New approach to forecasting the WACC inflation adjustment

December 2014

We are reviewing our approach to estimating the inflation adjustment for our real post-tax WACC. We propose to base our inflation forecast on a 10-year geometric average of:

- the RBA’s forecast of underlying inflation for two years, published in the RBA’s quarterly Statement on Monetary Policy
- the middle of the RBA’s target band of inflation, ie, 2.5%, for the remaining eight years.

This Fact Sheet provides stakeholders with detailed information and an opportunity to comment on our proposed change. We request submissions by 20 February 2015.

1 Background

In our calculation of the real post-tax WACC, we use a forecast of inflation to convert the nominal WACC into a real WACC.

It is important to note the scope for this review. This review of the inflation forecast is for use in the WACC calculation only. This Fact Sheet does not address the inflation rate we use for other purposes.

Before 2009, we used the break-even inflation rate as a forecast of inflation in our WACC calculation. The break-even inflation uses data from inflation indexed and nominal Commonwealth Government bonds to forecast inflation for our WACC calculation. In 2009, due to changes in bond market conditions, we changed our approach to one that uses data from the swap market.
Additional research has been conducted since we changed our approach in 2009 showing that there may be other methods that more accurately forecast inflation than the swap-implied inflation rate.\textsuperscript{1} We have recently assessed a number of options to forecast inflation for the WACC calculation. The rest of this Fact Sheet sets out the options and our preferred approach.

2 Analysis

2.1 Overview of the options

We have assessed the following options to obtain a forecast of inflation for the purpose of converting the nominal WACC into a real WACC using:

1. the 10-year yield-to-maturity of the swap market implied inflation
2. the middle of the RBA’s target band of inflation, ie, 2.5%
3. an approach that uses the RBA’s forecast of underlying inflation obtained from their quarterly statement on Monetary Policy for one year and the middle of the RBA’s target band of inflation, ie, 2.5%, for the remaining nine years
4. an approach that uses the RBA’s forecast of underlying inflation for the first two years, and the middle of the RBA’s target band of inflation for the remaining eight years
5. break-even inflation based on data from inflation indexed and nominal Commonwealth Government bonds.\textsuperscript{2}

2.2 Evaluating the options

We have assessed the accuracy of each of these forecasting options by using historical data on inflation. Figure 2.1 compares each of the five options against actual inflation (CPI) between 2009 and 2014.

\textsuperscript{1} Reserve Bank of Australia, *Estimates of Uncertainty around the RBA’s Forecasts*, November 2012, p 2.
\textsuperscript{2} The break-even inflation rate is the difference between the 10-year Commonwealth Government nominal and inflation indexed bonds. Break-even inflation is calculated using the Fisher equation.
Figure 2.1 and Table 2.1 show that options 3 and 4 provide a robust forecast of actual inflation for the first year in the sample period. The swap market implied inflation and the break-even inflation provide a less accurate 1-year forecast. On average, in the long run, all options tend toward the midpoint of the RBA target range of inflation, with the swap market implied inflation displaying the largest divergence (Table 2.1).

Table 2.1 Comparison of options – Maximum, minimum and mean (January 2009 to December 2014)

<table>
<thead>
<tr>
<th>Options</th>
<th>Max</th>
<th>Min</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI</td>
<td>3.88%</td>
<td>1.76%</td>
<td>2.58%a</td>
</tr>
<tr>
<td>1) Swap-implied inflation</td>
<td>3.05%</td>
<td>2.22%</td>
<td>2.79%b</td>
</tr>
<tr>
<td>2) RBA midpoint (2.5%)</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
</tr>
<tr>
<td>3) RBA forecast first year then RBA midpoint (2.5%)</td>
<td>N/A</td>
<td>N/A</td>
<td>2.59%c</td>
</tr>
<tr>
<td>4) RBA forecast first two years then RBA midpoint (2.5%)</td>
<td>N/A</td>
<td>N/A</td>
<td>2.63%d</td>
</tr>
<tr>
<td>5) Break-even inflation</td>
<td>3.00%</td>
<td>2.35%</td>
<td>2.64%e</td>
</tr>
</tbody>
</table>

- **a** Quarterly CPI all capitals, year-on-year. Mean calculated using data from 1/1/2009.
- **b** Mean calculated using data from 1/1/2009. No data available prior to this period.
- **c** 10-year geometric mean of first year of RBA forecast of underlying inflation and midpoint of the RBA’s inflation target range for the remaining nine years, starting 1/1/2009.
- **d** 10-year geometric mean of first two years of RBA forecast of underlying inflation and midpoint of the RBA’s inflation target range for the remaining eight years, starting 1/1/2009.
- **e** Mean calculated using data from 8/10/2009. No data available immediately prior to this period.

**Sources:** Bloomberg swap and break-even data, RBA statement on monetary policy November 2008, RBA website and 6401.0 - Consumer Price Index, Australia, Sep 2014.
Table 2.2 summarises our assessment of the five options in Table 2.1.

Table 2.2  Assessment of the options

<table>
<thead>
<tr>
<th>Option</th>
<th>Accuracy</th>
<th>Simplicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Swap-implied inflation</td>
<td>Less accurate than the other options</td>
<td>This approach requires a sophisticated model and is not readily replicated</td>
</tr>
<tr>
<td>2) Middle of the RBA’s target band of inflation (2.5%)</td>
<td>Approximates average CPI</td>
<td>Simple to replicate and transparent</td>
</tr>
<tr>
<td>3) One year of RBA forecasts of underlying inflation then midpoint of the RBA’s inflation target range</td>
<td>Approximates average CPI</td>
<td>Simple to replicate and transparent</td>
</tr>
<tr>
<td>4) Two years of RBA forecast of underlying inflation then midpoint of the RBA’s inflation target range</td>
<td>Approximates average CPI</td>
<td>Simple to replicate and transparent</td>
</tr>
<tr>
<td>5) Break-even inflation using Commonwealth Government bonds</td>
<td>Less accurate than the other options</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are several ways of calculating break-even inflation</td>
</tr>
</tbody>
</table>

Option 1 – Swap-implied inflation

This option is based on a 40-day average of the 10-year yield-to-maturity of swap market implied inflation. We decided to adopt this approach in 2009 due to short supply of indexed Commonwealth Government bonds at the time. Additionally, it is a market-based forecast that does not require any adjustments for biases in the market.3

Figure 2.1 shows that the inflation forecast implied by the swap market is on average above the RBA midpoint. Over the sample period swap market implied inflation was on average 2.79% which was 21 basis points above average CPI (2.58%). However, we only take a 40-day average, which means that depending on the period selected variance could be as wide as 46 basis points higher or 37 basis points lower than average CPI over the sample period.

The price of inflation swaps is a better predictor of the risk profiles of the businesses that purchase inflation swaps rather than economy-wide inflation. Therefore, on average the implied inflation values calculated are likely to magnify the difference between the swap price (implicit inflation rate) and actual inflation.

An advantage of using the swap market implied inflation is that, in principle, this is the price utilities would have to pay to hedge inflation using this particular instrument. But, hedging costs are usually accounted for as operating expenditure in our building block model and not in the WACC. The process of calculating implied inflation from swap prices is complex, requiring access to data that is not available to the public (swap market data) and a complex financial model.

Option 2 – Midpoint of the RBA’s target range for inflation (2.5%)

Using the midpoint of the RBA’s target range for inflation would provide certainty for regulated businesses. It is also the simplest option to implement because it is based on a publicly available long-term target of inflation for the Australian economy.

However, using the midpoint of the RBA’s target range for inflation may not provide a good forecast of inflation over a 4-year regulatory period. This is because actual inflation could be materially different from 2.5%.

Option 3 – One year of RBA forecasts and midpoint of target range thereafter

This approach uses the RBA’s forecast of underlying inflation, obtained from their quarterly Statement on Monetary Policy, for 1-year and the middle of the RBA’s target band of inflation, ie, 2.5%, for the remaining nine years.

This method is based on research undertaken by the RBA in 2012 analysing the accuracy of their inflation forecasts. The RBA found that its forecasts have “substantial explanatory power for inflation over the first forecast year.” However, the explanatory power breaks down after the first year.

Australian inflation rates can be expected to fluctuate around an average value over time. Rates tend to revert to the mean because the RBA exercises inflation targeting, actively managing monetary policy to keep inflation within their target band. The consequence of this is that the middle of the RBA’s target band is an accurate approximation of inflation in the medium to long term.

The advantage of using this methodology is that it is easily replicable, robust and a reasonable predictor of future inflation. In times of interest rate market volatility, the midpoint of the RBA’s target range may not accurately predict inflation.

We consider that Option 3 should be applied as a geometric average to each year of the determination (see Table 2.3) using 10-year averaging period matching the term-to-maturity of the cost of debt.

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4 Reserve Bank of Australia, Estimates of Uncertainty around the RBA’s Forecasts, November 2012.
5 Ibid, p 30.
Table 2.3 One year of RBA forecasts and midpoint of target range thereafter

<table>
<thead>
<tr>
<th>Year</th>
<th>4-year average</th>
<th>10-year average</th>
<th>4-year CPI average</th>
<th>10-year CPI average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast inflation</td>
<td>2.72%</td>
<td>2.59%</td>
<td>2.47%</td>
<td>2.78%</td>
</tr>
</tbody>
</table>

Note: IPART’s pricing determinations typically apply for four years.


Option 4 – Two years of RBA forecasts and midpoint of target range for inflation thereafter

This option is similar to Option 3, except that it uses two years of forecast underlying inflation from the RBA then the midpoint of the RBA’s target range for inflation for the remaining eight years. This option is used by the ACCC and the AER to adjust the nominal cost of capital for inflation. They have used a 10-year geometric average.6

We consider that this approach is superior to option 3 because:

- two years of forecast underlying inflation better reflects the time it takes for inflation to revert to a 2.5% average compared to using only a 1-year forecast
- the explanatory power of the 2-year forecast is still reasonable.

Using this approach is almost as simple as using the midpoint of the RBA target range for inflation. Option 4 can be calculated using data that is publicly available from the RBA’s website. RBA forecasts of underlying inflation are reported in their statement on monetary policy. We intend to use the midpoint of the RBA’s forecast range of underlying inflation for years where no point estimate is available.

As for the previous option, we consider that Option 4 should be applied as a geometric average (see Table 2.3). We intend to use a 10-year average because it matches the term-to-maturity of the cost of debt.

Table 2.4 Two years of RBA forecasts and midpoint of target range for inflation thereafter

<table>
<thead>
<tr>
<th>Year</th>
<th>4-year average</th>
<th>10-year average</th>
<th>4-year CPI average</th>
<th>10-year CPI average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast inflation</td>
<td>2.85%</td>
<td>2.63%</td>
<td>2.47%</td>
<td>2.78%</td>
</tr>
</tbody>
</table>


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Option 5 – Break-even inflation

Break-even inflation is the difference between the nominal and the inflation indexed Commonwealth Government bonds. It is calculated using the Fisher equation. IPART used the break-even inflation rate for its WACC adjustment until 2009. In 2009, we decided not to continue using this method due to concerns that the scarcity of inflation-indexed bonds causes a bias in their yields.7

While the Australian Office of Financial Management has begun issuing inflation indexed bonds again we require a consistent and accurate approach to calculating forecast inflation. The Australian Government’s decision to issue inflation indexed bonds is based on their own risk portfolio. They could decide to stop issuing inflation indexed bonds again in the future.

While not as complex as using swap market implied inflation, this method is not as simple as options 2, 3 and 4. Given that there is a wide body of research indicating a bias in the inflation forecast derived from break-even inflation, we do not intend to use this methodology.

3 Our preliminary view

We propose to adopt Option 4 (the 10-year geometric average of the RBA’s first two years forecast of underlying inflation and the midpoint of the RBA’s target range for inflation for the remaining eight years). Evidence suggests that this is a robust estimate of future inflation and is easy to implement and replicate.

4 Next steps

We invite stakeholders to provide submissions by 20 February 2015. You can also contact us directly if you have any questions.

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