

Regulatory treatment of inflation



SUBMISSION TO THE AUSTRALIAN ENERGY REGULATOR

Queensland Treasury Corporation (QTC) welcomes the opportunity to provide comments on the Australian Energy Regulator's (AER) Regulatory Treatment of Inflation Discussion Paper. QTC's comments relate to the best estimate of expected inflation to be used in the post-tax revenue model (PTRM).

1 Summary of QTC's views

- QTC supports the use of the bond break-even inflation rate (BBIR) method based on 10-year nominal and capital indexed Commonwealth Government Security (CGS) yields to estimate expected inflation.
- The market prices of nominal and indexed CGS reflect the actions of investors who commit capital based on views on the future paths of inflation. In a well-functioning debt market the BBIR will reflect the probability-weighted average of these views, which is what the AER is required to estimate.
- In addition to expected inflation, the BBIR will reflect an inflation risk premium and a liquidity premium:
 - The inflation risk premium is usually positive as it compensates nominal CGS investors for the impact of uncertain inflation outcomes on realised real returns. A positive inflation risk premium will result in the BBIR over-estimating expected inflation.
 - The inflation risk premium may be negative if investors are concerned about deflation. A negative inflation risk premium will result in the BBIR under-estimating expected inflation.
 - The significant increase in supply of capital indexed CGS since 2010 has improved liquidity and turnover in the indexed CGS market. The Commonwealth Government has also committed to maintaining indexed CGS outstandings at 10–15 per cent of total CGS. As such, the current liquidity premium is likely to be small.
 - Increasing demand for nominal CGS during 'flight-to-quality' periods such as the 2008–2009 global financial crisis and the 2012 European sovereign debt crisis will increase the liquidity premium. This may result in the BBIR under-estimating expected inflation.
 - A negative inflation risk premium and/or an increase in the liquidity premium during flight-to-quality periods will cause the beta of nominal 10-year CGS to be negative. To the extent that the BBIR under-estimates expected inflation, there is likely to be a corresponding under-estimation of the allowed return on equity.
- Inflation swap rates also contain the market's inflation expectation. Due to the one-sided nature of the demand for inflation protection and hedging costs, inflation swap rates are usually higher than the BBIR.
- There have been periods where the indexed CGS market was not functioning effectively, which caused the BBIR to over-estimate expected inflation. For example, there was no issuance of indexed CGS between 2003 and 2009. This created a scarcity premium for indexed CGS that increased the BBIR for reasons unrelated to expected inflation. During this period it was appropriate to use an alternative method to estimate expected inflation.
- The AER's preferred estimation method produces estimates that are anchored to the 2.50 per cent mid-point of the Reserve Bank of Australia's (RBA) target band. QTC does not consider this to be reasonable in the current market as realised inflation has been 2.00 per cent per annum over the last 5 years despite significant reductions in the official cash rate prior to and during this 5-year period. The ability for further cash rate reductions to stimulate economic activity and inflation appears to be limited.
- In QTC's view it is likely that investors are giving increasing weight to a scenario where inflation is below the bottom of the RBA's 2–3 per cent target band for an extended period of time. This is consistent with the increasing divergence between the BBIR and the 2.50 per cent mid-point since 2014, and the current BBIR of 1.90 per cent.

2 Estimation methods

- Estimating long-term inflation expectations is an inherently difficult task. As expectations are unobservable they can only be inferred from market prices or estimated from surveys.
- There are sound reasons to favour estimates implied by market prices as opposed surveys¹:

*... consensus survey measures have been criticized for a number of reasons. Survey respondents are weighted equally, regardless of their convictions or ability to forecast inflation well. They may also have little incentive to reveal private information. In principle, market-based measures do not have these shortcomings. They are determined by **actions**, which are more revealing than **opinions**. The convictions of market players are weighted by their 'dollar votes,' which reflect the confidence and stake people have in their predictions [emphasis original].*

Professional forecasters may behave strategically, providing forecasts that are close to consensus—rather than reflecting their true forecast—to avoid being the only one who was wrong. Conversely, they may make contrarian forecasts to attract more attention to their products.

In addition, market-based measures are available at a much higher frequency than survey data, and they therefore should provide more current information about expectations.

- Market-based estimates reflect the actions, and therefore the beliefs and expectations, of investors rather than the subjective opinions of survey participants.
- In addition to the biases outlined in the above quote, surveys will usually ask for central inflation forecasts rather than probability weighted averages of possible future inflation paths over a 10-year period (the latter being the relevant input in the PTRM).

2.1 Bond break-even inflation rate method

- The BBIR method uses the difference between the 10-year nominal and capital indexed CGS yields to estimate expected inflation. The same 10-year nominal CGS yield is also used by the AER in the allowed return on equity.
- The AER outlines several perceived issues with the BBIR method. In QTC's view, most of the issues are not important (eg, difficulty in fitting an indexed CGS curve, different coupon frequencies and personal price indices differing from the consumer price index), or immaterial when estimating 10-year expected inflation (eg, convexity bias and the mismatched pattern of cash flows).
- The two issues that may be important are the inflation risk premium and the liquidity premium.

Inflation risk premium

- The inflation risk premium makes up part of the nominal CGS yield. It compensates nominal CGS investors for the impact of uncertain inflation outcomes on realised real returns. As the premium is usually positive it will cause the BBIR to over-estimate expected inflation.
- The inflation risk premium may be negative if investors are concerned about deflation because 10-year nominal CGS can be expected to produce relatively high returns in deflationary environments. A negative inflation risk premium will result in the BBIR under-estimating expected inflation.

Liquidity premium

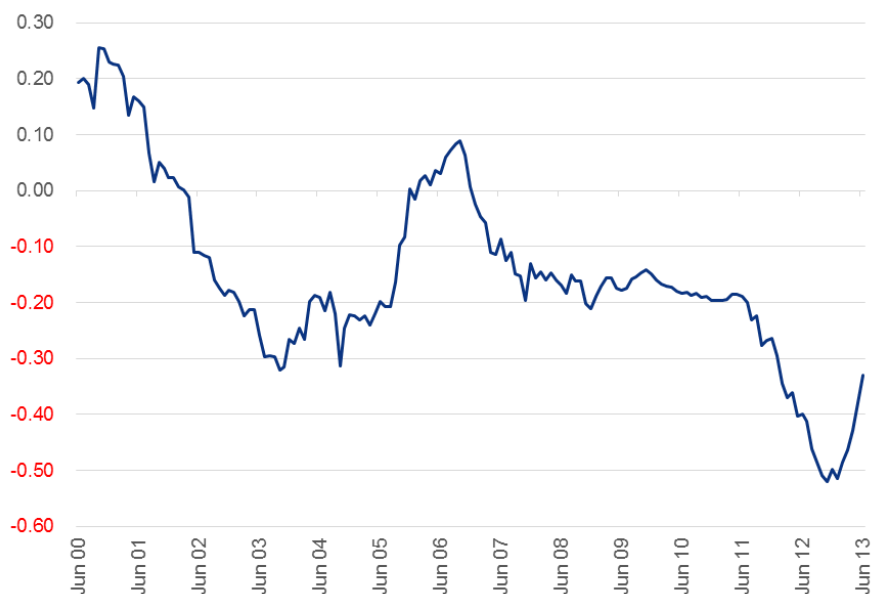
- The significant increase in supply of capital indexed CGS since 2010 has improved liquidity and turnover in the indexed CGS market. The Commonwealth Government has also committed to maintaining indexed CGS outstandings at 10–15 per cent of total CGS. As such, the current liquidity premium is likely to be small.
- Increasing demand for nominal CGS (ie, the safest and most liquid asset) during 'flight-to-quality' periods such as the 2008–2009 global financial crisis and the 2012 European sovereign debt crisis will increase the liquidity premium. This may result in the BBIR under-estimating expected inflation.

¹ Bank of Canada (November 2004), *Real return bonds, inflation expectations, and the break-even inflation rate*, p. 2

Impact on beta of 10-year nominal CGS

- A negative inflation risk premium and/or an increase in the liquidity premium during flight-to-quality periods (eg, 2008–2009 and 2012 as shown in Figure 1) will cause the beta of 10-year nominal CGS to be negative.
- The 10-year nominal CGS yield used to calculate the BBIR is also used by the AER as a proxy for the expected return on the zero beta asset when determining the allowed return on equity.
- To the extent that the BBIR under-estimates expected inflation during periods where the beta of 10-year nominal CGS is negative, there is likely to be a corresponding under-estimation of the allowed return on equity.

FIGURE 1: ROLLING 3-YEAR BETA OF 10-YEAR NOMINAL CGS



2.2 Inflation swaps

- A zero coupon inflation swap involves exchanging a cash flow indexed at a fixed rate of inflation for a cash flow indexed at the actual change in the consumer price index over the term of the swap.
- A 'receive actual/pay fixed' inflation swap protects against average inflation exceeding the fixed inflation swap rate.
- As with the BBIR, the inflation swap rate reflects the market's inflation expectation and an inflation risk premium. The inflation swap rate is usually higher than the BBIR due to:
 - the cost of the replicating portfolio that a swap dealer uses to hedge a 'pay actual/receive fixed' swap, and
 - the one-sided nature of the hedge market, which has more natural receivers of actual inflation.
- The replicating portfolio consists of a long 10-year capital indexed CGS position and a short 10-year nominal CGS position. The net cost of maintaining the portfolio reflects the different repurchase agreement rates for the indexed and nominal CGS. The net cost tends to increase during periods where funding markets are constrained.
- Due to these additional costs, the inflation swap rate will over-estimate expected inflation.

2.3 RBA inflation target method

- The AER gives the highest rank to the RBA inflation target method. This method combines the RBA's inflation forecasts for the next 2 years and the 2.50 per cent mid-point of the RBA target band for the subsequent 8 years to estimate 10-year expected inflation. Naturally, the AER's estimates are close to 2.50 per cent.
- The AER's preference for the RBA target band method is based on the belief that 10-year inflation expectations:
 - are relatively stable over time
 - are anchored at or within the target inflation band, and/or
 - do not respond significantly to inflation surprises

- The academic research relied upon by the AER to reach these conclusions use survey-based inflation forecasts as a proxy for long-term expected inflation²:

After 1991, the long-term inflation expectations series is Consensus' forecasts for CPI inflation 6–10 years ahead; expectations are surveyed in the June and December quarters, and we linearly interpolate between observations [emphasis added].

As the terminology suggests, inflation expectations represent investors' central forecast for inflation ...[emphasis added]

To better identify model parameters we also incorporate inflation forecasts from Consensus Economics in the estimation.... Adding forecast data helps to better anchor the model estimates of inflation expectations and so improves model fit.

- It does not follow that the inflation forecasts are the same as the probability-weighted average inflation expectation that makes up part of the 10-year nominal CGS yield. By definition, a 'central' forecast of inflation will not reflect alternative inflation paths that are relevant when estimating expected inflation.
- QTC notes that the AER gives the lowest rank to survey estimates of expected inflation, even though it implicitly relies on conclusions based on survey data when giving the highest rank to the RBA inflation target method.

Response to Discussion Paper questions

Question 1: Explain why you agree or disagree that the RBA inflation target method is more likely to provide best estimates of expected inflation than swap-implied estimates and bond break-even estimates?

- The AER has used expected inflation of 2.40 per cent in recent regulatory determinations. In contrast, the 10-year BBIR is currently 1.90 per cent. Even the current 10-year inflation swap rate of 2.25 per cent, which over-estimates expected inflation, is lower than the AER's current estimate.
- There is no reason to believe that the 0.5 difference between the AER and BBIR estimates is due to a negative inflation risk premium and/or an elevated liquidity risk premium. As such, there is no reason for the AER to favour an estimate that is materially higher than a market-based estimate of expected inflation.
- As explained in the response to Question 4 it is likely that investors are giving increasing weight to a scenario where inflation is below the bottom of the RBA's 2–3 per cent target band for an extended period of time. This is consistent with the increasing divergence between the BBIR and the 2.50 per cent mid-point since 2014, and the current BBIR of 1.90 per cent.
- QTC's other concerns with the RBA inflation target method are set out in Section 2.3

Question 2: Explain why you agree or disagree that inflation swaps are a more robust and congruent market-based estimate of expected inflation than bond breakeven estimates?

- For the reasons set out in Sections 2.1 and 2.2, QTC considers that the BBIR will produce a better estimate of 10-year expected inflation compared to the inflation swap rate.

Question 3: Do you agree that we should not rely on swap-implied estimates or bond breakeven estimates? Should we place some weight on estimates from each of the four methods?

- For the reasons set out in Section 2 QTC considers that the BBIR will produce the best estimate of expected inflation compared to the alternative estimation methods.
- Even though hedging costs and supply/demand imbalances cause the inflation swap rate to over-estimate expected inflation, it is noteworthy that the AER's current estimate is higher than the current inflation swap rate.
- In the absence of a well-functioning debt market, such as the period 2003–2009 when there was no indexed CGS issuance, it may have been appropriate to use the RBA inflation target method (or a variant of this method). This is not an issue in the current market.

² RBA (September 2015), *Inflation targeting: A victim of its own success?*, p. 7 and RBA (January 2011), *Estimating inflation expectations with a limited number of inflation-indexed bonds*, p. 15 and p. 2.

Question 4: Do you consider that monetary policy has (or is perceived to have) lost its effectiveness in influencing economic activity and as a result inflation expectations?

- It is reasonable to expect monetary policy to be progressively less effective as the official cash rate approaches zero:
 - Despite the adoption of accommodative monetary policy settings by central banks, including negative cash rates, realised inflation has been persistently below target levels in several developed countries, including Australia.
 - Realised inflation in Australia has been 2.0 per cent per annum over the last 5 years despite significant reductions in the official cash rate *prior to and during* this 5-year period³.
 - The official cash rate is currently 1.5 per cent, and it is unlikely that the RBA would maintain a zero or negative cash rate for an extended period of time. This places a limit on the extent of any further cash rate reductions.
 - Even if the RBA believes that further cash rate reductions should be made, it may be reluctant to do so due to the impact on an already overheated property market. The ability for further cash rate reductions to stimulate economic activity and inflation appears to be limited.
- Based on the above it is likely that investors are giving increasing weight to a scenario where inflation is below the bottom of the RBA's 2–3 per cent target band for an extended period of time. This is consistent with the increasing divergence between the BBIR and the 2.50 per cent mid-point since 2014, and the current BBIR of 1.90 per cent.

Question 5: In light of potential anchoring of long-term inflation expectations to the RBA's target band, explain whether you consider we should simply estimate expected inflation based solely on the RBA target band, without adjusting for the RBA's short-term (2-year) inflation forecasts?

- QTC assumes this means fixing expected inflation at 2.50 per cent. If so, the proposal in Question 5 would make the AER's estimate an even worse estimate of expected inflation in the current market.

Question 8: Do you consider the limited tenors of indexed CGS are likely to result in the swap-implied forward inflation curve better reflecting the decomposition of market-implied forward inflation rates than the bond breakeven-implied forward inflation curve?

- The AER's task is to estimate expected inflation over a 10-year period. This does not require implied forward inflation rates or fitting curves observable indexed CGS yields or inflation swap rates.
- There are currently capital indexed CGS maturing in September 2025 and September 2030. Straight line interpolation can be used to estimate the indexed CGS yield for a 10-year tenor.

Question 9: Do you consider that bond breakeven estimates are materially affected by various risk premia and biases? If so, do you consider that those biases and premia can be estimated robustly and removed from the bond breakeven estimates?

- In QTC's view the only premia that need to be considered are the inflation risk premium and the liquidity premium.
- It is difficult to estimate the size of these premia, however it may be less challenging to determine if the BBIR is a better estimate of expected inflation compared to the AER's estimate at a given point in time.
- The AER's current estimate is 0.5 per cent higher than the current BBIR. If the BBIR is under-estimating expected inflation this must be due to a large negative inflation risk premium and/or a highly elevated liquidity premium.
- If the inflation risk premium is significantly negative, the beta of 10-year nominal CGS is likely to be negative. The AER clearly does not believe this is to be true as it uses the 10-year nominal CGS yield as a proxy for the expected return on a *zero beta* asset when determining the allowed return on equity.
- The significant increase in supply of capital indexed CGS since 2010 has improved liquidity and turnover in the indexed CGS market. The Commonwealth Government has also committed to maintaining indexed CGS outstandings at 10–15 per cent of total CGS. As such, the current liquidity premium is likely to be small.
- In QTC's view, the superiority of the BBIR in the current market can be reasonably determined without making explicit estimates of the inflation risk premium or the liquidity premium.

³ The RBA reduced the official cash rate from 7.25 per cent to 4.25 per cent between September 2008 and March 2012. The cash rate has been reduced further from 4.25 per cent to its current level of just 1.50 per cent.

Question 10: Should we consider survey-based estimates of 10-year inflation, even if the data cannot be publicly reported?

- As explained in Section 2.3, surveys usually ask for central inflation forecasts rather than probability-weighted averages of possible future inflation paths over a 10-year period. As the latter is what the AER is trying to estimate, survey data should not be used.
- The AER has cited research indicating that survey-based forecasts may be anchored to the RBA's target band. Given that market-based estimates of expected inflation do not display this property (especially in the current market) survey data should not be used.