

Attachment A

FORECAST UNCERTAINTIES, SENSITIVITIES AND SCENARIOS

Overview

The macroeconomic and fiscal forecasts presented in the 2015-16 MYEFO incorporate assumptions and judgments based on information available at the time of preparation.

This attachment presents estimates of uncertainty around economic and fiscal forecasts and a medium-term scenario assuming an alternative profile for market yields. It also presents an analysis of the sensitivity of MYEFO estimates to changes in key assumptions, as required under the *Charter of Budget Honesty Act 1998*.

A more detailed discussion of risks around fiscal forecasts is presented in Appendix C.

CONFIDENCE INTERVALS AROUND THE ECONOMIC AND FISCAL FORECASTS

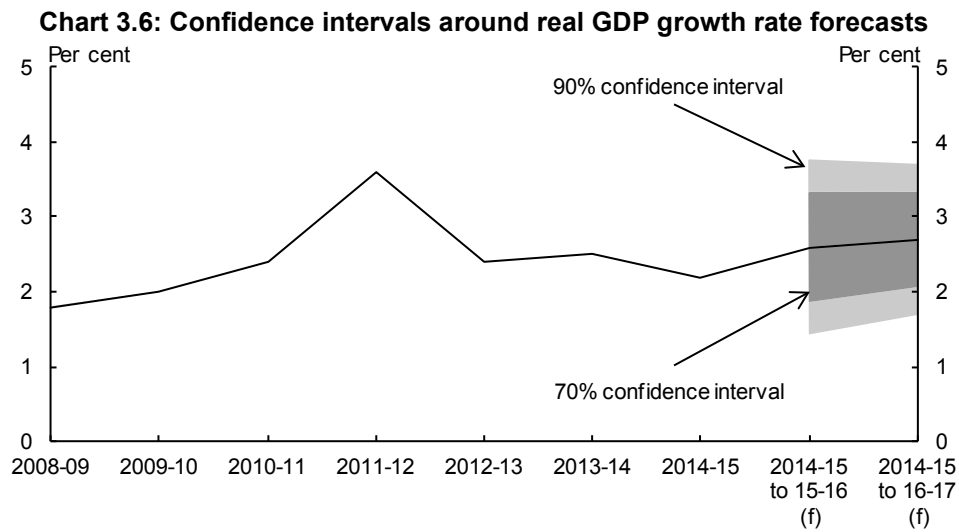
Estimates of economic and fiscal variables over the forward estimates period are subject to inherent uncertainties. Generally, these uncertainties tend to increase as the forecast horizon lengthens. Confidence intervals quantifying estimates of uncertainty around the key 2015-16 MYEFO forecasts are presented below. These confidence intervals present a range of plausible alternative outcomes around any given point estimate.

Measures of uncertainty around economic forecasts

Real GDP forecasts

Real GDP forecasts in the 2015-16 MYEFO are based on assumptions about the exchange rate, interest rates and oil prices. The forecasts incorporate judgments about how developments in one part of the Australian economy affect other parts, and also about the impact of events in the international economy on the domestic economy.

The accuracy of the forecasts depends on the extent to which the assumptions and judgments underpinning them prove to be correct.



Note: The central line shows the outcomes and the 2015-16 MYEFO forecasts. Annual growth rates are reported for the outcomes. Average annualised growth rates from 2014-15 are reported for 2015-16 onwards. (f) are forecasts. Confidence intervals are based on the root mean square errors (RMSEs) of December forecasts from 1998 onwards, with outcomes based on September quarter 2015 National Accounts data.

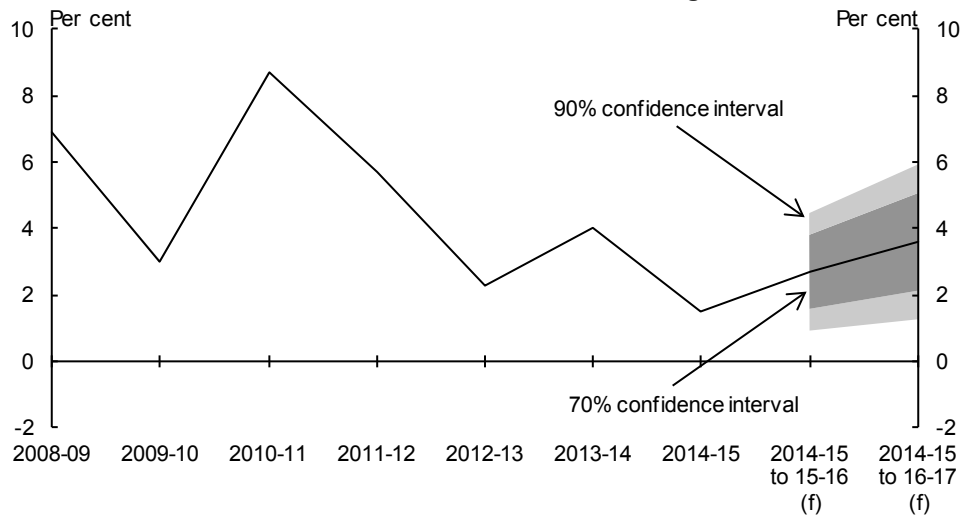
Source: ABS cat. no. 5206.0 and Treasury.

Chart 3.6 above shows that real GDP growth in 2015-16 is expected to be around 2½ per cent, with the 70 per cent confidence interval ranging from 1¾ to 3¼ per cent.

Nominal GDP forecasts

In 2015-16, nominal GDP growth is expected to be lower than forecast at the 2015-16 Budget. This reflects the steeper than anticipated decline in key commodity prices over the past six months, and slower than anticipated growth in consumer prices, which have contributed to a lower forecast of the GDP deflator.

Chart 3.7: Confidence intervals around nominal GDP growth rate forecasts



Note: See note to Chart 3.6.

Source: ABS cat. no. 5206.0 and Treasury.

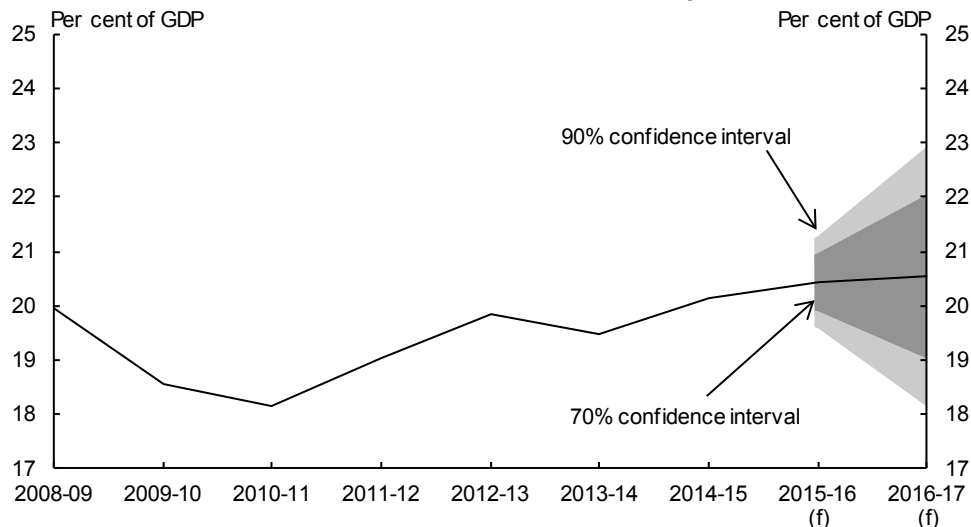
The confidence intervals around nominal GDP forecasts are wider than those around the real GDP forecasts, reflecting both the uncertainty over the outlook for real GDP and the added uncertainty about the outlook for domestic prices and the terms of trade. Chart 3.7 suggests that nominal GDP growth in 2015-16 is expected to be around 2¾ per cent, with the 70 per cent confidence interval ranging from 1½ to 3¾ per cent.

Measures of uncertainty around fiscal forecasts

Receipts forecasts

The Government's tax receipts estimates are generally prepared using a 'base plus growth' methodology. The last known outcome (2014-15 for the 2015-16 MYEFO) is used as the base to which estimated growth rates are applied, resulting in tax receipts estimates for the current and future years.

Chart 3.8: Confidence intervals around receipts forecasts



Note: The central line shows the outcomes and 2015-16 MYEFO point estimate forecasts. (f) are forecasts. Confidence intervals use RMSEs for MYEFO forecasts from the 1998-99 MYEFO onwards.
Source: Budget papers and Treasury.

Chart 3.8 shows confidence intervals around the forecasts for receipts (excluding GST¹ and including Future Fund earnings). Impacts of future policy decisions are beyond the scope of these forecasts. To account for this, confidence intervals constructed around the receipts forecasts exclude historical variations caused by subsequent policy decisions. These intervals take into account errors caused by parameter and other variations in isolation.

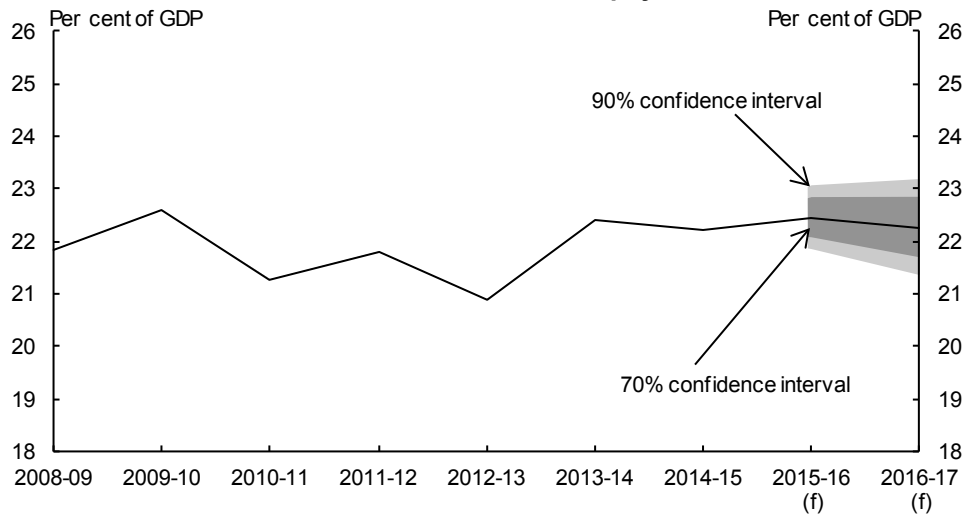
The chart shows that there is considerable uncertainty around receipts forecasts and that this uncertainty increases over the estimates period. It suggests that in 2015-16, the width of the 70 per cent confidence interval for the 2015-16 MYEFO receipts forecast is approximately 1.1 per cent of GDP (\$20 billion) and the 90 per cent confidence interval is approximately 1.7 per cent of GDP (\$30 billion).

Payments

The Government's payments estimates are prepared by Australian Government agencies that comprise the Australian Government general government sector.

¹ GST was not reported as a Commonwealth tax in budget documents prior to the 2008-09 Budget. As a result, GST data have been removed from historical receipts and payments data to abstract from any error associated with this change in accounting treatment.

Chart 3.9: Confidence intervals around payments forecasts



Note: See note to Chart 3.8

Source: Budget papers and Treasury.

Chart 3.9 shows confidence intervals around payments forecasts (excluding GST payments). As with the receipts estimates, historical policy decisions are excluded,² and future policy decisions are out of scope. The estimates include the public debt interest impact of policy decisions.

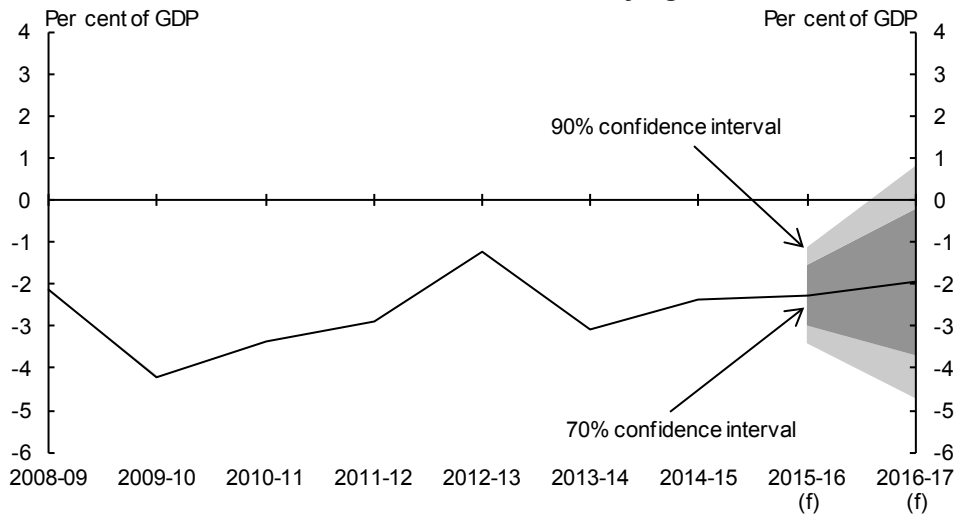
The chart shows that there is moderate uncertainty around payments forecasts. In 2015-16 the width of the 70 per cent confidence interval for the 2015-16 MYEFO payments forecast is approximately 0.8 per cent of GDP (\$15 billion) and the 90 per cent confidence interval is approximately 1.2 per cent of GDP (\$20 billion).

Underlying cash balance

The underlying cash balance estimates are sensitive to the same forecasting errors that affect estimates of receipts and payments. Confidence interval analysis shows that there is considerable uncertainty around the underlying cash balance forecasts (see Chart 3.10).

² Excluding historical variations stemming from policy decisions does not exclude cases that are classified in budget documentation as parameter and other variations, but have more in common with decisions of government. For example, decisions to re-profile spending due to changes in timing of projects are captured for reporting purposes as parameter and other variations, as are new and often substantial spending decisions to provide assistance for the impacts of natural disasters. Such variations contribute to the size of the confidence intervals around payments.

Chart 3.10: Confidence intervals around the underlying cash balance forecasts



Note: See note to Chart 3.8.

Source: Budget papers and Treasury.

In 2015-16, the width of the 70 per cent confidence interval for the 2015-16 MYEFO underlying cash balance forecast is approximately 1.4 per cent of GDP (\$25 billion) and the 90 per cent confidence interval is approximately 2.3 per cent of GDP (\$40 billion). In line with receipts forecasts, uncertainty increases over the estimates period.

SENSITIVITY OF BUDGET ESTIMATES TO ECONOMIC DEVELOPMENTS

Small movements in economic parameters can result in large changes to the fiscal estimates. For example, as highlighted in Box A of Part 3, downward revisions to population and labour force projections since Budget 2015-16 have affected nominal GDP and Commonwealth payments and receipts over the forward estimates and the medium term. Consideration of particular scenarios and sensitivity analysis in this section demonstrates the potential impact of such changes.

Fiscal sensitivity to permanent changes in key economic variables

Scenario 1: A one per cent reduction in nominal GDP from a fall in the terms of trade

This scenario involves a permanent fall in world prices of non-rural commodity exports in 2015-16 consistent with a fall in the terms of trade of around 4 per cent, which causes a 1 per cent fall in nominal GDP by 2016-17. The sensitivity analysis evaluates the flow-on effects on the economy, the labour market and prices. The impacts in Table 3.19 are stylised and refer to per cent deviations from the baseline levels of the economic parameters.

Table 3.19: Illustrative impact of a permanent terms of trade fall consistent with a 1 per cent fall in nominal GDP by 2016-17 (per cent deviation from the baseline level)³

	2015-16 per cent	2016-17 per cent
Real GDP	0	- 1/4
Non-farm GDP deflator	- 3/4	- 3/4
Employment	- 1/4	- 1/2
Wages	0	- 1/4
CPI	0	- 1/4
Company profits	-3	-3
Consumption	- 1/4	- 1/2

Assuming no change in exchange rates or interest rates, the fall in export prices leads directly to a lower non-farm GDP deflator (from the export component of GDP) and lower domestic incomes. Lower domestic incomes cause both consumption and investment to fall, resulting in lower real GDP, employment and wages. The fall in aggregate demand puts downward pressure on domestic prices.

Given these assumptions, the overall impact of the fall in the terms of trade is a decrease in the underlying cash balance of around \$2.7 billion in 2015-16 and around \$5.7 billion in 2016-17 (see Table 3.20).

On the receipts side, a fall in the terms of trade results in a fall in nominal GDP which reduces tax collections. The largest impact is on company tax receipts, as the fall in export income decreases company profits. Owing to lags in the tax system, the effect on company tax is larger in 2016-17. Lower company profits are assumed to flow through to lower Australian equity prices, therefore reducing capital gains tax from individuals, companies and superannuation funds.

The weaker economy results in lower aggregate demand, which flows through to lower employment and wages, reducing individuals' income tax receipts. The decrease in disposable incomes leads to lower consumption, which in turn results in a decrease in GST receipts (decreasing GST payments to the States by the same amount) and other indirect taxes.

³ These results represent a partial economic analysis only and do not attempt to capture all the economic feedback and other policy responses related to changed economic conditions, and assume no change in the exchange rate, interest rates or policy over the forecast period.

Table 3.20: Illustrative sensitivity of the budget balance to a 1 per cent decrease in nominal GDP due to a fall in the terms of trade

	2015-16 \$b	2016-17 \$b
Receipts		
Individuals' and other withholding taxes	-0.6	-1.7
Superannuation fund taxes	-0.1	-0.2
Company tax	-1.7	-3.3
Goods and services tax	-0.1	-0.3
Excise and customs duty	0.0	-0.1
Other taxes	-0.1	-0.1
Total receipts	-2.6	-5.7
Payments		
Income support	-0.2	-0.2
Other payments	0.0	0.1
Goods and services tax	0.1	0.3
Total payments	-0.1	0.2
Public debt interest	0.0	-0.2
Underlying cash balance impact(a)	-2.7	-5.7

(a) Estimated impacts fall within the 70 per cent confidence intervals for years 2015-16 and 2016-17, as shown in Charts 3.8 to 3.10.

On the payments side, a significant proportion of government expenditure is partially indexed to movements in costs (as reflected in various price and wage measures). Some forms of expenditure, in particular income support payments, are also driven by the number of beneficiaries.

The overall estimated expenditure on income support payments increases in both years because of a higher number of unemployment benefit recipients. The increase in spending on unemployment benefits in 2016-17 is partly offset by reduced expenditure on pensions and allowances reflecting lower growth in benefit rates resulting from lower wages growth and lower inflation. At the same time other payments linked to inflation fall in line with the reduced growth in prices.

The deterioration in the underlying cash balance results in a higher borrowing requirement and a higher public debt interest cost.

While not taken into account in this scenario, under a floating exchange rate, a fall in the terms of trade would be expected to lead to a fall exchange rate. This would likely dampen the effects on real GDP, meaning the impact on the fiscal position could be substantially more subdued.

Scenario 2: A one per cent increase in real GDP driven by an increase in labour productivity and labour force participation with each contributing equally

As discussed above, the 2015-16 MYEFO forecasts also depend on assumptions about the economy's supply side. Should the outcomes for population, productivity and participation differ from what was assumed, then so may the 2015-16 MYEFO outcomes.

This scenario involves a permanent 0.5 per cent increase in both the participation rate and labour productivity, resulting in a 1 per cent increase in real GDP from 2015-16. Once again, the sensitivity analysis evaluates the flow-on effects on the economy, the labour market and prices. The impacts in Table 3.21 are stylised and refer to per cent deviations from the baseline levels of the parameters.

Table 3.21: Illustrative impact of a 1 per cent increase in real GDP due to an equal increase in both productivity and participation (per cent deviation from the baseline level)

	2015-16 per cent	2016-17 per cent
Nominal GDP	3/4	3/4
Non-farm GDP deflator	- 1/4	- 1/4
Employment	1/2	1/2
Wages	1/4	1/4
CPI	- 1/4	- 1/4
Company profits	1 3/4	1 3/4
Consumption	1	1

The 1 per cent increase in real GDP increases nominal GDP by slightly less but the magnitude of the effects on receipts, payments and the underlying cash balance differ from the first scenario because different parts of the economy are affected in different ways.

The increases in labour force participation and labour productivity have the same impact on output, but different impacts on the labour market. Higher productivity leads to higher real GDP and higher real wages, while an increase in the participation rate increases employment and real GDP. Imports are higher in this scenario, reflecting higher domestic incomes.

Since the supply side of the economy expands, inflation temporarily falls relative to the baseline. The lower domestic prices make exports more attractive to foreigners, with the resulting increase in exports offsetting higher imports, leaving the trade balance unchanged. The exchange rate is assumed to be unchanged.

The overall impact of the increase in labour productivity and participation is an increase in the underlying cash balance of around \$3.6 billion in 2015-16 and around \$4.4 billion in 2016-17 (see Table 3.22).

Table 3.22: Illustrative sensitivity of the budget balance to a 1 per cent increase in real GDP due to an equal increase in both productivity and participation

	2015-16	2016-17
	\$b	\$b
Receipts		
Individuals' and other withholding taxes	1.9	1.6
Superannuation fund taxes	0.1	0.2
Company tax	1.1	1.7
Goods and services tax	0.5	0.6
Excise and customs duty	0.4	0.4
Other taxes	0.0	0.0
Total receipts	4.0	4.5
Payments		
Income support	0.0	0.2
Other payments	0.1	0.1
Goods and services tax	-0.5	-0.6
Total payments	-0.4	-0.3
Public debt interest	0.0	0.2
Underlying cash balance impact(a)	3.6	4.4

(a) Estimated impacts fall within the 70 per cent confidence intervals for years 2015-16 and 2016-17, as shown in Charts 3.8 to 3.10.

On the receipts side, individuals' income tax collections increase because of the rise in the number of wage earners and, additionally, higher real wages. The stronger labour market also increases tax collections from superannuation funds because contributions (including compulsory contributions) are higher. The increase in personal incomes leads to higher consumption which results in an increase in GST receipts (with the corresponding receipts passed on in higher GST payments to the States). In addition, the stronger economy results in higher levels of corporate profitability, increasing company taxes.

On the payments side, overall estimated expenditure on income support payments (including pensions, unemployment benefits and other allowances) is lower, reflecting lower growth in benefit rates through indexation due to lower inflation (as measured by the Consumer Price Index).⁴ This effect is partly offset by growth in the number of unemployment benefit recipients (as higher labour force participation increases both employment and the number unemployed). At the same time other payments linked to inflation fall in line with the reduced growth in prices.

On balance, the rise in estimated tax collections is only partially offset by increased payments. This improves the underlying cash position, which results in a lower borrowing requirement and lower public debt interest cost.

⁴ Under existing indexation arrangements, the growth in wages (average weekly earnings) has historically been the key driver of the growth in benefit rates for pensions and similar payments. However, with recent subdued wages growth, the key driver is now indexation of benefit rates to growth in the CPI.

Medium-term projection scenarios

The medium-term projections set out in the 2015-16 MYEFO are not equivalent to forecasts. The medium-term projections use the forward estimates as a base. They are therefore subject to similar risks and uncertainties that affect the fiscal aggregates discussed above, but the longer timeframes mean even greater uncertainty.

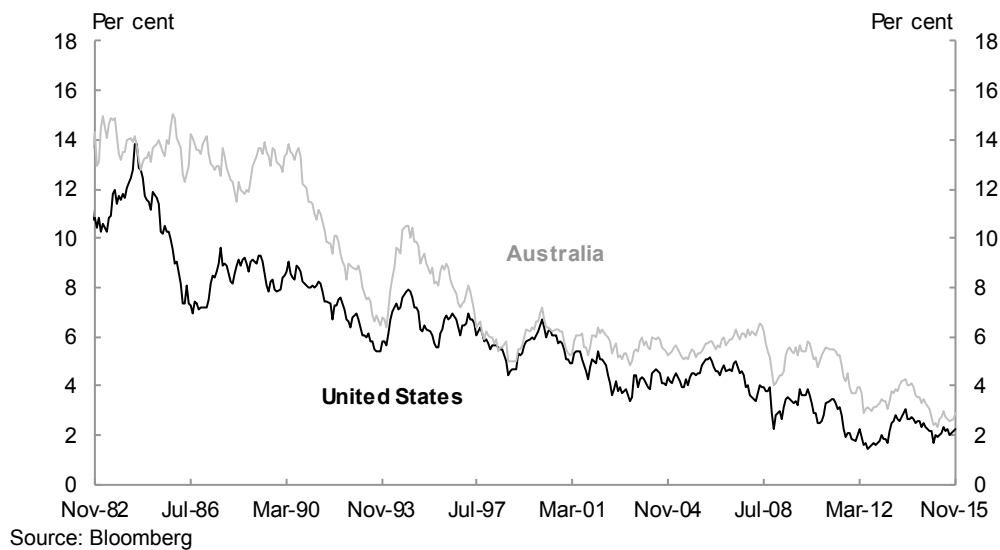
Beyond the forward estimates, a range of simplifying assumptions are used to project government payments, with the main drivers being: movements in prices; economic growth; the size and structure of the population; and the expected per person costs (in each age bracket) of major government programs based on current Government policy. In this context, it is important to note that the projections are very unlikely to unfold exactly as outlined. There will be changes over the projection period that are not anticipated in the underlying assumptions, and government policy will change.

Relatively small changes to assumptions underpinning medium-term projections can have a significant effect on projections of the key fiscal aggregates including the underlying cash balance and CGS on issue (otherwise known as gross debt) by the end of the projection period. In the same way, small changes from government decisions, or from developments beyond the Government's control, can be magnified over the medium term.

Scenario: Impact of higher yields over the medium term

Government bond yields have recently been at historically low levels (Chart 3.11). The 10-year Treasury bond yield underpinning the 2015-16 MYEFO is 2.9 per cent, compared with 2.6 per cent at the time of the 2015-16 Budget and 3.9 per cent at the 2014-15 Budget. This scenario illustrates the impact on key medium-term aggregates of an increase in yields to the level at the 2014-15 Budget. Such an increase is relatively modest compared with past peaks (see Chart 3.11).

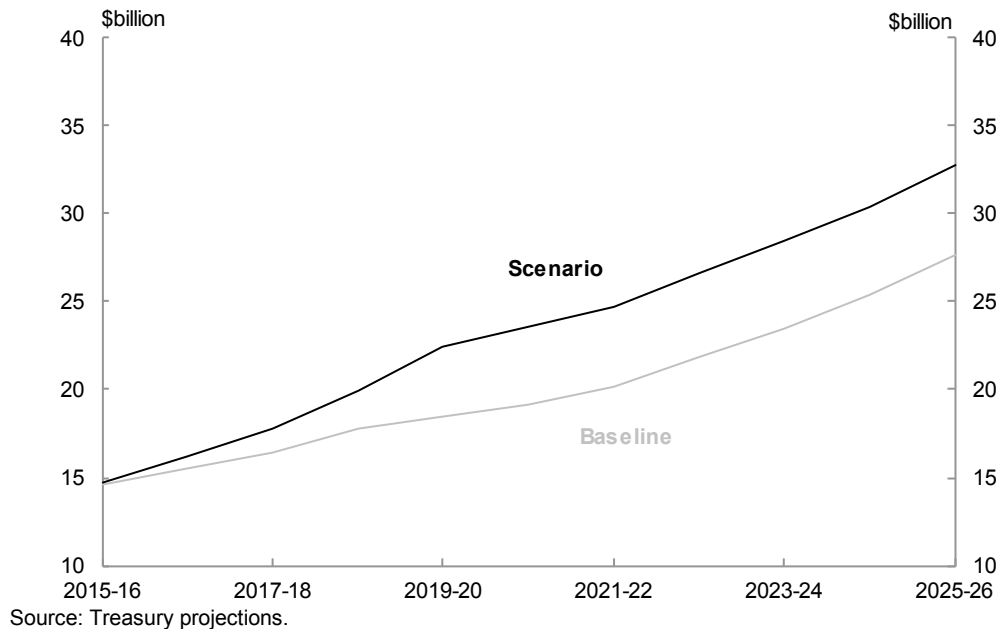
Chart 3.11: United States and Australian 10-year government bond yields



Future borrowing costs are determined by interest rates on Government bonds at the time of issuance. Significant levels of CGS are expected to be issued in the forward estimates period, including to finance projected cash deficits and to refinance maturing debt. This debt issuance requirement means that an increase in yields from current rates would lead to an increase in public debt interest costs.

Future pressures on global bond yields—such as a sustained recovery in global inflationary pressures—could be expected to increase the cost of servicing Government debt. Chart 3.12 shows public debt interest costs to 2025-26 under the yield assumptions for the 2015-16 MYEFO, compared with the higher yield assumptions at the 2014-15 Budget.

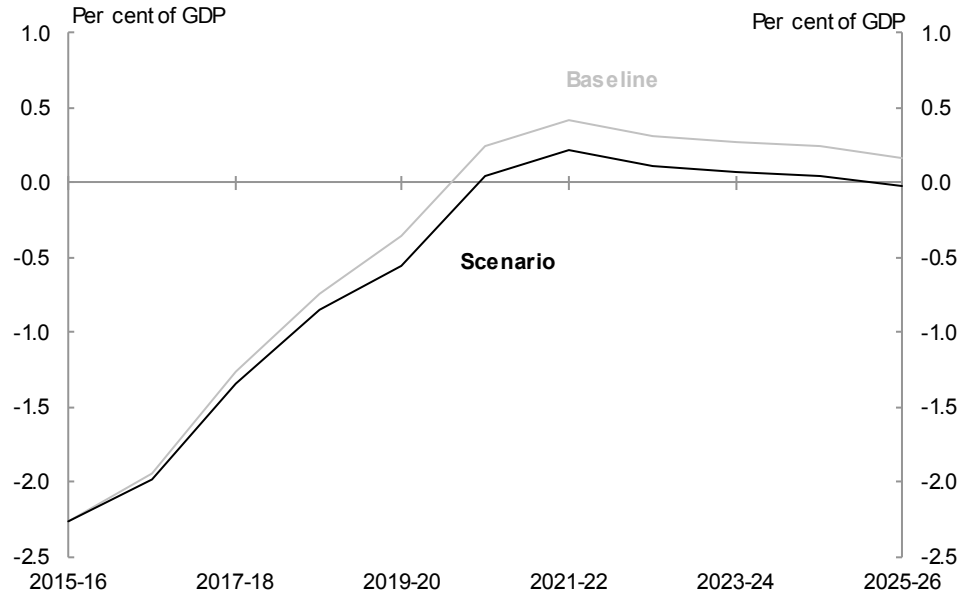
Chart 3.12: Impact of higher yields on public debt interest costs over the medium term



The chart suggests that if the 2014-15 Budget yield assumption was applied to borrowings estimated in the 2015-16 MYEFO, public debt interest costs would be around \$5 billion higher by 2025-26. This increase in public debt interest costs would increase payments, leading to a deterioration in the underlying cash balance (Chart 3.13).

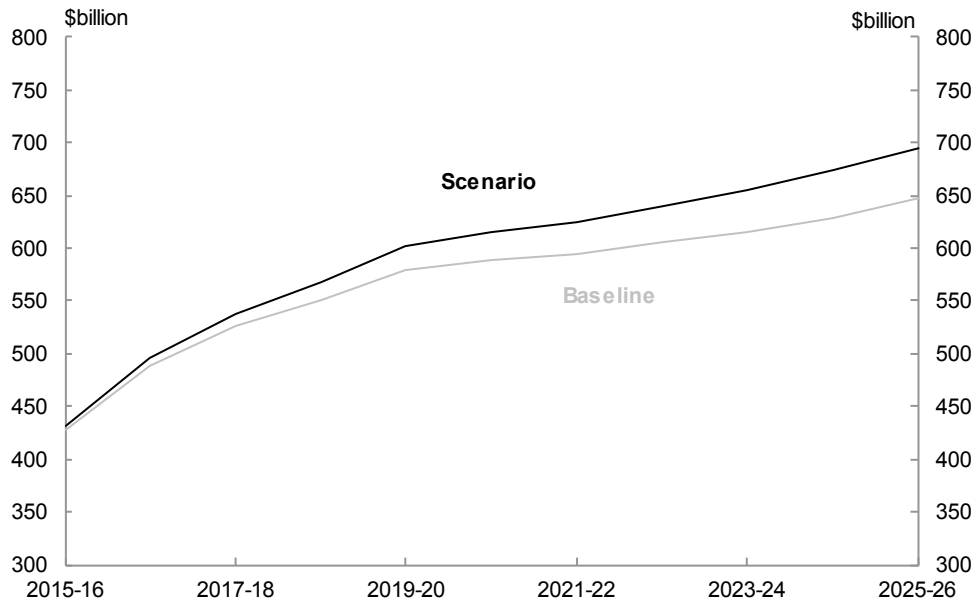
Chart 3.13 shows the underlying cash balance to 2025-26 under the yield assumptions for the 2015-16 MYEFO, compared with the higher yield assumptions at the 2014-15 Budget. The underlying cash balance over the medium term deteriorates from a surplus of 0.2 per cent of GDP in 2025-26 to a balanced position under the higher yield assumption.

Chart 3.13: Impact of higher yields on the underlying cash balance over the medium term



Source: Treasury projections.

Chart 3.14: Impact of higher yields on face value of CGS on issue over the medium term



Source: Treasury projections.

As shown in Chart 3.14, an increase in Commonwealth deficits from higher public debt interest payments would flow through to further borrowings, increasing the face value of CGS on issue to around \$695 billion by the end of the medium term, compared with \$647 billion under the 2015-16 MYEFO yield assumptions.

The impact of higher yields on the medium-term underlying cash balance and the face value of CGS on issue highlights the risks around the balance sheet and the importance of prudent balance sheet management. A strong balance sheet means that governments have the flexibility to respond to unanticipated events during times of financial crises or economic shocks, and that resources that would otherwise need to be used to meet interest payments can be allocated to other priorities.