Appendix: What to expect when you're expecting inflation

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Full article: What to expect when you're expecting inflation

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This appendix explains the methodology for Saunders (2021).

A.1: Forecasts

To assess the inflation outlook over the coming two years, I have put together forecasts for trimmed-mean inflation using a range of indicators of expected inflation. These include the expectations of businesses, consumers as well as those of 'inflation observers' such as union officials, the RBA, financial market participants and economists.

For the RBA, I have used its historical forecasts for one- to eight-quarters ahead, which are available on its website.[1]

For the business survey measures, I have used the following autoregressive-distributed lag model (ARDL) to map the measures of inflation expectations through to observed inflation.

$$\Delta\pi_t = \lambda(\pi_{t-1} - \alpha_0 - \alpha_1 x_{t-1}) + \Sigma_{i=1}^{2}\beta_i\Delta\pi_{t-i} + \Sigma_{i=1}^{2}\beta_i\Delta x_{t-i}$$

Where π is annualised quarterly trimmed-mean inflation and x is the measure of expected inflation.

There are several reasons why I used a mapping equation for these forecasts.

1. **Creating a forecast profile:** The survey measures only reference a specific point in time (that is, the current quarter or three-months ahead). However, for the projections in the article, I needed forecasts for each quarter from one- to eight-quarters ahead. Using an equation to map the survey measures through to actual inflation provides a simple way to construct these forecast profiles.
2. **Scaling the data:** Several business survey measures are only made available as indices (rather than growth rates), so the level and variance of these data are not directly comparable to observed inflation. Similarly, the survey measures that are represented in growth rates tend to have a persistent gap relative to observed inflation, so the forecasts will be biased if no adjustment is made for this gap. A least-squares regression (such as the above ARDL) is a simple way to adjust these series so that they can be used to forecast inflation.
3. **Forecast accuracy:** The accuracy of the forecasts improved noticeably when I included lags of trimmed-mean inflation in the equation, which suggests the use of an ARDL is appropriate.

I have used a similar equation to estimate the forecast profiles for the remaining 'inflation observer' measures, though with a few restrictions placed on the equations. These restrictions were made so that the models' forecasts equal the expected rate of inflation at the end of the forecast horizon (that is, the models two-year ahead forecast equals two-year ahead inflation expectations).[2]

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[1] For the period up to the end of 2014, these forecasts are available here (Historical Forecasts | RBA). For the post-2014 period, these forecasts have been updated using the inflation forecasts provided in each RBA Statement on Monetary Policy (Statement on Monetary Policy | RBA). See Wallace and Tulip (2012) for a detailed assessment of these forecasts.

[2] This involved restricting $\alpha_0 = 0$, α_1=1, and (in most cases) setting the value of λ so that actual inflation converges to its expectation over a two-year horizon. I allowed for slower convergence by not restricting the value of λ in the few cases where I used expectations for horizons longer than two years.

A.2: Forecast weights

The weights for the weighted-average forecasts are based on each forecasts mean-squared error (MSE), as proposed by Stock and Watson (2001).

Specifically, the weight for the *k*- step ahead forecast from indicator *i* is calculated as:

$$w_{i,k} = \frac{\left(\frac{1}{MSE_{i,k}}\right)}{\sum_{j=1}^{N}\left(\frac{1}{MSE_{j,k}}\right)}$$

The MSE is calculated using the out-of-sample forecast errors for each indicator, for the period from 2012Q1 to 2021Q1. These forecasts are 'out-of-sample' as they only use information that was available prior to evaluation period. For example, I started off by estimating all the models using the data available up to 2012Q1, and then produced forecasts for each quarter up to 2014Q1. I then expanded the window by one quarter, estimating the models using the available data up to 2012Q2, and compiled forecasts to 2014Q2. And so on. This iterative procedure should provide a relatively accurate assessment of the models' real-time forecast accuracy.

A.3: Data

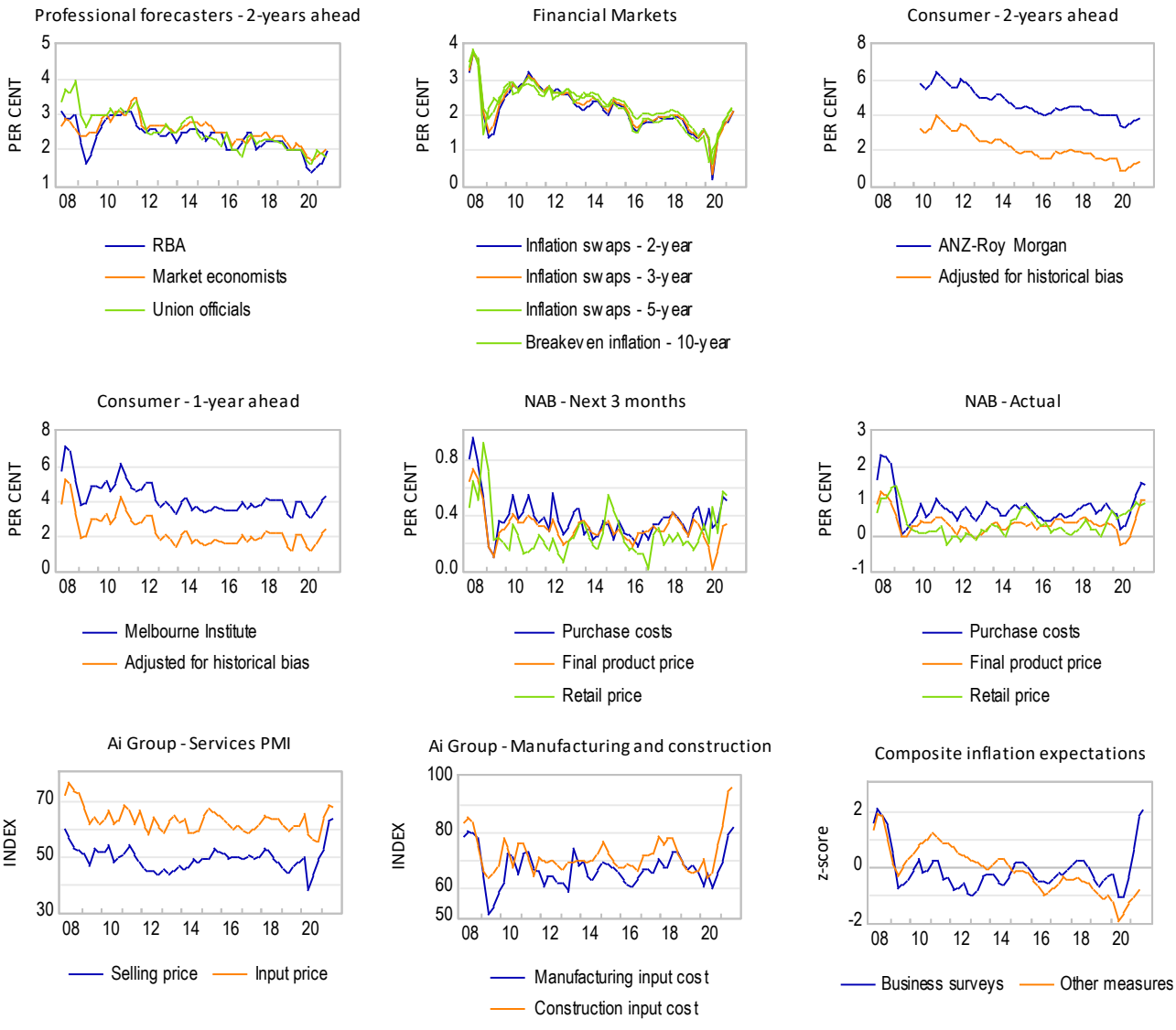
The tables below summarise the data that were used to put together the projections in Graph 5 in the article.

Business survey measures	**Source**
Composite index of business costs/prices	This is a composite index that estimates the common trend across the business survey measures listed below, as well as Ai Group-HIA's measure of construction selling prices.
Purchase costs - next 3 months	NAB Quarterly Business Survey
Retail price - next 3 months	NAB Quarterly Business Survey
Final product price - next 3 months	NAB Quarterly Business Survey
Purchase costs - actual	NAB Monthly Business Survey
Retail price - actual	NAB Monthly Business Survey
Final product price - actual	NAB Monthly Business Survey
Services - Average selling prices	Ai Group
Services - Input cost	Ai Group
Manufacturing - Input prices	Ai Group
Construction - Input prices	Ai Group / HIA

Other measures	**Source**
Composite index of 1- to 2-year ahead inflation expectations	This is a composite index that estimates the common trend across all the 1- and 2- year ahead measures listed below. It also includes the 1-year ahead forecasts from the RBA, union officials and market economists.
RBA – 2-year ahead trimmed-mean inflation forecast	For the period up to the end of 2014, these forecasts are available here (Historical Forecasts). For the post-2014 period, these forecasts have been updated using the inflation forecasts provided in each RBA Statement on Monetary Policy (Statement on Monetary Policy).
Union officials' inflation expectations – 2-years ahead	RBA Statistical Tables – G3
RBA survey of market economists – 2-years ahead	RBA Statistical Tables – G3
ANZ-Roy Morgan consumer inflation expectations – 2-years ahead	ANZ, Roy Morgan
Melbourne Institute consumer inflation expectations – 1 year ahead	RBA Statistical Tables – G3

Business survey measures	Source
Inflation swaps – 2-year	Bloomberg
Inflation swaps – 3-year	Bloomberg
Inflation swaps – 5-year	Bloomberg
Break-even inflation – 10-year	Bloomberg, RBA Statistical Tables – G3
Two year-ahead forecasts from the Phillips curve equation described in Cassidy, Rankin, Read and Siebold (2019)	QTC, RBA

Measures of inflation expectations



Sources: ANZ, Bloomberg, RBA, Refinitiv Datastream, Roy Morgan