**5 June 2020**

# Medium-term fiscal projection scenarios: technical appendix

The PBO’s report, *Medium-term fiscal projection scenarios: impact of COVID-19 pandemic and response*, uses publicly available information and technical assumptions to produce scenarios of the impact of the COVID‑19 pandemic and associated policy response on the medium-term fiscal position. This technical appendix provides detail on the methodology underlying the results presented in this report.

The framework constructs a pre-pandemic scenario and a post-pandemic scenario. Each of these scenarios comprise a set of economic inputs and government policy that are translated into fiscal projections through an accounting framework. The difference in the fiscal results between the pre- and post-pandemic scenarios represents the estimated impact of (or deviation due to) the pandemic. The deviations are then applied to the 2019-20 Mid-Year Economic and Fiscal Outlook (MYEFO) fiscal estimates.

## Macroeconomic accounting framework

Given that the PBO does not produce macroeconomic forecasts, the macroeconomic accounting framework uses the internally consistent official set of economic forecasts published by the Reserve Bank of Australia (RBA) in their Statements on Monetary Policy (SMP). The economic forecasts from the RBA’s February 2020 *Statement on Monetary Policy*[[1]](#footnote-1) are used for the pre-pandemic scenario and the forecasts from the May 2020 *Statement on Monetary Policy*[[2]](#footnote-2) are used for the post-pandemic scenarios. The May Statement included three scenarios: baseline, upside and downside. More detailed forecasts were published for the baseline scenario than for the other two scenarios.

The PBO’s fiscal projection scenarios do not assume changes to any economic variables beyond those published in the SMP. For the RBA’s upside and downside scenarios, the PBO constructed the components of GDP such that they differ proportionally with gross domestic product (GDP) from the RBA’s baseline scenario.

The RBA’s economic forecasts cover the period 2019-20 to 2021-22. For years from 2022-23 onwards, the PBO framework applies the medium-term projection methodology used in budget papers.

From 2022-23 to 2029-30 the analysis assumes that the real GDP output gap closes over the five-year period from 2022-23 to 2026-27. The real GDP output gap is the difference between the level of real GDP at a point in time and the theoretical level of potential real GDP if there was full employment and stable inflation. From 2027-28 to 2029‑30, real GDP is assumed to grow at a rate consistent with growth in potential GDP, as published in the 2019‑20 Budget. Between the baseline and the pandemic scenarios, the level of real GDP is therefore unchanged for the period 2027-28 to 2029‑30.

Nominal GDP is the value of all economic production in current dollars, representing the broad base for government tax receipts. Nominal GDP varies between the scenarios because of variations in real GDP and/or variations in prices.

Short-term inflation varies in each scenario according to the RBA forecasts. International trade prices also vary in each scenario according to the RBA forecasts of the terms-of-trade. From 2022-23 to 2029-30, price growth does not change between the scenarios, consistent with the budget approach of the consumer price index (CPI) growing at 2.5 per cent, the mid-point of the RBA’s inflation target band.

Aggregate wages, forming most of the personal income tax base, also vary in each scenario according to the RBA forecasts for employment and labour costs. Business profits, the basis of business income tax, vary according to the non-wage component of nominal GDP. Nominal consumption, the basis of consumption taxes, varies in each scenario according to the RBA forecasts for real consumption and the CPI.

## Fiscal accounting framework

The purpose of the fiscal accounting framework is to translate the economic scenarios into pre- and post-pandemic fiscal scenarios in order to estimate the impact of the post-pandemic scenario. The fiscal accounting framework comprises simplified versions of general government financial statements (the operating statement, balance sheet and cash flow statement) broadly anchored to nominal GDP growth, with specific adjustments to account for progressivity in taxation rates in the personal income tax system, and the debt financing task.

Personal income tax varies between scenarios proportionally to variations in aggregate wages plus an allowance for progressivity in the personal income tax system. This means that taxes on wages will fall proportionally further than the wages themselves.

Goods and services tax (GST) receipts are assumed to vary in the scenarios according to changes in nominal consumption expenditure. GST receipts are separately calculated as these are paid to the states and territories, so are both a receipt and offsetting payment for the Commonwealth Government.

Other taxes, excluding personal income tax and GST receipts, and non-tax receipts, both vary in the scenarios with nominal non-wage GDP. A tax-to-GDP cap of 23.9 per cent is applied, consistent with budget updates. The simplified approach for this analysis does not account for some impacts on revenue not directly related to GDP, such as capital gains and losses, the business tax instalment system, and carried forward losses. These mostly relate to the timing of revenue between different years. The most significant omission in our scenario analysis for revenue is likely to be the impact on capital gains tax.

Public debt interest payment variations are determined from a somewhat simplified approach compared to a full financing task calculation. In our scenarios, all variations to the headline cash balance are financed through issuance of debt, split evenly into four tranches: three year, 10 year, 20 year and 30 year, with corresponding interest rates on Australian Government Securities based on a yield curve that increases asymptotically such that the 10-year bond yield converges to 5 per cent, similar to the budget approach.

All other items on the cash flow statement are calculated from the projected line items.

For the operating statement, we calculate the cash-accrual wedges between operating revenue and receipts, and between operating expenses and payments over the forward estimates period and grow these with nominal GDP over the medium term. We then add the cash-accrual wedges to total payments and total receipts respectively to derive the total revenue and total expense projections over the medium term. Net acquisition of non-financial assets is grown with nominal GDP over the medium-term. Total other economic flows are a residual item that ensures the comprehensive change in net worth on the operating statement is equivalent to the change in net worth on the balance sheet. All other items on the operating statement are calculated from the projected line items.

For the balance sheet, most line items simply vary between the scenarios with nominal GDP: cash and deposits; other receivables; other interest bearing liabilities; advances paid; investments, loans and placements; other payables; and non-financial assets. The scenarios do not include any variance to the government’s superannuation liability or to programs subject to alternative financing approaches, such as the NBN. All other items on the balance sheet are calculated from the projected line items.

The scenarios incorporate the Government’s published costs for its COVID-19 policy response measures: the JobKeeper Payment scheme ($70 billion); Boosting cash flow for employers ($32 billion); Supporting Individuals and Households ($25 billion); Supporting the flow of credit ($15 billion); Other support for business ($8 billion); and legislated Advances to the Finance Minister ($40 billion) for unforeseen expenditure. The list of measures in the Treasury’s *Economic Response to the Coronavirus* document contains details for many of these.[[3]](#footnote-3)

# Detailed methodology

Fiscal accounting framework

| Line item  | Approach to calculating variations between scenarios  |
| --- | --- |
| ***Operating statement*** |
| Revenue |  |
| Total operating receipts | See methodology for *Total receipts* below. Total operating receipts is Total receipts less Cash receipts from the sale of non-financial assets. |
| Wedge between revenue and operating receipts | Varies with nominal GDP |
| Total revenue | Sum of Total operating receipts and Wedge between revenue and operating receipts |
| Expenses |  |
| Total operating payments | See methodology for *Total payments* below. Total operating payments is Total payments less Cash payments from the purchase of non-financial assets less Capital lease payments. |
| Wedge between expenses and payments | Varies with nominal GDP |
| Total expenses | Sum of Total operating payments and Wedge between expenses and operating payments |
| Net purchases of non-financial assets | Varies with nominal GDP |
| Total other economic flows | Residual/balancing item: Net operating balance less change in net worth from balance sheet |
| Net operating balance | Total revenue less total expenses |
| Fiscal balance | Net operating balance plus net purchases of non financial assets |
| Memo item: Comprehensive change in net worth | Net operating balance plus total other economic flows |
| ***Balance sheet*** |
| Financial assets |  |
|  Cash and deposits | Varies with nominal GDP |
|  Advances paid | Varies with nominal GDP  |
|  Investments, loans and placements | Varies with nominal GDP  |
|  Equities | Varies with nominal GDP  |
|  Other receivables | Varies with nominal GDP  |
| Total financial assets | Sum of Cash and deposits, Advances paid, Investments, loans and placements, Equities and Other receivables |
| Total non-financial assets | Varies with nominal GDP |
| Total assets | Sum of Total financial assets and Total non-financial assets |
| Liabilities |  |
|  Australian Government Securities on issue | Varies according to the financing task set by the cumulative variation in the headline cash balance, such that the additional issuance is allocated equally to four tranches that represent three year 10 year, 20 year and 30 year debt |
|  Other interest bearing liabilities | Varies with nominal GDP  |
|  Public sector superannuation liability | Varies with nominal GDP  |
|  Other provisions and payables | Varies with nominal GDP  |
| Total liabilities | Sum of Australian Government Securities on issue, Other interest bearing liabilities, Public sector superannuation liability and Other provisions and payables |
| Net debt | Sum of Australian Government Securities on issue and Other interest bearing liabilities less sum of Cash and deposits, Advances paid and Investments, loans and placements |
| Net financial worth | Total financial assets less Total liabilities |
| Net worth | Total assets less Total liabilities |
| Memo item: Change in net worth | Year-on-year differencing of Net worth, will be equal to the Comprehensive change in net worth from the Operating statement, by construction under this methodology |
|  |  |
| ***Cash flow statement*** |
| Receipts |  |
| Tax receipts | Personal income tax (PIT) receipts vary with compensation of employees, as determined by the RBA forecasts for employment and wagesGST varies with nominal consumption, as forecast by the RBACapital gains tax varies with nominal GDPOther taxes, of which company tax is a key component, vary with the sum of gross operating surplus and gross mixed income adjusted for depreciationUnconstrained tax receipts are the sum of PIT, GST and other tax receipts as defined above; Constrained tax receipts are the minimum of 23.9 per cent of GDP (the ‘tax-to-GDP cap’) and unconstrained tax receipts in a given year |
| Non-tax receipts | Varies with nominal GDP |
| Total receipts | Tax receipts plus non-tax receipts |
| Memo item: Tax receipts without tax-cap | Unconstrained tax receipts as described above |
| Memo item: ex-UCB Future Fund net earnings | Does not vary |
| Memo item: Net cash flow from investments for policy purposes | Varies with nominal GDP |
| Payments |  |
| Payments excluding public debt interest | GST payments to the states vary with GST receiptsPayments related to CPI and wages vary with the RBA forecasts for CPI and wages, according to a rule-of-thumb of $1 billion per one percentage point variation between scenariosPayments related to unemployment vary with the RBA forecasts for the unemployment rate, according to a rule-of-thumb of $1.8 billion per one percentage point variation between scenariosNew policy measures applied as net payments according to their announced costs. In particular, net payments related to COVID-19 policy measures are as published by the Treasury on 25 May 2020, and also take account of the $40 billion in available expenditure under an Advance to the Finance Minister, as set out in the *Supply Act (No. 1) 2020-21* and *Supply Act (No. 2) 2020-21*, which both received royal assent on 24 March 2020.Other payments (with the exception of public debt as described below) do not vary between scenarios |
| Public debt interest | Varies according to the change in debt, applying an interest rate yield curve which increases asymptotically, with the ten-year yield converging towards 5 per cent in the long run |
| Total payments | Total payments excluding public debt interest plus public debt interest |
| Memo item: superannuation payments | Varies with nominal GDP |
| Underlying cash balance | Total receipts less Total payments less ex-UCB Future Fund net earnings |
| Headline cash balance | Underlying cash balance plus ex-UCB Future Fund net earnings plus Net cash flow from investments for policy purposes |

Macroeconomic accounting framework

| Macroeconomic variable | Projection methodology: Baseline uses February 2020 RBA SMP Forecasts; Scenario uses May 2020 RBA SMP Forecasts |
| --- | --- |
| ***Gross domestic product (Expenditure, chain volume measure)*** |
| Household consumption | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Public demand | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Dwelling investment | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Business investment | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Ownership transfer costs and change in inventories | Calculated as a residual in order to match RBA forecast growth rates for gross national expenditure to the sum of its components |
| Gross national expenditure | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Imports | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Exports | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Statistical discrepancy | Residual balancing item to ensure that real GDP (constructed as Gross national expenditure less Imports plus Exports) equates back to real GDP according to RBA forecast growth rates; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Gross domestic product | RBA forecast growth rates applied over SMP horizon; growth rates fixed at real GDP growth rate required to close the output gap by 2026-27 thereafter |
| Gross domestic product (potential) | Potential GDP level for 2027-28 calculated from growth rates from 2019‑20 Budget Paper 1, Statement 7 |
| ***Implicit price deflators*** |
| Household consumption | RBA forecast CPI inflation growth rates applied over SMP horizon; set at 2.5 per cent (midpoint of RBA target inflation band) from 2022-23 onward |
| All other domestic demand deflators | Do not vary between scenarios |
| Gross national expenditure | Calculated from projected nominal and real flows |
| Imports | Varies with the CPI |
| Exports | Calculated from the imports price deflator and the RBA forecast for the terms of trade. The terms of trade does not vary between scenarios. |
| Statistical discrepancy | Not applicable |
| Gross domestic product | Calculated from projected nominal and real flows |
| ***Gross domestic product (Expenditure, current prices measure)*** |
| Household consumption | Set at real flow multiplied by implicit price deflator |
| Public demand | Set at real flow multiplied by implicit price deflator  |
| Dwelling investment | Set at real flow multiplied by implicit price deflator |
| Business investment | Set at real flow multiplied by implicit price deflator |
| Ownership transfer costs | Set at real flow multiplied by implicit price deflator |
| Total private investment | Sum of Dwelling investment, Business investment and Ownership transfer costs |
| Domestic final demand | Sum of Household consumption, Public demand and Total private investment |
| Change in inventories | Set at real flow multiplied by implicit price deflator |
| Gross national expenditure | Sum of Domestic final demand and Change in inventories |
| Imports | Set at real flow multiplied by implicit price deflator |
| Exports | Set at real flow multiplied by implicit price deflator |
| Statistical discrepancy | Not applicable |
| Gross domestic product | Calculated as Gross national expenditure less Imports plus Exports plus the Statistical discrepancy |
| *Gross domestic product (Income, current prices measure)* |
| Compensation of employees | Varies with employed persons multiplied by average hours multiplied by implied unit labour costs, all grown at RBA forecast rates over the SMP horizon, and determined over the medium term with a labour market projection framework that accounts for short-term variation but converges to steady-state levels for the number of persons employed and the unemployment rate |
| Gross operating surplus | Growth rates for Gross operating surplus, Gross mixed income and Taxes less subsidies on production and imports vary according to the residual between nominal GDP and compensation of employees. The business tax base is the gross operating surplus and gross mixed income less an invariant amount for depreciation. |
| Gross domestic product | Set equal to the Gross domestic product (Expenditure, current prices) series described above |

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1. <https://www.rba.gov.au/publications/smp/2020/feb/> [↑](#footnote-ref-1)
2. <https://www.rba.gov.au/publications/smp/2020/may/> [↑](#footnote-ref-2)
3. treasury.gov.au/sites/default/files/2020-05/Overview-Economic\_Response\_to\_the\_Coronavirus\_3.pdf [↑](#footnote-ref-3)