The Australian Treasury's fiscal aggregate projection model

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This article describes the Treasury's fiscal aggregate projection model (FAPmod) that underpinned the medium-term fiscal projections published in the 2009-10 Budget. FAPmod will also form the basis of future medium-term fiscal projections and the fiscal projections in the third Intergenerational Report.

1 The authors are from Budget Policy Division, the Australian Treasury. The authors acknowledge the role of Karen Incher in developing the model that is described in the article. This article has benefited from the contributions and comments of Nigel Ray, Luise McCulloch, David Lowe, Tony McDonald and Damien White. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

Well developed medium-term fiscal projections help to guide policy development by the government and frame public debate about the sustainability of budget settings. With this in mind the Treasury has developed FAPmod that produces detailed projections of the government's fiscal position over a period of up to 40 years consistent with the requirements set out in the *Charter of Budget Honesty Act 1998*.

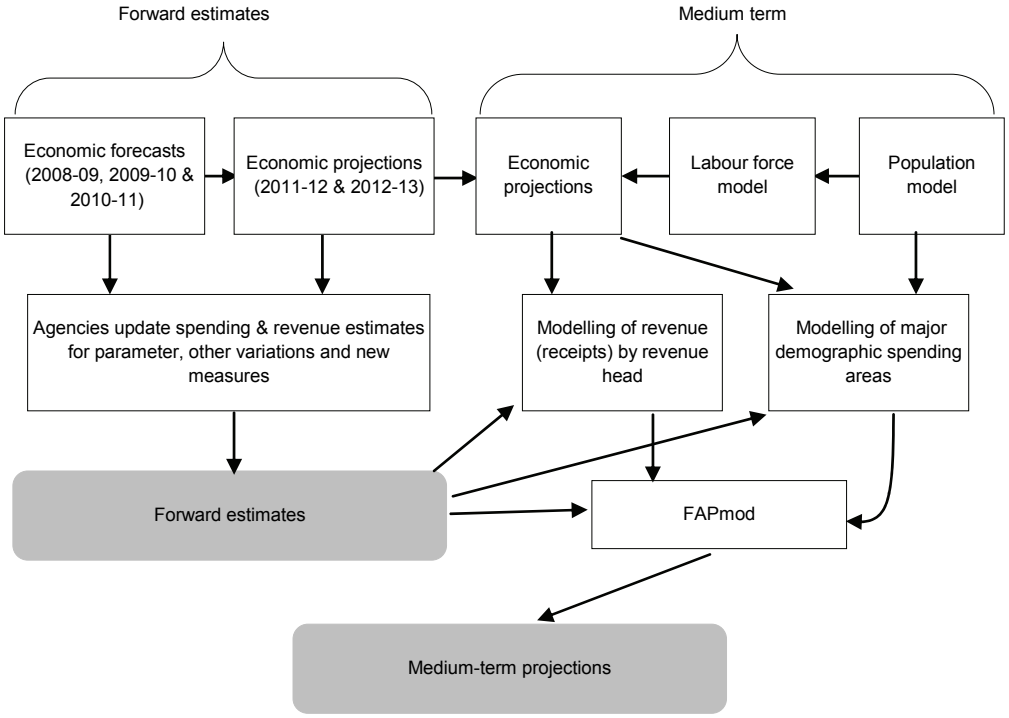
FAPmod builds on the work previously undertaken for the first two Intergenerational Reports (IGRs). It significantly adds to that capacity by modelling all the key indicators of fiscal sustainability. FAPmod is based on the three financial statements that are published at each budget and mid-year economic and fiscal outlook. By capturing the dynamics between flow concepts such as the budget balance and stock concepts such as debt, it provides more robust projections. In addition, FAPmod now offers the capacity to model the underlying cash and fiscal balances as well as balance sheet aggregates including net financial worth and net worth over the medium and long term. This capacity allows for a more detailed assessment of the fiscal outlook.

FAPmod was used to produce the medium-term fiscal projections for the period to 2019-20 that were presented in the 2009-10 Budget. FAPmod will form the basis of future medium-term projections and the projections of the fiscal aggregates in the third IGR.

Framework for the Treasury's medium-term fiscal projections

The focus of this paper is the capacity of FAPmod to generate projections of the fiscal outlook. However the FAPmod builds on the analytical framework developed through the first two IGRs. It draws together the outputs of a wide range of separate but internally consistent models in order to generate the fiscal aggregates (Figure 1).

Figure 1: Preparing the medium-term fiscal aggregates[2]



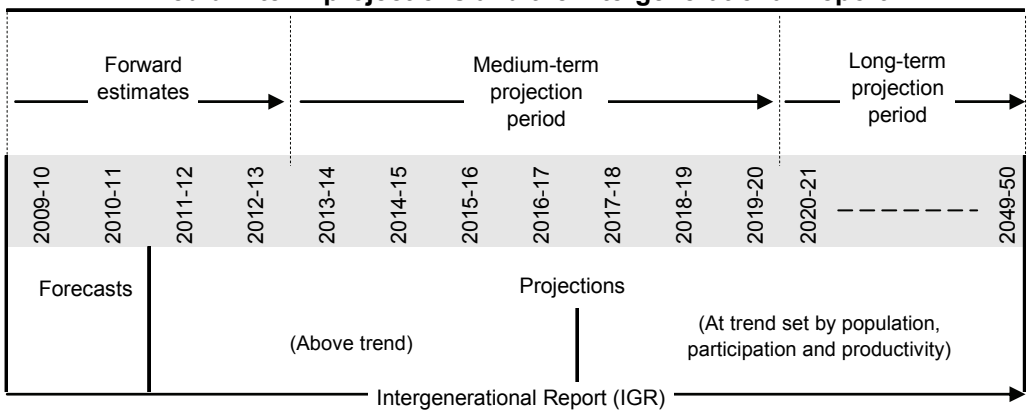
FAPmod takes the fiscal and economic forward estimates published in the budget as its starting point. Beyond the forward estimates, the fiscal projections draw together the population and economic projections developed explicitly within the '3Ps' (population, participation, productivity) framework that underlies the IGR. These projections, in turn, underpin the separate but related models of revenue, health, income support payments, education and training, aged care and unfunded government employee superannuation. As per the previous IGRs, this involves up to eight models that produce projections under the guidance of a senior Treasury steering committee designed to ensure internal consistency and legitimacy of assumptions.

2 This diagram shows how the 2009-10 Budget medium-term fiscal projections were developed. The preparation of the IGR projections is broadly comparable.

The medium-term fiscal projections published in the 2009-10 Budget allow for economic recovery. GDP was forecast to grow below trend in the forecast years of 2009-10 and 2010-11, and projected to grow above trend in the projection years of 2011-12 and 2012-13.

The medium-term projections extended this methodology by projecting GDP to grow above trend for a further four years, having the effect of bringing the unemployment rate down by half a percentage point each year until it reached the assumed non-accelerating inflation rate of unemployment (NAIRU) in 2016-17 (Figure 2). Once the NAIRU was reached, GDP was assumed to grow in accordance with changes in population, participation and productivity.[3]

Figure 2: Projections methodology in the forward estimates, medium-term projections and the Intergenerational Report



The nominal and real GDP growth rates generated through this methodology were an important driver of the projections of receipts and spending that are key inputs into FAPmod.

Medium-term tax receipts were projected by revenue head using income and employment parameters linked to GDP growth — similar to the revenue projections for the forward estimates period.

While the economy is recovering, this approach is more appropriate than adopting a constant tax-to-GDP ratio (the methodology used in the first two IGRs for long-term tax projections) as it allows for the natural recovery of receipts as the economy recovers consistent with the Government's medium-term fiscal strategy and the

3 For additional information about the medium-term projection methodology used for the 2009-10 Budget see 2009-10 Budget, BP1, Statement 3, pg 3-23 and Henry,K, 2009-10 post Budget speech.

commitment that taxation as a share of GDP will remain below the 2007-08 level on average.

Spending was projected to grow at 2 per cent in real terms in years of above-trend growth until the budget was projected to return to surplus. This is consistent with the Government's fiscal strategy.

Once surplus was reached in 2015-16, spending was projected in accordance with the IGR methodology, with health, education, payments to individuals, aged care and superannuation costs modelled to reflect the impact of demographic and other economic parameters. 'Other' payments are projected to remain constant as a proportion of GDP.

Modelling the financial statements in the medium-term fiscal model

FAPmod is designed to replicate an internally consistent cash and accrual accounting system so that all fiscal aggregates can be produced. This means the operating statement, the cash flow statement and the balance sheet are interconnected with changes in one statement affecting the other statements.

The modelled general government sector (GGS) financial statements are:

- the cash flow statement, which identifies how cash is generated and applied in a single accounting period[4] (to yield the underlying cash and headline cash balances);
- the operating statement, which presents details of transactions in revenues, expenses, the net acquisition of non-financial assets (net capital investment) and other economic flows for an accounting period (to yield the fiscal balance); and
- the balance sheet, which shows stocks of assets, liabilities, and the aggregates of net worth, net financial worth and net debt.

Cash flow statement

Table 1 sets out the modelled and non-modelled components of the cash flow and operating statements.

4 Cash transactions are specifically identified in the budget financial statements because cash management is considered an essential function of accrual budgeting.

The *underlying cash balance* (UCB) is the Government's key fiscal aggregate specified in its medium-term fiscal strategy. It is derived from projections of cash inflows and outflows in the cash flow statement.

- The UCB is total receipts (excluding Future Fund earnings) less total operating payments, investments in non-financial assets for policy purposes and finance leases.

Table 1: Cash flow and operating statements

	Receipts (revenue)	Payments (expenses)
Modelled		
	Tax receipts	Health
	GST	Education
	Other	Payments to individuals
	Future Fund earnings	Pensions
	Interest receipts	Disability Support Pension
	Dividends	Parenting payments
	Interest receipts	Unemployment allowances
	HELP	Austudy
	Term deposits	Youth allowance
	AOFM investments	Family tax benefits
	Other Funds	Child care benefits
		Child care rebates
		Maternity payment (baby bonus)
		Carer's allowance
		Paid parental leave
		Civilian and military superannuation
		Defence[a]
		GST
		CGS interest payments
Non-modelled		
	Other non-tax receipts	Other payments
	Sale of non-financial assets	Purchases of non-financial assets
	other Interest receipts	other interest payments

(a) Defence payments were not modelled in the 2009-10 Budget and were part of non-modelled payments. For future medium-term and IGR projections defence payments will be modelled.

Total receipts comprise tax receipts and non-tax receipts. Tax receipts are modelled separately and then fed into FAPmod as described above. Interest receipts are modelled endogenously as a function of the assumed rate of return on term deposits and other assets.

Non-modelled receipts (such as other non-tax receipts) are held constant as a proportion of GDP from the end of the forward estimates.

Total payments comprise modelled and non-modelled payments. Modelled payments reflect:

- primarily the modelled spending pressures fed into FAPmod as exogenous inputs after being formulated in the IGR framework described above; and

- interest payments on Commonwealth Government Securities (CGS) that are modelled endogenously as a function of the projected level of CGS in the balance sheet.

Non-modelled payments ('other payments') are held constant as a share of GDP except when the fiscal strategy of holding real growth in overall spending at 2 per cent is in force. For those years the non-modelled payments line becomes a residual item, with the overall spending constraint met by compressing growth in non-modelled spending.

Purchases of non-financial assets are held constant as a proportion of GDP from the end of the forward estimates.

The *headline cash balance* (HCB) is equal to the UCB plus future fund earnings plus net cash flow from investments in public non-financial corporations for policy purposes. It reports on the government's net cash position and is essential for cash management purposes.

- Future Fund earnings are modelled endogenously as a function of the assumed rate of return on the Future fund.

Modelling the operating statement

The operating statement is an accrual statement that is prepared using the same methodology as for the cash flow statement. The majority of modelled expenses are assumed to equal the modelled cash payments, but with the following extra items:

- the concessional loan treatment of student loans (HELP), which has a different impact on the operating statement from the cash flow statement; and

- unfunded superannuation and superannuation interest expenses.

In addition, depreciation is subtracted from net purchases of non-financial assets (derived from the cash flow statement) to provide an approximate measure of net capital investment. The level of depreciation is based on the average rate of depreciation across the forward estimates and is applied to the opening stock of non-financial assets held on the government's balance sheet.

Modelling the balance sheet

The addition of the balance sheet, along with the inclusion of the operating statement, now allows for projections of net financial worth and net worth in addition to net debt. The balance sheet includes both modelled and non-modelled items (Table 2).

The assumptions made on the balance sheet items affect the underlying cash balance and operating statement by allowing for a more sophisticated treatment of:

- the earnings (interest and dividends) on assets such as term deposits and the Nation-building Funds; and
- the cost of servicing liabilities, most notably CGS.

Net debt is, in turn, affected by changes to the cash flow statement (for example an increase in the size of the deficit to be financed), as well as by balance sheet changes that are unrelated to the cash flow statement. For example, the assumed portfolio allocation of the Future Fund assets affects the projections of net debt which, by definition, includes assets such as cash and deposits but excludes other financial assets such as equity.

The balance sheet projections are also sensitive to assumptions about the role of cash reserves held in the Nation-building Funds.

Projections of unfunded superannuation liabilities are sourced from the Long Term Cost Reports (LTCRs) prepared by the Australian Government Actuary.

Table 2: The balance sheet

	Liabilities	Assets
Modelled		
	CGS	HELP loans
	Superannuation	Term deposits
	Other provisions and payables	Other AOFM investments
		Future Fund
		Nation-building Funds
		Non-financial assets
		Other receivables
Non-modelled		
	Other interest bearing liabilities	Other advances paid
		Other investments, loans and placements
		Other equities and other receivables

Debt dynamics: CGS and term deposits

Changes in the stock of CGS are typically the major contributor to changes in the government's balance sheet position. For this reason, it is treated in detail in FAPmod.

The stock of CGS across the forward estimates reflects the opening balance, the CGS that matures and needs to be refinanced and the additional issuance required to finance headline cash deficits. Across the forward estimates:

- the interest paid on existing CGS reflects their maturity structure and the interest rate that the CGS were issued at; and
- the interest paid on new issuance reflects the maturity structure of the CGS that are issued and the prevailing yield curve.

Beyond the forward estimates, any further CGS that are issued to finance a headline cash deficit or to refinance maturing debt pays an interest rate of 6 per cent. This interest rate is a simplifying assumption that is consistent with the LTCRs prepared by the Australian Government Actuary, and is also applied to the government's term deposits. When the budget returns to surplus, the FAPmod assumes that surpluses will be used to retire any outstanding CGS and thereafter will accumulate in term deposits.

Beyond the forward estimates, the FAPmod includes the interest payments on CGS in the headline cash balance for any given year and therefore the government's financing task. CGS that are issued within a financial year are assumed on average to make one coupon payment, with two coupon payments assumed to be made on the opening stock of CGS. These payments will affect the size of the headline cash balance in that year. For example, a larger headline cash deficit entails a larger level of CGS which in turn entails a larger public debt interest cost that increases the size of the headline cash deficit. This relationship between the balance sheet and the cash flow statement is iterated until the additional interest payments have negligible effect on the headline cash balance. The same treatment applies to the government's term deposits when CGS is eliminated. This treatment ensures that the dynamics associated with accumulating CGS and term deposits are fully reflected in FAPmod.

Conclusion

FAPmod builds on the work previously undertaken for the first two Intergenerational Reports. It incorporates projections based on long-term economic and demographic trends into the financial framework that underpins the key fiscal aggregates published at each budget. This has two key benefits.

The first benefit is that FAPmod can now provide long-term projections on the full suite of fiscal aggregates that inform policy development and frame the public debate about the sustainability of budget settings. The operating statement and the balance sheet can now be modelled for up to 40 years which allows the preparation of aggregates such as the underlying cash and fiscal balances, net financial worth and net

worth. FAPmod also offers the capacity to continue to model the primary balance and net debt as in the first two Intergenerational Reports.

The second benefit is that the projections of the fiscal aggregates are more robust because FAPmod captures the dynamics between the cash flow statement and the balance sheet that is consistent with the fiscal estimates published at each budget. This means that the impact of the budget balance on the level of government debt and the feedback impact of changes to the level of public debt interest are fully captured by FAPmod.

FAPmod is therefore an important tool that will form the basis of future medium-term projections of the fiscal estimates as well as the fiscal aggregate projections in the third Intergenerational Report.