PEER REVIEW

Inflation and WACC

Prepared for
IPART

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THE CENTRE FOR INTERNATIONAL ECONOMICS
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Contents

BOXES, CHARTS AND TABLES

Summary

IPART is required to adopt an inflation expectation to derive a real estimate of the weighted average cost of capital. In its current reviews of the three water utilities — Sydney Water, Hunter Water and Water NSW — the utilities have raised a number of concerns around the proposed estimate of inflation expectations.

The CIE has been asked to conduct a peer review of the reasonableness of the approach and logic applied by IPART in coming to its proposed positions in regard to its inflation estimate and the other regulatory options put forward by the utilities. We have not considered the reasonableness of the resulting overall WACC estimates, but are focused on this specific issue.

In our view, IPART's proposed position is coherent and the underlying logic makes sense. In particular:

- IPART's position is that it is seeking to estimate **inflation expectations**, not actually forecasting **inflation.** This then allows it to estimate the real return required by the market, based on data on nominal returns
- It has previously reviewed measures of inflation expectations and determined a preferred approach in its 2018 WACC review
- There has been no particular reason to diverge from its previously developed position, although there are aspects of this that the CIE considers lead to potential problems. Namely:
  - the most relevant inflation expectation for IPART is the expectation of participants in nominal bond markets, rather than more broadly. It could be argued that indexed bond markets are more closely aligned to the expectations of these participants than is the RBA forecast
  - it is also not possible for utilities to hedge against the RBA forecast, because this is different to the implied inflation rates in markets where hedging could occur
  - it is not possible to determine whether measures of inflation expectations are accurate, because inflation expectations are never observed

  The relevant issues are not different for the current reviews. If anything, the volatility in indexed bond markets is supportive of IPART's previous view that this market is not deep enough to be confident in
- The level of uncertainty about future inflation is not problematic for inflation expectations, because the chief aim is to measure what the market's expectation is, and whether this is accurate or not is not relevant
- It is not possible to undertake a true up of inflation expectations, because the 'true' inflation expectation is not observed.

However, this is not to say that the utilities do not have valid claims. Ultimately, the utilities are claiming that they borrow in nominal terms and hence they bear a risk if the **inflation expectation** is different to **actual inflation**. This risk is greater the higher is the uncertainty about actual inflation outcomes.

Both the utilities' claims and IPART's logic can be right.

A simple example highlights the differences. Suppose the nominal cost of debt that a utility borrows at is 6 per cent. IPART estimates that this includes a 4 per cent real cost of debt expected by the market and 2 per cent inflation. Now suppose:

- the 'true' inflation expectation was only 1 per cent. In this case, IPART has underestimated the real cost of debt (and the real cost of equity) and the real cost of debt is actually 5 per cent. Because the true inflation expectation is never observed, it is not ever known if there is this type of error
- the actual inflation rate that occurs is 0 per cent. That is, neither IPART's estimate of inflation expectations or the 'true' expectation is correct. If the utility has borrowed in nominal terms, its actual borrowing costs were 6 per cent nominal and the allowed nominal cost of debt it receives is only 4 per cent. That is, it is impacted by the difference between IPART's estimate of expected inflation and the actual inflation rate. This represents the combination of the error in measuring inflation expectations and the error between inflation expectations and actual inflation
  - the same is not true of equity, because a utility is not locking in a nominal equity return in the same way as it is for nominal debt. The equity return is only impacted by the error in measuring inflation expectations.

In terms of solutions to this issue, there are a few possible directions:

1 IPART considers that inflation risk in taking out nominal debt is a systematic risk for businesses already compensated for in the rate of return allowed. It is up to the businesses if they want to hedge against this
   - the main problem with this is that a business could not hedge against the RBA's inflation expectation as this is not the same as the rates available in financial markets

2 IPART allows a process that compensates utilities for inflation risk for debt, on the basis that utilities largely use nominal debt markets, and where they do access indexed debt markets the implied inflation is not the same as IPART's inflation expectation
   - this has the useful property that it reduces the reliance on IPART's measure of inflation expectations
   - options include an annual or end-of-period inflation 'true up' in the revenue requirement, indexing the RAB by expected inflation for debt (and actual inflation for equity) or combining one of these options with indexing annual prices by a weighted average of CPI and expected inflation
   - this would have to be done in a way that does not lead to higher levels of financial risk or lead to excessive price fluctuations for customers
   - from initial thinking, the approach most likely to minimise price fluctuations would be to include the adjustment in the RAB (through indexing the RAB at the time of the next review by the previous inflation expectation for the debt

component and actual inflation for the equity component), and to annually index prices by a weighted average of expected inflation and actual inflation, with the weight on expected inflation based on the share of the building block cost related to the return on debt

- this would lead to less volatility in prices than a true up to revenue and is administratively simple
- it means that utilities recover their nominal cost of debt in the longer term
- if IPART finds in the future that inflation indexed bond markets can be used to set inflation expectations, then it could revert to option 1, where utilities can hedge their inflation risk

3 IPART seeks to more accurately measure inflation expectations

- this is a difficult task because inflation expectations are not observed. Hence it will be difficult to know if a measure is more accurate or not
- we do not see this as being possible within the timeframes available to IPART, without robust consultation, and hence this is a longer-term issue for IPART, which it has previously flagged that it will look at in its next WACC review.

1 Introduction and context

Utility claims

The utilities argue that IPART's method for estimating inflation expectations is not producing reasonable estimates. They argue that the method will result in the real WACC set for the regulatory period that is too low and that this will cause problems with financeability. The arguments put forward by the utilities include:

- That market-based measures of expected inflation over the 2020-2024 regulatory period have fallen to 0.65 per cent per annum in recent months and prior to the COVID-19 pandemic were pricing in 1.6-1.7 per cent
- IPART's inflation expectation and RBA's inflation forecasts have been higher than actual inflation consistently over the past several years
- There is heightened uncertainty over inflation.

Hunter Water and Sydney Desalination Plant expressed concerns that IPART did not properly apply the financeability framework it developed in 2018.

WaterNSW also submitted a memo from CEG, which discussed potential problems caused by transitory price impacts from the Commonwealth Government's free-childcare policy should IPART rely on inflation forecasts contained in the RBA's May 2020 Statement of Monetary Policy.

The utilities have proposed:

- setting the inflation expectation at 1.7 per cent, and
- including a true up mechanism for any differences between this expectation and actual inflation (or instead, as proposed by WaterNSW, increase the equity beta by 0.2 on account of inflation risk).

Generally, the utility submissions do not appear to recognise a distinction between forecasting inflation and estimating inflation expectations. There is an underlying assumption that IPART is or should be attempting to forecast inflation and that any differences between the forecast and actual inflation represent a forecasting 'error'. For example, Sydney Water defines windfall gains and losses relative to a nominal rate of return:

> …divergences between IPART's forecast inflation and outturn inflation will result in Sydney Water permanently under- or over-recovering **nominal** debt and equity costs. This will result in windfall losses (or in theory, gains) which are unintended and have no relationship to the operational performance or risk borne by the business. (emphasis added)

IPART's proposed positions

Inflation expectation

IPART's proposed position is to retain its existing method of forecasting inflation. This results in an inflation expectation for the regulatory period of 2.3 per cent, calculated based on:

- the forecast for the first year of the regulatory period of 1.75 per cent contained in the RBA's February 2020 Statement of Monetary Policy (which was the statement available at the time of the WACC parameter sampling window); and
- the 2.5 per cent midpoint of the RBA's target range thereafter.

IPART also notes that the same expectation of 2.3 per cent would also be derived from using forecasts for the first *two* years of the regulatory period from the *May* 2020 Statement of Monetary Policy and 2.5 per cent thereafter. As noted by IPART, using the May forecasts would be inconsistent with the objective of estimating the inflation expectation incorporated in the WACC parameters at the time of the sampling window. Using forecasts for the first two years of the regulatory period from the February 2020 Statement of Monetary Policy would result in a slightly lower inflation expectation of 2.19 per cent.

The key reasons given in the briefing for this proposed position are:

- recent movements in market-based measures of inflation have confirmed that they are not a good forecast in periods of financial stress
- RBA research on long-term expectations suggests they are anchored between 2 per cent and 2.5 per cent
- RBA commentary on countervailing impacts on inflation, and
- broader macroeconomic trends, including quantitative easing.

True-up for the difference between actual and forecast inflation

IPART's proposed position is to not accept utility proposals for a true up for any difference between actual inflation and the estimated inflation expectation.

This is consistent with the logic that IPART is attempting to measure the inflation expectation held by agents at the time of WACC sampling and that this expectation cannot be observed historically.

IPART's proposed position is that the key reason for not accepting the true up put forward by utilities is that it would not address cashflow problems in the coming regulatory period. It also notes that the price impacts of a true up could be significant and, if outturn inflation is higher-than-forecast, a true up may cause cashflow problems for utilities in the next regulatory period.

However, IPART also considered adopting an approach to the trailing average cost of debt, which would potentially accept the application of the utilities' proposed true up, but only to the debt component of the return on capital.

IPART's 2018 WACC review introduced a trailing average cost of debt under which the debt component of the WACC would be updated annually for a new tranche of debt in four- and ten-year trailing averages for the current and historical WACC estimates, respectively. The review left IPART to decide on a case-by-case basis whether the updates would feed through to prices annually or via an end-of-period adjustment. The review was silent on the question of whether the updates would include an update of the inflation expectation applied to adjust the nominal cost of debt to a real cost of debt.

IPART proposes to apply the updates to the nominal cost of debt at the end of the period. IPART also considered a true-up for differences between actual inflation and the inflation expectation set at the time of the determination. This is a more fundamental change than the question as to whether inflation *expectations* should be updated each year. It would ensure businesses are compensated for the observed nominal cost of debt, with the actual inflation component capitalised in the RAB.

This option would apply differing approaches to inflation with respect to equity and debt. IPART would set a real return on equity, derived from the observed nominal return on equity by removing an estimate of the inflation expectation at the time of the observation. When setting the real cost of debt for the coming regulatory period IPART would be attempting to forecast inflation, rather than reflecting the inflation expectation. The revenue impacts of any forecast 'error' would be reversed in the next regulatory period.

2 Reviewing the logic of IPART and utility claims

The regulatory approach for the three water utilities is designed so that the utility and customer are indifferent to inflation.

- This is currently achieved through a real framework.
- Part of the real framework uses expected inflation (the real WACC) and part uses actual inflation (price and RAB roll forward). For the WACC, expected inflation is used to estimate the real rate of return required by the market.

Basis for IPART's proposed position

Our view of the basis for IPART's proposed position is as follows.

1 IPART wants to obtain a measure of the real return required by the market as its estimate of the WACC.
   - this is not observable, along a few dimensions, including inflation expectations.
   - nominal returns are somewhat more observable than real returns through the use of the nominal government bond yield.
   - to obtain the required real return, IPART needs to estimate the inflation expectation that is embedded within the nominal government bond market
   - IPART is not trying to forecast inflation but is trying to measure the expectation of inflation within the nominal bond yields
2 This naturally leads to an argument about whose expectations are embedded within this market
   - IPART has determined that the RBA forecasts are the preferred measure of inflation expectations, as part of its 2018 WACC review
3 It is not possible to ever prove what estimate of inflation expectation is more accurate, because the inflation expectation is not observed
4 No true up process could occur because the 'true' inflation expectation is never observed.

Basis for utility perspective

The utility perspective is very different from IPART's logic.

1 IPART needs to forecast inflation as part of its WACC, rather than the inflation expectation
2 Forecast errors in inflation can make a big difference to regulated prices and cost recovery for utilities

3 There have been persistent forecast errors in inflation

4 A regulatory approach that had a smaller impact from forecast errors in inflation would be preferable, other things equal
   - this could mean forecasting inflation more accurately, or
   - removing the roll of forecasts in influencing outcomes.

Why are such different views being arrived at?

In our view the different views reflect that there are actually two separate issues at play. The first issue is whether IPART is accurately measuring inflation expectations. The second issue is that utilities largely borrow in nominal terms and are therefore subject to large inflation risk. IPART has focused on the first issue, while businesses have focused on the second.

The easiest way to see the differences in views is to explicitly separate out the three different inflation measures as follows:

- 'true' inflation expectations in nominal bond markets
- IPART's estimate of inflation expectations in nominal bond markets
- the actual inflation outcome.

For simplicity, in the example below we use approximate numbers and an approximation of the Fisher equation (real = nominal – inflation).

In table 2.1 we map out how these different rates feed into the outcome for utilities. In our view:

- utilities will end up with over or under-recovery of their return on debt depending on the difference between IPART's expected inflation and actual inflation. This is because they (largely) borrow in nominal terms
- utilities will end up with over or under-recovery of their return on equity depending on the difference between IPART's expected inflation and 'true' expected inflation.

2.1 Pattern of impacts for equity and debt

Item	Debt	Equity
	Per cent	Per cent
Nominal required return	6	8
Nominal borrowing cost	6	Na
IPART estimate of inflation expectation	2	2
'True' inflation expectation	1	1
Actual inflation	0	0
IPART estimate of real required return	4	6
'True' real required return	5	7
Nominal return achieved by utility	4	6
Nominal return required by utility	6	7
Gap in nominal return achieved by utility	-2	-1

Item	Debt	Equity
Reason for gap	Difference between IPART expected inflation and actual inflation	Difference between IPART expected inflation and 'true' expected inflation

Source: The CIE.

We can therefore consider these two issues separately, as (i) accurately measuring inflation expectations and (ii) inflation risk.

Accurately measuring inflation expectations

IPART has coherently argued that it is seeking to measure **inflation expectations** not forecasting **inflation**, in moving from nominal observed data to a real WACC. Because inflation expectations are embedded within the nominal government bond yield data used by IPART, the relevant measure is the expectation of inflation by bond market participants, not the broader market.

In our view, the most obvious measure of the inflation expectation for bond market participants is from the difference between nominal and indexed bonds, which is called the Break-Even Inflation (BEI) method. However, the indexed bond market is not as liquid as nominal bonds and may be subject to other premia, leading to fluctuations that influence the measure of inflation expectations that is derived. We also consider that the indexed bond market is the market that a utility would have to use if it wanted to hedge against inflation risk.

While we think this measure should be given some weight by IPART, it has considered these issues in the past in a number of WACC reviews with much more time and detail than we have. IPART noted in its 2018 WACC review:

> We recognise the in-principle benefits of using the BEI method to calculate inflation. However, on-balance, we have decided to maintain our draft decision to use a geometric average approach as we consider that currently, there is not a sufficient case for change:
>
> 1. While our analysis suggests that liquidity in the inflation-linked bond market not currently an acute concern, we remain concerned that the market may not remain sufficiently liquid throughout the business cycle. Therefore, the accuracy of the BEI method may vary at different points in the economic cycle.
>
> 2. In part, due to data limitations, the BEI method is a slightly more complex, and less replicable, method compared to a geometric average.
>
> We have also maintained our draft decision to reconsider moving to the BEI method at our next WACC review.

The BEI method and IPART's current method do provide increasingly divergent views of inflation expectations. The volatility in inflation expectations measured using the BEI method is supportive of IPART's previous findings. Given this, there is no particular reason for IPART to change to this method without thorough consideration and consultation, given it has reviewed this at length in the past.

The other point to note about measuring inflation expectations is that the uncertainty about future inflation outcomes is not of relevance. It is the accuracy with which IPART

can measure inflation expectations that is at issue, not whether this is an accurate measure of actual inflation.

Inflation risk

The businesses face inflation risk on their debt because they (largely) borrow in nominal terms, while they receive a real return plus actual inflation in their prices and RAB at time of regulatory reset. As discussed above, the risk faced by businesses combines:

- the difference between IPART's expected inflation and true expected inflation
- the difference between true expected inflation and actual inflation.

In sum, this risk is the difference between IPART's expected inflation and actual inflation.

Unlike the inflation expectation issue, this gap is both measurable and exacerbated by the level of uncertainty around inflation.

A critical question is whether this risk should be borne by businesses or not, whether this risk is already included in estimating the allowed rate of return and what tools businesses have to manage this risk. Relevant aspects of this include:

- this is an issue for all businesses, not just regulated businesses. For example, a business such as Transurban would likely face a similar risk, with its revenues linked to inflation, while its debt is nominal. These are the types of businesses used to derive estimates of betas that are comparable to regulated utilities
- a business cannot hedge the inflation risk at IPART's expected inflation rate. This is because the markets where this risk could be hedged have a different inflation expectation. If a business did try to hedge this risk currently using indexed bond markets, it would end up receiving a substantially lower level of inflation in its returns than IPART's expected rate.

Given the substantial uncertainties related to current economic conditions, and the inability to hedge the risk in a meaningful way, it is a reasonable solution to consider an approach that compensates utilities for nominal debt costs.

3 Financeability impacts

IPART's views

IPART's proposed position claims that the recommended approach provides efficient and financeable cashflows. Some of the considerations noted by IPART include:

- the potential to mitigate risks of unfunded debt obligations by incorporating actual inflation into the trailing-average cost of debt;
- operating cost pass-through, drought pricing and demand volatility adjustment mechanisms, which limit downside risk for utilities and are not fully reflected in the target financial ratios
- RBA evidence suggests the market risk premium is lower than in IPART's WACC, and
- other regulators are applying lower WACCs than IPART.

IPART's proposed position appears to result in an FFO-to-debt ratio below the threshold level for multiple utilities. This is unsurprising as this ratio will be lower the lower is the WACC. IPART would have to argue that such an outcome is within its financeability framework.

IPART notes that the main driver of the financeability ratios for utilities, in respect of inflation, is the estimate of inflation expectations that feeds into the WACC. The actual inflation outcome appears to have less of an impact on financeability within the next regulatory period. This is because actual inflation will lead to small changes in revenue and cost estimates, and hence small changes in Funds From Operations. However, these changes are persistent, in the sense that they will impact on prices for long periods. Hence inflation outcomes are of importance for the businesses, even though they will not have a major influence on financeability ratios in the next regulatory period.

Utility views

The utilities have indicated considerable impacts from inflation outcomes.

- CEG has forecast very large impacts on Water NSW financeability ratios from different inflation outcomes.[1] We cannot understand the logic of these outcomes. The paper notes that the impacts are so large because growth in the RAB is lower and therefore, there is less funding available from new debt backed by the growing RAB. This is the case, but we are not sure why this feeds into Funds from Operations.

1 CEG, *WACC, inflation compensation and financeability.*

- Sydney Water's submission presents financeability ratios that are very different to those estimated by IPART.
- Hunter Water submits that IPART's analysis indicates that it fails financeability tests.
- Sydney Desalination Plant submits that IPART has not followed its financeability framework for Sydney Water, Hunter Water and Water NSW.

CIE views

We accept IPART's arguments that financeability over the next regulatory period will primarily be impacted by the estimate of inflation expectations in the WACC, rather than the actual inflation outcome. The large differences in financeability ratios estimated by IPART and utilities will need to be considered and explained by IPART, and we have not been able to review these in any detail within the time available for this review.

IPART should consider the financeability metrics with its proposed decisions and a range of possible actual inflation outcomes, that also account for potential approaches to compensating utilities for nominal debt costs.

4 Potential solutions

In this chapter we discuss potential solutions, including those proposed by utilities. These are divided into the two areas of (i) accurately measuring inflation expectations and (ii) inflation risk.

More accurately measuring inflation expectations

It is not straight forward to determine what is a more accurate measure of inflation expectations, as this is not observable. This is a long-term problem for IPART to deal with and could not be addressed quickly. This would need rethinking of whether there is any role for the Break-Even Inflation (BEI) method, because this is what the utilities can actually access for hedging purposes.

IPART has previously considered these issues in its 2018 WACC review, and, for the current reviews, a clear reason would be needed to change. In our view there is not a clear reason to change without a consultation process. IPART's previous conclusion about whether the inflation indexed bond markets would remain sufficiently liquid throughout the business cycle have probably be borne out in the volatility in this market.

IPART has indicated it will look again at the use of a BEI approach in its next WACC review, and at this stage the issues raised by utilities would again be relevant.

There is also the issue that IPART currently applies the future inflation expectations to both the current market and long-term average WACC estimates. This seems unusual to us as the inflation expectation for the long-term average method is the inflation expectations over that same period, not the inflation expectations today. This has been raised by NSW Treasury as part of IPART's 2018 WACC review and could also be reconsidered in a future WACC review.

We also do not see any possible role for an inflation true up in relation to more accurately measuring inflation expectations. Like IPART, we consider that it would not be possible to true up because the true value is not observable.

Inflation risk

It is possible to insulate the businesses from inflation risk related to their borrowing in nominal terms. Options include:

- making an adjustment to the revenue requirement based on the difference between expected inflation and actual inflation, either:
  - as part of the annual price reset process, or

  - in the next regulatory period
- indexing the RAB by the inflation expectation for debt and by actual inflation for equity, or
- one of the adjustments above combined with indexing prices annually by a weighted average of CPI and the inflation expectation.

In our view, these options are worth considering for the three utilities, for the following reasons:

- utilities cannot hedge against the inflation risk, because the inflation priced into financial markets is different to the inflation expectation measured by IPART
- this would reduce the impact of errors in measuring inflation expectations on the debt component, as well as reducing the impact of differences between true inflation expectations and inflation outcomes
- there is a large amount of uncertainty about inflation outcomes currently
- returns are low, which means that the difference between estimated inflation expectations and actual inflation outcomes will have a more than normal proportional impact on businesses than if returns were higher.

The main argument against such a process is that the betas allowed by IPART may already be reflecting that utilities are bearing inflation risks. To insulate the businesses from this risk, while maintaining the same beta may overcompensate the businesses.

In our view, the arguments are currently stronger for introducing an approach that insulates businesses from inflation risk on the debt side.

As noted above, there are several options for achieving this insulation. The main considerations when choosing between the options are the extent to which cashflows match business costs and the extent to which the approach causes volatility in prices.

IPART has provided us a possible nominal debt true up formula that would attempt to provide the adjustment above. Our preliminary review of this indicates that this would compensate a business for the difference between IPART's expected inflation and actual inflation, for the debt component of the RAB.

- We note that IPART has argued that applying an end of regulatory period true up for inflation applied across debt and equity could substantially impact on the financeability of the businesses in the next regulatory period. It would not impact on financeability within the regulatory period.
- Given this, IPART would have to consider whether a true up only applied to debt would have the same issue.

Indexing the proportion of the RAB associated with debt by the inflation expectation, while retaining indexation by actual inflation for the proportion of the RAB associated with equity, would be a simpler approach resulting in less price volatility. A drawback of this approach is that it wouldn't address cashflow concerns within the 2020 regulatory period, except to the extent that businesses could borrow against the indexation due to be applied at the next determination.

Our preferred option is:

- to index the debt component of the RAB by expected inflation for rolling forward the RAB at the time of the next regulatory review as described above,
- to index prices within the regulatory period by a weighted average of actual CPI and IPART's measure of expected inflation; with the weight for expected inflation based on the share of building block costs related to the return to debt. Indexing prices in this way would more closely align revenue with efficient costs between price determinations, since a proportion of these costs represent debt costs locked in on the basis of expected inflation.

If IPART finds in the future that inflation indexed bond markets can be used to set inflation expectations, then it could revert to letting utilities hedge their inflation risk directly if they choose to do so.