

SECTION 1: BACKGROUND

1.1: The challenges to preparing macroeconomic and revenue forecasts

Treasury is the principal economic advisory agency of the Australian Government. In this role, Treasury prepares macroeconomic and revenue forecasts as key inputs into the preparation of budget estimates of revenue and expenditure. The budget estimates provide a fiscal baseline against which new policy decisions can be taken by the Government, including policy decisions taken to meet its medium-term fiscal strategy. Treasury's medium term projections have taken on an enhanced role because of the requirement of the *Charter of Budget Honesty* for Governments to set fiscal policy within a sustainable medium-term framework.¹

Treasury's macroeconomic forecasts are also used more broadly to assist in the framing of forward-looking macroeconomic policy advice.

Forecasting is an inherently difficult exercise. It is challenging to capture the salient features of a modern complex economy in a framework simple enough to be tractable. Unlike the physical sciences, the inability to conduct repeated experiments means that it is difficult to use economic data to disentangle quantitatively the impacts of different influences on the economy, particularly in the face of continual structural change. Human behaviour, in particular the influence of *animal spirits*, has elements that are inherently unpredictable. Economies are buffeted by shocks, which by their very nature are not foreseeable, for example economic disasters, such as droughts, and technological advances. Lags in data collection and survey error mean that forecasters are reliant upon their own informed assessment about the current state of the economy. It follows naturally that judgement plays an important role in the preparation of forecasts.

It is for these reasons that the discussion of the risks and uncertainties around central case point estimates is a fundamental part of any set of forecasts and a critical input into forward-looking macroeconomic policy deliberation. This element of forecasting practice can be downplayed in a review of forecasting performance which focuses on point estimates. Analysis of forecast errors can point to areas where forecasting methodology can be improved, but caution is required when using ex post evaluations of forecast accuracy to draw conclusions relating to the effectiveness of forecasts as inputs into the policy process. This would require an assessment of whether the broader presentation of the economic outlook affords a picture of likely developments that provides an adequate basis for policy decisions.

1.2: The 2005 Review of Forecasting the Nominal Economy and Taxation Revenue

As discussed, part of the process of improving forecasts is reviewing past forecasting performance, examining the reasons for forecasting errors and identifying areas where forecasting methodology can be improved.

Treasury's forecasting of the macroeconomy and revenue operates in an environment of continuous evaluation and development. The forecasts are regularly subjected to internal review, and to formal peer review by other government agencies as part of the quarterly Joint Economic Forecasting Group (JEFG) meetings. However, from time to time, it is also valuable to formally take stock of the Department's forecasting capability and performance.

¹ Clause 4 of the *Charter of Budget Honesty* requires that:

'The Government's fiscal policy is to be directed at maintaining the on-going economic prosperity and welfare of the people of Australia and is therefore to be set in a sustainable medium-term framework.'

The most recent major internal review of Treasury's forecasting performance was the Review of Forecasting the Nominal Economy and Taxation Revenue (the 2005 Review). It was commissioned in 2005 in response to significant upward revisions to successive published forecasts of Australian Government taxation revenue over a number of years, which had drawn into question the quality of Treasury's forecasts at the time.²

The major findings of the 2005 Review related to the revenue forecasts and revenue forecasting methodology and included that:

- the underestimation in the Treasury's revenue forecasts appeared to reflect a series of conservative biases in the revenue forecasting process, combined with technical assumptions that implied that forecast revenue growth was insufficiently sensitive to nominal GDP growth;
- Treasury had an inadequate understanding of the relationship between the nominal economy and taxation revenue; and
- Treasury's capacity to undertake meaningful analysis of taxation revenue had been severely hampered by underinvestment in taxation revenue data.

In response to these findings, Treasury's Executive Board established a dedicated team to implement the recommendations of the 2005 Review that were designed to overhaul the data and methodology used to forecast taxation revenue. The team subsequently made major investments in the quality of taxation revenue data sets and taxation revenue forecasting methodology over an eighteen month period.

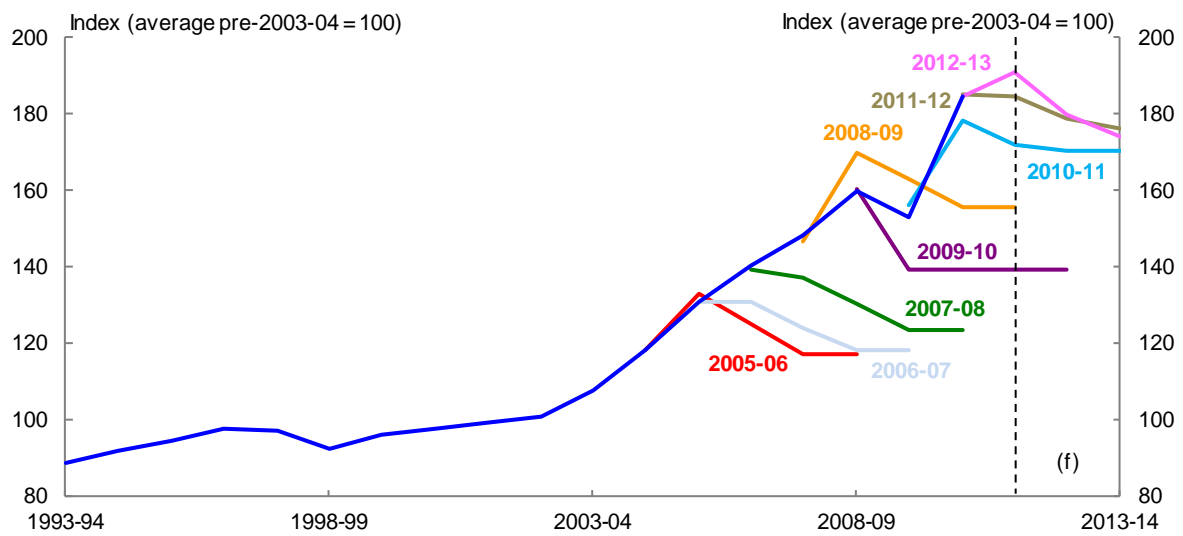
The 2005 Review also made a number of recommendations designed to improve the professional interactions between the economic and revenue forecasters; to enhance the skill sets of the revenue forecasters; and to increase the emphasis given to the nominal economy forecasts in the economic forecasting area. The recommendations of the 2005 Review are at Attachment A, together with an assessment of progress made towards their implementation.

1.3: Recent forecasting challenges

The period since the 2005 Review has been challenging for both economic and revenue forecasting. Two major developments, in particular, stand out.

The first of these relates to rapid rates of industrialisation in Asia, particularly in China, which increased worldwide demand for natural resources and in turn, underpinned an investment boom and a sharp rise in output prices in the mining sector over an extended period. In common with other forecasters, Treasury underestimated the extent of the resultant terms of trade boom in Australia through the mid-2000s (see Figure 1.1), which led to the underestimation of nominal economic outcomes and taxation revenue.

² The outcome of the review of macroeconomic forecasts was published in the *Economic Roundup*, Autumn, 2005. This follows on from the publication of key results of the 1996 evaluation of macroeconomic forecasting performance in the *Economic Roundup*, Autumn, 1996.

Figure 1.1: Budget Forecasts of Australia's Terms of Trade

Note: The figure plots the forecast level of the terms of trade against outcomes, with the forecast level derived from forecast growth rates of the terms of trade from successive Budgets, beginning with the 2005-06 Budget.

The second of these relates to the impact of the global financial crisis (GFC), and its aftermath, on the Australian economy and taxation receipts. In common with other forecasters, Treasury did not predict the onset of the GFC in 2008-09, and subsequently overestimated the impact of the GFC on economic growth in 2009-10. This created large macroeconomic and revenue forecast errors. In particular, in the 2009-10 Budget, at the height of a period of significant global and domestic pessimism, Treasury forecast a domestic recession in 2009-10 that did not eventuate. Treasury has also overestimated revenue growth in recent years, reflecting the lingering effects of the GFC. Even though Australia's nominal economy is now around 25 per cent larger than in 2007-08, tax receipts are only around 11 per cent higher, resulting in the tax-to-GDP ratio being 2.6 percentage points of GDP below its pre-GFC level (Figures 1.2 and 1.3).

Figure 1.2: Nominal GDP**Figure 1.3: Tax to GDP ratio**

1.4: The Review of Treasury Macroeconomic and Revenue Forecasting

Against this backdrop, and given the time that has passed since the last major review, Treasury decided that it was again time to undertake a review of its macroeconomic and revenue forecasting performance.

The Review of Treasury Macroeconomic and Revenue Forecasting (the Review) has been undertaken by a secretariat established within Treasury, and overseen by an independent external reference group (the Advisory Panel) made up of members with strong economic credentials.

The Terms of Reference for the Review require an assessment of the quality of Treasury's forecasting of the macroeconomy and taxation revenue by:

1. examining the appropriateness of forecasting methodologies and
2. comparing forecast accuracy with other forecasters, both in Australia and overseas.

In the view of the Review, to examine the appropriateness of forecasting methodologies requires an assessment of whether the Treasury:

- is drawing upon the full range of information in preparing its forecasts;
- is using this information efficiently by drawing upon models/technical tools appropriate to the forecasting task; and
- has appropriate governance structures in place to ensure that (i) Treasury's forecasts are subject to quality assurance and review (ii) its forecasting methodologies operate in an environment of continuous evaluation and development and (iii) Treasury has in place knowledge management systems, recognising the need for specialist expertise and technical tools in these areas that takes considerable time to build.

To aid in this assessment, a high level review of international forecasting practice has been prepared. This work forms the second section of this report.

Further, the Review ruled out of scope of the Terms of Reference matters relating to:

- the resourcing of the forecasting areas, including the number, technical capability and experience of staff. In part, this reflects the difficulty of the Review assessing the appropriateness of staff resourcing without an appreciation of the other demands on Treasury resources and the broader fiscal environment. This issue has been the subject of earlier internal reviews;
- any technical assessment of the models/technical tools being used by the forecasting areas, including their econometric and conceptual rigor. This issue has also been the subject of earlier internal reviews. Furthermore, Treasury has employed an in-house technical specialist to ensure that its macroeconomic technical models/tools are at the cutting edge of macroeconomic forecasting practice, within the overall modelling strategy that Treasury has adopted; and
- the accuracy of Treasury's taxation policy costings, noting that the 2005 Review found that errors in taxation policy costings did not make a material contribution to revenue forecast errors.

The interpretation of the second part of the terms of reference is more straightforward, requiring a quantitative assessment of Treasury's forecasting accuracy, and a comparison with forecasters in Australia and overseas. This work forms the third section of this report

In addition, case studies have been prepared that provide more qualitative analysis of Treasury's forecasting performance in relation to the key forecasting challenges faced over the last decade, including the lessons learned from these events. As foreshadowed earlier in this section, these forecasting challenges relate to the rapid industrialisation of China, and the associated terms of trade boom, and the GFC and its aftermath. The case studies form the fourth section of this report.

1.5: The role of the independent external reference group

The Advisory Panel has played an oversight role, including providing comments and suggestions to the Secretariat on the scope and content of the report. In addition, the Advisory Panel has prepared the Executive Summary which includes a number of recommendations and suggestions for further improving the Treasury's forecasting processes going forward.

The Secretariat has authored the report and is responsible for the data, analysis and commentary contained in the report.

