APGA Submission to the AER

Regulatory Treatment of Inflation

29/07/2020

1. Introduction

The Australian Pipelines and Gas Association (APGA) welcomes the opportunity to comment on the Australian Energy Regulator's (AER) May 2020 discussion paper on the Regulatory treatment of inflation.

APGA is the peak body representing Australasia's pipeline infrastructure, with a focus on gas transmission, but also including transportation of other products. Our members include owners, operators, constructors, advisers, engineering companies and suppliers of pipeline products and services. APGA's members build, own and operate the gas transmission infrastructure connecting the disparate gas supply basins and demand centres of Australia, offering a wide range of services to gas producers, retailers and users. The replacement value of Australia's gas transmission infrastructure is estimated to be $50 billion.

A stable, predictable regulatory framework is vital to maintaining the attractiveness of the Australian energy sector as a destination for investment. It is in the context of this recent history that we make this submission in respect of the current process, which we hope can contribute to a future improved investment environment.

APGA agrees that the AER's framework of the roll forward model, post-tax revenue model (PTRM), and annual tariff variation mechanism does intend to deliver an expected real rate of return. However, the approach of using a non-market-based inflation forecast means it is not able to meet the framework's objective.

The AER's forecasting approach does not deliver the real rate of return expected by investors investing in the debt and equity of the relevant network business. This is because it deducts from the nominal return an arbitrary inflation forecast which is not reflected in the nominal return on equity, nominal risk-free rate and the nominal debt yields. In order to deliver the expected real rate of return, the inflation forecast used by the AER should reflect market conditions – which is not the case currently.

This could be improved both by improving the forecast of inflation by giving weight to market-based measures and/or moving to a hybrid return. Such improvements would recognise that network businesses are unable to issue indexed debt – and therefore that the intended incentive effects of targeting the real return on capital does nothing more than impose windfall gains and losses on investors and customers.

APGA's response is underscored by two key points:

1. We recognise that the benchmark efficient entity issues nominal bonds, as these are the only option available to it in the Australian marketplace.

2. We conceptualise the AER's approach to inflation as a particular swap contract imposed on both networks and consumers by the AER. This assists in understanding impacts of the current approach and options available if change occurs.

In respect of the first point, the AER noted in the 2017 Inflation Review that it was targeting a real return on capital to provide appropriate incentives to networks vis-à-vis their debt choices. However, if efficient debt is nominal then it seems that, rather than incentives, the approach merely creates windfall gains and losses for debt and equity holders.

In respect of the second point, the AER's approach to inflation involves subtracting (from the depreciation building block) a dollar-amount equal to its expected inflation multiplied by the RAB, and then returning to networks actual inflation via revenues and the RAB roll-forward. This is done to avoid double counting of inflation in the PTRM and assist in targeting real returns.

This, however, is functionally equivalent to a swap; pay fixed and receive floating from the perspective of networks, and pay floating and receive fixed from the perspective of customers. If this swap achieves the AER's goals, so could another swap; in particular, one with the market rate in the fixed leg.

The difference is one of cost. The market rate is currently 1.08% and the AER's fixed leg is priced at 2.27%. Nobody would voluntarily enter into such an out of the market swap without substantial up-front payment, which we estimate in this instance (using standard Bloomberg tools) at $62 million per billion dollars of RAB. This cost, which presently goes against networks, could just as easily go against customers if market swap rates were above the AER's expectation of inflation. Most importantly, it is not a necessary cost, needed in order for the AER to achieve its goals of avoiding the double-counting of inflation and delivering expected real returns, but is just a consequence of the particular out of the market swap the AER has chosen to impose on networks and customers. The practical effect of this cost is to make prices for customers more volatile than they need to be.

Our conclusions stemming from these two points and our consideration of the evidence, are:

1. The hybrid model delivers a real return on equity with the same characteristics the AER finds desirable for the real return on capital it has targeted in the past. This is preferred where efficient debt is nominal and thus targeting the real return on capital has no incentive benefits.

2. Market-based measures of inflation provide a much better means of estimating expected inflation compensation than the current approach and the swap rate in particular represents a way to achieve the AER's goals at lower long run costs to consumers (via less volatile prices). It also allows consumers to choose between stable nominal or stable real prices, because it can be efficiently hedged by retailers to offer varied products to them. This cannot occur with the present reliance on out of the market swaps.

In the remainder of this submission:

1. In Section 2 we provide an overview of the economics of the different decisions in respect of inflation.

2. In Section 3, we address the estimation issue, examining the evidence afresh, and leading to our preference for more weight to market-based measures, which we think could substantially ameliorate the impacts of the out of the market swap issue noted above. We also address our comments on the Lally and Deloitte reports in this section

3. In Section 4 we turn to the framework issues which lead us to the hybrid model as the preferred approach to deal with a world of nominal debt contracts.

4. In Section 5, we respond to Eric Groom's call to understand more about whether consumers desire stable real or nominal prices; a choice that is forced essentially by the AER's choice of an out of the market swap contract to deal with inflation.

2. Understanding the framework of inflation compensation

A key part of understanding whether the current estimate of expected inflation is the best one to use, or whether there is a need to make changes to the existing framework for the treatment of inflation is understanding precisely how inflation features in the PTRM and roll-forward model. This leads us to the following analytical steps, which underpin our considerations in the remainder of the submission.

1. If the AER is targeting a real return on equity and debt, there are only two possible (economically meaningful) objectives of PTRM inflation used in the context of deriving a real return on equity and/or debt:

   a. Remove the inflation compensation that is embedded in the nominal cost of equity and/or debt pursuant to the estimation process set out in the December 2018 rate of return instrument;

   b. Remove the inflation compensation that is expected to be returned via revenue and RAB roll forward model indexation over the regulatory period.

2. Objective 1.a. is consistent with the cost in question (debt or equity) being funded in real terms. Objective 2.a. is consistent with the cost in question (debt or equity) being funded in nominal terms.

3. Debt and equity are estimated differently in the rate of return instrument; debt is a historical nominal trailing average and equity is built on a prevailing estimate of the risk-free rate. Consequently, nominal debt and equity costs estimated pursuant to the rate of return instrument have different inflation compensation built into them. It follows that, even if 1.a. was the objective, the PTRM would need to remove different inflation compensation from debt and equity. That is, the PTRM would need to index the debt and equity portions of the RAB differently.[1]

4. APGA's view is that equity is efficiently funded in real terms and debt is efficiently funded in nominal terms, and that this presumption is explicit in the rate of return instrument's use of the CAPM (a real model) for equity and the use of a historical trailing average of nominal yields for debt. Consistent with this, APGA considers that the objective of PTRM inflation should be:

   a. Equity: Remove the inflation compensation that is embedded in the nominal risk-free rate estimated consistent with the rate of return instrument;

   b. Debt: Remove the inflation compensation that is expected to be provided via indexation for inflation in revenues and the RAB roll-forward model.

5. In this context, equity is relatively simple and requires only the best estimate of the ten-year expected inflation compensation. In relation to debt, the objective 4.b. can be achieved via one of the following two alternative reforms.

   a. The roll-forward model is amended to always index the debt portion of the RAB by the same inflation rate that is used in the PTRM for the same purpose. We describe this as

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[1] *Indexation of the RAB gives rise to negative depreciation in the PTRM and this is the mechanism by which inflation compensation is removed from revenues*

the "hybrid" model for short-hand. The hybrid ensures that the amount of inflation that is "taken out" in the PTRM is the same as that which is "added back" in the roll-forward model. If this reform is adopted, any value for inflation (within reason) can be removed from nominal debt compensation in the PTRM because it is guaranteed that this same value will be added back in the roll-forward model.

OR

b. The PTRM is amended so that the debt portion of the RAB is indexed by a forecast of the inflation that will be added back in the roll-forward model. This ensures an expectation, rather than certainty, that the amount of inflation that is "taken out" in the PTRM is the same as that which is added back in the roll-forward model. If this reform is adopted instead of the hybrid, APGA believes that there is a strong case that market swap rates are used to inform the best estimate of inflation that will be added back in the roll-forward model. This is because option 5.b. effectively imposes a CPI swap on networks and customers and volatility is lowered by choosing a swap rate which is closest to the market swap rate.

3.   Estimating Expected Inflation Compensation

The estimate of expected inflation compensation plays a key role for equity in the delivery of expected real returns. It also plays a key role in debt if the hybrid model is not adopted. For this reason, networks and customers need confidence that the best measure of the expected inflation compensation will be used

There are two components to this best estimate of the expected inflation compensation: what it represents; and forming the best estimate itself. We discuss the former in Section 3.1, and the latter in Section 3.2, which culminates in our discussion of what we believe to be the best measure. Section 3.3 provides some commentary on the reports by Deloitte and Dr Lally.

The expected inflation compensation

The expected compensation for inflation that is embedded in the nominal risk-free rate (or any other nominal debt instrument) consists of two components:[2]

- Expected inflation (or, more precisely, the actuarially expected inflation); and

- The inflation risk premium (additional compensation – positive or negative – that investors require in order to bear the risk that inflation will be different from expectations).

These items are very difficult to quantify individually (see Section 3.2) as they occur jointly in the risk-free rate, but the RBA and US Federal Reserve both believe that the inflation risk premium has recently turned negative.

Since market measures include both expected inflation and the inflation risk premium, there is no need to separately identify them if these measures are included in order to estimate the expected inflation compensation. However, it is correct that they may be incorrect as measures of expected inflation in isolation. The key issue is whether this is meaningful in respect of what the AER is endeavouring to achieve in respect of inflation within the current framework.

An investor receiving a real return requires compensation for neither expected inflation nor the inflation risk premium, because he or she is bearing no inflation risk. The current regulatory design means that the equity portion of the RAB is unambiguously a real (inflation indexed) asset. It follows that any inflation risk premium embedded in nominal risk-free rates should be removed (in the PTRM, from the depreciation building block; though where it is removed matters less than the final effect of doing so) to arrive at the real return for a network.

It is not economically logical for the PTRM to remove more inflation from the nominal RoE than is actually embedded in the nominal risk-free rate. Failing to also remove any negative inflation risk premium will result in equity investors being compensated 'as if' they benefit from protection against deflation when the regulatory regime explicitly does the opposite (i.e. delivers a real, not a nominal return).

Sapere's report for the AER makes exactly the same point:[3]

a.   The CAPM is a real model and, therefore, the risk-free rate needs to be the expected return on a risk-free real asset.

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[2] See AER, 2017, Regulatory Treatment of Inflation: Discussion Paper, April 2017, p29
[3] See Sapere, 2020, Target Return and Inflation: Input to the AER inflation review, 2020, June 2020, para 81 and appendix I

b. The AER starts with a nominal risk-free rate and subtracts expected inflation as to arrive at a proxy for the real risk-free rate.

c. This will not be accurate if there is any inflation risk premium embedded in the nominal risk-free rate.

d. The correct adjustment to the nominal risk-free rate to derive the real risk-free rate requires the deduction of both:

> i.   expected inflation; and
>
> ii. any the inflation risk premium.

Sapere state:[4]

> *The method of estimating the nominal WACC and the AER's approach to estimating inflation are out of scope for this report and are taken as given.* **However, it should be noted that the SLM-CAPM does not address uncertain inflation, which results in the nominally risk-free asset having a risky real rate of return. The CAPM with uncertain inflation is derived in Appendix I.** *The impact on the estimate of the return on equity compared with an estimate resulting from application of the SLM-CAPM depends on currently unavailable empirical estimates of the covariance between inflation and the return on equity and the covariance between inflation and the returns on the market portfolio.* [Emphasis added]

Appendix I makes (algebraically) clear that the AER's estimate of the real risk-free rate (the nominal risk-free rate less expected inflation) is equal to the true real risk-free rate plus any inflation risk premium built into the nominal risk-free rate.

Equation (1) of Appendix I is the standard Sharpe CAPM formula – with a real risk-free rate and an inflation risk premium (IRP) relative to the real risk-free rate. Equation (2) applies equation (1) to the nominal risk-free rate. We set out Sapere's equation (2) in words below.

Expected real return on nominal   =   Nominal RFR   -   E(infl.)   =   True real RFR   +   IRP RFR

Sapere's equation 2 recognises that the nominal "risk free" rate is not truly riskless because it is exposed to inflation risk. Consequently, its expected real return will be different to the real risk-free rate by an inflation risk premium. The inflation risk premium is simply the beta of the inflation risk multiplied by the true market risk premium.

It follows that, in order to arrive at the true real risk-free rate, the PTRM should remove both expected inflation (E(infl.)) and the inflation risk premium (IRP). That is, rearranging Sapere's equation (2) to solve for the true real RFR gives.

True real RFR   =   Nominal RFR   -   E(infl.)   -   IRP

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[4] *Ibid*

The inflation risk premium that is embedded in the nominal risk-free rate will automatically be embedded in breakeven inflation and also in inflation swap estimates:

- Break even inflation estimates are derived by subtracting yields on inflation indexed CGS from yields on nominal CGS. Any inflation risk premium embedded in the latter will, therefore, also be embedded in breakeven inflation.

- The fixed leg of an inflation swap is also a risk-free nominal asset.[5] This means that any inflation risk premium affecting the nominal RFR will also affect the nominal CPI swap with the same maturity.

Evidence on the expected inflation compensation

Over the past 5 years and in the current environment of low inflation, AER's approach has been systematically overestimating inflation and is not reflective of market conditions. It would have the symmetrical effect of underestimating inflation in a high inflation environment, creating volatility for consumer prices and increasing bankruptcy risk for NSPs. Further, we believe that the estimation error has arisen by various stakeholders being vague about what "expected inflation" actually means and, in particular, what is actually being tested in the various papers in the literature the AER has relied upon to draw conclusions about which approaches are best.

This is an important consideration. If one is seeking to estimate the cause of traffic accidents, for example, all parties can agree on the data that go into the dependent variable, and what this actually represents. For inflation, we do not have this situation. Most of the research papers, generally published by central banks, have broadly the following methodology:

a) Adopt a survey of inflation expectations as either the 'true' measure of inflation expectations or as a critical determinant of the ultimately modelled expected inflation;

b) Compare this survey-based measure of expected inflation to market measures of expected inflation (bond break-even inflation and swap inflation);

c) Attempt to explain the time varying difference between a) and b) in terms of other factors. Generally, these other factors are either: i) a time varying inflation risk premium built into nominal rates (nominal risk-free rates or the nominal fixed rate on a CPI swap); or ii) a time varying liquidity premium built into inflation indexed bonds yields.

Of course, the results of this methodological approach are only as good as the survey estimates of expected inflation. If these are not an accurate estimate of true expected inflation then the estimates of inflation risk premium and/or liquidity premium will themselves be inaccurate. The fact that survey estimates are frequently not particularly good was a key factor in their being given little weight in the 2017 inflation review or the 2018 rate of return instrument.

By way of example, one could perform research that assumes that long term inflation expectations in Australia are always 2.5%. That research would find that market-based measures of expected inflation have been downward biased by around 50bp to 100bp over the last 5 years.

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[5] *Inflation swaps, like interest rate swaps, have extremely low default risk because the present value of the fixed leg matches the present value of the floating leg when the contract is struck (by definition). After that time one leg may become more valuable than the other. Given that the prices we observe for swaps are at the time contracts are struck it is appropriate to consider these to be risk free. Moreover, use of central clearing counterparties minimise risks associated with any subsequent deviation between the value of the fixed and floating legs.*

The researcher may go further, and decompose the 50 to 100bp "bias" into various factors.

However, the conclusion can only ever be as robust as the initial estimate of 2.5% expected inflation. The researcher has found a systematic difference between the assumed 2.5% inflation expectation and the market measures of inflation expectations. It may be that the 2.5% is correct and that, if so, analysis of the difference to market measures may be of interest. However, if the 2.5% does not reflect true market expectations the analysis of the residual to market expectations is largely meaningless.

Appendix A summarises all of the papers cited by the AER in 2017, plus the newer Lally paper and papers which Deloitte has cited, along with work presented by the networks from CEG. The analysis in Appendix A summarises for each paper:

- What the proxy for expected inflation used by the researcher(s) in question is; and

- How the estimate, if any, of the inflation risk and/or liquidity risk premium in market measures has been estimated.

In respect of the proxy for expected inflation, there are three alternatives found:

- A survey of forecasters or a model developed by the author of the paper that uses a survey of forecasters as a critical input.

- Actual inflation.

- No direct measure of expected inflation (rather, movements in the market measure of expected inflation is decomposed into changes in inflation expectations or risk premia).

The vast majority of the studies fall into the first category. They use as a proxy for expected inflation some survey, or a model developed by the author of the paper that uses survey inflation as an input. This is crucial. If a paper is testing the bond break-even approach against "expected inflation", but uses surveys as the proxy for expected inflation and reports a finding of bias, the only thing that this means is that the author of the paper has found a systematic difference between the expectations of inflation embedded in the market measure and the expectations formed by the respondents of the survey. This is a core issue which appears unappreciated by either the AER or its consultants (see our discussion of the Deloitte report below). You cannot reliably quantify an effect if the thing which you put forward as the dependent variable is something which is unobserved.

APGA considers that, absent a reason to believe the survey respondents are the most accurate measure of investor expectations, this class of papers is the least reliable.

There are only 3 examples of the use of actual inflation in Appendix A,[6] including that by Lally in his most recent report for the AER, and we discuss these studies in responding to that report, as the same basic issue obtains.

The third type of study is a special case, which we discuss in the box below, because it is not proxying expected inflation per se.

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[6] *Ang, Bekaert and Wei (2008), Lally (2020) and CEG (2019)*

Box 1:　　　　Decomposing market measures

> The studies that do not rely on surveys or actual inflation as a proxy for expected inflation are an important class of the literature. There are 9 such studies included in Appendix A.[7] These studies commonly use dynamic factor models that attempt to summarise the information contained in a large number of economic variables into a small number of factors common to the set of variables. Such models can be used in data rich environments associated with financial markets. By way of illustration, Abrahams, et. al. (2016) use time series data for both nominal and inflation indexed bond yields along with a large number of pricing factors, including observable measures of liquidity. They use this large number of factors to jointly explain the time series and cross-section of nominal and real yields with a good degree of fit. They find that the inflation risk premium in nominal yields has been between -50 and +50bppa and that the liquidity premium in inflation indexed yields has been less than 50bppa since 2010.
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> Of this class of study, the inflation risk premium has been found to typically be negative since 2010 (while positive before then). Similarly, the illiquidity premium has found to be not significant.

In respect of how the distortions in market measures such as liquidity premia are quantified, almost every study finds these by decomposing the error vector. What this means in practice is that the study concerned has found a patter in the error vector, and given it the name "liquidity bias". The fact that this name has been given does not mean that liquidity bias has been quantified, but only that a particular pattern in the dependent variable (which could come from any source not in the set of independent variables being tested) has been found which the model can't explain. Again, this is not to say that liquidity bias is imaginary, but just that its scale is not revealed by decomposing the error vector in a regression alone.

In summary, the evidence that market measures of inflation expectations are inaccurate measures of true expected inflation boils down to:

- Differences between market measures of expected inflation and surveys.

- Names given to patterns found in the error vectors of models.

The former is particularly important. Surveys were last ranked by the AER in the 2017 inflation review, and were again viewed as highly questionable by the AER in assessing the return on equity. However, since surveys form the proxy for expected inflation in almost all of the studies actually relied upon by the AER, they were in fact entirely determinative in the AER's eventual choice of a proxy for expected inflation. We believe that, where surveys give different results to the market, the market is far more likely to be providing the right answer. We note that this is the same conclusion the AER itself drew in the rate of return review in 2018.

Box 2:　　　　Treating the views of survey respondents consistently

> In the 2018 rate of return instrument process, the networks put forward evidence associated with the forecasts of stock market analysts as a proxy for expected equity returns in the marketplace. This was rejected by the AER on the grounds that the forecasts of said analysts were biased.[8]
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> However, in the inflation review of 2017, as noted in the main text, the views of survey respondents were determinative in the rejection of market-based evidence on expected inflation. In Australia, the relevant survey is that produced by Consensus Economics.
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> The table below shows the institutions responding to the Consensus Economics survey, and the institutions providing analyst forecasts for stock returns. Institutions that are in both groups are highlighted.

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[7] *Coroneo (2016), Chen, Engstrom and Grishchenko (2016), Camba-Mendez and Werner (2017), Abrahams, Adrian, Crump, Moench and Yu (2016), Andreasen, Christensen and Riddell (2018), Christensen and Gillan (2019) Campbell, Shiller and Viceira (2009) Devlin and Patwardhan (2012) and Coeuré (2019)*

[8] *See AER 2018, Rate of Return Instrument: Explanatory Statement, December 2018, pp217-18 which discusses both the network submission and the AER's response.*

Consensus Economics Survey respondents in Australia[9]	Analysts providing forecasts
HSBC Australia	Argonaut Securities Pty Ltd
Economist Intelligence Unit	Argus Research Corp
Merrill Lynch Australia	Barclays
Barclays	Bell Potter
Euromonitor International	Berenberg
Citigroup	Bernstein
Commonwealth Bank	Blue Ocean Equities
Melbourne Institute	BMO Capital Markets
Deloitte Access Economics	Canaccord Genuity
HIS Markit	CCZ Statton Equities
QIC	CIBC Capital Markets
JP Morgan Chase	CIMB
UBS	Clarksons Platou Securities Inc
Westpac Banking Group	Cormark Securities Inc.
Morgan Stanley	Craigs Investment Partners Ltd
BIS Oxford Economics	Credit Suisse
AMP Capital	Deutsche Bank
National Australia Bank	Edison Investment Research
Capital Economics	+46 others

The lists are not identical, but there does appear to be a fair degree of overlap. This is concerning. It would be somewhat inconsistent if, going into the 2022 rate of return instrument process, forecasts from a given institution about the return on equity were given zero weight on account of bias, but when that same institution provides a forecast of inflation, that (along with the rest of the survey) is entirely determinative in rejecting market data that the AER would more normally turn to estimate parameters of interest.

3.1 Preferred measures of expected inflation compensation

We now turn to our preferred measure of the expected inflation compensation, which takes into consideration the principled view of what it needs to include, and the assessment of the evidence in the literature. Together, the evidence suggests to us that market-based measures ought to play a far larger role, even if the RBA forecasts remain in use for short-term forecasts. Of the two market-based measures, the swap rate seems particularly apt not necessarily because of any improvement in predictive performance per-se, but rather because it matches most closely what the AER already does. In fact, it produces exactly the same result as the AER is seeking, with less volatility for networks and customers.

The approach the AER takes is to subtract (via the depreciation building block) a fixed forecast of inflation, and then to pay back (via adjustments in revenue and in the roll-forward model) actual inflation. This is exactly the same as a (five-year) pay-fixed, receive-floating rate CPI swap. The AER's approach to inflation creates a swap contract between networks and consumers whereby networks pay fixed and receive floating, and customers receive fixed (in the reduction in price at the outset that comes from subtracting inflation from depreciation) and then pay floating.

The difference between the swap the AER forces upon networks and customers by virtue of the way inflation is treated and a plain or vanilla pay-fixed, receive-floating swap is the rate on the fixed leg. In the most recent set of decisions, the AER imposed a swap with a fixed leg of 2.27%. By contrast, the fixed leg of a swap in the marketplace at the moment for a five year pay-fixed, receive-floating swap is 1.08%.

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[9] This is from a sample Consensus Economics forecast from 2019. Note that Consensus Economics do not name the people in each institution responding to their survey.

Recognising the AER's approach to inflation as a swap is useful. It allows one to value the AER's approach, and to understand the scale of the distortion when the fixed leg of the AER's swap is different from the fixed leg of the same swap available in the marketplace. Apart from any establishment or arranging, a pay fixed receive floating swap at the market rate is basically free; the fixed leg represents the best guess of the parties concerned about future rates (here future inflation rates), which means that no money changes hands when the swap is entered into. Only in the future if actual inflation is different to the fixed rate agreed does money change hands.

When the fixed leg is not the same as the rate available in the market, it can still be transacted, but if the pay fixed leg is higher than the market rate, the party paying the fixed leg will require compensation up-front to compensate for this.[10] A Bloomberg terminal allows one to price an "out of the market" swap, and we have done so for a swap with a notional principal of $1 billion and a fixed leg of 2.27%.[11] The cost is $62 million over 5 years

Note that this is a cost due entirely to the particular choice of expected inflation the AER has made; the AER could implement exactly what it wants to do in a framework sense (that is, providing a real return to capital) whilst imposing zero cost, by using a different swap; one with the market rate in the fixed leg. Thus, the AER is creating a risk by imposing on the energy sector, a series of out of the money swaps. Since the implicit swap contract is between customers and networks, this risk is imposed upon both parties, by the AER.

At the moment, the swap "goes against" the network, because the market rate is lower than the rate the AER prefers, and networks are not able to ask for compensation for being required to enter into a pay fixed receive floating swap contract where the pay-fixed leg is well above the market swap rate. This means that consumer prices are lower than they otherwise would be if the swap were voluntary, which may appear advantageous to consumers. However, if the swap rate was above the AER's fixed leg rate, then the situation would be reversed, and consumers would be paying more than they need to; again, without the possibility of recompense. Note that, in both of these cases, the effects are permanent; there is no "wash-up" later on in the RAB indexation which reverses the impacts of the out of the money swap on either consumers or networks, they simply lose out from the out of the market swap rate imposed by the AER.[12] This is the nature of the bargain which the AER is forcing upon both networks and customers with its choice of expected inflation, when it deliberately deviates from the market rate for a swap.

The net effect of the AER choosing an out of the money swap is prices that are more volatile than they need to be. We therefore think that the AER should give most weight to the swap rate which represents an in the money rate in order to make prices more stable for consumers.

As a final point, if the AER adopted the hybrid method, which we discuss further in Section 3, then the CPI swap analogy would disappear. Under the hybrid there are two fixed legs (rather than a

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[10] In the AER version of the swap, neither networks nor customers are able to demand compensation for entering into an out of the market swap; either networks suffer a loss when market rates are below the fixed leg the AER wishes to impose, or customers suffer a loss if it is higher. It is worthwhile testing with customers whether they are firstly aware of this bargain, and secondly, whether they would choose it absent of the actions of the AER.

[11] We will happily provide the AER with detailed instructions and the relevant Bloomberg screen shots. We have not done so here in order to avoid any confidentiality issues with Bloomberg.

[12] Obviously, if the situation changed from 2.27% being too low to 2.27% being too high then networks would first suffer a permanent loss and then get a permanent gain (and conversely for customers) and in that sense would recover their losses, but the fact that this might occur hardly seems like a good reason to create the losses in the first place.

fixed and floating leg). Under the hybrid, the both the PTRM and the RFM have the same fixed leg (i.e., what is paid in the PTRM is received in the RFM).

Consideration of the Deloitte and Lally reports

Both the Deloitte and Lally reports focus on the way in which the AER derives estimates of expected inflation. We cover both of them here.

3.1.1.   The Deloitte report

The Deloitte report is flawed and we see little benefit from it continuing to play a role on this process as its flaws are likely to confuse and mislead stakeholders.

The central flaw is the apparently unrecognised contradiction which sits at the heart of the whole paper. On page 15, Deloitte notes:

> *Expected inflation cannot be directly observed from the data. As such, various approaches (discussed in Section 2 of this report) are required in order to estimate expected inflation.*
>
> *Forecasts of inflation are developed using macroeconomic models of the Australian economy that combine model-based projections, other information and professional judgement. Macroeconomic modelling is a constantly improving discipline, but the results of forecast models may differ from inflation expectations in the economy. This may occur due to variation in the views of professional forecasters and wider market participants as well as when forecasts were finalised.*

Despite acknowledging this (and we agree with the observation), Deloitte then proceeds in the remainder of the paper to act as though expected inflation is not only observable but can form a robust basis of comparison for various measures which purport to reflect it.[13]

We appreciate that the AER has a criterion which looks at "congruence with inflation expectations". However, if the Deloitte report was intended to be an independent assessment, it should have followed up on the quotation above and asked the obvious question as to whether that criterion was in fact valid. We cannot see why this is not part of this independent report.

Apart from this fundamental flaw, there are several other flaws which further highlight the irrelevance of the findings to the task at hand. We list these in Appendix B.

3.1.2.   The Lally report

Lally's report covers much of the same ground as the Deloitte report and indeed it is difficult to see where the Deloitte report adds value above and beyond the Lally report. In relation to the first few pages where he discusses his views about the need for the tenor of rates to match the regulatory cycle, we note that he reaches the same conclusion that inflation in the PTRM to both debt and equity should be 5 years. However, Lally's formulaic proof implicitly assumes that the discount rate

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[13] *By way of an example, on page 24, Deloitte suggests that "this analysis confirms that inflation expectations largely converge to the mid-point of the RBA's target range by the third year of the forecast period", but how can it make this confirmation if expected inflation is unobserved. From context, we can guess that what Deloitte means is that Consensus Economics forecasts, which may be a proxy for expected inflation, converge over the course of three years, but this is very different to being able to confirm that inflation expectations do the same thing.*

used is nominal. APGA agrees with Lally's conclusions as they apply to debt (which is a nominal cost) but not equity (which APGA considers is a real cost and therefore Lally's proof does not apply). We do not discuss the component towards the end where he responds to comments made by the QTC, the ENA, SAPN and others, but rather leave the relevant parties to make their own response.

The rest of Lally's paper is an assessment of the various methods. It is clear that Lally believes that the inflation risk premium and liquidity premium are the key concerns associated with the bond break-even and swaps approaches, though it is not clear he adds much here compared to what was available in 2017 (apart from shortening the "laundry list" of problems associated with the bond break even approach which came out of the AER's 2017 report, by suggesting that most of them are likely to be fairly small). This critical view is helpful, as it assists in removing distraction from irrelevant issues. However, Lally does not deal with the central issues identified above: a) the fact that the inflation risk premium should be included (not excluded) from PTRM inflation; and b) the plethora of proxies associated with expected inflation in the literature discussed above.

Lally also seeks to update the various studies which have looked at the performance of different proxies for expected inflation. We have some concerns about the timeframes he uses; his last forecast is made in 2009, which is well before all of the issues associated with the various measures which have emerged more recently.[14] However, the main issue is his proxy for expected returns; all of his tests are tests of predictive success, where he tests against actual out-turn inflation. This is the same as the work by CEG in Appendix A.

Whilst we believe that actual values can be useful in understanding expectations, the AER has consistently made a distinction between actual and expected returns in respect of equity, and has rejected the role of actual returns in explaining expectations. Since the task here is essentially the same, except that we are dealing with actual and expected inflation, rather than actual and expected return to equity holders, we would expect that the AER would adopt a similar approach to evidence based on actual data. It is thus not clear to us how this evidence from Lally, even if it did not have the timeliness flaws alluded to above, could be useful in the AER's considerations.

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[14] *We are unsure why he would conclude that four years of poor performance by the RBA method is not relevant because the method is still sound (p29); how many poor predictions are needed before methodological issues are diagnosed? We are also unclear how any strong conclusions could be drawn from the prediction success of the handful of extreme cases for the BBIR and swap rate (p28); this appears more like anecdote than analysis to us.*

4. Structural Solutions and the Hybrid Approach

We now turn to consideration of structural issues, and whether or not the AER should use a hybrid approach. The basic issue is whether the AER should target a real return on capital or real return on equity. If it intends to target the former, then we agree with Sapere that the current approach does so (it is just the wrong real rate of return, as the previous chapter outlines). However, if it intends to target a real return on equity, our analysis shows that it is in fact the hybrid approach that does exactly that.

Before addressing this core question, we turn to what the hybrid model actually is, and how it works. This is important because it appears to us that it might not be fully understood; it appears, for example, that Sapere may have misunderstood what the networks propose (which is perhaps inevitable given that their report was commissioned prior to any submissions made by networks).

We close this section with an assessment of the Sapere report.

The hybrid model

To begin, we discuss the hybrid approach and how it works. This is most usefully considered by considering its differences from the current regime. The current regime is laid out diagrammatically in Figure 1.

Figure 1:   Schematic of current treatment of inflation
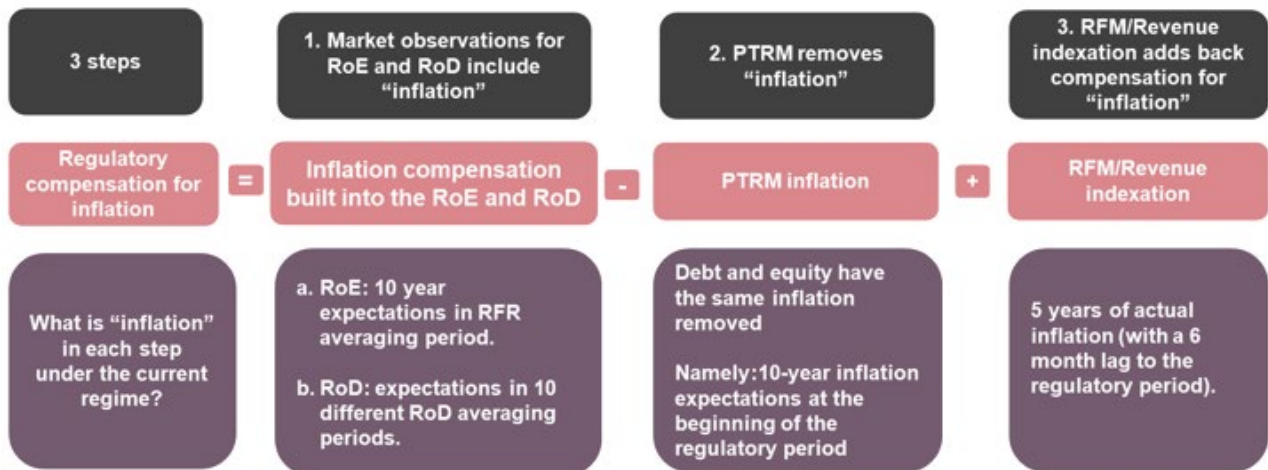
If one is to change the way in which inflation is treated in the model there are two things which can be done:

- The PTRM can seek to remove the inflation compensation that is embedded in the cost of debt or the cost of equity at Stage 1.

- The PTRM can seek to remove the inflation compensation that is expected to put back in at Stage 3.

The former is appropriate if the funding has been incurred in real terms, and we propose that this should occur for equity, just as it does now. However, for debt, the inflation that is embedded in current nominal debt contracts is an average of inflation which tracks back ten years, and it changes

through the relevant regulatory period. Removing it is likely to be complex. Given debt is a nominal contract, the more reasonable approach is for PTRM to attempt to remove the inflation compensation that is expected to be provided in the future. This means that, if inflation turn out precisely as the AER estimates it is expected to, the nominal compensation received will equal the nominal return on debt estimated pursuant to the rate of return instrument.

It is worthwhile pointing out that the current AER approach, applied to debt, achieves neither of the two possible objectives outlined above. In particular, since it takes out a ten-year inflation estimate of inflation formed just before the start of the AA period, this is not what is embedded in the debt allowance (which is a trailing average over 10 years (14 years by the end of the AA period)). Nor is 10 year expected inflation at the beginning of the AA period what is returned by the end of the AA period. This means that it is essentially unhedgeable in the market.[15]

With this in mind, we consider what the hybrid model proposes; the key difference lies in what is added back in terms of revenue indexation within the RAB roll-forward; for debt, rather than being actual inflation, the PTRM forecast of inflation is added back, meaning that:

- If inflation used to index the debt portion of the RAB in the PTRM is X% in any given year.

- Indexation of revenue continues to index non-debt building blocks at CPI but the contribution of debt costs to revenues is indexed at X%.

- Indexation of the debt portion of the RAB in the same year is also made at X%.

This is shown in Figure 2.

Figure 2:   *Schematic of proposed treatment of inflation*
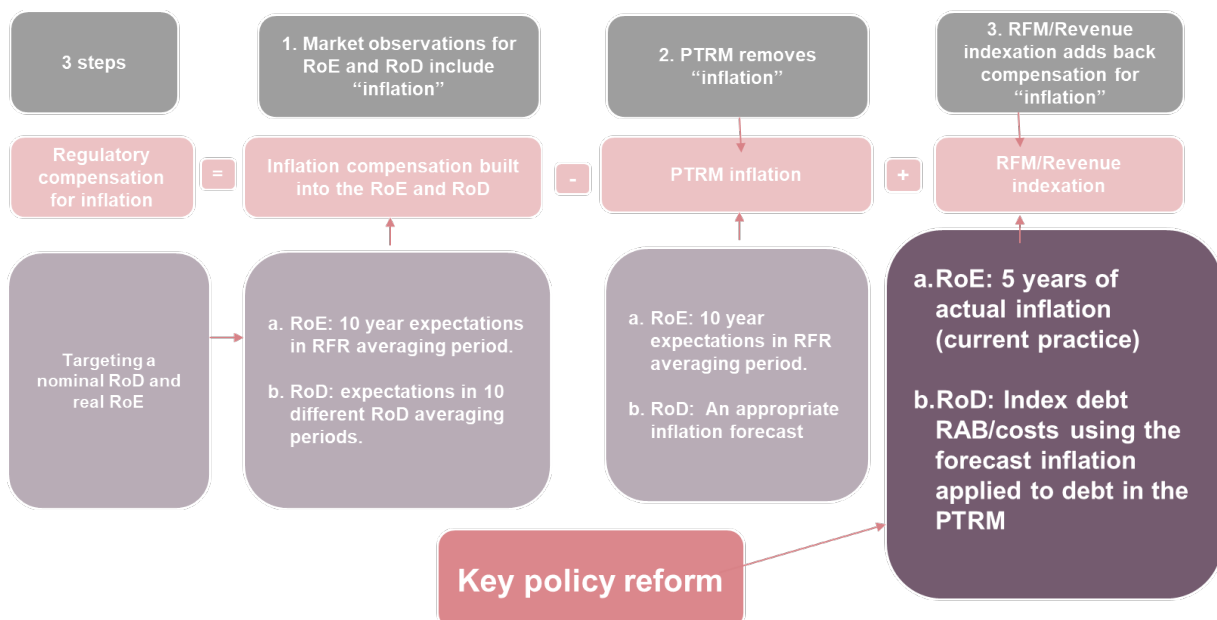
We note that the vast majority of the impact (in terms of targeting) nominal returns on debt comes from the change to the roll-forward model (as opposed to revenue indexation). This is because the

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[15] *As discussed in the previous section, one can usually obtain an off-market swap, for a premium, with a fixed leg different to the inflation expectation at the start of a regulatory period. However, this will be costly, particularly if, as at present, the inflation embedded in historical debt is higher than current inflation expectations.*

debt portion of the RAB is simply much larger than the annual real debt interest costs in revenues. This is an issue which must be explored further as the review progresses.

Note that, under the hybrid approach, PTRM inflation applied to debt costs could be different to what one believes is the best estimate of expected inflation. Even if this was the case, NSPs and customers would still expect to be paid/pay the efficient nominal cost of debt. The level of the PTRM inflation applied to the cost of debt only determines how much of this compensation is paid during the next regulatory period versus in future regulatory periods.

In particular, the PTRM inflation applied to debt costs could be zero. That is, zero inflation could be removed from debt costs compensated by the PTRM. The flipside of this would be that zero indexation is applied to the debt portion of the RAB in the roll-forward model (and zero indexation is applied to that portion of revenues that are debt costs).

The choice of the PTRM inflation applied to debt costs reflects here essentially the speed of money. If it is set at zero, then the network gets its efficient debt cost returned in period with no deferral. If it is set above the value of inflation actually expected over the regulatory period, then the speed of money is slowed down (in real terms) and the customers/networks essentially have to fund a growing real RAB as a result of the PTRM inflation being above expected inflation.

Targeting a real return on equity or capital

We now turn to the question of whether the AER ought to target a real return on capital, or a real return on equity. In so doing, we note firstly that the current approach does in fact provide a stable real return on capital, as Sapere suggest (p17). However, it also means, as Sapere also point out, that equity, not debt, bears the consequences of actual inflation differing from predicted (ibid). This means that, if actual inflation is lower (higher) than expected, then equity suffers a lower (enjoys a higher) real return, and this return is transferred to (from) debt holders, who correspondingly enjoy (suffer from) a higher (lower) real rate of return compared to expectations. In situations where nominal interest rates are low, as at present, this has the perverse effect of equity needing to borrow or restrict dividends in order to provide debt with a higher real return than it expected (Sapere p. iv).

The AER appears to believe this is a reasonable outcome, and supported its position thus in 2017:[16]

> *Several submissions from service providers (prior to the preliminary position) characterised this as either an error or an unintended side effect of the decision to target the initial real rate of return. These stakeholders submitted that the most important outcome was the delivery of the initial real return on equity, and so proposed that we change the inflation objective accordingly. If the benchmark firm issued nominal debt, this would entail a hybrid inflation target: targeting the real return on equity (on the equity portion of the asset base) combined with targeting the nominal return on debt (on the debt portion of the asset base).*

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[16] *AER, 2017, Regulatory Treatment of Inflation: Final position paper, December 2017, p88-9. We note that, at the time, the AER may not have foreseen the consequences which Sapere has described as it was not clear then what would happen to future interest rates. However, the fact that it has happened suggests that the 2022 rate of return instrument may require more flexibility than in 2018.*

We consider that this effect was not an error or side effect; rather, it was well understood prior to the adoption of the current approach more than fifteen years ago. It reflects a deliberate policy decision on the appropriate level to assess returns for the benchmark entity—that is, at the service provider level (not the equity investor level). Targeting the overall rate of return means that financing decisions remain the concern of the service provider, who bears the benefit or detriment of all such decisions (on the appropriate gearing level, whether to issue fixed or floating debt, whether to issue domestically or overseas, and so on). It appropriately assigns any risk arising from these financing decisions to the service provider, rather than consumers. If debt is issued in nominal terms, it is not possible to target both the real return on capital and the real return on equity.

Although this financing risk is assigned to the service provider, and so inflation can alter returns to equity holders, this does not change the allocation of overall inflation risk. Consumers still bear this inflation risk, as the charges they pay move in line with inflation outcomes, and so insulate the business from changes in actual inflation. When inflation causes the real return to equity holders to drop below the initial target, the real return to debt holders rises above the initial target—this is a consequence of the decision to issue nominal debt.

The key part of the quotation is the last sentence. Implicit in the AER's stance is a view that both:

- The networks can in fact choose between real and nominal debt; and

- The AER's current models and methods deliver compensation commensurate with this.

APGA considers that neither of these views are correct.

Dealing with the second point first, the AER's models and methods actually do is start with a trailing average of nominal debt costs over 10 historical years then deducts a 10-year estimate of expected future inflation at the beginning of the AA period. This does not bear any relation to the real debt costs that an NSP would incur if they funded themselves using inflation indexed debt. To achieve this objective the AER would have to remove a 10-year trailing average of expected inflation. [17]

Turning to the first point, it is not clear that networks can fund themselves with real debt (at least not efficiently so). This is highlighted in Table 1, which shows all of the indexed corporate debt currently issued in Australia by Australian companies. The total, of slightly over $5 billion, is, by way of a comparison, somewhat less than the nominal debt associated with the RABs of AGIG's three regulated businesses.

Table 1: Issuances of indexed corporate debt in Australia by Australian firms

Issuer	Ticker	Bonds Outstanding	Aggregate Outstanding (A$m)
AGL Loy Yang Projects Pty Ltd	LOYAU	1	350,000,000
Airtrain Citylink Ltd	AIRTAU	2	120,000,000
ALE Finance Co Pty Ltd	ALEFC	1	111,900,000
Ancora OAHS Pty Ltd	ANCORA	1	171,050,000
Ancora RCH2 Pty Ltd	ANCORA	1	125,000,000
Australian Gas Networks Ltd	ENVAU	1	203,000,000

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[17] *And the AER would need to add a liquidity premium to reflect the difference in real yields between nominal and inflation indexed corporate debt.*

Australian National University	ANU	1	115,000,000
Axiom Education Pty Ltd	AXIOM	2	92,500,000
Bank of America Corp	BAC	1	45,000,000
Civic Nexus Finance Pty Ltd	CIVIC	1	135,000,000
Commonwealth Bank of Australia	CBAAU	1	150,000,000
Cooperative Rabobank UA/Australia	RABOBK	1	436,400,000
India Pty Ltd	INDPTY	1	14,600,000
JEM CCV Pty Ltd	JEMAU	1	136,000,000
JEM NSW Schools II Pty Ltd	JEMNSW	2	114,190,000
JEM Southbank Pty Ltd	SBTAU	1	95,000,000
JEM Warehouse Bonds Pty Ltd	JEMWHB	1	129,973,614
MPC Funding Ltd	MPCF	4	479,000,000
Novacare Solutions Pty Ltd	NOVAC	1	85,850,000
Plenary Health Casey Finance Pty Ltd	PHF	1	87,000,000
Plenary Justice SA Pty Ltd	PLENA	1	37,650,000
Plenary Living Leap Finance Pty Ltd	PLENA	1	237,019,000
Port Augusta Hospital Pty Ltd	PORTAG	1	21,000,000
Praeco Pty Ltd	PRAEAU	1	52,000,000
Rembrandt Australia Trust	RAT	3	76,080,000
RWH Finance Pty Ltd	RWHP	1	145,000,000
Steel River Trust	SRT	1	31,300,000
Sydney Airport Finance Co Pty Ltd	SYDAU	2	835,000,000
Sydney Harbour Tunnel Co Ltd	SYDHAR	5	320,000,000
University of Wollongong/The	UOW	2	62,500,000
Western Liberty Group Finance Pty Ltd	WESL	1	110,000,000
Wyuna Water Pty Ltd	WYUNA	2	16,170,000
Grand Total		**47**	**5,140,182,614**

For the reasons set out above, the claimed incentive effects alluded to by Sapere are illusory. The simple conclusion to be drawn from the evidence in Table 1 is that Australian energy networks do not in fact have a choice of issuing indexed and nominal debt.

Even if PTRM inflation is unbiased, all the current regime does is create windfall gains and losses for customers and NSPs (depending on whether actual inflation turns out to be higher/lower than PTRM inflation applied to debt costs). It is not providing an incentive for anyone to make efficient choices in respect of financing. This provides further motivation for adopting the hybrid method, as it recognizes that debt is a nominal contract, and puts the focus on what equity holders can exercise incentives around, the real cost of equity.

4.1.1.   Impacts on consumers of a change to the hybrid

Even if the current approach makes no difference to efficient incentives and merely creates windfall gains and losses; if changing the status quo were very costly for consumers, then a case could be made to retain it. Certainly, these costs would need to be considered.[18]

If the AER's current forecast of inflation turned out to be exactly correct, then, of course, the hybrid model proposed above would make no difference to consumer prices now or in the future. If, however, inflation is lower (higher) than forecast, then consumer prices through time will be higher (lower) than they are at present. This is a simple out-working of the removal of volatility which comes from the use of the hybrid approach.

Modelling of the revenue outcomes over 2,000 years using the AER simulator, adjusted to include a hybrid model as proposed by APGA, shows that revenues will be trivially different on average and, if anything, less volatile under the hybrid.[19]

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[18] We note that considering these costs to consumers means recognition of their existence. Thus, if the AER determines not to pass them on to consumers, it needs a good reason for networks to bear them.
[19] Detail on this modelling is provided in the ENA submission.

The hybrid and the base case deliver essentially the same average revenue and the same variance in revenues. Across the 2,000 modelled years, the average revenues for the base case was $374.9m while the average revenue for the hybrid was $374.2m (i.e., the hybrid revenues were 0.002% lower on average). The hybrid had slightly lower variance than the base case (2.6% lower). Key statistics are summarised in Table 2 below.

Table 2: Comparison of revenue levels and volatility

	Hybrid	Current	Difference as a %
Average revenues	374	375	-0.2%
Variance	8,243	8,465	-2.6%
SD	91	92	-1.3%

Consideration of the Sapere report

We comment on three parts of the Sapere report:

- The stability of real returns.

- The findings in respect of the two hybrid models he tests.

- Sapere's concerns in relation inconsistencies in the AER's approach.

4.1.2.   Real returns and stability

Paragraph 113 of the Sapere report states:

> *Hence, these stakeholders are concerned that the AER is targeting too low a rate of return on equity, and that the adverse impacts from the low target rate will be compounded should outturn inflation exceed the AER expected inflation.*

The last sentence appears to contain a typographical error; networks are more concerned with *AER expected inflation* exceeding *outturn inflation.*

This is because the 'regulatory depreciation' in the PTRM will subtract a high figure for inflation on the opening RAB each year based on the relatively high AER inflation expectation. The roll-forward model will then compensate for inflation by adding in a relatively low (lagged) outturn inflation on the opening RAB each year.

Indexation in the annual tariff variation mechanism using actual lagged inflation does not resolve this because it is limited to indexing revenue streams but it does not compensate for the difference between the forecast and outturn inflation on RAB.

This results in low cash flows in period, due to depressed regulatory depreciation embedded in revenue, together with a low closing RAB in the roll-forward model (used to set the opening RAB in the next PTRM (i.e. the residual value of investment)). The resulting real IRR on free cash flow to the network is fairly stable at the real WACC, as demonstrated by Sapere (putting aside inflation gains and losses on non-capital building blocks).

The resulting real IRR on free cash flow to equity is not stable at the real return on equity when the actual debt cash flows are taken into account. The actual debt cash flows must be based on the roll-forward model RAB each year, not the forecast PTRM RAB. This is because the roll-forward

model more closely resembles the asset that payments will be made on and that will be funded by any new borrowing on account of using actual (albeit lagged) inflation.

Sapere appears to indirectly recognise this point in its reference to negative NPAT in paragraph 124. This is one of the key concerns of networks because, as outlined above, we rarely have the option of accessing indexed debt.

4.1.3.   The hybrid model findings

Sapere finds little support for the two hybrid models they test adding much by way of value to the treatment of inflation. However, neither of these models are models we have proposed.

Sapere's first hybrid model treats debt as an opex expense. We have not proposed this. In fact, networks would prefer the treatment of debt to remain unchanged.

The second hybrid approach treats expected inflation on the debt proportion of the opening RAB each year as an expense; and expected inflation on equity as a revaluation (inflationary) gain.

This effectively increases the sum of the nominal return on and of capital under the current arrangement by forecast inflation on the opening debt proportion of the RAB in each year.

Theoretically, this is equivalent to revenue including a nominal return of capital and regulatory depreciation that subtracts inflation on only the equity proportion of the opening RAB in each year, instead of the entire opening RAB each year.

The report then proposes making a corresponding decrease in the revaluation increment to the RAB. There are no specific details on how this decrease is implemented, but presumably it is a direct corresponding reduction to the inflation component of the roll-forward RAB. That is, the RAB is inflated at lagged realised inflation and then this amount is directly applied to the RAB with all other adjustments remaining the same.

This appears to be the opposite of the hybrid we have discussed above which makes no adjustment in period, and thus has no immediate impact on consumer prices, but rather makes its adjustments to the roll-forward model. We look forward to engaging with Sapere in respect of the hybrid model as proposed by networks, which it does not appear the AER has shared.

4.1.4.   Inconsistencies in the AER's approach.

Although Sapere were instructed not to comment on the specific merits of the AER's estimates of the nominal required return or expected inflation,[20] it notes an apparent "underlying inconsistency." The nature of this inconsistency is that the AER's estimate of expected inflation appears to be too high, relative to the AER's allowed nominal return on equity. Sapere conclude:[21]

> …*we note that the* ***sustained fall in inflation expectations*** *mean that the parameter estimates determined recently by the AER imply a negative cashflow return on equity for a benchmark efficient entity. An assumption that the benchmark efficient entity would fund dividends (and growth) from depreciation cashflows—that is, spending less on replacement of real capital—*****would not be consistent with the efficient investment and efficient operation of an NSP,*** *at*

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[20] *Sapere report, paragraph 81*
[21] *Sapere report, paragraphs 10-11, emphasis added.*

least beyond the short-term. Borrowing to pay dividends may be justified by the higher increase in the RAB (than would be expected with a positive cash rate of return on equity) and consequential increase in revenue, though may alter the cash payment profile for consumers.

*We suggest that the AER consider, during its 2020 Inflation Review, whether a projected negative cash return on equity might indicate **an underlying inconsistency** in one or more inputs into its estimate of WACC and expected inflation. Some possible aspects to explore might include:*

- *whether the estimate of expected inflation is too high and thus causes the negative cash rate of return on equity*

- *whether the nominal cost of equity might be under-estimated relative to the estimated expected inflation*

- *whether the assumed capital structure is efficient, given the relative rates of return to equity and debt.*

The first two points combined raise the same issue that APGA raised in its presentation of July 2, which we replicate in Figure 3 below.

*Figure 3:   Allowed real and nominal rates of return*
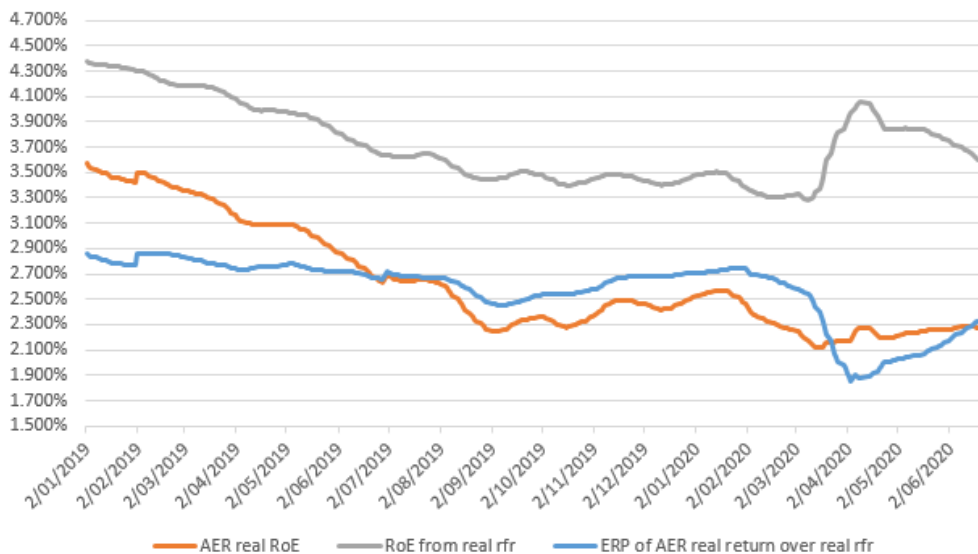
Subtracting the AER's forecast of inflation from the current nominal risk-free rate implies a real government bond rate of -1.5% and an equity allowance of 2.16% (that is, -1.50+3.66), but indexed government bonds are currently available yielding -0.2%. Taking -0.2% as proxy for the real risk-free rate a real required return on equity of around 3.46% (that is -0.2+3.66). The two are clearly very different, and, as Figure 3 shows, the application of the AER's approach to inflation since the 2018 rate of return instrument provides a real equity risk premium, relative to indexed CGS yields, of around 100 bps lower than the equity risk premium in that document.

The final point on gearing also echoes a point made in the APGA submission, which shows that the real return on equity is only around 60 bps higher than the sole indexed corporate bond in the

energy sector, rather than the 185-bps different the AER deemed reasonable in its 2018 rate of return instrument. This is shown in Figure 4.

Figure 4:   Allowed real equity and real debt returns
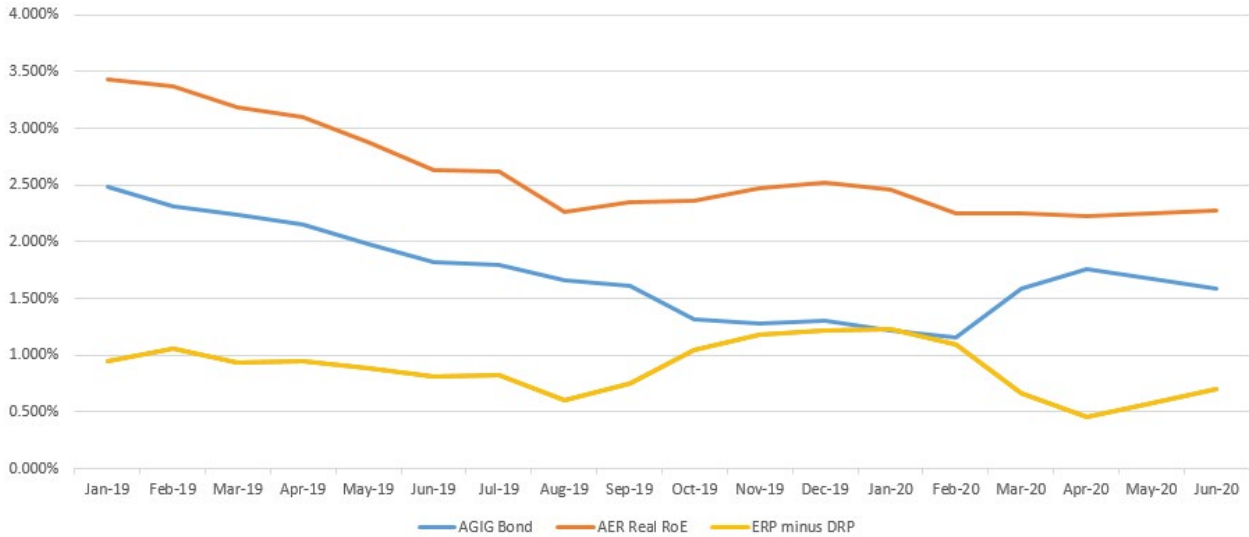
This chart shows that investors in an AGIG bond can achieve a guaranteed real return (absent default) that is within 1% of the return that the AER allows AGIG to fund equity costs.

Although one debt instrument cannot be indicative of the whole market (though APGA shows in its July 2 presentation that the AGN bond is not an outlier), there would be good reason, as Sapere appears to suggest, for a business to question its gearing if the allowed return on equity were so close to what was available in the marketplace for debt.

These kinds of inconsistencies are a key part of APGAs concerns with the AER's current treatment of inflation.

5. Consumers and real or nominal prices

At the AER Forum on 2 July 2020, Eric Groom from the AER made a key point about consumers and the type of pricing they desire. He pointed out that the AER currently sets prices to preserve the purchasing power of consumers by keeping prices (relatively; depending upon X factors) stable in real terms, but that it could also set stable nominal prices which would involve a change in purchasing power through time. He made the valid point that it is reasonable from time to time to question which consumers prefer.

This is ultimately a question for consumers to address, and we look forward to hearing from the CRG and other consumer representatives on this point. Here we wish only to make two points:

- The consumer price index is an average of the prices of a wide variety of goods and services.

- It is not clear whether the regulators need to choose stable real or nominal prices for consumers is simply a function of the choices the AER has made in respect of its inflation measure.

The first point is highlighted in Figure 5, which shows the wide range of price changes that go into the growth of CPI

Figure 5:   Range of elements comprising CPI
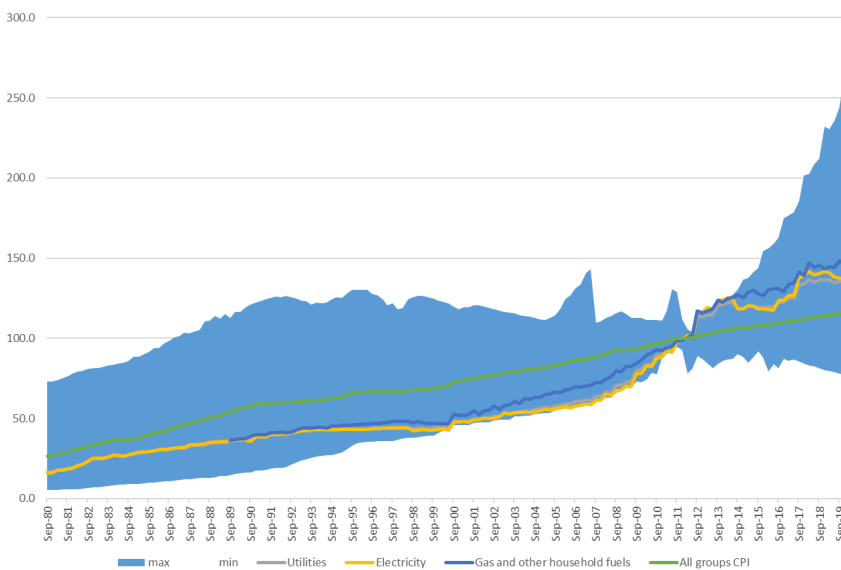
In simple terms, why is there anything special about energy, compared to – for example – groceries, which means that consumers might desire its price to move in-line with overall CPI, but are less concerned that this be the case for other commodities and services they purchase? We appreciate that energy is a large expense (perhaps sufficiently large that it might influence CPI), but it is not clear why this fact alone would be sufficient for consumers to wish for real price stability. In fact, if it is a large expense, they might prefer nominal price stability, since this means that energy prices will be increasing less slowly when other prices are increasing at a fast rate.

As a related point, the correlation between CPI growth and the growth of utilities, electricity and gas and other household fuels (the three ABS categories comprising the energy sector) since 2020 is about 0.45 (gas is slightly higher over this period, and electricity and utilities – gas is lower – are roughly the same over the whole sample set). This correlation is positive, but is not particularly high. Thus, it is not clear whether the AER targeting stable real prices actually results in stable real

energy prices for consumers. In fact, it seems real prices rise and fall a little more slowly than CPI as a whole.

The second point reflects the discussion in Section 3.2.1 around the nature of the AER's inflation approach being a pay floating, receive fixed swap (from the perspective of networks; for consumers it is a receive fixed, pay floating swap). Since the AER's choice of inflation represents an out of the market swap, if either a business or a consumer wanted to take on a counter-veiling swap to turn their revenue or price exposure from being stable in real to stable in nominal terms, the costs of doing so would be far too high, and so everyone is effectively stuck with stable real revenues or prices.

However, if the AER used a different swap rate, that was in the market, then the cost of the swap would be very low. Thus, anyone, business or consumer, who wanted to change their exposure from real or nominal could do so with a swap. We do not think that an individual household would do this (an individual large customer might) as the scale of demand would be much too small. However, a retailer might, and then offer to consumers, prices that were stable in nominal terms, rather than real terms. Those customers who wanted this form of price stability could then switch retailers, and another dimension of competition would become prevalent in the retail sector.

The basic point is that it is not clear that it is necessary for the AER to work out what type of price path consumers want and then impose a one-size-fits-all solution on the whole marketplace, but rather this is a function of the particular choice the AER has made in respect of its inflation measure. A different choice of swap contract would allow the marketplace to render the AER's choice for it in this circumstance, moot, and replace the AER's choice with a choice open to individual consumers. We believe this is a benefit in the marketplace.

Appendix A   Summary of evidence on expected inflation

Paper	What is assumed about expected inflation in the model	Bias/Premium	Can the total bias/premium estimated by characterized as, the variation in market expectations from survey estimates?
D'Amico, Kim and Wei (2010) and D'Amico, Kim and Wei (2016)	Use 10 year forecast from the Survey of Professional Forecasters. Implied relationship between inflation expectation and term structure.	Inflation risk premium and liquidity premium are large and time varying largely because of stable survey estimates of inflation.	Yes. Further decomposition between inflation risk premium and liquidity premium is estimated using: risk parameters of term structure model and a dynamic factor model.
Scholtes (2002)	Use Barclay's Basix survey of expectations for RPI inflation over the next two years.	Does not separately identify inflation risk and liquidity premia. Combined inflation risk premium and liquidity premium is large and time varying largely because of stable survey estimates of inflation.	Yes. Risk premia are defined as the difference between breakeven inflation and survey expectation
Grishchenko and Huang (2012)	10-year expectation uses the Survey of Professional Forecasters. 1-year expectation use unconditional average of historical inflation, forecast inflation model based on VAR model, and the Survey of Professional Forecasters.	10-year inflation risk premium and liquidity premium are large and time varying largely because of stable survey estimates of inflation.	Yes. Further decomposition of breakeven inflation using survey expectation and a liquidity proxy.
Shen and Corning (2001)	Use Livingston Survey of economists	Inflation risk premium and liquidity premium are large and time varying largely because of stable survey estimates of inflation.	Yes. Further decomposition of breakeven inflation using survey expectation and liquidity proxy
Gurkaynak, R., Sack, B., Wright, J. (2010),	Use Blue Chip Economic Indicators' forecast survey	Inflation risk premium and liquidity premium are large and time varying largely because of stable survey estimates of inflation.	Yes. Further decomposition of breakeven inflation using survey expectation and liquidity proxy
Finlay and Wende (2011)	Use Consensus Economics' inflation forecast survey. Implied relationship between inflation expectation and term structure.	Large and time varying inflation risk premium largely because of survey estimates of inflation stable. Does not separately identify liquidity and inflation risk premia.	Yes. Difference between survey and breakeven inflation is assigned to risk premia using a dynamic factor model.
Christensen, Dion, and Reid (2004)	Use survey from Watson Wyatt and Conference Board's quarterly Survey of Forecasters.	Does not separately identify inflation risk and liquidity premia. Combined inflation risk premium and liquidity premium is large and time varying largely because of stable survey estimates of inflation.	Yes. Risk premia is difference between breakeven inflation and survey expectation
Angus Moore (2016)	Use Consensus Economics' inflation forecast survey. Implied relationship between inflation expectation and term structure.	Does not separately identify inflation risk and liquidity premia. Combined inflation risk premium and liquidity premium is large and time varying largely because of stable survey estimates of inflation.	Yes. Inflation risk premium is determined as difference between break even inflation and survey expectations - estimated using a dynamic factor model.
Pflueger and Viceira (2015)	Use forecast from Survey of Professional Forecasters and Chicago Fed National Activity Index	Inflation risk premium and liquidity premium are large and time varying largely because of stable survey estimates of inflation.	Yes. Further decomposition of difference between breakeven inflation and survey expectation using a liquidity proxy
Hambur and Finlay (2011)	Use surveys of inflation expectations from Consensus Economics. Implied relationship between inflation expectation and term structure.	Does not separately identify inflation risk and liquidity premia. Combined inflation risk premium and liquidity premium is large and time varying largely because of stable survey estimates of inflation.	Yes. Difference between breakeven inflation and survey expectations using risk parameters of term structure model.

Banco Central do Brasil (2014)	Use Focus survey	Inflation risk premium is large and time varying.	Yes.
Kim, Walsh and Wei (2019)	Use 10 year forecast from the Survey of Professional Forecasters. Implied relationship between inflation expectation and term structure.	Inflation risk premium and liquidity premium are large and time varying largely because of stable survey estimates of inflation.	Yes. Further decomposition between inflation risk premium and liquidity premium is estimated using: risk parameters of term structure model and a dynamic factor model.
Ang, Bekaert and Wei (2008)	Modelled from historical CPI and implied relationship between inflation expectation and term structure	Does not separately identify inflation risk and liquidity premia. The 5-year premium ranges from 42 to 125 basis points, and the 1-year premium ranges from -14 to 47 basis points.	No. Inflation risk premium is estimated using risk parameters of term structure model. Estimated inflation dynamics is used to improve precision.
Coroneo (2016)	Implied relationship between inflation expectation and term structure in main model. Inflation expected is embedded inflation swap in alternative model	Does not examine inflation risk premium. Liquidity premium accounts for 12.5% of variation in 10-year TIPS yield.	No. Liquidity premium is estimated as a dynamic factor model in main model. Liquidity premium is recovered using difference between breakeven inflation and inflation swaps in alternative.
Chen, Engstrom and Grishchenko (2016)	Inflation risk premium is assumed to vary in accordance with the predictions of the CAPM (consistent with Sapere advice).	Only examine the sign of inflation risk premium. Inflation risk premium has been negative since 2010.	No. Correlation between consumption and inflation.
Camba-Mendez and Werner (2017)	Use survey forecast from Consensus Economics in one model and Implied relationship between inflation expectation and term structure in another model. Inflation expected is embedded inflation swap.	Inflation risk premium is larger and more time varying in model using survey forecast. One-year premium ranges from -50 to 10 basis points in euro area and -250 and 50 basis points in US based on the approach without using survey. Does not separately report inflation risk premium and liquidity premium, but finds liquidity factor is not significant when outliers are ignored.	Yes, but only in one model. Difference in breakeven inflation and survey forecast in one model and Inflation risk premium is estimated using as dynamic factor model in another. Impact of liquidity is analysed through the explaining power of the liquidity proxy, difference compared to inflation swaps.
Abrahams, Adrian, Crump, Moench and Yu (2016)	Implied relationship between inflation expectation and term structure.	10-year inflation risk premium ranges from -50 to 50 basis points. Liquidity premium has been less than 50 basis points since 2010.	No. Inflation risk premium is estimated using risk parameters of term structure model. Liquidity premium is estimated as a dynamic factor model.
Andreasen, Christensen and Riddell (2018)	Implied relationship between inflation expectation and term structure.	10-year liquidity premium below 60 basis points since 2010.	No. Liquidity premium is extracted using the difference in the constructed short rate of indexed and unindexed bonds.
Christensen and Gillan (2019)	Embedded in Inflation swap	Total 10-year liquidity premium below 50 basis points since 2010.	No. Difference between breakeven inflation and inflation swaps
Campbell, Shiller and Viceira (2009)	Inflation risk premium is assumed to vary in accordance with the predictions of the CAPM (consistent with Sapere advice).	Inflation risk premium has been negative since 2000.	No. Correlation between breakeven inflation and equity returns
Devlin and Patwardhan (2012)	Embedded in Inflation swap	Total 10-year liquidity premia less than 40 basis points since 2010.	No. Difference between breakeven inflation and inflation swaps
Coeuré 2019	Embedded in Inflation swap	Inflation risk premia in 5-year inflation swaps (five years ahead) have fallen by over 70bp between 2014 and June 2019.	No. Decomposition of term structure in inflation swaps.
CEG 2019	Actual inflation used as proxy for inflation expectations	From 2009 onwards the central bank target 4 and 5 years out over-estimated actual inflation 95% of the time. If the central bank target was an unbiased estimate in each period there would be a less than 0.5% probability of such an extreme event occurring.	No. Expectations are assumed to match actual inflation.
Lally 2020	Actual inflation used as proxy for inflation expectations	Up to 2009 the middle of the central bank target range was the best estimate of actual inflation over the next 10 years.	No. Expectations are assumed to match actual inflation.

Appendix B   Issues with Deloitte report

The table below provides an overview of our detailed concerns with the Deloitte report.

Page	Issue
7 & 9	Deloitte suggest that the AER's approach is excellent because long term expectations remain anchored in the RBA's target band, but that if evidence were to emerge that expectations had become "de-anchored", a glide path would be preferred, before concluding (in a footnote) that if expectations became de-anchored in the long run, then a market-based measure would need to be used. At the moment, market-based measures already suggest that inflation will not be within the target band for 10 years, but Deloitte has dismissed this as reflective of bias and concluded no de-anchoring. It therefore suggests that, if other evidence corroborates the market-based measures, these will switch from playing no role to being completely determinative. This does not seem logical; why is their value now not being considered valid information if there are situations when it would be relied upon entirely?
7	Deloitte also suggests that surveys rank highly on relative congruence because professional forecasters devote a large amount of time and effort to making forecasts, but then note that surveys are often proprietary in nature and hard to scrutinise. If this is the case, how do Deloitte know that time and effort have been put into the survey responses? In relation to the same point, Deloitte ignores the fact that market operators not only put time and effort into their decisions around inflation instruments, but also put at risk their own money. How can this be less significant than the "time and effort" which Deloitte believe forecasters have put into their survey responses?
9 & 38	Deloitte suggests the AER approach has no significant biases. However, this is untested.
9 & 10	The AER's approach is rated highly because it is "easily verified by stakeholders", and the glide path is also considered transparent to the extent that its determination is clearly defined by the AER, but the BBIR and swaps approaches are marked down because they are complex and cannot be easily verified and, in the case of the BBIR, can be done many ways. This is not an apples with apples comparison because it compares the AER and glide path approaches after the AER has determined how they should be done with the BBIR and swaps approach before such a determination has been made. There may be many ways to do the BBIR, for example (just as there could have been many ways the AER chose to implement its methodology), but once one way has been chosen, that way is very easy to follow and highly transparent. The ERA, for example, has specified a way to do the BBIR, and to our knowledge, none of the companies governed by the ERA in WA have the slightest difficult implementing the ERA approach.[22]
10 & 29	Swaps are marked down because there are a small number of traders. However, the Consensus Economics survey (the only one of its kind in Australia) has only 20 respondents. Moreover, they are similar organisations to those are active in the swap market. How is it that the same group of people are marked down under one approach (when they have skin in the game) and up in another.
10 & 25	The glide path is suggested to contain no significant biases or distortions, but how does Deloitte know this when it never tests the approach? Moreover, one can have many different glide paths (as Deloitte shows) which give substantially different end results for inflation. How could all of these be unbiased? Likewise, the glide path is suggested to balance short run distortion and long run stability, but, how can so many different outcomes do this equally well?
10	The BBIR is ranked down in terms of transparency because it is complex. The actual method is highly transparent. Even complicated versions of the method, such as the IPART approach, were easily followed by the AER-ACCC in 2017, and other regulators, such as the ERA use simpler spreadsheet models which show the answer in a very simple fashion.
10	The BBIR is suggested to still lack "relative congruence" even after various distortions and biases (which we argue in Section 3.2 are not as well specified as Deloitte suggests) are addressed, but it provides no evidence that it has made such adjustments, and then tested them in order to deliver this conclusion.
10	The BBIR and swaps methods are both marked down because estimates can change due to shot run shocks that have no impact on long run expectations. In the first instance, how do Deloitte know what does and does not affect long run expectations if, as it acknowledges on p15, expectations are unobservable? Secondly, Deloitte provides no evidence that there is some kind of well-agreed set of short-run shocks which are known not to affect the long run. We contend that there is no such list; this is a topic of debate in the academic literature. The current Covid 19 pandemic is an excellent case in point in this respect; nobody has any idea whether it will have long-run effects and, if it does, what these might be.
10	Surveys are rated as excellent because professional forecasters "closely track changes in relevant data with respect to the formation of inflation expectations". How does Deloitte know this if surveys are proprietary; the reason they are marked down for transparency? More to the point, if the debate on what factors have long and short run is not settled, why would we expect forecasters to only take "relevant factors" into consideration. Finally, in Australia, almost all of the forecasters providing responses to the Consensus Economics survey are also active in the swaps market. Why is it that these forecasters would take only "relevant factors" into consideration when making their forecasts, but then put real money into their trades on the basis of short-run shocks that have no consequences in the long run?
15	Deloitte note that inflation expectations (what proxy of these it does not specify; this is the same page on which they note said expectations are unobservable) vary and that some suggest they should be measured better as a distribution, and yet the AER's expectation is not only a point, but is 2.5 percent for every year after year 2. The specific nature of the AER's approach does not seem to be properly considered, and it is only ever assessed in generic terms.
16	The discussion on the formation of inflation expectations focuses almost exclusively on households and how they form expectations. However, it is not clear whether any of the literature cited by Deloitte has this as the measure of expectations, and it seems from context that (this is an area where clarity would assist), when Deloitte itself talks about expectations, it is actually talking about expert forecasters who are suggested to have excellent congruence with expected inflation. However, unless it can be shown that

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[22] We note also that the ERA took approximately 7 pages in its 2018 rate of return instrument to describe how it would implement the BBIR and its reasoning behind doing so, whilst the AER's 2017 final decision (alone) on inflation is 138 pages long.

expert forecasters match how households form expectations, it appears that Deloitte is confusing forecast accuracy with being a good measure of expectations, and failing to recognize that actual expectations, whatever these might be, may be quite different from those which expert market participants produce. In the very least, Deloitte needs to specify how its discussion on household inflation expectation formation feeds into and correlates with its use of the term "inflation expectations" elsewhere in the document and in the literature. If it turns out that inflation expectations formed by households is the best measure of expected inflation, and all of the surveys in the literature use something else as their proxy, then this would mean they should be ignored. This is similar to the conclusion the AER itself drew in respect of all of the literature which measures bias in the CAPM; that it is wrong because it is measuring the wrong thing.

18	Deloitte notes a drop in short run forecasts from professional forecasters over the past decade, with some drop in long run forecasts. A good reason for this might be conservatism or anchoring bias (views change only slowly with new information). Deloitte fails to acknowledge this, or indeed any other of the well-recognised biases in forecasters.
21 & 15	Deloitte note a benefit of the AER approach is that it allows for short-term volatility through use of the RBA forecast, whilst keeping the long run stable, in line with expectations. However, how do Deloitte know that long run expectations are stable, if these are unobserved? It may be true that forecasts are stable, but, as Deloitte points out forecasts are not the same thing as expectations. Deloitte notes the forecast accuracy of the RBA forecasts as a benefit for the AER approach, it also notes that forecasts are not the same thing as expectations, and it is unclear why forecast accuracy should be a relevant goal.
21, 9 & 38	Deloitte notes an advantage of the AER approach is that it does not respond to short-run shocks with no impact in the long run. However, Deloitte fails to acknowledge that the AER sets the long-term (actually, from year 3) at 2.5 percent; a number which does not change regardless of what kinds of shocks one has at any point in time.
23	Deloitte notes that a problem with the glide path is that you don't know when to use it (i.e. – what set of economic conditions). However, the AER's approach is simply a special case of the glide path, where the glide is set to zero. If this is a problem of glide paths in general, then it must be a problem with the AER's special case of the glide path.
27	Deloitte notes that illiquidity for indexed bonds remains less than for nominal bonds, but it then infers that liquidity remains a major concern. It seems unlikely that indexed bonds would ever be issued in the same volumes as nominal bonds. What matters is not relative liquidity, but rather if indexed bonds have reached some minimal level of liquidity for their use to no longer be a concern.
30	Deloitte note as an advantage of surveys is that professional forecasters tend to keep close track of changes in interest rates, but elsewhere the fact that the BBIR moves with interest rates is listed as a disadvantage.
31	Deloitte note a number of papers which show that long-run expectations are difficult to de-anchor, without noting that these studies use forecasts as their proxy of expectations. We would agree that getting forecasters to change their long run forecasts is difficult due to conservatism bias, but would suggest this has nothing to do with market expectations of inflation.
31	Deloitte cites a number of Australian papers, concluding that there is no evidence in the Australian literature of de-anchoring of expectations. However, it fails to make clear that none of these papers was published post 2015. The whole point of the issue is whether expectations are "de-anchored" (whatever that actually means in practice specifically – is an expectation of 1.9 percent in year 4 "de-anchored"?) now. If the literature is inconclusive or out of date, then Deloitte should have developed a well-specified and transparent test and then run it using the best and most recent data it could. What Deloitte has actually found is that there is no evidence extant either way on the question of de-anchoring, and it has then assumed that this means it hasn't occurred.