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QCA's inflation forecasting review

A report for Dalrymple Bay Infrastructure Management Pty Ltd

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Report authors

Greg Houston

Dale Yeats

Brendan Quach

Bronwyn Taylor

Tony Chen

Contact Us

Sydney
Level 40
161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800

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1. Introduction

We have been asked to prepare this report by Dalrymple Bay Infrastructure Management Pty Ltd (DBIM). Its subject is the Queensland Competition Authority's (QCA's) request for comments in the context of the QCA's review of the approach by which it estimates expected inflation.[1]

1.1 Role of inflation

The framework applied by the QCA – and most Australian regulators – delivers a real return on capital through annual cashflows, with compensation for outturn inflation arising in the form of an annual indexation allowance added to the asset base.

The principal benefit of targeting a real return on capital through cash flows is that it protects investors from the effect of unanticipated inflation during the period of an access undertaking. This is because the regulated business is compensated for the effects of inflation by means of an adjustment to the asset at the end of each year, based on actual consumer price inflation.

Since the QCA applies a nominal (inflation inclusive) weighted average cost of capital (WACC) to calculate the rate of return component of revenue, it is necessary to adjust downwards a business's allowed revenue to avoid providing compensation for inflation twice, ie:

- once in allowed revenue, through the application of an inflation inclusive rate of return; and
- again in the capital base, by means of the indexation step in the roll forward process.

This offsetting deduction to allowed revenue is based on the level of expected inflation estimated at the commencement of the access period. It acts to deliver a real return through annual cash flows, since the deduction of forecast inflation is intended to offset the inflation component of the nominal WACC.

The QCA's derivation of the approximate real rate of return by deducting forecast inflation from the nominal WACC has the important consequence that a regulated business can only expect to derive the targeted real return if the amount deducted from its revenues for expected inflation is a best estimate.

A business can expect to be under- (or over-) compensated relative to the determined rate of return if the estimate of expected inflation is biased upwards (or downwards).

1.2 Our view

In our opinion, the QCA's current methodology for estimating expected inflation does not produce a 'best estimate' and, in the current market conditions, is likely to incorporate an upwards bias.

The strong likelihood of an upwards bias arises from eight of the ten observations in the QCA's forecast horizon, as generally adopted in its regulatory decisions to date, being equal to the mid-point of the RBA's inflation target, ie, 2.5 per cent.

In our opinion, the QCA's methodology could be significantly improved by two key modifications, ie:

- shortening the inflation forecast horizon to five years; and
- applying a linear glide path in years three to five of the forecast horizon that arrives in year five at a point within the Reserve Bank of Australia's (RBA's) inflation target band of two to three per cent, where the precise point in that range is informed by available evidence on medium term inflation expectations.

[1] QCA, *Inflation forecasting: Issues paper*, March 2021.

In the remainder of this report, we address each of the consultation questions put forward by the QCA in its issues paper.[2]

[2] QCA, *Inflation forecasting: Issues paper*, March 2021, p 2.

2. Response to consultation questions

2.1 Forecast horizon

Question 1: Over what term should we forecast the inflationary gain deduction we use to derive the 'return on capital' component of allowable revenues?

The two principal options for the time horizon over which an inflation forecast is developed concern alignment with either the term of:

- the price setting period, which is typically five years; or
- the term of the risk free rate used to derive the WACC, which is typically ten years.

The primary reason for adopting a ten year time horizon for forecast inflation is to match the term of the nominal WACC. The application of a rate of return by reference to a ten year nominal WACC and the deduction of a ten year inflation forecast to calculate cashflows is consistent with an underlying objective of providing a real return that reflects the opportunity cost of capital.[3]

However, weighing against this approach are the material advantages of matching the inflation forecast time horizon to the typically shorter term of an access period. The principal advantage arises from the resulting removal of any mismatch between:

- the inflation inclusive (or nominal) rate of return reflected in the estimation of a nominal WACC; and
- the inflation inclusive rate of return that arises from the combination of the QCA's calculation of revenue and indexation adjustments to the capital base over pricing period.[4]

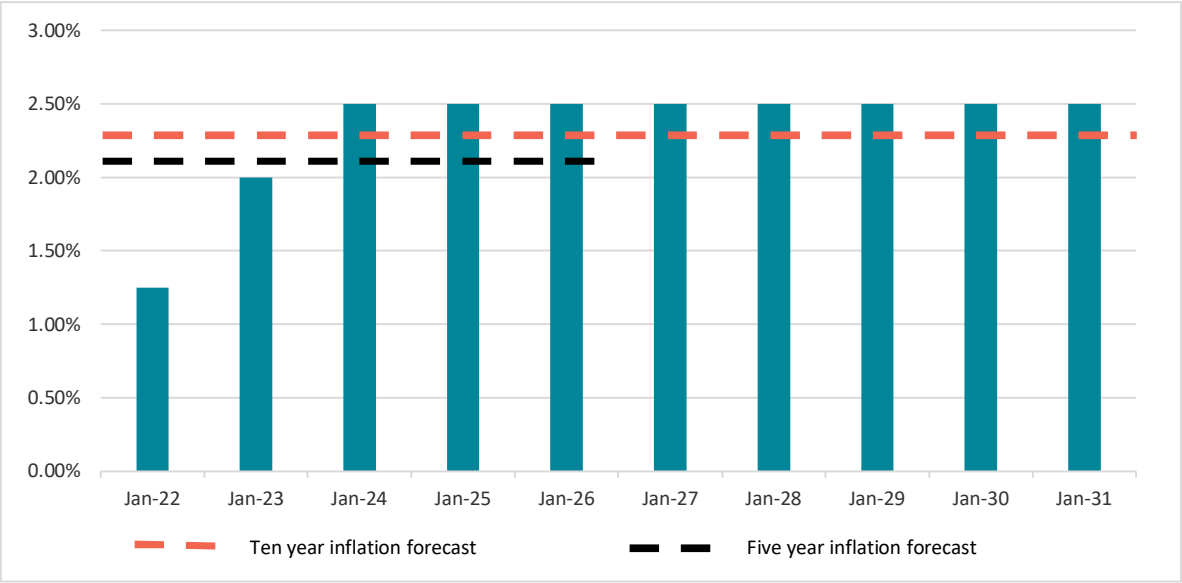
We illustrate the implication of any potential mismatch at figure 1 overleaf, which shows that application today of the inflation forecasting method adopted to date by the QCA would result in a ten year inflation forecast of 2.32 per cent (red line).[5]

[3] AER, *Regulatory treatment of inflation*, Final position, December 2020, p 66.

[4] AER, *Regulatory treatment of inflation*, Final position, December 2020, p 39.

[5] Short term inflation forecasts for the first two years from the Reserve Bank of Australia, Statement on Monetary Policy, February 2021, p 63.

Figure 1 Ten and five year inflation forecasts compared



Source: HoustonKemp analysis and RBA, Statement on Monetary Policy, May 2021, p 73.

Even if actual inflation in each year of a five year access period was to align precisely with the inputs illustrated in figure 1 (teal bars), the average annual rate of inflation over that five year period would be only 2.15 per cent (black line).

It follows that the adoption of a ten year inflation forecast of 2.32 per cent over that pricing period gives rise to an upwardly biased forecast over a five year pricing period, ie, forecast inflation would be set at 2.32 per cent, when in fact – and assuming perfect foresight – it will be 2.15 per cent.

In principle, this overestimation of actual inflation in the first five years of a ten year time horizon would be balanced by the corresponding underestimation of actual inflation in the second five years of the forecast time horizon, which in this case would be 2.5 per cent.

However, under a price setting framework that treats each five year period independently for the purposes of estimating forecast inflation, there is no opportunity for these two off-setting biases to be equalised.

In the circumstances described above, the expected return on the capital base is lower than the nominal rate of return estimated by the QCA, since:

- the deduction of indexation in the calculation of revenue is based on forecast inflation of 2.32 per cent; but
- the indexation adjustment to the capital base in the roll forward process is expected to be only 2.15 per cent.

The effect of any difference between a five and ten year inflation forecast will fall on equity investors because Australian businesses almost exclusively issue debt that pays a nominal (inflation inclusive) return.[6] Equity investors therefore bear inflation risk for the whole capital base, rather than only on the equity financed proportion of the capital base.

[6] The Energy Network Association recently indicated that the corporate debt market for Australian inflation indexed bonds was insufficient to allow regulated businesses to routinely issue inflation-linked debt. See ENA, *A hybrid approach that has regard to market data | Response to AER Review of Regulatory Treatment of Inflation*, 29 July 2020, pp 21-22.

By way of example, if the ten year inflation forecast is 50 basis points higher than the five year forecast and benchmark gearing is 60 per cent, then:

- the expected nominal return on equity will be approximately 125 basis points below the required nominal return on equity;[7] and
- the expected real return on equity will be approximately 75 basis points below the required real return on equity.[8]

As a matter of principle, a ten year inflation forecast time horizon is capable of delivering an expected ten year *real* return on capital to investors, taking debt and equity investors in aggregate. However, over a shorter pricing period there are important consequences arising from its inability to deliver the required *nominal* rate of return when five and ten year inflation expectations are different.

To avoid the intrinsic risk of such differences arising, particularly in circumstances where near term forecast inflation is different from that implied by the mid-point of the RBA's target range, it is necessary to align the inflation forecast time horizon with the pricing period. This enables the forecast inflation parameter to be more responsive to changing circumstances as regards the near term outlook for inflation.

The practical effect of alignment between the inflation forecast time horizon and the pricing period is:

- greater reliance on the RBA's short term forecasts of inflation; and
- diminished reliance on the assumption that investors anchor their expectations of inflation at the mid-point of the RBA's target band from year three and beyond.[9]

In our opinion, the adoption of an inflation forecast time horizon that matches the pricing period is necessary to meet the objective of pricing principle (a) at section 168A of the Act.

This is consistent with the AER's recent conclusion that adopting an inflation forecast time horizon that corresponds with the pricing period:[10]

> - …is desirable because service providers will in expectation receive the same allowance during RAB indexation in the RFM [roll forward of the capital base] as the amount (expected inflation) deducted from total revenue in the PTRM. Thus, service providers are expected to receive the nominal return set in the rate of return instrument over the regulatory period.
> - …is more responsive to changes in market circumstances.

The AER's adoption of a time horizon for estimating forecast inflation is consistent with the advice from Dr Martin Lally that the:[11]

> …best estimate of expected inflation should match the regulatory period and not the term of the rate of return.

Dr Lally provided the following reasons for this conclusion:[12]

- estimating expected inflation over the term of the pricing period will match the expected indexation of the capital base for actual inflation over the pricing period;
- estimating expected inflation over the term of the pricing period will provide for the net present value (NPV) = 0 principle to be met if a five year rate of return is also used; and

[7] Calculated equal to 50 basis points divided by an assumed 40 per cent equity financed component of the capital base.

[8] Calculated equal to 125 basis points less 50 basis points.

[9] AER, *Regulatory treatment of inflation*, Final position, December 2020, p 38.

[10] AER, *Regulatory treatment of inflation*, Final position, December 2020, p 38.

[11] AER, *Regulatory treatment of inflation*, Final position, December 2020, p 28.

[12] AER, *Regulatory treatment of inflation*, Final position, December 2020, p 28.

- that there is no advantage in using a ten year estimate of inflation as opposed to a five year estimate in terms of setting the correct rate of return.

The AER also explained that the implicit reduction in the forecast period reflects:[13]

> …the sustained decline in the required rate of return and the increased difference between 5 and 10 year inflation expectations due to short-term fluctuations in inflation expectations.

2.2 Application of cost escalators

Question 2: Should we use the same expected inflation estimate (including the use of the same inflation forecasting term) for all purposes when modelling prices, or should we derive a different forecast inflation estimate for each purpose? Under what circumstances should we apply an input cost escalator that differs from our expected CPI inflation measure?

This is not a material issue for DBIM, since it forecasts efficient expenditure in real terms and, in practice, the asset base is updated at the end of each year to incorporate outturn efficient capital expenditure on projects – in nominal terms – commissioned in the previous year.

In our opinion, it is appropriate to apply a single forecast of inflation in the building block calculation of the efficient cost of providing the DBT service.

2.3 Change of approach

Question 3: Should we maintain our existing approach to estimating expected inflation?

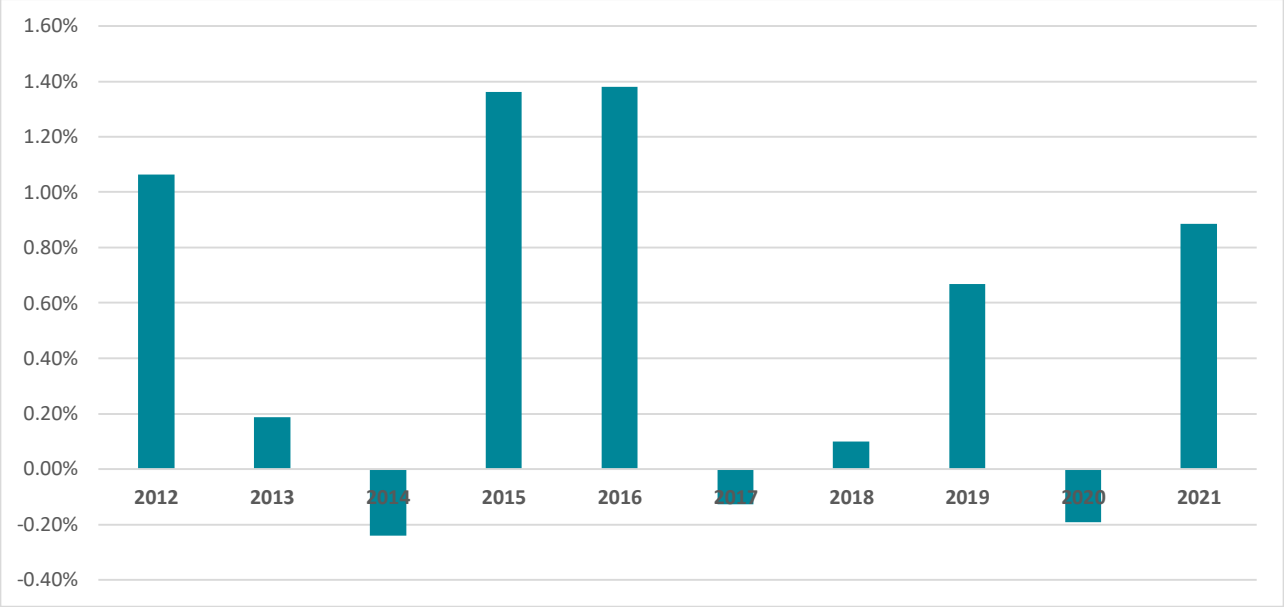
The QCA's current method has taken the geometric mean of the short-term RBA inflation forecast one year and two years out, and the midpoint of the RBA's medium term inflation target range (2.5 per cent) for the remaining years of the forecast period.

In our opinion, the QCA's current methodology for determining forecast inflation does not produce a 'best estimate' and, in the current market conditions, is likely to incorporate an upwards bias.

Figure 2.2 presents the inflation forecast error applying to the DBT service in the last two access periods, and shows that that the QCA's estimates of forecast inflation have been markedly higher than actual inflation over that period.

[13] AER, *Final position – Regulatory treatment of inflation*, December 2020, pp 6 and 7.

Figure 2.2: Inflation forecast error for DBT (QCA forecast less actual inflation)



Source: Australian Bureau of Statistics, CPI All Groups, Weighted Average of Eight Capital Cities, March to March inflation, accessed on 7 May 2021; and QCA, Final decision – DBCT Management's 2015 draft access undertaking, *November 2016, pp 167 and 175.*

The strong likelihood of this upwards bias continuing in the future arises from eight of the ten observations in the QCA's forecast horizon being equal to the mid-point of the RBA's inflation target, ie, 2.5 per cent.

In contrast, recent statements by the Governor of the RBA, Dr Philip Lowe, indicate that inflation is not expected to be within its target range for an extended period, ie:

> Before increasing the cash rate, the Board wants to see inflation sustainably within the 2 to 3 per cent target range. Meeting this condition will require a tighter labour market and stronger wages growth than we are currently forecasting. It is difficult to determine exactly when this condition might be met, but, based on the outlook I have discussed today, we do not expect it to be before 2024, and it is possible that it will be later than this.[14]
>
> …[the RBA] will not increase the cash rate until actual inflation is sustainably within the 2 to 3 per cent target range. For this to occur, the labour market will need to be tight enough to generate wages growth that is materially higher than it is currently. This is unlikely to be until 2024 at the earliest.[15]
>
> The GDP and labour market forecasts represent a stronger outlook than presented in the February Statement, and this is reflected in the forecasts for inflation. Even so, underlying inflation is still expected to increase only gradually over the next few years, to be close to 2 per cent in mid 2023.[16]

The RBA's view suggest that an inflation forecast of 2.5 per cent from year three onwards is not a best estimate of inflation. This is reinforced by the Australian Energy Regulator's (AER's) recent introduction of a linear glidepath to 2.5 per cent over the course of its forecast period.

[14] RBA, *Opening Statement to the House of Representatives Standing Committee on Economics*, 5 February 2021, p 5.

[15] RBA, *Statement on Monetary Policy*, May 2021, p 4.

[16] RBA, *Statement on Monetary Policy*, May 2021, p 77.

Consistent with this, we have presented the QCA with empirical analyses showing statistically significant evidence that the RBA target produces biased evidence of expected inflation.[17]

That same analysis indicated that neither of the distinct approaches considered by the QCA in previous regulatory decisions,[18] were an unambiguously better estimator for five-year inflation or 10-year inflation.[19]

In our opinion, the QCA's methodology could therefore be improved by drawing on a combination of information sources, including the views and objective of the RBA and available market evidence.

To summarise, in our opinion the QCA should not retain the existing approach by which it estimates expected inflation. We comment on alternative approaches in the remainder of this report.

2.4 Transition path

Question 4: If we continue to use short-term RBA forecasts in our forecasting methodology, should we consider using a multi-year transition path to our estimate of long-term inflation expectations? If so, what factors should we consider in our choice of transition path?

In our opinion, it is appropriate to apply a multi-year transition to the QCA's estimate of long term inflation expectations.

This would mitigate the bias likely to arise, in current market conditions, from the adoption of an estimate of long term inflation expectations in year three onwards, as discussed in section 2.3.

Against a backdrop of uncertainty as to future market conditions, the volatility exhibited by inflation and the consequent challenge of forecasting inflation, in our view there is no demonstrably superior alternative to the adoption of a linear glidepath between estimates of expected inflation applying at different points in the future.

Similarly, the AER recently adopted a linear glidepath because: [20]

> …it can withstand significant disruptions to the market in the future, but also apply under stable market conditions

The AER also highlighted:[21]

> …a number of precedents for the use of glide-path approach in the regulatory treatment of inflation, with the Commerce Commission of New Zealand and the Essential Service Commission of South Australia (ESCOSA) both using a form of linear glide-path to estimate expected inflation.

2.5 Medium to long term inflation expectations

Question 5: How should we derive medium- to long-term inflationary expectations, particularly over a shorter forecasting period where expected inflation may not reach the midpoint of the RBA's target range?

In our opinion, the QCA should have regard to all available information that can inform expectations as to medium and long term inflation expectations. This includes, but is not limited to:

[17] HoustonKemp, *Evaluation of inflation forecasting methods*, September 2019, p 13.

[18] QCA, *Aurizon Network's 2017 draft access undertaking | Draft decision*, December 2017 (the "Aurizon draft decision"), p 51 and QCA, *DBCT Management's 2015 draft access undertaking | Final decision*, November 2016 (the "DBCT (2015) decision"), p 167.

[19] HoustonKemp, *Evaluation of inflation forecasting methods*, September 2019, p 13.

[20] AER, *Regulatory treatment if inflation – Final report*, December 2020, p 54.

[21] AER, *Regulatory treatment if inflation – Final report*, December 2020, p 55.

- commentary from the RBA, including in its quarterly Statement on Monetary Policy and recent speeches;
- surveys of long term inflation expectations; and
- the expected inflation implied by the yield on nominal and indexed bonds.

Drawing on a breadth of information mitigates the risk of bias arising arise from reliance on any single source.

By way of indication as to the information provided by these sources, we highlighted in section 2.3 recent statements by the RBA that indicate inflation is not expected to be within its target range for an extended period.

The RBA also publishes surveys of long-term inflation forecasts in its statement on monetary policy, which currently indicate that:[22]

- unions expect average inflation of just under two per cent over the period from five to ten years from now;
- market economists expect average inflation of just above two per cent over the period from five to ten years from now; and
- Consensus Economics' survey of private sector forecasters indicates expected average inflation of around 2.5 per cent over the period from six to ten years from now.

Insights can also be drawn from the inflation expectations implied by the difference between nominal and indexed bond yields, which currently suggest that inflation will continue to be subdued.

The yields on nominal and indexed bonds in April 2021 imply that:

- annual inflation in year five of the pricing period is expected to be 1.90 per cent; and
- average inflation over the next five years will be 2.08 per cent.

In recognition of the theoretical possibility of bias in market-based measures of expected inflation noted by the QCA,[23] we highlight our recent empirical analysis that found no statistically significant evidence of bias in either five or ten year estimates of expected inflation derived by reference to nominal and indexed bond yields.[24]

In our opinion, information on inflation expectations implied by nominal and indexed bond yields should inform medium to long term expectations and, at the very least, should not be discarded in their entirety.

2.6 Market-based measures of inflation

Question 6: Should we consider the use of market-based measures of inflation expectations as either the primary estimation method or to derive long-term inflationary expectations?

We explain in section 2.5 that, in our opinion, the QCA should have regard to market-based measures of inflation expectations in forming its view of long-term inflation expectations, along with other sources of information capable of shedding light on long-term inflation expectations.

[22] RBA, Statement on Monetary Policy, May 2021, p 69.

[23] See: QCA, *Inflation forecasting: Issues paper*, March 2021, p 11; and QCA, Draft decision Aurizon Network's 2017 draft access undertaking December 2017, pp 52-55.

[24] HoustonKemp, *Evaluation of inflation forecasting methods*, September 2019, p 9.

2.7 Trimmed mean

Question 7: If we continue to use RBA forecasts in our estimation methodology, are there certain circumstances where the RBA's trimmed mean forecast should be used?

It is important to acknowledge, at the outset, that a business will only be provided with an opportunity to recover its efficient costs if a consistent basis is applied to estimate forecast inflation and to adjust the asset base for outturn inflation. The estimation of forecast inflation by reference to trimmed mean inflation would therefore necessitate indexing the asset base for outturn trimmed mean inflation.

The RBA explains that the trimmed mean inflation is:[25]

> …the average rate of inflation after 'trimming' away a certain percentage of the distribution of price changes at both ends of that distribution. These measures are calculated by ordering the seasonally adjusted price changes for all CPI components in any period from lowest to highest, trimming away those that lie at the two outer edges of the distribution of price changes for that period, and then calculating an average inflation rate from the remaining set of price changes.
>
> …trimmed-mean measures down-weight the impact of items in a given period if their price changes are 'unrepresentative' in the period in question.

The fundamental objective of investors is to increase their purchasing power through time, which necessitates the derivation of a return in excess of price inflation applicable to the goods and service they purchase.

A key benefit of the QCA targeting the delivery of a real return to investors is that it protects investors from unanticipated changes in inflation, as explained in section 1.1.

Although the proper implementation of either a target nominal or real return should be equivalent in present value terms, it would be reasonable to expect a risk averse investor to prefer a targeted real return, ie, owing to the more precise protection from unanticipated inflation.

Estimating expected inflation by reference to trimmed mean inflation – and therefore indexing the asset base by reference to outturn trimmed mean inflation – would change the QCA's framework so as to expose investors to inflation risk associated with the price changes that are 'trimmed' by the RBA.

Given the potential increase in the required rate of return arising from the transfer of this risk from customers to the regulated business, in our opinion the QCA should not estimate forecast inflation by reference to trimmed mean inflation.

Further, we note that estimating forecast inflation by reference to trimmed mean inflation for some short period and then reverting to an estimate based on CPI, will not preserve the value of the asset base in real terms and, therefore, not provide investors with an opportunity to recover their efficient costs.

2.8 National or Brisbane CPI

Question 8: When using expected inflation measures for the different purposes in revenue and price modelling, are there local considerations that could make the Brisbane consumer price index (CPI) preferable to the national CPI?

We explain in the previous section that investors require a real return in excess of price inflation applicable to the goods and service they purchase.

[25] RBA, Bulletin, March 2010, pp 8-9.

The estimation of forecast inflation by reference to Brisbane CPI would only be appropriate the to the extent all investors were located in Brisbane, such that they require a real return in excess of price inflation applicable to the goods and service *in Brisbane*.

In our opinion, the QCA should estimate expected inflation for by reference to 'national CPI', ie, the weighted average of eight capital cities, reflecting the geographic spread of investors.

HOUSTONKEMP
Economists

Sydney
Level 40
161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800