Update to nominal risk free rate and expected inflation

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COMPETITION ECONOMISTS GROUP

1 Update to risk free rate and inflation parameters

1. ActewAGL Distribution (**AAD**) has asked that CEG update our best estimate of inflation (see Table 1-1). This update, consistent with our 4 January memo to AAD,[1] incorporates the most recent actual Australian Bureau of Statistics (**ABS**) inflation figures at the time of the AER's decision and financial information from within AAD's averaging period.

Table 1-1: Updated AER/CEG risk free rate and inflation parameters (2016-2021 regulatory period)

Estimate	September 2015^	December 2015	Feb/March 2016 averaging period	6 May 2016+
10 year risk free rate	2.75%	2.87%	2.57%	2.31%
AER inflation (based on closest dated SoMP#)	2.50%	2.50%	2.50 %	2.39%
10 year break-even inflation	2.19%	2.22%	1.96%	1.64%
5 year RAB RFM forecast	1.77%			1.20%
CEG PTRM Inflation (September 2015)	1.94%			
CEG PTRM Inflation* (40% weight to 10 year break-even during averaging period, 60% weight to most recent 5 year RAB RFM (both highlighted))				1.51%

*Source: ABS, Bloomberg, RBA, CEG analysis. ^Based on CEG's 4 January 2016 memo for AAD. + 6 May 2016 is the most recent estimate at the time of writing. Only one day is used because, at the time of writing, only one day has passed since the release of the May 2016 Statement on Monetary Policy (an important market event). The AER could reasonably use a longer averaging period starting on this date when measuring expected inflation over the remainder of the RAB RFM period (or in the event it persists with only using a 10 year horizon). # RBA Statement on Monetary Policy (SoMP). * Weighted average of actual and forecast inflation (Actual = December 15 to March 16. Forecast = March 16 to December 2020).These dates reflect an assumption that the AER will index the RAB for inflation for 2016-21 using the method specified in the Proposed AA for CPI indexation of reference tariffs in 2016-21. Specifically, revenues in each year will be indexed by the percentage change in the CPI index over the four quarters to the December quarter immediately prior to the regulatory year.*

2. The most material changes between finalisation of our previous advice and AAD's averaging period (and beyond) are the falls in both the nominal risk free rate (and therefore the AER cost of equity) and break-even inflation expectations. We consider that these falls are interdependent. Specifically, we consider that the fall in the nominal risk free rate (proxied by nominal Commonwealth Government

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[1] CEG Memorandum, September 2015 cost of debt and inflation forecasts, 4 January 2016.

Securities (CGS) yields) is, in large part, as a result of the fall in inflation expectations – leaving the real risk free rate largely unchanged.

3. Specifically, the fall, moving left to right, in the 10 year risk free rate row needs to be viewed in the context of the similar fall in break-even inflation expectations – with the net effect that, relative to December, the best estimate of real returns (not shown) declines only marginally in moving to AAD's averaging period (and actually rises in moving to 6 May 2016). This underlines the importance of using consistent market data in measuring the nominal risk free rate and inflation.

4. The remainder of this report has the following structure:

  ▪ Section 1.1 surveys actual inflation outcomes published in 2016 relative to forecasts and outcomes in prior years;

  ▪ Section 1.2 describes the link between falling risk free rates over 2016 and falling inflation expectations;

  ▪ Section 1.3 assesses the relative merits of break-even inflation and the AER's inflation estimation methodology in the current market circumstances; and

 ▪ Section 1.4 concludes.

1.1   Actual inflation has been persistently low

5. The two most recent quarters of inflation, both released since our 4 January 2016 memo to AAD, are well below the bottom end of the RBA range. The December 2015 quarter inflation (released on 27 January 2016) was 1.5% annualised and the March quarter CPI was -0.7% annualised. Combined, these represent a 0.37% annualised inflation rate for the last half year. This reflects an intensification of a pre-existing trend whereby over the nearly five year period beginning 1 July 2011, the arithmetic average annual inflation has been 1.9%. Over the last two years inflation has averaged 1.3%.

6. In terms of forecast accuracy, actual inflation over the year to December 2015 (March 2016) of 1.7% (1.3%) can be compared to the year ahead forecast of these values using:

  ▪ the AER methodology of 3.0% (2.75%) which overestimated the actual inflation outcome by 1.30% (1.45%),[2] and

  ▪ the one year ahead break-even forecast of 1.59% (0.93%)[3] which over-estimated year to December 15 actual inflation by 0.29% and under-estimated year to March 16 inflation by 0.37%).

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[2]   The forecast for the year to December 2015 is taken as the midpoint of the RBA forecast range in the November 2014 RBA SoMP for the year to December 2015. The forecast for the year to March 2016 is taken as the midpoint of the February 2015 SoMP forecast range for the year to June 2016.

7. Figure 1-1 provides the same comparison for the last 5 years – with break-even inflation responding more rapidly to persistently low actual inflation.

Figure 1-1: AER and breakeven forecast versus actual inflation
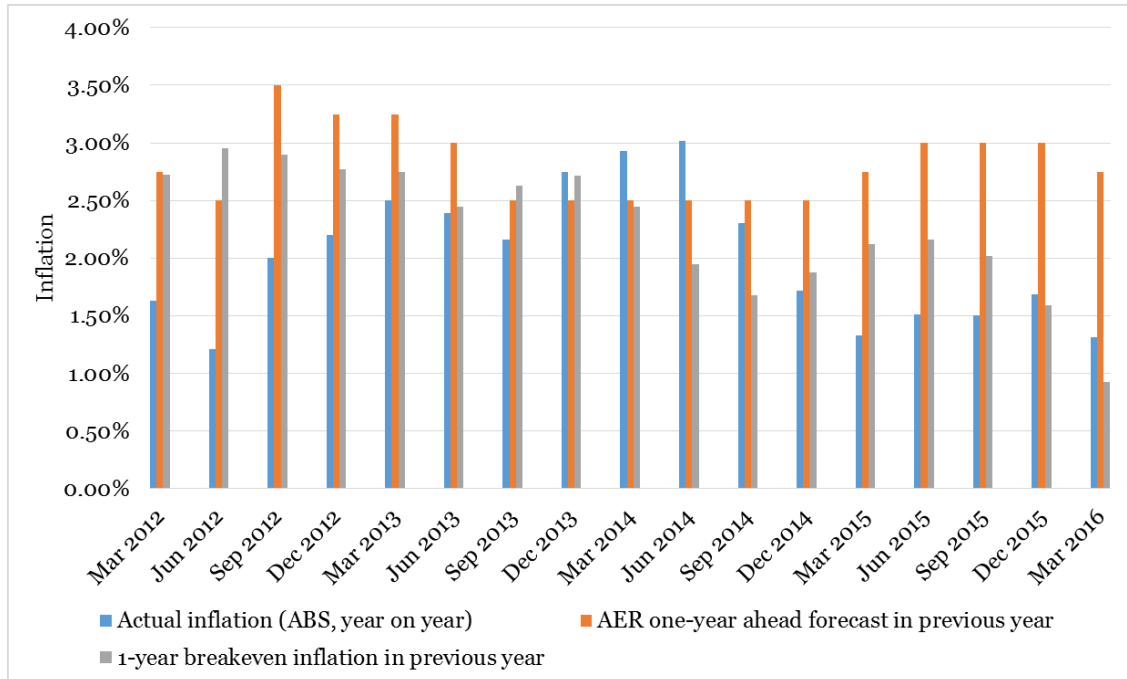
Source: ABS, AER, RBA, CEG analysis

8. On 5 May 2016 the RBA released its May SoMP which included a dramatic reduction in the range for forecast inflation – from 2-3% to 1.5-2.5%. This is not reflected in the above chart because there are, as yet, no actual inflation figures to compare this forecast to.

9. Low Australian inflation is entirely consistent with international experience across western developed countries, with inflation persistently at or below the bottom end of central bank targets.[4] RBA Governor Glenn Stevens has made the same point in a recent speech shortly after the end of AAD's averaging period and also on 3 May 2016 when announcing a further cut in the official cash rate by 25bp to 1.75%.

> *Inflation is quite low. Recent information has confirmed that growth in labour costs remains quite subdued. Given this, and with inflation also*

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[3] These are taken as the average break-even inflation rates (interpolated to one year) over the December (March) quarter of 2014 (2015).

[4] See IMF, World Economic Outlook (WEO), April 2016. "*Headline inflation in advanced economies in 2015, at 0.3 percent on average, was the lowest since the global financial crisis, mostly reflecting the sharp decline in commodity prices, with a pickup in the late part of 2015 (Figure 1.2). Core inflation remained broadly stable at 1.6–1.7 percent but was still well below central bank targets.*"

*restrained elsewhere in the world, inflation in Australia **is likely to remain low over the next year or two.** [5]*

*Inflation has been quite low for some time and recent data were unexpectedly low. While the quarterly data contain some temporary factors, **these results, together with ongoing very subdued growth in labour costs and very low cost pressures elsewhere in the world, point to a lower outlook for inflation than previously forecast***. [6] [Emphasis added]

1.2 Falling inflation expectations and falling nominal CGS

10. There has been a material fall in nominal CGS returns since our 4 January 2016 memo. The fall in 10 year nominal CGS yields has been associated with a similar fall in break-even inflation estimates. [7] If one believes, as we do, that break-even inflation estimates are an accurate measure of expected inflation, then this implies that most of the fall in nominal CGS yields has been due to a fall in inflation expectations – rather than falls in real yields. [8] This would imply that the real yield on 10 year CGS has been relatively stable over this period.

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[5] RBA, Statement by Glenn Stevens Governor: Monetary Policy Decision, 2016-08, April 2016.

[6] RBA, Statement by Glenn Stevens Governor: Monetary Policy Decision, 2016-10, 3 May 2016.

[7] Inflation is the link between nominal and real returns on assets. Other things equal, a rise/fall in expected inflation implies a rise/fall in nominal yields as investors demand more/less compensation for the erosion of the purchasing power of money. Under clause 87(5)(c) of the NGR (and similar requirements under the NER), the AER is required to consider "any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt". Consistent with this, the AER must be cognizant of the interrelationship between the inflation forecast input to the PTRM and the nominal risk free rate input into the cost of equity.

[8] This does not imply that changes in inflation expectations are the only cause of changes in nominal interest rates or that they are always the dominant cause. It may also be that real interest rates change (as they have dramatically since the GFC). However, over the period from December 2015 it is apparent that changes in inflation expectations have been the dominant driver of changes in nominal yields.

**Figure 1-2: 10-year nominal CGS rates and 10-year breakeven inflation**
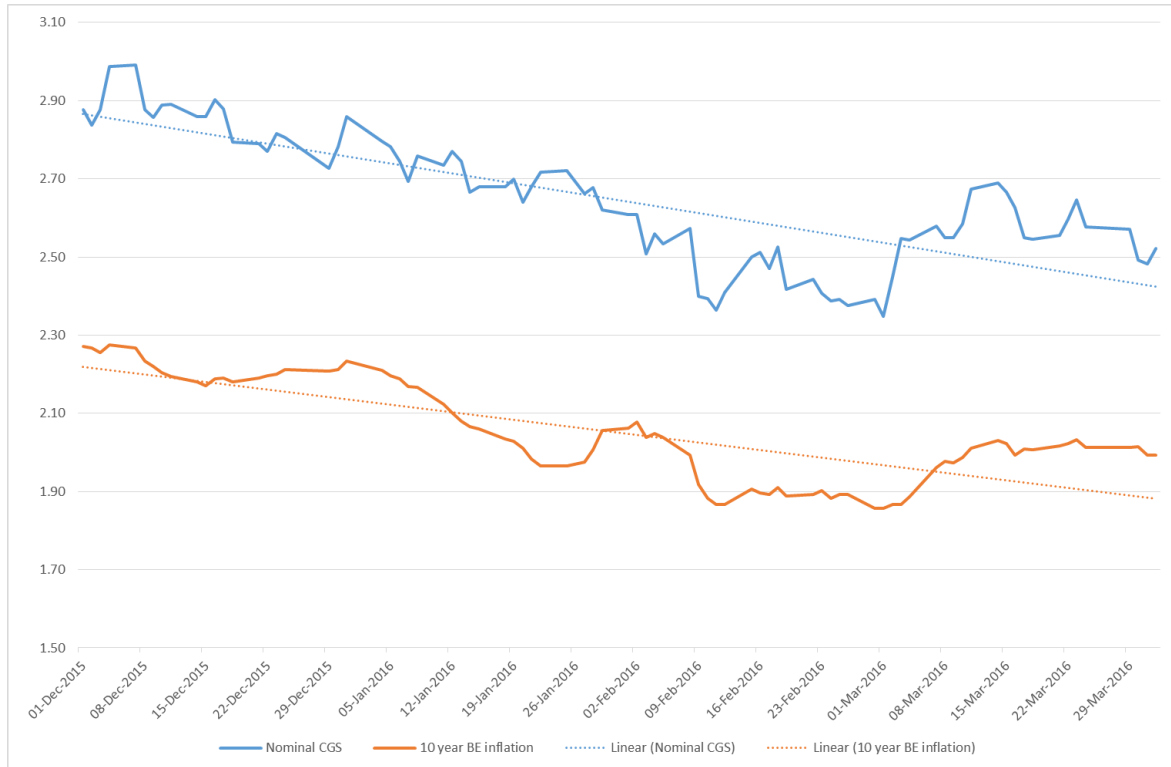
Source: RBA, CEG analysis

11. By contrast, if, as is the case with the AER estimation technique, inflation is assumed to have remained constant at 2.5%[9] over the December 2015 to March 2016 period, this would imply that real CGS yields have fallen by the same magnitude as nominal CGS yields. Indeed, it would imply that real yields became negative during the first week of AAD's averaging period– implying that investors were happy to invest in nominal CGS in the expectation that the purchasing power of their investment in 10 years' time would be lower than it was at the time of their investment.

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[9] The AER's most recent revision to inflation forecasts only occurred on 5 May – one month and 25 days from the midpoint of the AAD averaging period - and followed the 27 April announcement of deflation by the ABS. In any event, even if this forecast were taken to apply to the AAD averaging period the forecast for 10 year inflation is only 11bp lower (at 2.39%) than the 2.5% estimate that prevailed previously.

Figure 1-3: Real 10 year CGS yields using AER vs break-even inflation expectations
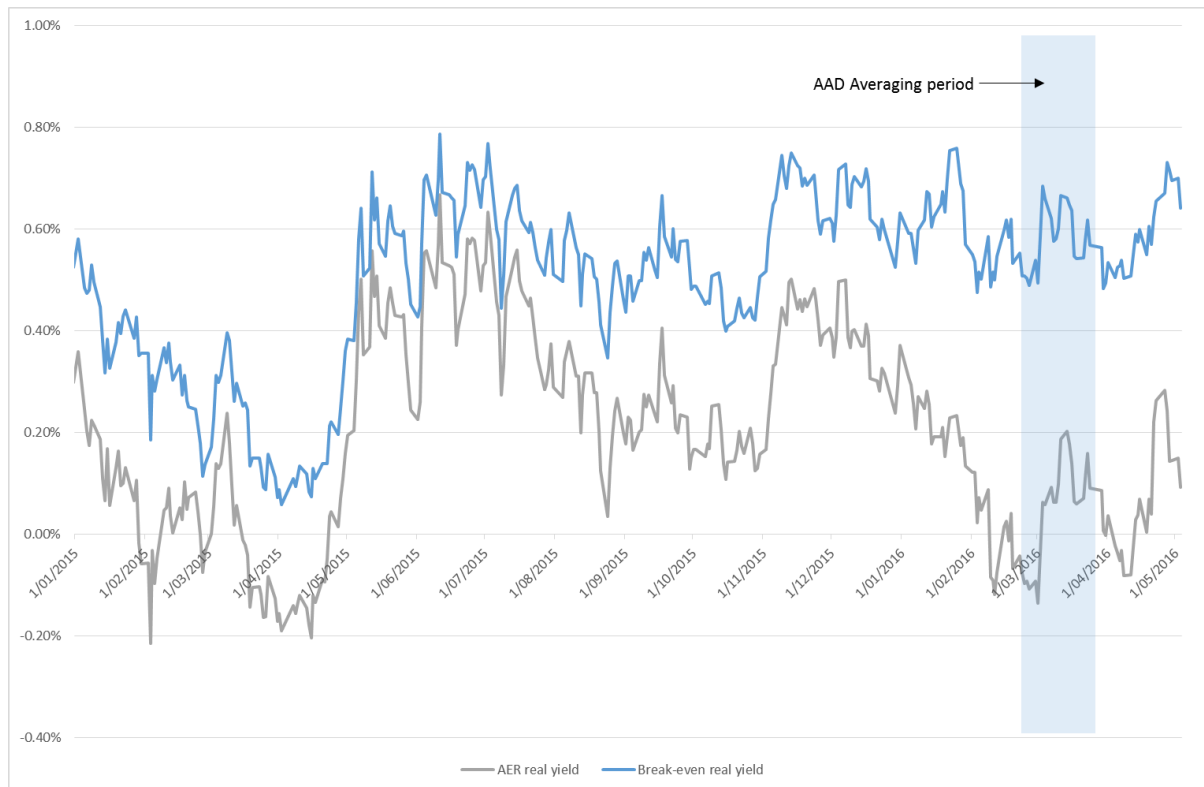
Source: Bloomberg, RBA, CEG analysis.

12. It is not impossible for investors in nominal CGS to buy them in the expectation of receiving a negative real return (i.e. it is not impossible for investors to save in order to have lower future consumption options than they have if they did not save and instead consumed now). However, this is an anomalous result and one that would, in our view, require investigation and justification before being accepted. This is especially so in the context where the investor could have bought inflation indexed CGS at a guaranteed real return of around 0.59% (the average yield on CPI indexed 10 year CGS over AAD's averaging period).

13. CEG believes that the anomaly (negative estimated real returns to risk free saving in nominal assets during AAD's averaging period) is a result of inaccuracies in the AER's inflation forecast rather than a true anomaly in investor required returns.

14. This conclusion is supported by the fact that, over the course of 2016, daily changes in 10 year break-even inflation have a strong explanatory power in explaining daily changes in nominal 10 year CGS yields (as one would expect of an accurate measure). From 31 December 2015 to the end of March 2016 regression of daily changes in CGS yields on daily changes in break-even inflation results in an estimated coefficient of 0.93 (i.e., close to 1.0 – suggesting that, on average, changes in inflation expectations are reflected in changes in nominal yields of a similar

magnitude), as shown in Table 1-3 below. This coefficient is highly statistically significantly different to zero (significant at the 99% confidence level, with the standard errors of each parameter shown in parentheses).

Table 1-2: Regression of nominal CGS yields against inflation

	Constant	Slope
Change in 10 year nominal CGS vs change in 10 year breakeven inflation	-0.00 (0.01)	0.93 (0.27)

*Source: Bloomberg, RBA, CEG analysis*

1.3 AER methodology in the current market context

15. The AER's current practice is to arrive at an estimate of expected inflation at a 10 year horizon based on the most recent RBA SoMP forecasts at the time of its final decision – which we expect to be the May 2016 SoMP. In doing so, the AER does not link its forecast of inflation to the specific averaging period used to set the risk free rate.

16. If the AER applies its current practice in making its final decision for AAD's 2016-21 regulatory period, then it will estimate expected inflation as 2.39% being the geometric average across 10 years where:

   ▪ for the first two financial years (ended June 2017 and June 2018) inflation is assumed to be the midpoint of the RBA's forecast range as published in Table 6.1 of the SoMP (2.0% for each year); and

   ▪ for each of the subsequent 8 years inflation is assumed to be 2.5% (being the midpoint of the RBA's target range).

17. The AER's forecast methodology makes the following assumptions:

   a. there is no need to link inflation expectations to the period on the basis of which the AER has estimated the risk free rate and cost of debt;

   b. the AER implicitly assumes that, in years 3 to 10, investors place the same probability on inflation being above as opposed to below RBA target;

   c. in the two years in which the AER uses the midpoint of the RBA forecast range the AER implicitly assumes that:

      i. the midpoint of the RBA range is the RBA's central estimate within that range; and

      ii. the RBA's published range reflects the probability weighted (as opposed to most likely) CPI outcomes.

18.   In relation to the assumption at paragraph 17.a, we have previously explained why we consider that the portion of expected inflation that is used within the PTRM to determine the real return on equity should be determined based on expected inflation within the averaging period used to measure the nominal risk free rate (and cost of equity).

19.   The assumption at paragraph 17.b is, in our view, unreasonable in the context of the current domestic and international market conditions outlined in this report. This assumption implies that, based on the May 2016 SoMP, even though inflation has averaged 1.3% over the most recent two years to March 2016 and even though the centre of the RBA forecast range (published in Table 6.1) is 2.0% for the next two financial years, investors expect inflation to then immediately jump from 2.0% to 2.5% in the year ended June 2019. This assumption would be problematic in general. However, it is also problematic in the specific context where the RBA's central forecast of underlying inflation (trimmed mean inflation)[10] increases only gradually over the next two years as evidenced from Graph 6.4 of the May SoMP (reproduced below).

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[10]   The RBA's standard measure of underlying inflation is trimmed mean inflation. See RBA Bulletin, Measures of Underlying Inflation, March Quarter 2010 which states "Given that CPI inflation is quite volatile, most of the models and equations used in the Bank to explain inflation use some measure of underlying inflation (often 15 per cent trimmed-mean inflation) as the dependent variable."

Figure 1-4: RBA forecast path for underlying inflation

Graph 6.4
Trimmed Mean Inflation Forecast*
Year-ended
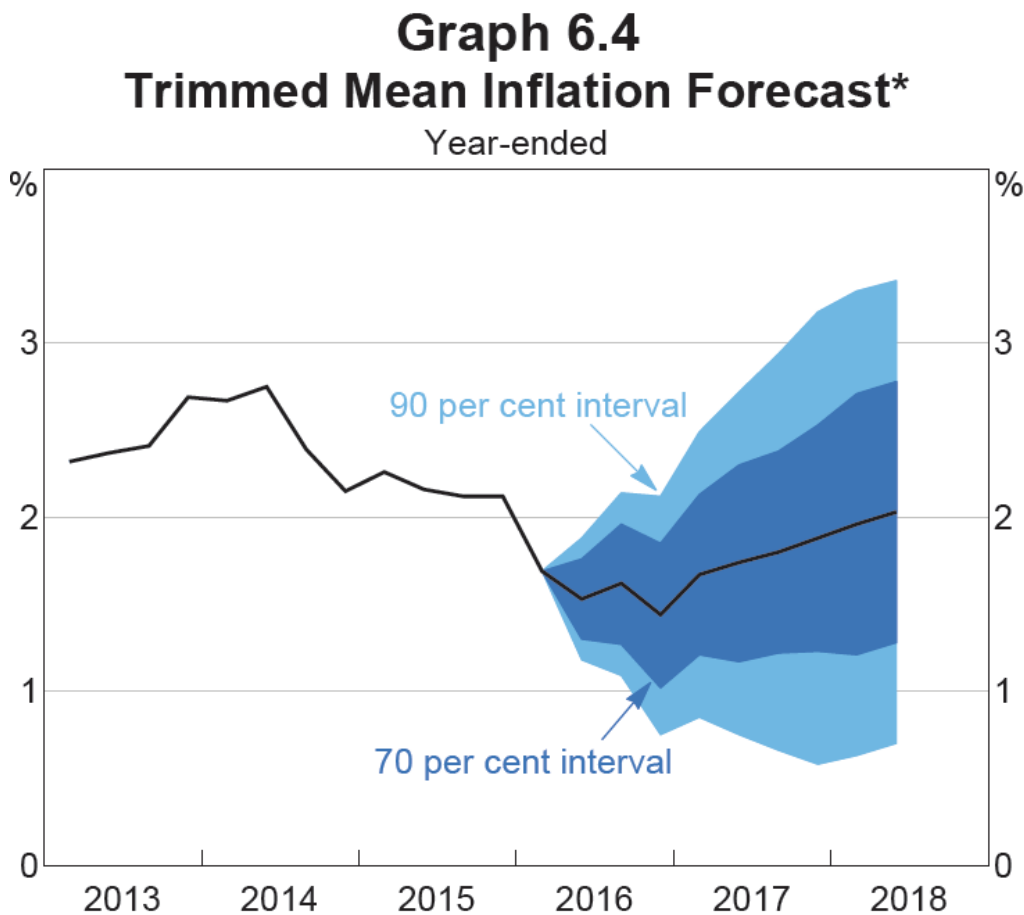
* Confidence intervals reflect RBA forecast errors since 1993

Sources: ABS; RBA

20. That is, the RBA's central forecast is for gradual increases in underlying inflation[11] over the next two financial years with inflation only just reaching 2.0% at the end of the forecast period. There is no obvious reason to assume inflation would then jump immediately to 2.5% in the following year.

21. In relation to the AER's implicit assumption set out at paragraph 17.c.i, this is also problematic based on the same Graph 6.4 from the May SoMP. To see this, note that the RBA reports a range of 1.5-2.5% for underlying inflation in Table 6.1 which is the same range as for CPI inflation (from which the AER draws its forecast). The AER adopts the middle of this range (2.0%) as its forecast for inflation for both the 2017 and 2018 financial years. However, in Graph 6.4 the RBA provides a more detailed time-path for its central estimate which shows the midpoint of its forecast is actually below 2.0% until June 2018.

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[11] Noting that underlying inflation has the same forecast range in Table 6.1 of the SoMP as "headline" CPI inflation.

22. Notwithstanding the above, the implicit AER assumption at paragraph 17.c.ii is potentially the most problematic in the current circumstances. This is the assumption that the midpoint of the RBA forecast range (and the midpoint of the RBA target beyond that) can be used as a probability weighted forecast across all potential inflation outcomes (i.e. the AER assumes the forecast represents actuarially expected outcomes). As is explained in paragraphs 27 to 29 below, the RBA makes clear that its forecast range is a forecast of the most likely outcome and that there are downside risks to this forecast that are not embodied in the central estimate. Moreover, these downside risks extend beyond the forecast range making the adoption of the middle of the RBA's target range (2.5%) as a mean (probability weighted) estimate of possible future inflation outcomes problematic.

23. In our June 2015 report, *Measuring expected inflation for the PTRM*, we explained why, in a low interest rate environment, the risks associated with inflation outcomes in the current environment are asymmetric – with greater risk of below target inflation than above target inflation.[12] The essential point is that monetary policy is constrained in how low interest rates can go in order to raise inflation (the 'zero lower bound') with no similar constraint on raising interest rates in order to reduce inflation. This creates the potential for a 'low inflation/interest rate trap' that has no symmetrical opposite. Following the RBA's most recent rate cut, the financial press reported that:

> *Australians must urgently confront the danger that the Reserve Bank of Australia is nearing the very limits of its powers and risks stumbling into the same zero-interest rate trap that has neutered European and Japanese central banks, say two high-profile economists. ...*

> *"The evidence is that even aggressive monetary policy action doesn't seem to be driving up inflation, so far," Mr Yetsenga told* AFR Weekend. *[13]*

24. Bloomberg also reported that the May SoMP inflation forecasts are built on an assumption that the RBA will reduce interest rates in line with market

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[12] See CEG, Measuring expected inflation for the PTRM, June 2015, section 2.1, paragraphs 27 to 33.

[13] AFR Weekend, RBA joins race to the interest rate bottom, 6 May 2016 at 11.45pm. Available at this link: http://www.afr.com/news/economy/monetary-policy/rba-joins-race-to-the-interest-rate-bottom-20160506-goobl0#ixzz47xFNhJoE . See also Bloomberg, RBA's New Head Seen Facing Risk of Rate Cuts to 1% by JPMorgan May 9, 2016 (Available at http://www.bloomberg.com/news/articles/2016-05-08/rba-s-new-head-seen-facing-risk-of-rate-cuts-to-1-by-jpmorgan.) which reports:

> *The central bank's focus Friday on inflation expectations was notable given the phrase appeared 16 times in a document that rarely mentions it, said Joseph Capurso, a senior currency strategist in Sydney at Commonwealth Bank of Australia. "It is very hard to lift inflation expectations when they are low and Japan is a good example of this," he said*

expectations.[14] This implies that the RBA's inflation forecasts are based on the RBA reducing interest rates again at least once in the near term which would imply cash-rates fall to at least 1.5%.[15]

> *"If after cutting once and factoring in another rate cut, as per market pricing, you are still only getting to the bottom half of your target band by the end of the forecast horizon, that's giving a clear signal you feel quite concerned about underlying inflation pressures and the outlook," said James McIntyre, head of economic research at Macquarie Group Ltd.*

25. In this context, break-even inflation has a further critical advantage over simple analyst forecasts of the most likely inflation outcomes. This is because, in the presence of asymmetry, the most likely inflation outcome (which is, as is discussed below, typically what published forecasts are predicting) will not equal the mean expected inflation outcomes (which is what prices in financial markets reflect). That is, break-even inflation reflects the market's probability weighted assessment of all possible inflation outcomes – not just the most likely outcome.[16]

26. The most recent IMF April 2016 World Economic Outlook provides a cogent summary of the difference between central forecasts and probability weighted forecasts where the distribution of possible outcomes is tilted to the downside. This discussion, while focussed on global forecasts and risks is, as we shall show, effectively mirrored in the RBA February SoMP and explanatory statements by the RBA. Notable also is the fact that the IMF continues to express concern about low

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[14] RBA, May 2016 SoMP, p. 60. *"In preparing the domestic forecasts, a number of technical assumptions have been employed. The forecasts are conditioned on the assumption that the cash rate moves broadly in line with market pricing as at the time of writing."*

[15] Bloomberg, *Reserve Bank of Australia Cuts Core Inflation Forecast to 1-2%,* May 6, 2016. (Available at http://www.bloomberg.com/news/articles/2016-05-06/rba-cuts-core-inflation-forecast-unlikely-to-hit-target-in-16.)

[16] For example, if investors perceive:

- a 2/3rd probability that Australia will escape the "low inflation trap". In this state of the world, 10 year inflation may be expected to fall within the RBA target range (centred on, say, 2.5%);
- a close to 0% probability of inflation being above the RBA target range; but
- a 1/3rd probability of being, at least for a time, stuck in a "low inflation trap". In this state of the world 10 year inflation might be expected to average only 1.0%.

Faced with these perceived probabilities an investor's (actuarially) expected inflation will be 2.0% (=0.67*2.4 + 0.33*1.0%). This is the additional return that they will demand to compensate them for the, probability weighted, expected level of inflation. This is notwithstanding the fact that the most likely outcome may well be that inflation is around 2.5%. The AER methodology automatically takes lower nominal CGS yields resulting from asymmetrical inflation expectations into account and reflects this in a lower nominal risk free rate as observed in bond markets. However, the AER does not automatically reflect the same lower probability weighted inflation expectations in its PTRM inflation input. This is even though this can also be directly observed from bond markets in the form of break-even inflation estimates.

inflation outcomes in a world where low interest rate environments limit central banks' scope to raise inflation expectations. [17]

> *WEO [(World Economic Outlook)] growth forecasts form a **central, or modal, scenario**—growth rates that the IMF staff estimates to be the **most likely** in each year of the forecast horizon. The weakening in global growth in late 2015 and the escalation of threats to global economic activity since the start of this year have led the staff to reduce the projected growth rates under the central scenario.*
>
> *Alongside these reduced central projections, the staff views **the likelihood of outcomes worse than those in the central scenario as having increased**. Put differently, not only is the central WEO scenario now less favorable and less likely; **in addition, the even weaker downside outcomes have become more likely**.*
>
> *... Over the near term, the main risks to the outlook revolve around (1) the threat of a disorderly pullback of capital flows and growing risks to financial stability in emerging market economies, (2) **the international ramifications of the economic transition in China**, ... **Perceptions of limited policy space to respond to negative shocks, in both advanced and emerging market economies, are exacerbating concerns about these adverse scenarios.** In the euro area, **the persistence of low inflation** and its interaction with the debt overhang is also a growing concern. Beyond the immediate juncture, the danger of secular stagnation **and an entrenchment of excessively low inflation in advanced economies,** as well as of lower-than-anticipated potential growth worldwide, has become more tangible.*
>
> [Emphasis added.]

27. RBA Assistant Governor Christopher Kent, in a speech made on 6 April 2016, has used precisely the same example to illustrate the difference between central forecasts of what is most likely to occur and probability weighted consideration of all possible outcomes.[18]

> *One can also imagine scenarios that are unlikely to occur but may have far more substantial implications for the economic outlook if realised. These scenarios can be difficult to quantify but may be worth discussing nonetheless. **An example that we discussed in our most recent***

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[17]   IMF, World Economic Outlook (WEO), April 2016, p. 24.

[18]   Christopher Kent, Assistant Governor (Economic), Address to the Economic Society of Australia (Hobart), University of Tasmania, Hobart – 6 April 2016. See also section 5.3 of RBA Research Discussion Paper, Estimates of Uncertainty around the RBA's Forecasts, Peter Tulip and Stephanie Wallace, 2012-07. This article is referenced by Assistant Governor Kent in his 6 April 2016 speech.

Statement which was the potential for financial instability in China to lead to a sharp slowdown in economic activity there and in the Asian region more broadly.

28. The "Statement" referred to above is the February 2016 SoMP where there is a long discussion of downside risks to the forecasts associated with negative development in China which mirrors the IMF's own discussion.[19] This is repeated in the May SoMP in which the RBA states under the heading of "uncertainties":[20]

   The forecasts are based on a range of assumptions about the evolution of some variables, such as the exchange rate, and judgements about how developments in one part of the economy will affect others. One way of demonstrating the uncertainty surrounding the central forecasts is to present confidence intervals based on historical forecast errors (Graph 6.3, Graph 6.4 and Graph 6.5).

   It is also worth considering the consequences that different assumptions and judgements might have on the forecasts and the possibility of events occurring that are not part of the central forecast. One of the key sources of uncertainty continues to be the outlook for growth in China and the implications of high levels of debt there.

29. Put simply, the midpoint of the RBA's forecast range cannot be assumed to be the probability weighted mean inflation expectation that is perceived by investors (and which will be reflected in nominal CGS yields).[21]The best way to ensure that this is the case is to use inflation forecasts derived from financial market prices which

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[19] See RBA, Statement On Monetary Policy, February 2016 pp. 63-64.

[20] RBA, Statement On Monetary Policy, May 2016 p. 63.

[21] In this context it is also relevant to note that the biggest challenge the RBA faces is avoiding a low inflation trap. However, the greatest risk in this regard is the self-fulfilling prophecy of low inflation expectations. In the words of Nobel Prize winning economist Paul Krugman, "…if nobody believes that inflation will rise, it won't" (Paul Krugman, Rethinking Japan, 20/10/2015, New York Times, The Opinion Pages (online, available at: http://krugman.blogs.nytimes.com/2015/10/20/rethinking-japan/?_r=0)). If the RBA does forecast inflation to continue to be below its target range then this very act may make its task of returning inflation expectations, and ultimately actual inflation, back to within its target range more difficult.* One way the RBA could deal with this issue is to adopt a very wide range for its forecasts (which it has done). Similarly, the RBA can ameliorate this tension by discursively dealing with downside risks to its forecast range rather than embedding these in its central estimate (which it is also apparent that it has done – see discussion at paragraphs 27 to 29 above).

   * Consistent with this, break-even inflation forecasts fell materially following the release of the RBA's downgraded inflation forecast in its 5 May 2016 SoMP. In that publication the midpoint of the RBA forecast range for inflation was 2.0%; at the bottom of, but still within, the target range of 2.0% to 3.0%. This would appear to have shifted market expectations of inflation - with the 10 year break-even rate falling from 1.84% on 4 May to 1.64% on 6 May (noting that in the 5 days after the ABS release of the March quarter CPI deflation (i.e., 28 April to 4 May) the 10 year break-even rate had traded at between 1.80% and 1.84%).

automatically reflect investors' mean actuarial expectations across all possible outcomes.

1.4   Interval of delay

30. If AAD simply proposes the use of a 10 year break even forecast - the appropriate estimate of inflation for the 2015/16 interval of delay is, as it is for the 2016-21 regulatory period, 1.96% (because AAD's averaging period for the risk free rate for the 2015/16 year is the same as that for 2016-21).

31. However, consistent with our previous advice, we recommend a 60% weight be given to the best estimate of actual inflation that will be used to index the RAB over the RAB RFM period. The values in Table 1-1 are based on the assumption that the RAB RFM period will be solely related to the five year 2016-21 regulatory period.[22] In which case, the PTRM will need to be run, and a separate inflation input used, for 2015/16 alone. This inflation input should give 60% weight to the inflation that will be used to index the RAB for that year.[23] We are instructed to assume that this will be inflation for the year ended December 2015 – which is already known and is 1.69%.[24] Giving 60% weight to this 1.69% figure and 40% weight given to the 10 year expected inflation in the averaging period for the risk free rate (1.96%) results in an estimate of 1.80%=(0.6*1.69%+0.4*1.96%).[25]

32. Alternatively, if the AER were to run the PTRM over a 6 year period (2015-21) then 60% weight should be given to the best estimate of inflation from December 2014 to December 2020. This is simply 1/6th weight given to the 1.69% actual inflation for the year to December 2015 plus 5/6th weight given to the 1.20% 5 year RAB RFM estimate in Table 1-1 – which gives 1.28%.

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[22]   Assuming that the opening RAB for the 2016-21 period is indexed using CPI up to the December quarter 2015 and the next application of the RAB RFM (to set the opening RAB for the 2021-26 regulatory period) will index the RAB using actual inflation from December 2015 to December 2020.

[23]   That is, to index the RAB from the opening RAB for the 2015-16 interval of delay to the opening RAB of the 2016-21 regulatory period.

[24]   This assumes that inflation is calculated in the same manner as the Proposed AA provides is to be used to index reference tariffs in the 2016-21 period, based on the change in CPI from December 2014 to December 2015. Alternatively if, consistent with the indexation of reference tariffs for 2010-15 pursuant to AAD's AA for that period, RAB indexation was based on the average CPI over the four quarters to December 2015 relative to the average over the four quarters to December 2014 it would be 1.51%.

[25]   It is not clear what the AER methodology would be for 2015/16 where the actual inflation to be used in indexing the RAB for that year is known with certainty and where the AER is making its final decision at the end of that year (rather than before the year begins). In the context of actual inflation of 1.69% it would be anomalous to use an estimate of inflation of 2.39% (based on application of the AER method to the May 2016 RBA SoMP) or even 2.50% (based on application of the AER method to the May 2015 RBA SoMP).

1.5 Conclusion

33. The risk free rate used by the AER to estimate the cost of equity (and also embedded in the AER's estimate of the cost of debt) fell materially (30bppa) between the finalisation of our previous advice in early January 2016 and AAD's averaging period.

34. Consistent with advice in our 4 January memo, we have now updated our inflation estimate over AAD's averaging period. This update suggests that 26bppa of the 30bppa fall in nominal risk free rates is attributable to a fall in inflation expectations. The evidence since the finalisation of our previous advice to AAD[26] continues to support the conclusions that:

   ▪ Actual inflation continues to be below the RBA target range, the newly published December and March 2016 quarters averaging just 0.37% annualised; and

   ▪ Inflation expectations are below the value that would be estimated using the AER's methodology in the short and long term.

35. Updating CEG's previous September 2015 estimate of the best estimate of inflation to be used in the PTRM (1.94%) for subsequent actual inflation and expected inflation results in a revised best estimate of 1.51%. This reflects a 40% weight given to 10 year break-even inflation measured over AAD's averaging period (1.96%) and 60% weight given to a forecast of inflation to be used in the next application of the RAB RFM (1.20%). This 1.20% estimate reflects actual inflation to date over the one known quarter of the RAB RFM period (-0.74% annualised) (and expected inflation measured on 6 May 2016 for the remaining 19 quarters (1.31%)). (The AER may, in updating the CEG methodology, reasonably choose to use a longer averaging period starting on this date).

36. I acknowledge that I have read, understood and complied with the Federal Court of Australia's Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia". I have made all inquiries that I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld.

37. I have been assisted in the preparation of this report by Johnathan Wongsosaputro in CEG's Sydney office. However, the opinions set out in this report are my own.

Thomas Nicholas Hird

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[26]   CEG Memorandum, September 2015 cost of debt and inflation forecasts, 4 January 2016.