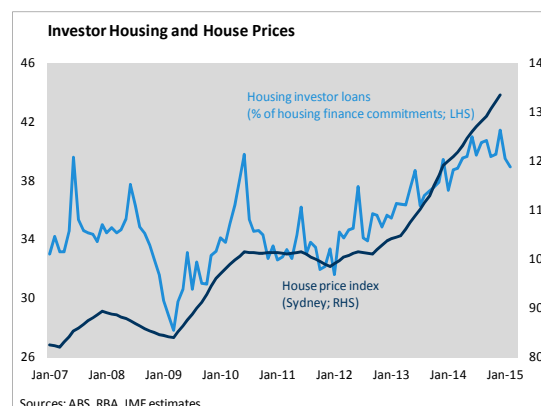
Australia's tax and benefits system incentivizes investment in real estate. Both owner-occupiers and investors receive significant support through the tax system (Australian Government, 2014). This tends to increase demand for housing, with likely consequences for the real estate market. This in turn has potentially negative implications for housing affordability, financial stability, and equity.

The principal housing-related tax incentives are:

- **Owner-occupiers.** Owner-occupied residences are exempt from CGT. While demand for the overall number of dwellings might be only little affected (since people who do not own homes would have to rent), it is likely to lead to overinvestment in housing since this form of investment is tax-preferred (see Australian Government 2014), and thereby drives up the value of dwellings.
- **Investors.** CGT for real estate owned for more than a year is effectively halved, to account for the erosion of real value due to inflation. This is reinforced by the deductibility of interest payments and maintenance expenses from taxable income from other sources (though rental income is taxed), an uncommon feature internationally and among Australia's peers. While this deductibility is not different from that of other investments, it facilitates 'negative gearing'. As with incentives for owner-occupiers, it drives up prices, but likely does not trigger a significant supply response, which is largely determined by more fundamental factors such as zoning regulations and infrastructure availability.

The CGT concession for investors and the tax deductibility of net losses on housing investments from other income increase incentives for 'negative gearing'. When an investor expects capital gains, a property investment may be worthwhile even if rental income does not cover interest costs and maintenance expenses. This effect is enhanced if the resulting loss can be deducted from taxable income, and by concessional CGT treatment. In an environment of rapidly rising real estate prices, the incentives for this form of investment increase, since low-taxed expected capital gains increase. Negative gearing thereby acts as an amplifier of price movements in the real estate market and encourages investment that would otherwise incur ongoing revenue losses. At the same time, however, this tax treatment could subsidize rents, since at a given dwelling price it makes a lower rent acceptable to landlords. However, as it also increases dwelling prices, the net impact is not clear—moreover, if the motivation is to help low-income renters, this can be done much more efficiently (e.g., through direct transfers).

The transfer system also has an impact on real estate investment. When the level of the (means-tested) Age Pension is calculated, the value of owner-occupied houses is exempt from the assessment of assets (Australian Government, 2014). While there is an argument that owner-occupied real estate does not yield an income stream, it encourages investment in real estate, increases Age Pension costs and likely benefits wealthier households. The amount of additional expenditure this generates is difficult to estimate, but could be substantial.

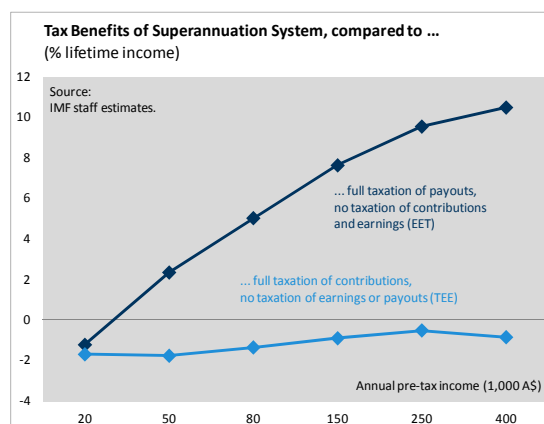


Box 2. Superannuation and Income Distribution

Australia’s pension system is based on three pillars. The universal ‘Age Pension’ (the first pillar) is means-tested and taxpayer funded; the ‘superannuation guarantee’ (the second pillar) is a mandatory contribution made by employers on behalf of their eligible employees into a superannuation (pension) fund; and the third pillar consists of voluntary savings including additional contributions to superannuation funds. As the current working generation accumulates assets, overall reliance on the public pension system is expected to decline over the long run. With this move, responsibility for providing for old age is increasingly shifted to the individual (though a safety net remains), and the question of taxation of pensions arises.

There are two broad concepts for taxing pension savings. In principle, the ‘expenditure tax’ system, where either contributions or payouts are taxed, is neutral between current and future consumption, while the ‘income tax’ in which earnings of the pension funds are also taxed is neutral between current consumption and saving, which provides a (relative) disincentive to save (Whitehouse 1999).¹ However, in practice, the effect on savings behavior and tax revenue depends on the progressivity of the income tax regime and the tax rates applied to contributions, fund earnings, and/or payouts.

Australia’s system incentivizes retirement saving and benefits higher-income earners. Australia taxes pre-tax (concessional) contributions (which are made by employers and the self-employed) and earnings during the accumulation phase, but at concessional rates. This represents a somewhat hybrid—and administratively complex and opaque—system, in which the disincentive to save is counterbalanced by concessional rates. The tax rates on contributions and earnings are largely flat, though a higher tax rate applies to contributions of high-income earners, and the tax on contributions for low-income earners are effectively reduced through a government subsidy. A highly stylized model calculation (for details of the model, see Appendix) suggests that the tax impact of the Australian concessional TTE system is close to that of a TEE system at full income tax rates, but provides significant savings incentives compared to an EET system, which most OECD countries have adopted. Moreover, higher-income earners gain relatively more from the favorable tax treatment of retirement savings (indeed, low-income earners lose: subsidies are insufficient to offset the effectively higher average tax rate on superannuation contributions than on other earnings), which undermines the progressivity of the income tax system.

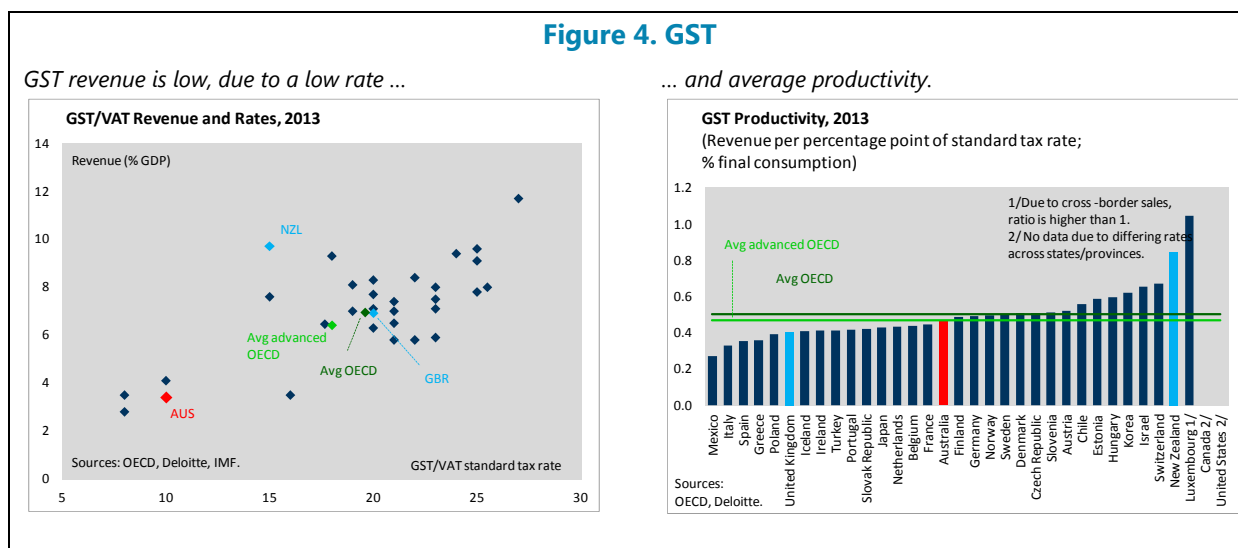


¹ Corresponding to the three points at which pension savings can be taxed (at the contribution stage, when investment income and capital gains accrue to the fund, and when payouts are made), systems are classified as TEE (contributions are **T**axed, earnings are **E**xempt, payouts are **E**xempt), EET, TTE, or ETT.

- *Royalties and resource rent taxes (about ¾ percent of GDP).* These largely accrue to the states. Their productivity is difficult to assess, since royalty regimes are often complicated and differ widely across countries. Illustratively, Australia’s revenue natural resource revenues as a percentage of natural resource rents as calculated by the World Bank (see World Bank World Development Indicators) is about 10 percent, broadly comparable to Canada (11 percent).

Sales Taxes

13. Australia stands out in that its revenue from value added tax is much lower than in almost all other OECD peers (Figure 4). This is in part due to the low standard GST rate of only 10 percent, but also due to numerous exemptions which narrow the tax base and reduce GST productivity. For example, New Zealand, with a standard rate lower than in most other OECD counties (though higher than in Australia) but almost no exemptions achieves one of the highest GST revenue-to-GDP ratios in the OECD (Box 3). GST is collected by the Commonwealth government but distributed to the states (see below).



Other Taxes

14. There are a number of other taxes which, while less important from a total revenue viewpoint, nevertheless have significant economic efficiency costs. Some of them are, however, an important source of revenue for states.

- *Stamp duties.* Stamp duties on the transfer of residential and commercial property (‘stamp duties on conveyances’) are the third-largest source of tax revenue for states (after GST and payroll taxes). The 2010 Henry Tax Review and the 2015 Tax Discussion Paper both find that this type of tax has a large welfare cost—unsurprisingly, since it directly adds to transaction costs, impedes labor mobility, and can lead to the retention of land for relatively unproductive purposes. They are also a volatile revenue source, as they are driven by property prices and the number of transactions.

- *Insurance taxes.* As with stamp duties more broadly, insurance taxes have large welfare costs, as they may lead to under-insurance or to people not insuring at all.
- *Energy subsidies.* Australia levies excise taxes on fuels, the indexation of which has recently been reintroduced. Overall, however, taxation of energy is too low—as in most other countries—to adequately reflect negative externalities (Box 4).

Box 3. GST Reform in New Zealand

New Zealand introduced its GST in 1986. At the time, New Zealand's economy was in crisis, and the government pursued a wide range of economic reforms to liberalize the economy and restore fiscal and external balance. The GST was introduced at a rate of 10 percent, which was later increased to 12.5 percent (1989) and 15 percent (2010). Its main aim was to increase revenues to put public finances on a sounder footing and to boost growth through reduced economic distortions and administrative and compliance costs. Equity considerations played a secondary role at the time.

The overarching principle of the GST (as well as of New Zealand's tax reforms more broadly) was to establish a broad base and tax it at low rates. This led to the adoption of a GST at a single rate and with almost no exemptions. Most notably, food was included in the GST base at the full rate. This not only led to a broad base but also to reduced compliance and administration costs, as definitional issues that afflict more complex systems (including Australia's) were avoided. As a result, New Zealand has the highest tax productivity in advanced economies (with the exception of Luxembourg, where significant cross-border sales boost VAT productivity).

The introduction of the GST was part of a comprehensive tax and welfare reform package. At the same time, or very shortly thereafter, reforms of the income tax, company tax, and taxation of retirement savings were implemented. In addition, a major reform of the welfare system was carried out, which was critical to the political acceptance of the GST (Head 2009).

A confluence of political economy factors were key for the government's ability to push through reform (White 2009). These included the adverse (macro)economic environment and dissatisfaction with the existing tax system, which created consensus on the need for reform. Moreover, the government was formed by one party in a unicameral parliament, with no need for a coalition at the national level and the absence of subnational levels of government that could influence the decision-making (in Australia, GST reform needs the support of the Commonwealth and all states).

Inequality

Despite a well-targeted transfer system, inequality in Australia has risen somewhat over the past decade, and relative poverty is comparatively high. Any tax reform should aim at least not to worsen inequality, and ideally to reduce it.

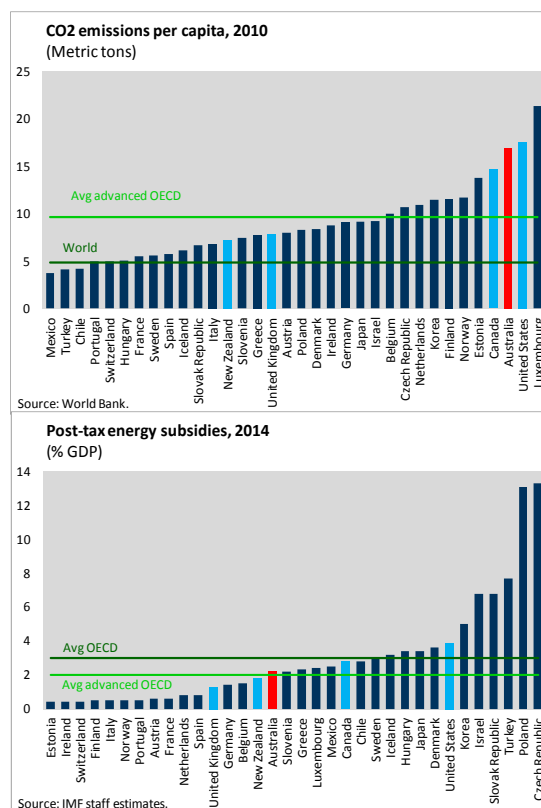
15. Inequality can affect economic outcomes. Lower net (i.e. after taxes and transfers) inequality is robustly correlated with faster and more durable growth, and redistribution appears generally benign in terms of its impact on growth (Berg, Ostry, and Tsangarides, 2014). Conversely, higher inequality can undercut the social consensus required to adjust in the face of shocks (Persson

and Tabellini, 1994; Berg, Ostry and Zettelmeyer, 2012). This could be especially relevant in the Australian context, where a key element of tax reforms under discussion is an increase in GST revenue, which tends to affect poorer household disproportionately (even though the better off account for the bulk of the revenue lost from GST exemptions, which makes a low GST an inefficient form of support for lower-income households).

Box 4. Energy Subsidies¹

Energy subsidies have wide-ranging economic consequences. They distort resource allocation by encouraging excessive energy consumption, thereby artificially promoting capital-intensive industries; reduce incentives for investment in renewable energy; and accelerate the depletion of natural resources.

Energy subsidies are pervasive, including in Australia, and can impose substantial fiscal and economic costs. They not only include payments to producers, or consumers paying prices that are below supply costs (pre-tax subsidies): the most important element of total subsidies are tax subsidies, which occur if taxes for energy are below their efficient level (i.e. they are taxed lower than other consumer products, and/or end-consumer prices fail to take into account negative externalities—largely the effects of pollution and global warming). In most countries, taxes on energy fall far short of this, implying the full costs of consuming energy are not reflected in its price, as it should when energy is priced efficiently. Post-tax subsidies are the sum of pre-tax and tax subsidies.

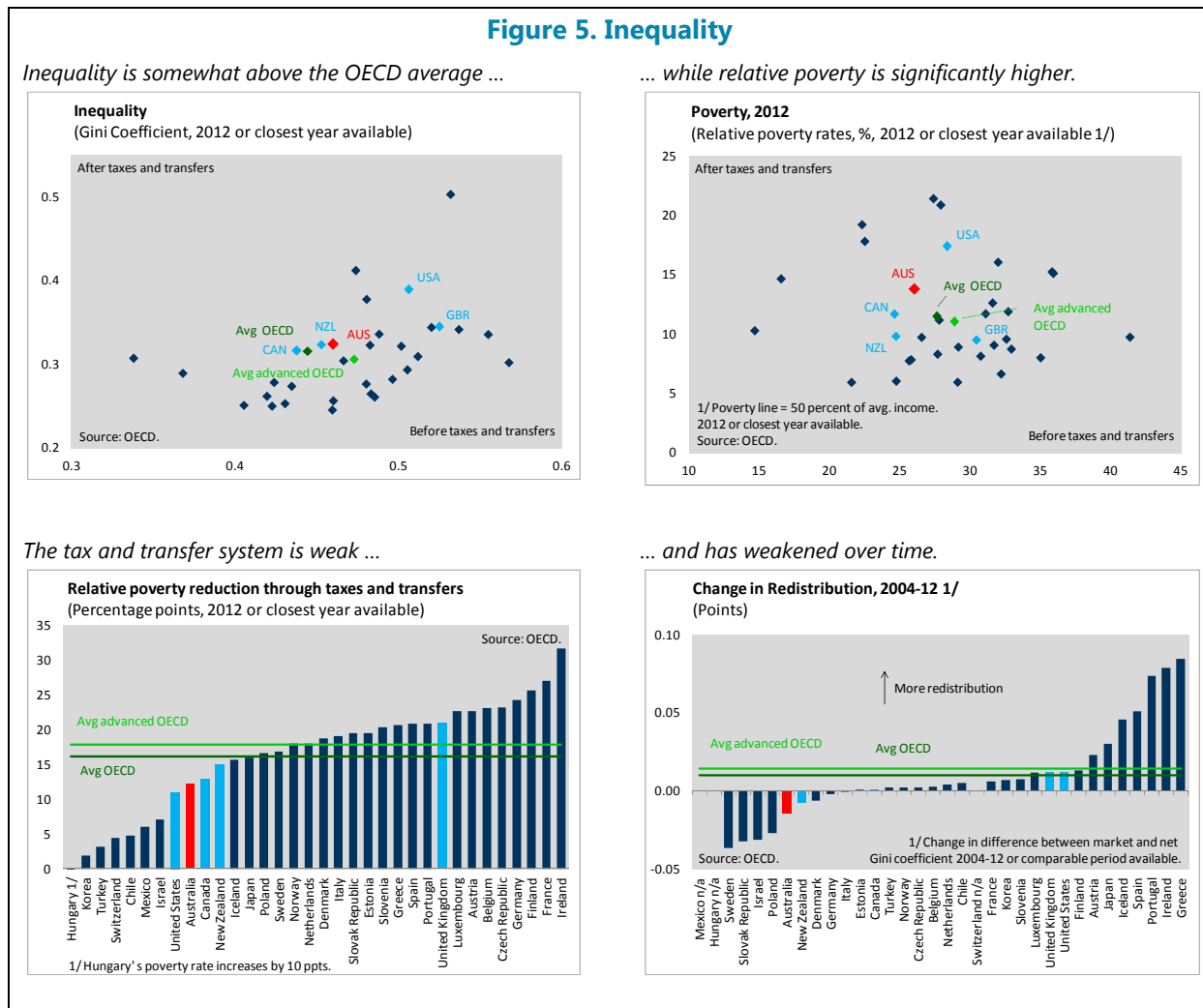


In 2014, global post-tax subsidies for petroleum products, electricity, natural gas, and coal reached \$5.2 trillion (6¾ percent of global GDP), of which \$481 billion were pre-tax subsidies. Advanced economies account for about a quarter of the global post-tax subsidies. Australia, which has one of the highest emissions of carbon dioxide per capita among OECD countries (and, indeed, the world), has also significant post-tax energy subsidies, estimated at 2¼ percent of GDP—close to the OECD advanced economies average.

¹ Based on IMF 2013 and updated calculations.

16. Inequality after taxes and transfers in Australia is similar to the OECD average, but relative poverty is comparatively high (Figure 5). The redistributive mechanism uses extensive means-testing to target transfers, but the limited size of the state (i.e., the amounts available for redistribution) circumscribes the extent of redistribution that can be achieved. Nonetheless, there appears to be scope to improve targeting those most in need.

17. Inequality has also risen somewhat over the last decade (though it has declined again slightly in recent years). While the increase of the Gini coefficient has not been marked and the post-tax/transfer relative poverty rate has not increased, the ratio of the income of the richest to the poorest has risen significantly. At the same time, pre-tax/transfer Gini inequality has declined slightly while post-tax/transfer Gini inequality has increased, implying a weakening of the redistributive system. Moreover, the post-tax/transfer relative poverty rate has increased slightly while the pre-tax/transfer relative poverty has declined.



Federal Fiscal Relations

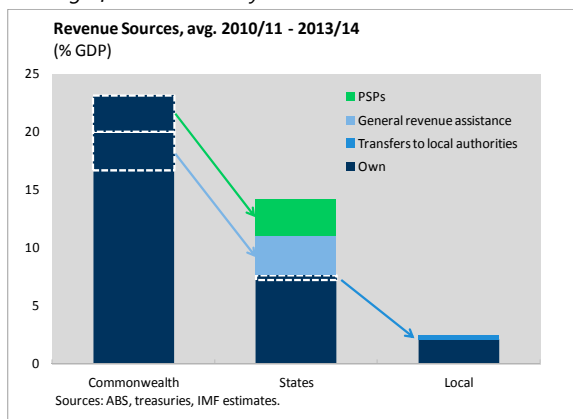
Australia's federal fiscal system is tilted toward the Commonwealth. But federations are complex and involve trade-offs between efficiency on one hand, and equity and autonomy on the other.

18. The Commonwealth government in Australia is relatively dominant (Figure 6). It receives (excluding its transfers to state and local governments) slightly over half of all general government revenue. States collect another 41 percent (excluding transfers to local authorities);

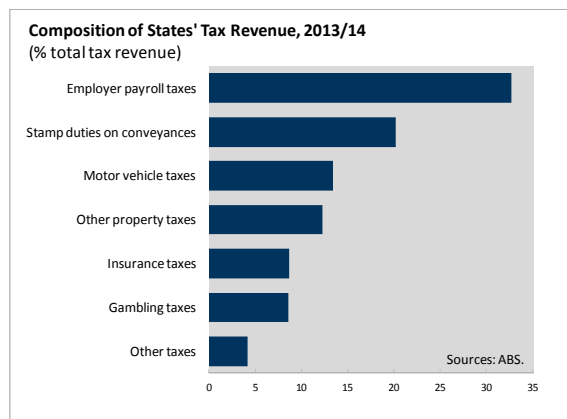
local authorities the remainder. By comparison, in Canada the federal government receives less than 30 percent of total revenue, while provinces receive over half and local authorities about one-fifth.

Figure 6. Fiscal Federalism

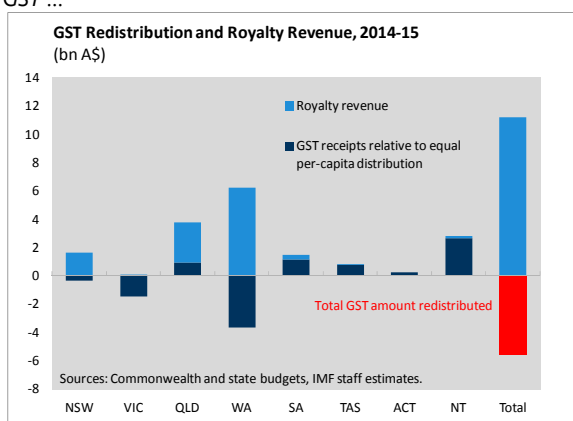
The Commonwealth is relatively dominant, though states have significant autonomy ...



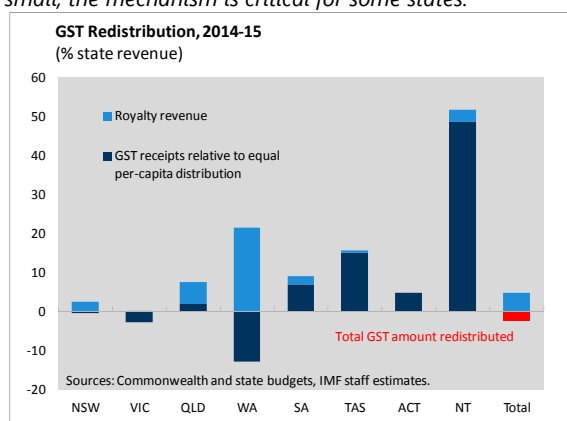
... but state taxes are inefficient.



Resource-rich and densely populated states receive less GST ...



... and while the overall amount of GST redistribution is small, the mechanism is critical for some states.



19. Australian states' revenue-raising and expenditure autonomy is significant.³ Tax and nontax revenue are exclusively assigned to each level of government, which have full powers to change the base and rates. Therefore, states have full control over about 54 percent of their revenue, while about one quarter comes in the form of general revenue assistance from the Commonwealth (most of which is GST revenue), for which states neither set the rate nor the base independently. A further 22 percent comes in the form of Payments for Specific Purposes (PSPs; transfers from the Commonwealth), which implies that they are tied to specific sectors or to specific projects. The system of PSPs is complex, with different programs in different sectors. In particular,

³ States have the power to raise revenue from a range of tax bases, but have not fully exploited them.

financing of specific projects and support for specific targets (through National Partnership payments, a subset of PSPs, which comprise about one third of total PSP payments) is extremely detailed, and often provides resources to only one state, and/or very small amounts. In contrast, Canadian provinces fully control close to 85 percent of their revenue. However, since GST transfers are untied, Australian states fully control close to 80 percent of their expenditure.

20. Horizontal fiscal equalization takes place through the distribution of the GST. GST revenue is distributed according to a formula that takes into account states' revenue generating capacity as well as expenditure needs to ensure that states have the ability to provide public services to a common standard. The formula takes into account a wide range of factors, including population size, age, and structure; per-capita income; the impact of geography on costs; the presence of indigenous people; English fluency; and the capacity of various tax bases (Kirchner 2013). Overall, however, the redistribution is modest (11 percent of GST revenue, and about 0.4 percent of GDP). By comparison, Germany redistributes about $\frac{3}{4}$ percent of GDP among its *Bundesländer*, and Canada about 1 percent of GDP among its provinces.

21. These features represent a broadly reasonable compromise between efficiency and autonomy. Too high a degree of revenue autonomy, for example by allowing differentiated sales taxes, as in Canada, could create distortions within the national economy. Moreover, while states cannot unilaterally change GST in their jurisdiction, they receive the proceeds unconditionally, which implies considerable leeway in spending them. Similarly, while equalization payments constitute a disincentive for states' own revenue-raising and economy-strengthening efforts, the effect is small (Novak 2011). Moreover, such equalization payments feature in all federations, and are an expression of solidarity within the federation, which is ultimately a political choice.

22. However, there are also important drawbacks embedded in the institutional set-up of Australia's fiscal federalism:⁴

- *The GST-setting mechanism.* The effective veto that each state (and the Commonwealth) has makes GST reform—which may be needed from time to time—politically difficult to achieve.
- *The equalization mechanism.* The system is complex and some states argue for change on various grounds. However, the current system, and the tensions it generates, do not appear substantially out of line with the experience of international peers. The concept of “equalization” is also inherently political rather than purely economic.
- *PSPs.* The system of PSPs, and especially the National Partnerships, appears somewhat micro-managing. While the underlying rationale of ensuring common standards across Australia is sound, they can also create perverse incentives, for example through matching requirements, which tend to increase state/local taxation (Spahn and Shah, 1995), or leading to an allocation of

⁴ It is beyond the scope of this paper to assess the usefulness of GST revenue versus other revenue sources for equalization payment purposes.

resources determined by central government priorities instead of those of the local population and its government/legislature.

- *States' reliance on inefficient taxes.* States rely to a significant extent on relatively inefficient taxes for their own-source revenue. State payroll taxes, stamp duties, and taxes on insurance comprise over 60 percent of states' own-source tax revenue. This is a consequence of the exclusive assignment of taxes to different levels of government.
- *Infrastructure investment.* Infrastructure investments often require a long time horizon and can justify borrowing against a future boost in productivity and tax revenue that well-planned infrastructure can generate. However, infrastructure investment in Australia is undertaken largely by states, which typically face tighter constraints on their ability to borrow than the Commonwealth, in part due to their limited revenue-raising autonomy. This may result in a sub-optimal provision of infrastructure nationally.

C. Reform options

Tax policy and federal fiscal relations reforms need to achieve multiple objectives, requiring a comprehensive reform package that implements various reforms simultaneously. Table 1 provides an illustrative scenario of a combination of reforms (not all costed). Any actual reform package could of course be geared to yield less or more gross or net revenue, use revenue differently, and distribute it differently between the Commonwealth and states.

23. Any reform of Australia's tax and federal fiscal relations system will need to reconcile competing objectives. Overall, it should (i) increase efficiency and reduce distortions, thus promoting higher growth and incomes; (ii) at least preserve, if not improve, socio-economic equality while maintaining or strengthening incentives for work and investment; and (iii) provide for an adequate degree of fiscal autonomy of the states, while also preserving their ability to provide public services to a high common standard. This requires a package approach consisting of simultaneous changes to several taxes, as well as transfers—though some elements could be introduced gradually to avoid penalizing existing interests which are the result of decisions made under the current tax system, and thereby increase social and political acceptability.

24. Not all changes to the tax and federal fiscal system are equally critical. Some desirable changes may be politically more difficult than others to implement; therefore this paper presents a modular approach in which different options across and within modules can be combined. Nonetheless, key elements are linked, either because they are needed to balance revenue additions and subtractions, or because they compensate for adverse effects of other policies. Some reforms are key building blocks without which not much else can be accomplished, while others are more of an auxiliary nature.

Table 1. Impact of Illustrative Tax Reform Options 1/

Measure	Impact (% GDP)		
	Total	Commonwealth	States
Module 1: Increase GST and compensate low-income households			
Boost GST revenue	5.9	...	5.9
Raise GST productivity to Swiss level	1.5	...	1.5
Raise GST productivity further to New Zealand level	1.3	...	1.3
Increase GST rate to 15 % 2/	3.1	...	3.1
Compensate lower-income households	-3.3	-3.3	...
Income tax relief	-1.1	-1.1	...
Increased transfer payments 3/	-2.2	-2.2	...
Module 2: Reducing distortions in the real estate market			
Reduce capital gains tax discount for individuals and trusts 4/	0.2	0.2	...
Abolish deductibility of net losses from other forms of income (+)	n/a	n/a	...
Abolish stamp duties on conveyances	-1.0	...	-1.0
Increase land taxes to compensate for stamp duties	1.0	...	1.0
Cap value of exemption of primary residence from Age Pension calculation (+) 3/	n/a	n/a	...
Remove CGT exemption of inherited primary residences (+)	n/a	n/a	...
Module 3: Improving fairness by reforming superannuation			
Adjust concessional superannuation taxation (+)	n/a	n/a	...
Remove CGT exemption of inherited primary residences (+)	n/a	n/a	...
Reduce personal income tax	-0.3	-0.3	...
Module 4: Taxing negative externalities and cutting minor taxes			
Taxing energy use right	1.3	1.3	...
Eliminate insurance taxes	-0.4	...	-0.4
Module 5: Reducing company and state payroll taxes			
Reduce company tax by 5 percentage points	-0.7	-0.7	...
Eliminate state payroll taxes	-1.4	...	-1.4
Module 6: Federal reform			
Abolish National Partnership payments	0.0	0.9	-0.9
Assign 30% of GST revenue to Commonwealth	0.0	2.8	-2.8
NET IMPACT	1.3	0.9	0.4
Use			
Additional public investment	0.5	0.1	0.4
Deficit reduction	0.8	0.8	0.0
Memorandum items:			
Direct tax revenue	-3.3	-1.9	-1.4
Indirect tax revenue	6.8	1.3	5.5

1/ IMF staff estimates based on 2013/14 outcomes (ABS and Commonwealth Treasury data).
2/ Assumes GST productivity at New Zealand level.
3/ Expenditure measure.
4/ Illustrative calculation based on halving tax expenditure on capital gains tax discount for individuals and trusts.
(+) = net revenue gain or expenditure reduction (not quantified).

Reform Modules

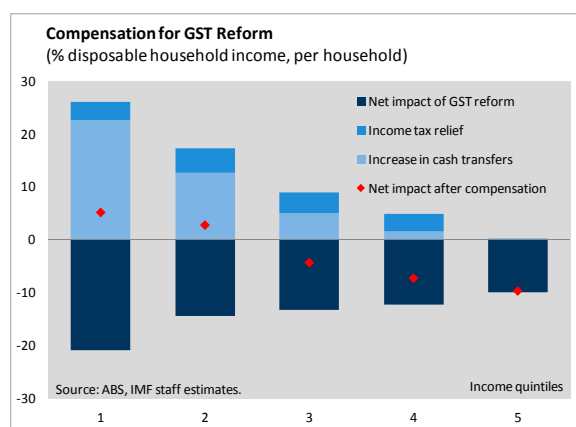
25. Module 1: Increasing efficiency while improving equity—GST reform and compensation.

A key plank of fiscal policy and transfer reform revolves around an increase in GST revenue, and complementary reforms to income taxes and transfers to low-income earners.

- Boost GST revenue.* Central to any tax reform effort should be a significant increase in GST revenue. This tax is relatively less distortive than most other large revenue sources, and has the potential to raise sufficient additional revenue to reduce other, less efficient, taxes and to meet emerging longer-term spending pressures. Raising the productivity of the GST to New Zealand’s level, and the rate to 15 percent could, together, yield close to 6 percentage points of GDP in additional revenue, which would accrue to the states (if the higher GST revenue is not shared with the Commonwealth—see below).
- Compensate lower-income households.* Since the GST is relatively regressive, lower-income households would need to be compensated, reducing Commonwealth revenue and increasing Commonwealth expenses. Further increasing the effective income tax-free threshold to relieve the lowest income quintile of income tax payments, and partial relief of the second, third, and fourth quintiles would go some way to reduce the burden of a higher GST on households. However, this would be not enough for a full compensation of low-income households. Therefore, an increase in cash transfers would also be required. Figure 7 provides an illustrative example of (over)compensation of the lowest income quintiles and partial compensation (through a simple across-the board increase in cash transfers) of the other quintiles. The total cost in this example is estimated at close to 3¼ percent of GDP.

Figure 7. Compensating Lower-Income Households for GST Reform

Income tax reductions and increases in transfers are needed to compensate lower-income households.



Assumptions for compensation

Quintile	1	2	3	4	5
Total compensation per household (A\$)	8,616	9,690	6,927	5,085	485
Income tax relief	1,152	2,573	3,091	3,491	0
% of current income tax payments	100	50	25	15	0
Transfer increase	7,464	7,118	3,836	1,595	485
% of current cash assistance	40	40	40	40	40
Compensation costs per income quintile (m A\$)	14,834	16,134	11,146	8,290	860
Net impact per HH (A\$)	1,705	1,557	-3,344	-7,477	-16,354
% HH disp. income	5.2	2.8	-4.3	-7.3	-9.7
HH disp. income (A\$)	33,103	56,270	77,126	103,007	168,868

26. Module 2: Reducing risks—reducing distortions in the real estate market. Reducing the concessional treatment of capital gains, eliminating the deductibility of housing losses from other taxable income, and capping the exemption of owner-occupied housing for the calculation of the

Age Pension, would likely reduce incentives for negative gearing and overinvestment in housing, and improve housing affordability, financial stability and equity. It would also likely improve the allocation of savings, and raise revenue to allow reduction in other taxes. Cutting stamp duties would reduce transaction costs in the real estate market, improving efficiency, and could partly offset the impact of the lower tax incentives. These reforms would need to be carefully calibrated to avoid a too severe shock to the market and unduly penalizing people who have made investments in the belief that the current system would continue to operate.

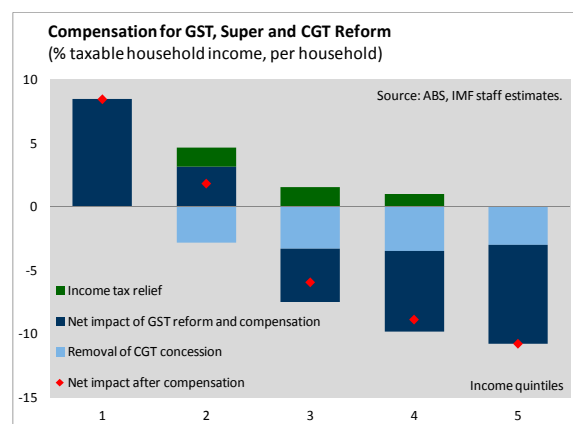
- *Revisit the level of CGT concessions for housing investors.* Since the introduction of the CGT discount, inflation rates have declined, which would suggest a reduction in the CGT discount is warranted. To avoid distortions across asset classes, concessional taxation of capital gains of individuals and trusts on assets owned for more than a year should be aligned. A complete abolition of the CGT concession would yield slightly less than ½ percent of GDP; a reduction commensurately less.
- *Abolish deductibility of net losses from property investment from other taxable income.* Similar to CGT concessions, the ability to deduct net losses arising from property investment from unrelated other taxable income reinforces incentives for negative gearing and supports overinvestment in housing. To avoid distortions across asset classes, deductibility of interest costs from other taxable income when making financial investment should also be abolished. Due to data availability issues, this measure has not been quantified.
- *Abolish stamp duties, and broaden the base for and raise land taxes.* As outlined above, stamp duties on real estate transactions are highly distortive and could be abolished. To compensate for the revenue loss, recurring land taxes—the most efficient form of taxation—could be raised (at a uniform rate, to avoid penalizing larger-scale residential development), and the additional revenue distributed to states (not local governments). While, in principle, this switch could be revenue-neutral, it can also be calibrated to achieve a net gain or loss in revenue.
- *Limit primary residence exemption from Age Pension.* Since the unlimited exemption of the primary residence from the assets used for the calculation of the Age Pension tends to lead to overinvestment in housing (and higher expenditure on the Age Pension), a cap for this exemption could be introduced. To avoid penalizing homeowners who have occupied their house for a long time and which has risen in value beyond such a threshold while not generating a revenue stream, the length of ownership/occupancy could be taken into account in determining the threshold, or a uniform high level could be used. Due to data availability issues, this measure has not been quantified.

27. Module 3: Improving fairness—reforming income and superannuation tax. The tax advantages deriving from tax concessions for superannuation are substantial. Changing parameters (thresholds as well as a move to more progressive taxation of superannuation contributions) could be calibrated to yield a net revenue gain (or loss, if the combination of other tax reforms yields sufficient fiscal space). However, adjusting any of these policies would need careful calibration and phasing, and should be introduced in tandem with measures to enhance efficiency.

- *Reduce superannuation subsidies for high-income earners.* As outlined above, superannuation tax concessions are significant, and disproportionately benefit higher-income earners, reducing the progressivity of the tax system. At the same time, there is an economic rationale to continue to subsidize retirement savings—both to reduce demands on the Age Pension and to help maintain a high national savings rate. To re-strengthen the progressivity of the tax system and make the subsidization of savings more transparent, the tax rates and thresholds for mandatory superannuation contributions and earnings during the accumulation phase could be aligned more closely with income tax rates (though they could still be lower). This could remove the bias toward favoring higher income earners. The quantitative impact will depend on the calibration of these measures.
- *Remove the CGT exemption of inherited primary residences.* This would be akin to an estate tax, but has the advantage of fitting in the existing tax structure, as well as avoiding possible forced sale of assets to meet tax liabilities that fall due upon death. To avoid circumvention of the tax through gifting, time limits for the non-taxation of gifts could be introduced. This would improve equality of opportunity, reduce the intergenerational transmission of inequality, and incentivize work for the beneficiaries of inheritances. It would also reduce incentives to invest in housing to the extent that people take intergenerational welfare into account. However, the yield would likely be modest.
- *Adjust income tax thresholds and/or rates.* The reforms in Modules 1 and 2 and the reduction of superannuation concessions would leave middle- and higher-income households with a significant additional tax burden (though it should be noted that the actual income tax burden in these income brackets is not as high as the statutory tax rates suggest—precisely because of the tax concessions in superannuation and housing). This could be partially compensated for by adjusting income tax threshold and/or rates. An illustrative example is provided in Figure 8. The total cost in this example would be close to ¼ percent of GDP (though more income tax relief could be provided dependent on the recalibration of superannuation tax concessions).

Figure 8. Compensating Middle- and Higher-Income Households

Income tax reform—adjusting thresholds and/or rates—can provide partial relief for higher-income households.



28. Module 4: Taxing negative externalities and cutting inefficient minor taxes.

- **Tax energy right.** The taxation of negative externalities arising from fuel consumption would achieve both a revenue gain that could be used for other purposes (reducing other taxes or increasing spending, such as investment in human capital or physical infrastructure), and an incentive to reduce the negative externality. Taxing energy right would yield substantial benefits

for Australia, providing about 1¼ percent of GDP in revenue, reduce negative spillovers on Pacific Islands, and position Australia (again) at the forefront of international efforts to reduce carbon emissions.

- **Eliminate insurance taxes.** Eliminating insurance taxes would remove one of the least efficient taxes at relatively little cost (½ percent of GDP).

29. Module 5: Boosting incentives for investment and employment—reducing company and state payroll taxes. Increased revenue from the reforms outlined above could be used to reduce the high and inefficient company tax, and eliminate payroll taxes. These would boost growth, jobs, incomes, and productivity.

- **Reduce company tax.** Reducing the standard company tax rate by 5 percentage points to 25 percent for all corporations would bring Australia’s tax rate to the OECD average, and below that of advanced economy peers. The cost in foregone revenue would be modest, at ¾ percent of GDP.
- **Abolish state payroll taxes.** Additional GST revenue would increase states’ scope to lower the overall tax burden of payroll taxes. Their abolishment would cost about 1½ percent of GDP. However, this would deprive states of a revenue source that is directly under their control and thus contributing to fiscal autonomy. An alternative would be base broadening (there are estimates that up to 50 percent of employees are exempt from payroll taxes; see Australian Government 2015b) combined with rate reduction, but this could imply significant additional compliance costs for small businesses. Should such a course be chosen, the net revenue impact could be calibrated to yield some reduction of the total tax burden.

30. Module 6: A more efficient state and strengthening of the federal fiscal institutional set-up. A substantial increase in GST would increase states’ revenues and reduce the vertical fiscal imbalance, and allow states to eliminate inefficient taxes. It would also provide scope for streamlining Commonwealth-state/territory fiscal relations through a reduction of specific purpose payments, in particular National Partnership payments. In addition, the institutional arrangements for future tax adjustments should be strengthened, and the central government’s role in infrastructure investment could be increased.

- **Abolish national partnership payments.** While the aim of National Partnerships, to ensure high common standards across Australia, is appropriate, the costs are also substantial, both administratively and by creating perverse incentives. Instead, there may be scope for increased reliance on the political process in individual states to hold governments to account for adequate public service delivery. This would allow abolishing National Partnership payments, implying a shift of resources from the states to the Commonwealth of close to 1 percent of GDP.
- **Assign some GST revenue to the Commonwealth.** The combined effect of the reform modules outlined above would be a significant net increase in states’ revenue, while the Commonwealth would not gain additional funds. However, the Commonwealth will face most of the consolidation and spending pressures in the medium term (see below). Therefore, some of

the GST revenue could be assigned to the Commonwealth, along the lines of the German system, where a number of taxes are shared between different levels of government.

- **Reforming the GST-setting mechanism.** The effective veto that each state (and the Commonwealth parliament) has over adjustments to the GST should be abolished. The current system, while a very—perhaps too—effective brake against ‘excessive’ revenues, as shown by Australia’s low GST take, makes adjustments in the national, but possibly against a particular state’s, interest very difficult. This is important not only in current circumstances but also for potential adjustments that may be needed in future.
- **Enhancing the Commonwealth’s role in infrastructure investment.** With states more constrained in their ability to borrow, there is scope for the Commonwealth to play a larger role in public investment. For example, the central government could on-lend funds for infrastructure projects of national importance. This could also require enhanced coordination of infrastructure investment plans.

D. Conclusions

Comprehensive tax and federal fiscal relations reform can have multiple benefits, but these can be achieved only in a package.

31. The potential benefits of reform are significant. A comprehensive tax and federal fiscal relations reform has the potential to (i) support growth, investment, employment; (ii) reduce overall economic distortions, thus increasing productivity and incomes, by shifting the tax mix toward indirect taxes; (iii) reduce specific distortions and risks, e.g. in the housing market and those generated by externalities; (iv) make the tax and transfer system fairer and more transparent; (v) improve administrative efficiency and reduce compliance costs; and (vi) generate sufficient revenue to return the fiscal balance to surplus while allowing additional public investment.

32. Reforms need to be pursued in a package. Key changes, such as an increase in GST revenue, or housing and superannuation reforms, have significant implications for lower-income households, which will need to—and, given the high revenue potential of these reforms, can—be at least compensated. In addition, the effects of tax changes on the distribution of revenue between states and the Commonwealth will need to be taken into account, and addressed. Overall, a package approach represents an opportunity to streamline the tax system in a holistic way, which would also serve to reduce the need for further adjustments going forward, thus reducing uncertainty.

33. Some reforms are not critical for the overall package, but would nonetheless yield significant benefits. For example, the taxation of negative externalities, or the abolition of small and inefficient taxes would shift the tax burden toward undesirable activities, while saving administrative resources.

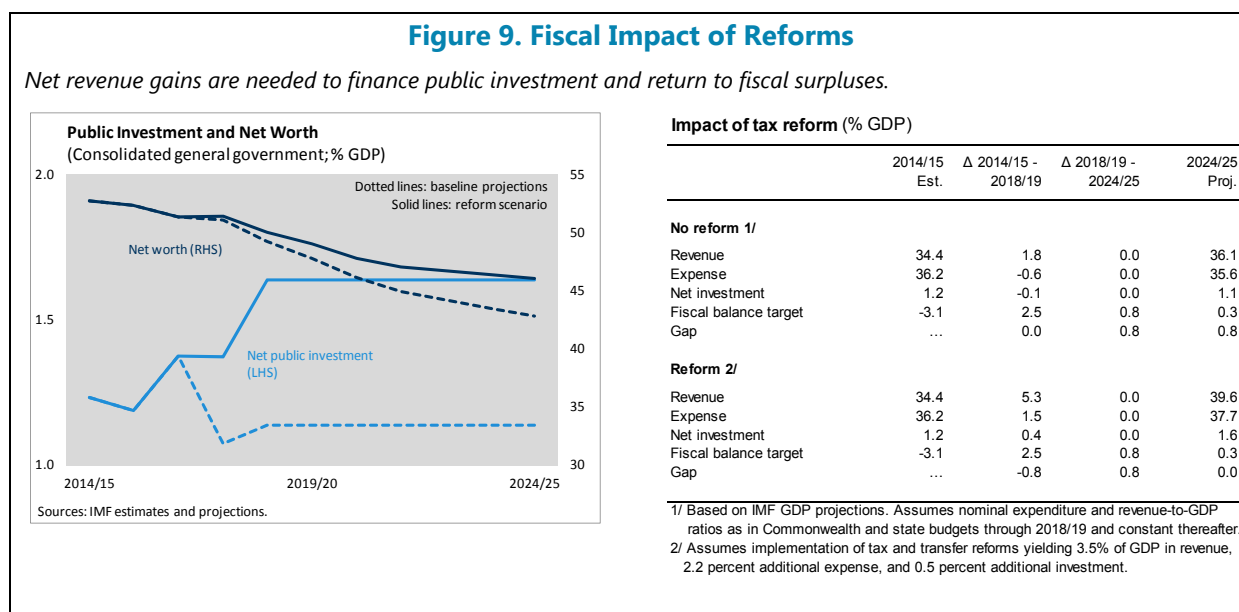
34. With regard to fiscal federal reform, the institutional set-up is at least as important as quantitative measures. To facilitate future tax reforms, streamlining the GST adjustment mechanism is vital, and giving the Commonwealth government a stake (by providing it some of the

GST revenue, which is also necessitated by the effect of tax reforms) could also help. In addition, the Commonwealth and the states will need to decide on the balance between autonomy and uniformity, which is ultimately largely a political choice.

35. The reform package will likely need to yield a net revenue gain over time. While expenditure reduction can and should play a role in reducing the fiscal deficit, there may be limited scope for this avenue since expenditure is already relatively low compared to other advanced economies, and substantial spending pressures will likely emerge in the longer term. An illustrative reform scenario could deliver sufficient revenue to help return the general government fiscal balance to surplus (Figure 9), as well as sufficient fiscal space to allow an expansion of public investment to support productivity growth in the private sector and halt the erosion of public net worth. However, the distribution of fiscal adjustment between higher revenue and lower spending (in particular expense) is largely a political one. Key parameters of the illustrative reform package scenario outlined above are:

- Revenue: +3.5 percent of GDP
- Expense: +2.2 percent of GDP
- Public investment: +0.5 percent of GDP
- Deficit (reduction = -): -0.8 percent of GDP

However, the effects of reform on specific population groups (as well as overall) need to be analyzed more thoroughly. The estimates presented in this paper are, in particular with regard to the housing and superannuation tax regimes, imprecise.



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Appendix—Technical Notes

This appendix provides technical explanations for the assumptions and calculation methods underlying the charts shown as well as the reform options discussed.

A. Figures

Figure 1, panel 1 (total levies): General government revenue (IMF data) plus employer contributions to autonomous pension funds (OECD data). 2013 or latest available data.

Figure 1, panel 2 (direct and indirect taxes): Direct taxes = total tax revenue minus taxes on goods and services plus employer contributions to autonomous pension funds (OECD data); indirect taxes = taxes on goods and services (OECD data). 2013 or latest available data.

Figure 2, panel 1 (personal income tax progressivity): OECD data on tax rates, GNI per capita based on IMF data. 2013 or latest available data.

Figure 2, panel 2 (tax wedges): OECD data on tax wedges, with employer contributions to autonomous pension funds (in percent of compensation of employees; OECD data). 2013 or latest available data.

Figure 2, panel 3 (taxation of individuals): Taxation of individuals plus employee social security contributions (OECD data). Excludes employee contributions to autonomous pension funds, which are assumed to be voluntary. 2013 or latest available data.

Figure 2, panel 4 (income taxation by quintile): *Income tax paid:* based on ABS data (65370DO001_200910 Government Benefits, Taxes and Household Income, Australia, 2009-10, Table 5—equivalized disposable income), adjusted for nominal per-capita income growth 2009/10 – 2014/15 (assumes equal growth across quintiles, does not take into account change in tax structure—increase in thresholds and rate adjustment—since 2010). Taxable income is assumed to be private income plus Age Pension payments. *Average statutory income tax rate at average income in quintile:* based on 2013/14 tax code (excludes temporary budget repair levy, assumes equal Medicare levy of 2 percent at all income levels). The calculation implies that the statutory income tax rate is lower than tax actually paid; therefore statutory income tax rate was assumed to be equal to tax actually paid.

Box 1 figure (investor housing and house price index Sydney): *Investor housing:* RBA data; *house price index Sydney:* ABS data (quarterly; missing months assumed in linear function between two actual data points—IMF staff calculation).

Box 2 figure (tax benefits of superannuation system): These calculations represent a simplified modal of actual income and superannuation taxation, and are not intended to estimate the total tax revenue lost from concessional taxation of superannuation, but provide an indicative distribution of the benefits from the concessions across income quintiles. Calculations at income levels indicated assuming (i) 40 years constant earnings (at income levels indicated); (ii) contribution rate to

superannuation funds of 10 percent; (iii) returns on superannuation investments of 5 percent; (iv) payouts over 25 years at amounts that deplete accumulated savings. Income excluding superannuation contributions is taxed at average tax rate; superannuation contributions are taxed at 15 percent (30 percent for contributions over A\$30,000); superannuation payouts are taxed at 15 percent.

Figure 3, panel 1 (taxation of corporations): Corporate income tax (OECD data) plus social security contributions and employer contributions to private pension funds (OECD data) plus payroll taxes (OECD data). For Australia: red bar: company tax (budget data); pink bar: payroll taxes plus employer contributions to social security funds (OECD data); brown bar: fringe benefit taxes, superannuation contribution taxes, resource rent taxes (budget data). 2013 or latest available data.

Figure 3, panel 2 (corporate tax productivity): Corporate income tax (OECD), tax rates by KPMG (<http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>). 2013 or latest available data.

Figure 4, panel 1 (GST/VAT revenue and rates): General sales taxes –GST/VAT, other (OECD data), tax rates by Deloitte (<http://www2.deloitte.com/global/en/pages/tax/solutions/global-indirect-tax-rates.html>). 2013 or latest available data.

Figure 4, panel 2 (GST/VAT productivity): Calculation based on OECD revenue data, and IMF final consumption data. 2013 or latest available data.

Box 4, figure 1 (CO2 emissions per capita): World Bank: World Development Indicators.

Box 4, figure 2 (post-tax energy subsidies): IMF staff calculations.

Figure 5, panels 1-4: OECD data.

Figure 6, panels 1-4: ABS data and Commonwealth and state budget documents.

Figure 7 (chart and table): Applies reductions in income tax and increases in transfers as described in figure table to income quintiles as calculated from *65370DO001_200910 Government Benefits, Taxes and Household Income, Australia, 2009-10, Table 5—equivalized disposable income*, adjusted for nominal per-capita income growth 2009/10 – 2014/15 (assumes equal growth across quintiles, does not take into account change in tax structure—increase in thresholds and rate adjustment—since 2010).

Figure 8: Income tax relief calibrated to yield target net effect of measures.

Figure 9 (chart and table): No reform scenario assumes no change in revenue, expense, and net investment after 2018/19 (end of authorities' projection horizon). Reform scenario assumes gradual increase in investment from 2016/17 onward to a total of 0.5 percent of GDP above the no-reform scenario, as well as increases in revenue and expense as estimated in Modules 1-5.

B. Estimation of Impact of Reform Options:

Module 1

- *Raise GST productivity to Swiss level.* Assumes Switzerland's tax productivity (second-highest after New Zealand) and applies it to Australia's final consumption. Subtracts current GST revenue.
- *Raise GST productivity further to New Zealand level.* Assumes New Zealand's tax productivity and applies it to Australia's final consumption. Subtracts GST revenue reached at Swiss productivity level.
- *Increase GST rate to 15 percent.* Applies 15 percent rate at New Zealand GST productivity.
- *Income tax relief (for GST increase) and increased transfer payments—see also figure 7.* Applies reductions in income tax and increases in transfers as described in figure table to income quintiles as calculated from 65370DO001_200910 *Government Benefits, Taxes and Household Income, Australia, 2009-10, Table 5—equivalized disposable income*, adjusted for nominal per-capita income growth 2009/10 – 2014/15 (assumes equal growth across quintiles, does not take into account change in tax structure—increase in thresholds and rate adjustment—since 2010).

Module 2

- *Reduce capital gains tax discount for individuals and trusts.* From Tax Expenditure Statement, 2014, E11.
- *Abolish deductibility of net losses from other forms of income (+).* n/a.
- *Abolish stamp duties on conveyances.* ABS data.
- *Increase land taxes to compensate for stamp duties.* Set to offset abolition of stamp duties on conveyances.
- *Cap value of exemption of primary residence from Age Pension calculation (+).* n/a.

Module 3

- *Adjust concessional superannuation taxation.* n/a
- *Remove CGT exemption of inherited primary residences.* n/a
- *Reduce personal income tax—see also Figure 8.* Income tax relief calibrated to yield target net effect of measures.

Module 4

- *Taxing energy use right.* IMF staff calculations (Global Energy Subsidies Update in IMF 2015) for energy subsidies; impact on revenue assumed similar to global total in relation to subsidies as

calculated in Coady, Sears and Shang: *How Large are Energy Subsidies?*, IMF Working Paper, forthcoming.

- *Eliminate insurance taxes.* ABS data.
- *Unilaterally remove external tariffs.* Revenue from Commonwealth budget documents.

Module 5

- *Reduce company tax by 5 percentage points.* Revenue from Commonwealth budget documents.
- *Eliminate state payroll taxes.* ABS data.

Module 6

- *Abolish National Partnership payments.* Expenditure from Commonwealth budget documents.
- *Assign 30% of GST revenue to Commonwealth.* Calibrated to allow states most additional capital expenditure as a result of higher net revenue from reforms.
- *Additional public investment.* Distributed between Commonwealth and states.
- *Deficit reduction—see also Figure 9.* Assigned to Commonwealth, since states are projected to reach balance in 2017/18.