Analysis of aspects of ACCC Draft Decision on State Water Application

A REPORT PREPARED FOR STATE WATER

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Key findings

1. The ACCC's Draft Decision cannot stand as the ACCC cannot reasonably satisfy itself that its proposed tariff structure and associated 'unders and overs' mechanism will meet the revenue adequacy requirements of the WCIR and the BWCOP.
2. Leaving delivery charges high does affect efficiency of water use
   - When interstate trade is taken into account, high delivery charges in excess of the efficient level can distort water market outcomes and lead to water being inefficiently allocated between competing uses within and outside of State Water areas/valleys.
   - It is plausible for the market price of water to fall to extremely low levels (as occurred in late 2011-12) due to high water availability and low water demand. As observed by the ACCC, under such circumstances it is possible that high charges for water delivery will deter some productive uses of water at the margin.
   - State Water's proposed tariff structure would therefore contribute to improving the efficiency of water use.
3. The ACCC's proposal does not contribute to the BWCOP in relation to facilitating the efficient functioning of water markets.
4. Risk-management tools in the water market already exist and are becoming more widely available and therefore their absence should not be used to justify the use of the tariff structure as a risk management tool.
5. There are more direct and targeted measures to address any concerns about the financial position of water users at times of low water availability than to distort the tariff structure for all users and to impose risks on State Water which it is not in a position to manage.
6. The ACCC's argument that State Water's proposed tariff structure could fail to "avoid perverse or unintended pricing outcomes" would require accepting a range of propositions:
   - that State Water's proposed tariff structure involves transferring an "unreasonable" amount of volume-related risk from State Water to customers which is inappropriate
   - that State Water's proposed change to the tariff structure would have such a material impact on irrigator's cashflows particularly during dry years as to itself be a major cause of irrigators not being able to obtain finance
   - that any impacts of assigning more volume-related risks to water users are "perverse" or "unintended" and represent some sort of market failure to be addressed by State Water
   - that no better instruments for farmers to manage such risks or to address any concerns about the financial viability of some farmers exist.

   None of these propositions withstand rigorous scrutiny. In contrast, a number or perverse or unintended outcomes are very conceivable under the ACCC's proposed tariff structure and associated form of price control. The ACCC cannot credibly maintain this argument as the dominant rationale for its Draft Decision on State Water's tariff structure.

7 The ACCC has not adequately assessed its own and State Water's proposed tariff structure and form of price control against each of the BWCOP criteria and has also given undue weight to (and problematic interpretation of) the BWCOP relating to perverse or unintended price outcomes.

8 The ACCC's Draft Decision does not comply with the requirements under the WCIR because:

- State Water's proposed tariff structure (and associated revenue cap) proposal does meet the WCIR requirements and meets all of the BWCOP. It should therefore have been approved by the ACCC.
- The ACCC's proposed tariff structure (and associated LCM) does not meet the WCIR requirements and the BWCOP:
  - it cannot reasonably be assessed as meeting the WCIR requirements regarding revenue adequacy
  - it does not meet some of the BWCOP or at least does not meet them as well as State Water's proposal.

9 The form of price control proposed by the ACCC in its Draft Decision has many major deficiencies. Such a complex and non-transparent LCM mechanism should only be adopted in the absence of better alternative instruments to address the various policy issues of concern. In our view, a cost-reflective tariff structure, supplemented by direct measures (e.g. CSOs or hardship schemes) to address concerns about the cashflows of a small subset of irrigators, is a much superior policy response than distorting the tariff structure for all customers.

10 The base and step methodology is a well established component of the ACCC's regulatory approach, the validity of this approach depends heavily on its appropriate application. The ACCC adjusted the base year to include a number of costs and correct for error, however, these adjustments do not appear to have been exhaustive. There are a number of examples in the ACCC's draft decision where the underlying assumptions or the argument justifying its decisions on the step changes allowed are not satisfactory.

11 The ACCC's approaches to estimating the risk-free rate and MRP are deeply inconsistent, and it has misunderstood State Water's submission on these issues:

- Despite suggestions to the contrary, the ACCC's MRP has clearly given primacy to long-run, historical data.
- The ACCC has inappropriately dismissed evidence of the negative relationship between the risk-free rate and the MRP.
- The ACCC has not given any reasonable consideration to forward-looking evidence.

12 The ACCC has provided no plausible explanation as to why estimates of the betas of overseas water networks provide no information at all on the beta of State Water. The ACCC should reconsider the evidence it has used to derive its estimate of the equity beta.

Executive summary

Background

State Water has commissioned Frontier Economics to review a number of aspects of the ACCC's Draft Decision on its Application for regulated charges to apply from 1 July 2014. The issues Frontier Economics has examined include:

- tariff structure
- form of price control
- the proposed 'base and step' opex methodology
- elements of the weighted cost of capital (WACC).

Key findings on the Draft Decision on State Water's regulated charges

Our key findings are summarised in the key findings box above. We highlight the following:

Tariff structure and form of price control

This report provides additional information and analysis which demonstrate that a number of the key assumptions underlying the conclusions reached by the ACCC its Draft Decision with respect to the tariff structure and associated form of price control do not hold true in practice.

The Draft Decision would not contribute to consistency in charging across the Murray-Darling Basin or to promoting efficient water markets, despite these being fundamental stated objectives underlying the Water Charges (Infrastructure) Rules which underpin the price review. Indeed, the ACCC has exhibited little regard for the broader context of water reform in the Murray-Darling Basin in its draft decision.

The ACCC should not have rejected State Water's proposed tariff structure and form of price control, as they meet the Water Charges (Infrastructure) Rules (WCIR) and the Basin Water Charging Objectives and Principles (BWCOP). In contrast, the ACCC's Draft Decision on tariff structure and related form of price control do not meet the WCIR or the BWCOP. The ACCC's analysis of these issues is based on a number of assumptions that do not hold in the real world and has a number of other deficiencies.

In Frontier's view the approach proposed in State Water's Application, namely progressively moving to a more cost-reflective tariff structure together with a revenue cap (subject to a cap on annual price adjustments) represents the best way to deal with the volume risk to which State Water is exposed. Importantly, it involves moving to a tariff structure that best meets the WCIR and the BWCOP including ensuring revenue adequacy for State Water. In our view it provides a

good balance between revenue certainty and stability for State Water and price impacts on customers.

By contrast, the form of price control proposed by the ACCC in its Draft Decision has many major deficiencies. The complex and non-transparent Loss Capitalisation Model (LCM) proposed by the ACCC should only be adopted in the absence of clearly better alternative instruments to address the various policy issues of concern. In our view, a cost-reflective tariff structure, supplemented if necessary by direct measures (e.g. CSOs or hardship schemes) to address concerns about the cashflows of a small subset of irrigators, is a much superior policy response than distorting the tariff structure for all customers.

If the ACCC nevertheless adheres to its decision to retain the current 40:60 fixed to variable tariff structure, it should couple this with a revenue cap subject to a constraint on annual price adjustments which it deems acceptable. Alternatively, but less preferably, it should adopt an adjusted version of its LCM approach that includes an allowance for the retiring of accumulating debt (this option allows for both a return on the LCM balance and a return of the LCM balance). The return of component of the incremental LCM charge should be attached to the fixed charge. This approach would have the effect of (a) amortising losses/gains over a reasonable but defined timeframe, thereby smoothing the effect on allowed revenues, and (b) compensate State Water for the time value of any losses by allowing a return to be earned on any past under-recovery of efficient costs.

Methodology for establishing efficient operating expenditure

While the base and step methodology for establishing operating expenditure is well established, the validity of the ACCC's application of the approach depends to a large degree on:

- the representativeness of the base year
- the appropriateness of the adjustments made to the base year.
- the appropriateness of the productivity assumptions
- the appropriateness of the cost escalators
- the appropriateness of the non recurrent and step changes applied to the base over the course of the regulatory period.

While the ACCC adjusted the base year to include a number of costs and correct for error, these adjustments do not appear to have been exhaustive. There are a number of examples in the ACCC's draft decision where the underlying assumptions or the argument justifying the Commission's decisions on the step changes allowed are not satisfactory.

Elements of the Weighted Average Cost of Capital (WACC)

The ACCC's approach to determining the WACC is flawed:

- the ACCC's approaches to estimating the risk-free rate and MRP are deeply inconsistent
- the ACCC has inappropriately rejected all evidence provided by State Water on beta

Broader implications

The ACCC's Draft decision raises a number of concerns for the application of robust and predictable economic regulation in Australia that extend beyond the current State Water price review. If the Final Decision does not entail extensive revisions from the Draft Decision, the ACCC would be establishing precedents which should be of major concern to other regulated businesses.

These include:

- Past applications of a LCM mechanism to allow a business to alleviate the risk associated with investment in growth assets differ fundamentally from the way in which the ACCC intends to apply it in this instance. Hence, the ACCC's proposed use of the LCM does not have any regulatory precedent, and would result in poor regulatory outcomes by:
  - Potentially deferring indefinitely or preventing the ability of a regulated business to recover costs deemed efficient by the regulator. This amounts to a retrospective disallowance of costs previously approved by the regulator.
  - Potentially transferring costs from one generation of customers to another in an arbitrary way as opposed to smoothing the price path for current customers.
- Allocating a major risk (in this case, volume-related risk) which the regulator itself concedes the regulated entity has no ability to control, largely to the regulated business.
- Giving scant regard to the financial risks its decision imposes on a regulated business because it is a government-owned business with recourse to taxpayer funding.
- Giving excessive weight in its decision to a subsidiary criterion and applying an extremely subjective interpretation to this criterion.

In Frontier's view this Draft Decision starkly illustrates the need for merits based review of all decisions by economic regulators.

1 Introduction

1.1 Background

State Water has commissioned Frontier Economics to review a number of aspects of the ACCC's Draft Decision (ACCC 2014a) on its Application for regulated charges to apply from 1 July 2014. The issues Frontier Economics has examined include:

- tariff structure
- form of price control
- the proposed 'base and step' opex methodology
- elements of the weighted average cost of capital (WACC).

Frontier Economics has also prepared a separate report which reviews the technical analysis presented in Appendix A of the ACCC's Draft Decision (ACCC 2014b) and which should be read in conjunction with this report.

1.2 Approach to our assessment

Ultimately, the standard for assessing the Draft Decision is whether the regulated charges, including tariff structures, are consistent with the *Water Charge (Infrastructure) Rules 2010* (WCIR) and will contribute to achieving the Basin Water Charging Objectives and Principles (BWCOP) as set out in Schedule 2 of the *Water Act 2007* (Cwth).

Water charging objectives

Water charging objectives are:

- To promote the economically efficient and sustainable use of water resources, water infrastructure assets and government resources devoted to the management of water resources
- To ensure sufficient revenue streams to allow efficient delivery of the required services
- To facilitate the efficient functioning of water markets (including inter-jurisdictional water markets, and in both rural and urban settings)
- To give effect to the principles of user-pays and achieving pricing transparency in respect of water storage and delivery in irrigation systems and cost recovery for water planning and management
- To avoid perverse or unintended pricing outcomes.

BWCOP charging principles

The BWCOP charging principles for water storage and delivery include:

- Pricing policies for water storage and delivery in rural systems are to be developed to facilitate efficient water use and trade in water entitlements.
- Water charges are to include a consumption-based component.
- Water charges are to be based on full cost recovery for water services to ensure business viability and avoid monopoly rents, including recovery of environmental externalities where feasible and practical.
- Water charges in the rural water sector are to continue to move towards upper bound pricing where practicable.

Further pricing principles are set out in regard to cost recovery for planning and management, environmental externalities, and benchmarking and efficiency reviews.

Water Charge (Infrastructure) Rules

The WCIR require the regulator to be satisfied that:

- The applicant's total forecast revenue (from all sources) for the regulatory period is reasonably likely to meet the prudent and efficient costs of providing infrastructure services in that regulatory period
- The forecast revenue from regulated charges is reasonably likely to meet that part of the prudent and efficient costs of providing infrastructure services that is not met from other revenue.

The Regulator must also have regard to whether the regulated charges would contribute to achieving the BWCOP set out in Schedule 2 of the *Water Act 2007* (Cwth) when approving or determining regulated charges under this rule.

ACCC Pricing Principles

The ACCC (2011) set out the pricing principles to be followed by economic regulators for price approvals and determinations under the WCIR.

The document states that the pricing principles will apply to the ACCC when approving or determining charges under the rules, as well as to any regulators accredited by the ACCC.

2 Tariff structure

2.1 Introduction

2.1.1 State Water proposal

State Water proposed progressively moving to a tariff structure whereby it collects 80 per cent of its revenue from entitlement charges and 20 per cent from usage charges. State Water has also proposed changes to the calculation of the charge for high security entitlements from their current form..

2.1.2 ACCC draft decision

The ACCC's draft decision is to maintain State Water's current tariff structure so that 40 per cent of its revenue is recovered through entitlement charges (fixed charges) and 60 per cent is recovered through usage charges (variable charges) over the 2014-17 regulatory period.

The ACCC's draft decision also proposed to maintain the calculation of high security entitlement charges that applies in the current regulatory period.

2.1.3 Stated reasons for draft decision

The ACCC has stated that its reasons for its draft decision are that State Water's proposed 80:20 fixed to variable pricing structure "did not contribute to the BWCOP".

The ACCC stated that it considered that the current tariff structure best contributes to the BWCOP. In having regard to the BWCOP, the ACCC stated that it considered the following aspects of the BWCOP to be particularly significant:

- to avoid perverse or unintended pricing outcomes
- to ensure sufficient revenue streams to allow efficient delivery of the required services
- to promote the economically efficient and sustainable use of water resources.

The ACCC stated that it placed more weight on these aspects of the BWCOP as it considered them to be the most relevant to determining water charges for MDB valleys.

2.2 Analysis of the ACCC's Draft Decision

The following discussion provides our assessment of the validity of the ACCC's Draft Decision. Our detailed analysis assesses both the ACCC's and State Water's

proposed tariff structure against each of the key requirements of the WCIR and BWCOP.

We also note that the ACCC's Draft Decision appears to rely heavily on a technical theoretical analysis contained in Appendix by Dr Darryl Biggar. A detailed critique of this Appendix is provided separately in the attached report by Frontier Economics.

2.2.1 Assessment against WCIR and BWCOP requirements

The following discussion examines the extent to which the ACCC's draft decisions (and State Water's proposals) in relation to tariff structure meet the WCIR and BWCOP requirements. For the purposes of this report we have grouped these as:

- ensure efficient revenue streams to allow efficient delivery of the required services/full cost recovery
- promote the economically efficient and sustainable use of water resources and water infrastructure
- to facilitate the efficient functioning of water markets
- avoid perverse or unintended pricing outcomes
- pricing transparency
- consumption-based component
- the principle of user pays.

Ensure efficient revenue streams to allow efficient delivery of the required services/full cost recovery

This criterion encompasses a number of the WCIR requirements (as outlined in S. 29 of the WCIR) and the following BWCOP objectives and principles:

- to ensure sufficient revenue streams to allow efficient delivery of the required services
- water charges are to be based on full cost recovery for water services to ensure business viability and avoid monopoly rents, including recovery of environmental externalities where feasible and practical.
- water charges in the rural water sector are to continue to move towards upper bound pricing where practicable.

Ensuring that a regulated business has a reasonable opportunity to recovers its prudent and efficient costs is widely recognised as a fundamental requirement of a robust economic regulatory regime. As noted in the March 2014 edition of the ACCC's *Network* bulletin:

> Thus a critical regulatory principle is that prices charged by regulated firms need to be sufficient to generate adequate revenues to provide appropriate incentives for investment and efficient operation, but not so high as to generate profits in excess of efficient financing requirements. The term 'revenue sufficiency' (or 'revenue adequacy') is used to describe this principle. (ACCC 2014c, p. 9)

It is important to reiterate that revenue adequacy for the regulated business is ultimately in the long-term interests of its customers and owners (in this case, the NSW Government). Any risks to revenue adequacy will ultimately impact on customers and the owner and/or taxpayers. As noted by State Water in its application:

> The long-term financial sustainability of State Water is a key regulatory outcome for all stakeholders, including shareholders and customers. It is important that State Water has the financial capacity to invest in bulk water infrastructure and undertake appropriate operating and maintenance expenditure to provide essential services to customers. It is also important that State Water has the capacity to meet its debt obligations and provide a commercial return to equity holders, otherwise incentives for new investment are weakened. These needs are taken into consideration when determining State Water's regulated revenue requirement. (State Water 2013, p. 41)

Clearly revenue adequacy is a critical criterion which should be given considerable weight in the ACCC's decision. There is a strong obligation on the ACCC to ensure that the regulatory regime it establishes, particularly through the regulated tariff structure and associated form of price control, unequivocally satisfies this criterion.

The ACCC appears to accept that State Water's proposed tariff structure, in conjunction with a revenue cap, meets the revenue adequacy requirement. It accepts that under an 80:20 tariff structure State Water's revenue is less sensitive to the volume of water extracted than it is under the current 40:60 tariff structure. This is because State Water's proposed tariff structure would more closely reflect its underlying cost structure, so that variations between forecast and actual demand do not lead to major under- or over-recoveries. Any remaining under- or over-recoveries would be recouped or returned within a short timeframe via the proposed revenue cap, subject to annual constraints to protect customers from excessive price shocks.

In its Draft Decision, however, the ACCC has rejected State Water's proposed shift to an 80:20 tariff structure for other reasons (discussed below) and instead proposes to retain the current 40:60 fixed: variable tariff structure.

However, the ACCC recognises that the current 40:60 tariff structure does expose State Water to risk of revenue under-recovery due to volatility in water availability and proposes two alternative mechanisms for moderating State Water's revenue variability.

- a 20 year rolling average approach to forecast water extractions in the 2014-17 regulatory period

- a form of price control that includes an 'unders and overs' account which is a running balance of differences between actual and forecast revenues.

We would note that merely "moderating State Water's revenue variability" is not a sufficient test to meet the revenue adequacy requirements. Rather, the ACCC must be satisfied that the regulated charges and related arrangements ensure efficient revenue streams to allow efficient delivery of the required services, and fulfil all of the detailed requirements under the WCIR and the BWCOP as outlined above.

The ACCC asserts that it proposal meets these requirements:

> The 80:20 tariff structure proposed by State Water weights charges in favour of a fixed cost component. Under this structure, State Water's revenue is less sensitive to the volume of water extracted than it is under the current 40:60 tariff structure. However, the ACCC considers that a 40:60 tariff structure with an appropriate form of price control will also allow State Water the opportunity to recover its efficient costs. An appropriate form of price control will allow State Water to adjust its prices to account for a proportion of the difference between its actual and target revenue. This structure avoids the detriments associated with transferring volume related risk to customers, while allowing State Water to earn sufficient revenue to efficiently deliver its services. (ACCC 2014a, p. 17)

It also states:

> The ACCC recognises that the current tariff structure, under which revenues vary with water availability, does expose State Water to variability in its revenue stream. However the regulatory framework ensures that over time State Water will on average earn sufficient revenue to cover its costs, including an appropriate cost of capital.
>
> The ACCC considers that a 40:60 tariff structure in conjunction with the ACCC's proposed form of price control will adequately address any risk to State Water of revenue under recovery as a result of volatility in water availability. (ACCC 2014b, p. 215)

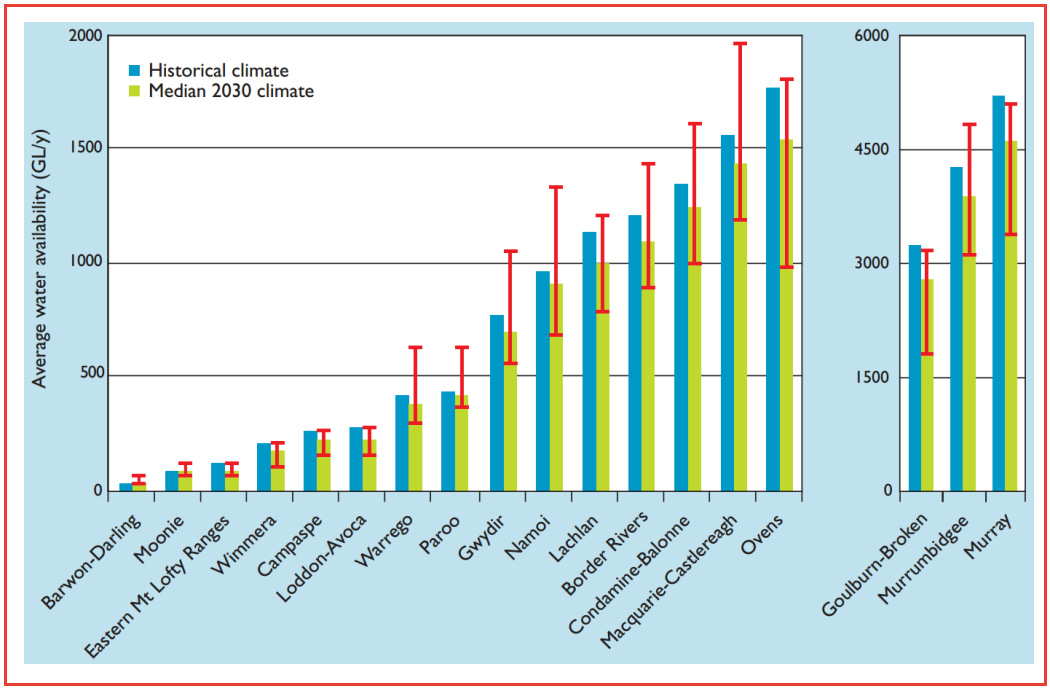
In our view this conclusion has not been substantiated. It appears to rely entirely on a theoretical analysis undertaken in Appendix A by Dr. Darryl Biggar. As discussed in more detail in the attached report by Frontier Economics, the analysis in this Appendix contains a number of erroneous assumptions and other deficiencies.

The key reasons why the proposed tariff structure together with the proposed 'unders and overs' mechanism do not in fact ensure revenue adequacy for State Water as defined by the WCIR and the BWCOP include:

- the ACCC cannot be sure that the 'unders' and 'overs' will balance out in the long run because it is not possible for it or anyone else, to forecast expected long-term water availability because of unforeseeable climate change (e.g. step changes in water availability that bears no relationship to past trends).

- The most recent Intergovernmental Panel on Climate Change (IPCC) report on climate change was released in March (IPCC 2014). This report considered impacts, adaptation and vulnerability to climate change. It identified that there was "continuing uncertainty about the severity and timing of climate-change impacts". It also noted (IPCC 2014, p. 19) that "major future rural impacts are expected in the near-term and beyond through impacts on water availability and supply".
- In 2008, CSIRO completed the Murray–Darling Basin Sustainable Yields Project. This project identified the potential impact of climate change on MDB water resources (covering many of State Water's valleys) and highlighted the very large uncertainty inherent in climate projects for 2030 — as represented by the red bars in Figure 1.

Figure 1: Uncertainty of climate change impacts on water availability



Source: CSIRO 2008.

- Even if it were possible to forecast long-term water availability, the likelihood of extended periods of significant under-recovery (e.g. due to drought) or over-recovery (during periods of above- average water availability) means that the timing of these events will impact on the value of State Water's cashflows in NPV terms. Because the LCM model does not compensate State Water for the time value of money, it is virtually impossible for the LCM model to be NPV neutral for State Water as claimed by the ACCC (see the companion report reviewing Appendix A).
- Even if were accepted that the LCM were NPV neutral over the very long term (this is not likely to hold true in practice given the timing and extent of

unders and overs), this does not provide sufficient surety that the business will have a reasonable opportunity to recover its efficient costs in the short to medium term. To rely on a model with a 50 year timeframe is clearly inappropriate given the level of uncertainty as to what may happen to the business over such a long timeframe – indeed whether it still exists in its current form if at all.

- The likelihood of asymmetric patterns of water availability (e.g. long periods of drought) means that the 'unders and overs' account could build up very large balances which are reduced only very far into the future. This feature of the proposed approach would violate the WCIR and the BWCOP requirements in a number of ways:
  - Even though only a WACC is applied to the balance which is added to or subtracted from State Water's revenue requirement, there would be regulatory periods where customers were paying far below the efficient revenue requirement and other times when (potentially a different generation of) customers were paying far below the revenue requirement. This would appear to contravene the BWCOP with regard to water charges being based on full cost recovery and avoiding monopoly rents.
  - Extended periods of under- or over-recovery would in practice raise a number of issues about State Water's financial position and its consequent ability to borrow and invest. State Water is capital-constrained in that it cannot borrow unlimited amounts of money. Its borrowings take place via the NSW Treasury Corporation, for which it pays an interest rate including a guarantee fee taking into account State Water's credit rating. State Water is a commercial entity and its Board have legal obligations for the business to be run as a commercial business. Imposition of excessive debt on State Water - particularly where such debt is effectively incurred to pay for ongoing operational activities rather than for capital investment - would impact on its credit rating and its cost of borrowing. This would ultimately affect State Water's ability to undertake capital investment. This would contravene the WICR and the BWCOP in regard to ensuring sufficient revenue streams to allow efficient delivery of required services and to ensure business viability.
  - If the regulated tariff structure (and related form of price control) means that under extended periods of below average deliveries, State Water is not able to recover its efficient costs, it may have an incentive to seek to reduce its operating costs to a point which might lead to lower service standards for its customers. Moreover if there is a risk that State Water may never be able to recover its efficient costs, including an appropriate return on capital, this will impose a disincentive for investment by the NSW Government and/or impose a risk on NSW taxpayers to make

good the difference. This would seem to be directly counter to the BWCOP with regard to water charges being based on full cost recovery.

- Even if it were true that the 'unders and overs' mechanism allowed for revenue adequacy for State Water over the very long term, this is not sufficient to meet the WICR requirements:
  - The WCIR require (S 29 (2) (b) (i) that the Regulator cannot approve regulated charges unless it is satisfied that "the applicant's total forecast revenue (from all sources) for the regulatory period is reasonably likely to meet the prudent and efficient costs of providing infrastructure services *in that regulatory period*" [emphasis added] (p. 25). Curiously, these last four words are not included in the reference to the WCIR in the ACCC's Decision.
  - The qualification that the forecast revenue must be reasonably likely to meet the prudent and efficient costs of providing services *in that regulatory period* in our view implies a clear policy intent that a regulated business should have a reasonable opportunity to recover their efficient costs in each and every regulatory period, rather than potentially have extended periods of under- and over-recovery which might balance out on average. Given the inherent volatility of deliveries around the long-term average, in our view this imposes a much stronger obligation on the ACCC to ensure that the regulated charges maximise the probability that the forecast revenues (recognising the uncertainty of those forecasts) will allow the regulated business to recover its costs for that period. Adoption of a cost-reflective tariff structure is clearly the most direct approach to ensuring revenue adequacy in the next regulatory period.
- The LCM may render the regulatory regime itself inherently unstable or unsustainable, particularly if the loss capitalisation account accrues a large balance in either direction. This will make the 'regulatory contract' very difficult to enforce in practice.
  - For example, if such a mechanism had applied during the recent drought, the unders account would have led to a major addition to the revenue requirement in later years, notwithstanding that only a rate of return applies to the balance. Water users in subsequent years asked to pay higher bills to pay for the shortfalls incurred by earlier generations of users would understandably lobby the regulator and the NSW Government to have these amounts removed from the revenue requirement. Frontier observes that this precisely what occurred during a previous IPART determination where irrigator groups argued for the removal of the revenue volatility allowance on the basis that it was an unjustified tax, notwithstanding that IPART had explicitly included it as a revenue line item in an attempt to recognise the risk it was imposing on

State Water through the current tariff 40:60 fixed to variable tariff structure.

- Similarly, if an LCM is put in place now and there is a return to more normal or above-average deliveries over the next one or two regulatory periods, State Water could accrue funds significantly in excess of what is required to fund its ongoing operations. Again, there is likely to be pressure placed on State Water to return these funds to users, rather than it being able to retain them to cover future under-recoveries.

Finding 1

The ACCC's Draft Decision cannot stand as the ACCC cannot reasonably satisfy itself that its proposed tariff structure and associated 'unders and overs' mechanism will meet the revenue adequacy requirements of the WCIR and the BWCOP.

Promote the economically efficient and sustainable use of water resources and water infrastructure assets

A fundamental objective of water reform as reflected in the National Water Initiative and subsequently in the BWCOP is to promote the economically efficient and sustainable use of water resources and water infrastructure assets. As noted in the Explanatory Statement to the WCIR, the Rules contribute to the water charging objective and principles by:

- promoting the economically efficient and sustainable use of water resources by signalling the true costs of storing and delivering water
- promoting the economically efficient and sustainable use of water infrastructure assets by signalling the true costs of providing infrastructure services.

At the outset, we note that the ACCC Pricing Principles states (ACCC 2011a, p. 51) that in practice, promoting the economically efficient use of water infrastructure assets "can be best achieved where the fixed and variable components of a charge recover the fixed and variable costs of providing services". The ACCC's Draft Decision is direct contrast to this statement. This is not consistent with providing regulatory certainty.

Despite State Water proposing to progressively move to a tariff structure that more closely reflects it underlying highly fixed cost structure, the ACCC has found that neither State Water's proposed tariff structure nor the retention of the current tariff structure would significantly affect economic efficiency.

The ACCC states that:

> The ACCC has considered whether State Water's proposal would have a significant impact on the sustainable and efficient use of water resources. The ACCC considers

> that in comparing the current 40:60 tariff structure with State Water's proposal, neither are likely to have a significant impact on the efficiency of water use. (ACCC 2014a, p. 17)

It further states:

> The ACCC has considered whether State Water's proposal would have a significant impact on the sustainable and efficient use of water resources, having regard to the role of the water market, where water trade is not established and where it is established.
>
> If water trade is not established, it is likely that users would have a range of different values for water at the margin. The marginal value of water for some of those users could be quite low. In this case there is a risk that increasing the water usage charge might deter some of those users from using their water allocation, reducing economic efficiency.
>
> But given the presence of water trade, all users must have the same marginal value for water allocation, as reflected in the market price. In this context, increasing the usage charge results in a reduction in the market price for water, with no change in the volume of water used. As long as the market price is greater than zero there are no efficiency consequences from a change in the usage charge. In the presence of water trade a shift from charges on usage to charges on entitlement should have no impact on the efficiency of water use. (ACCC 2014b, p. 216)

This conclusion is based on analysis in Appendix A of the ACCC's Attachments. Frontier Economics has undertaken a detailed review of the analysis in this Appendix in its separate companion report.

We find that the ACCC's conclusion is contingent on a number of flawed assumptions, including:

- that trade does not occur with non-State Water customers (i.e. interstate users)
- that water market prices remain many times higher that the water delivery charge even in years of high water availability
- that delivery charges must be paid on all water volumes that are allocated and not traded (i.e. delivery charges cannot be avoided by a water user choosing not to use available water).

By using realistic assumptions to characterise the problem, we find that leaving delivery charges high does affect efficiency of water use.

In particular, we identify two key issues where the high delivery charges under State Water's current tariff structure would affect the economic efficiency of water use, namely:

- efficiency of allocating water between competing uses in the presence of interstate water trade
- efficiency of decisions to use water at times of very low water prices.

We find that when interstate trade is taken into account, high delivery charges in excess of the efficient level can distort water market outcomes and lead to water being inefficiently allocated between competing uses within and outside of State Water areas/valleys. This result holds under the current State Water policy to levy variable usage change on trades to interstate, as well as in the absence of such as policy. State Water's proposed tariff structure would therefore contribute to improving the efficiency of water use.

We also find that it is plausible for the market price of water to fall to extremely low levels (as occurred in late 2011-12) due to high water availability and low water demand. As observed by the ACCC, under such circumstances it is possible that high charges for water delivery will deter some productive uses of water at the margin.

State Water's proposed tariff structure would substantially reduce delivery charges and would therefore contribute to improving the efficiency of water use.

Finding 2

Leaving delivery charges high does affect efficiency of water use

- When interstate trade is taken into account, high delivery charges in excess of the efficient level can distort water market outcomes and lead to water being inefficiently allocated between competing uses within and outside of State Water areas/valleys.
- It is plausible for the market price of water to fall to extremely low levels (as occurred in late 2011-12) due to high water availability and low water demand. As observed by the ACCC, under such circumstances it is possible that high charges for water delivery will deter some productive uses of water at the margin.
- State Water's proposed tariff structure would therefore contribute to improving the efficiency of water use.

To facilitate the efficient functioning of water markets

While the ACCC briefly refers to water markets in their discussion of efficiency of water use, this criterion should have been comprehensively addressed in its own right as it is fundamental underlying objective of the WCIR.

We have identified several aspects of the ACCC's proposed arrangements which could inhibit the efficient functioning of water markets, which would be improved under State Water's proposed tariff structure.

An important aspect of this relates to inter-state trading between State Water's customers and water market participants in other jurisdictions – an issue to which the ACCC inexplicably gives no consideration. More consistent charges across the Basin will facilitate the more efficient functioning of inter-

jurisdictional water markets as different customers' water trading decisions will not be distorted by the structure of the tariffs they face (see discussion above). Goulbourn Murray Water (GMW) has already moved towards more cost-reflective tariffs with 85% of their tariff revenue coming from fixed charges (GMW 2012, p. 65).

Table 1: Fixed: Variable charges in Basin jurisdictions

	State Water	Goulburn-Murray Water [a]	SA [b]	Sun Water (Macintyre Brook)	Sun Water (Burdekin Haughton)
Fixed	40%	100%	100% [b]	90%	96%
Variable	60%	0%	0% [b]	10%	4%

Notes: [a] Goulburn-Murray Water bulk water charges are all based on the number of water shares (water access entitlements) held by customers. Irrigation infrastructure deliver service charges are approximately 85-90% fixed, and 10-15% variable. [b] In South Australia, water users are not charged for bulk water services. A NRM levy (division 2) is legislated and governed under the Natural Resources Management Act 2004 and is applicable to all licence holders in the Natural Resources SA Murray-Darling Basin (SA MDB) region and is charged on the basis of water entitlement held (i.e. 100% fixed). NRM water levies are directly attributable to the SA MDB Regional NRM Plan, which is protecting and improving the condition of the natural resources of the SA MDB region. A 'Save The River Murray Levy' is also charged to all SA Water customers as a fixed charge per quarter.
Sources: GMW (2014); SA Govt (2014); SA Water (2014); Sunwater (2014a and 2014b).

The ACCC's Draft Decision to not approve State Water's proposed shift to a more cost-reflective tariff structure with a higher fixed: variable structure leaves it as a clear outlier.

This does not sit comfortably with one of the key stated purposes of the WCIR overseen by the ACCC being "to introduce a more consistent approach to pricing across Basin jurisdictions" (p. 3).

In addition, the ACCC has placed considerable weight on the use of the current tariff structure as a risk-management tool for water users. Moreover, it states that if additional risk management tools were available in the water market, there would be no need for the tariff structure to play this role. As discussed in Frontier's review of Appendix A, such risk management products to which the ACCC refers are in fact becoming available (e.g. the recent launch of Waterfind's Forward Market), which would by the ACCC's own admission remove any need to use the tariff structure as a risk management tool.

The point here is that the explicit retention of the current tariff structure to manage risk for some irrigators itself represents a potential impediment to the development of such water market products, or at least dampens the demand for them. This would seem to run counter to the whole thrust of the Water Act and the WCIR to promote efficient water markets across the MDB.

Finding 3

The ACCC's proposal does not contribute to the BWCOP in relation to facilitating the efficient functioning of water markets.

Avoid perverse or unintended pricing outcomes

In effect the ACCC's Draft Decision, by virtue of its (in our view incorrect) assessment of the other requirements and criteria, relies entirely on its interpretation and assessment of this criterion, which on any reasonable reading of the BWCOP represents a side-constraint rather than a primary objective of the WCIR. We note that, while this is one of the BWCOP, it was not seen by the ACCC as sufficiently important to be included in the list of pricing principles relating to tariff structures in Appendix A of the ACCC's *Guide to the water charge (infrastructure) rules: Pricing application for Part 6 operators* (ACCC 2011b).

Nevertheless this is one of the BWCOP which needs to be addressed in assessing State Water's proposal and the ACCC Draft Decision.

In doing so, there is a need to carefully consider what is meant by the term "perverse or unintended pricing outcomes", as it is potentially subject to many different interpretations. Given the weight placed on this criterion, we would have expected the ACCC to have had a substantive discussion of what might reasonably characterise this term.

Unfortunately, the ACCC makes no attempt to characterise what would define a "perverse or unintended outcome". For example, a "perverse or unintended outcome" might reasonably be taken to mean a pricing signal that provided inappropriate incentives or where a regulated price would distort outcomes in a related competitive market. For example, water pricing reforms under the NWI explicitly recognised that the traditional under-recovery of costs of supplying water to users were seen as providing perverse incentives for excessive use of the resource and exacerbating adverse environmental outcomes. In the current context, a "perverse or unintended pricing outcome" might reasonably be seen as setting a regulated price that undermined achievement of the other BWCOP, such as a price that impeded efficient water trading in the MDB.

A "perverse or unintended outcome" might also be seen as occurring where risk is allocated in such a way that it entails a 'moral hazard'. For example, it might be contended that a government guarantee of financial institutions encourages them to engage in riskier behaviour than they otherwise would, even though this is clearly not the intent or objective in providing such a guarantee.

Rather than carefully define the circumstances which might define a "perverse or unintended pricing outcome", the ACCC has simply selected one situation that it asserts constitutes a "perverse or unintended pricing outcome", namely the transfer of volume-related risk to irrigators, which it claims may increase the

economic risk faced by irrigators during periods of low water availability by increasing the variability of their cashflows. The ACCC states that:

> The ACCC considers State Water's proposed 80:20 fixed to variable pricing structure may lead to perverse or unintended pricing outcomes. The ACCC considers the 80:20 tariff structure would increase the financial risk to State Water's customers. During dry periods, customers, particularly those holding general security entitlements, are less likely to receive their full allocation of water. A high entitlement cost means that these users would pay relatively more for their water during dry periods when they are also likely to have less ability (due to reduced crop yields) to pay for the water.
>
> The ACCC is concerned that State Water's proposal will reduce the cash-flow of water users in dry periods, which may limit their ability to finance their activities, with potentially detrimental economic impacts. This could give rise to perverse or unintended pricing outcomes. The ACCC does not consider that this transfer of risk to customers through an 80:20 tariff structure would contribute to the BWCOP. (ACCC 2014a, p. 16)

Appendix A elaborates on the ACCC's position:

> In addition, there can be other real effects. Specifically, although many of State Water's customers are large corporations or town councils, many of State Water's customers are owner-farmers. These smaller enterprises often do not have easy access to capital markets – that is, they cannot easily raise equity and often face borrowing constraints. The amount such customers can borrow is typically limited by a worst-case scenario – that is, the cash-flow in a bad year, or in a string of relatively bad years. An increase in cash-flow volatility will likely increase the probability the cash-flow from a bad year or string of bad years will fall below any given threshold. As a consequence, an increase in volatility can reduce the amount the customer can borrow. This may, in turn, limit investment, which can have an impact on farm productivity. In other words, shifting risk on to these customers may have harmful economic consequences. (ACCC 2014b, p. 278)

This line of argument stretches credulity. It would require accepting:

- that State Water's proposed tariff structure involves transferring an "unreasonable" amount of volume-related risk from State Water to customers which is inappropriate
- that State Water's proposed change to the tariff structure would have such a material impact on irrigator's cashflows particularly during dry years as to itself be a major cause of irrigators not being able to obtain finance
- that any impacts of assigning more volume-related risks to water users are "perverse" or "unintended" and represent some sort of market failure to be addressed by State Water
- that no better instruments for farmers to manage such risks or to address any concerns about the financial viability of some farmers exist.

We address each of these propositions below.

Appropriate allocation of risk

A key conclusion of the ACCC's analysis in Appendix A is that State Water's proposed tariff structure should not be adopted because it involves some risks being assumed by water users. Biggar suggests (ACCC 2014b, p. 278) that:

> To the extent to which State Water's customers are risk-averse, exposing customers to risk in this way can be undesirable – it directly reduces overall economic welfare.

In Frontier's view, the ACCC's analysis is grossly inadequate for reaching a conclusion on the appropriate allocation of risk between State Water and users. It does not provide a comprehensive and robust assessment to support the conclusion it reaches on this issue.

We would have expected to see a comprehensive analysis which clearly identified the risks and how they are manifested, an assessment of who is best placed to manage these risks, and a discussion of risk aversion of the parties. No assessment is made by the ACCC of the relative risk aversion or ability of State Water and water users to manage the relevant risks).

The notion that irrigators are likely to be highly risk-averse (or more risk averse than State Water) seems problematic. Irrigated agriculture would seem to be an inherently risky activity, being subject to international commodity prices, water availability, climatic conditions etc.

Moreover, the ACCC has made no comment about State Water's likely preferences for risk. We note that State Water is a bulk water infrastructure operator (ACCC 2013, p. 7). It does not own the water, it stores and transports it and has responsibilities to meet service standards and other legal obligations imposed upon it. In this regard, the ACCC's statement (ACCC 2014a, p. 16) that users would pay relatively more for their water during dry periods is misleading and reveals fundamental misconception on the ACCC's part. The fixed entitlement charge is not for the delivery of water – which is owned by the irrigators – but is for the maintenance of the system which provides the potential for water to be delivered. This cost is incurred regardless of whether water is delivered or not.

Nor does the ACCC appear to have considered the ability of the parties to manage the relevant risks. The key risk relates to volume-related risk. A number of other economic regulators including some operating in the MDB have accepted that regulated water businesses are not well-placed to assume volume-related risk. The position adopted by the ACCC on this issue would seem to run counter to the objective of the WCIR to promote consistent pricing practices across the MDB.

Allocating the majority of volume-related risk to water users could hardly be seen as perverse. In Frontier's view it would be completely appropriate and economically efficient for demand risk to be assigned primarily to water users.

This brings into serious question the ACCC's retention of a tariff structure which effectively allocates significant volume risk to State Water which it itself concedes State Water has no ability to manage.

The implications of assigning demand risk to State Water need to be clearly articulated, as these risks may ultimately be borne by its customers. At the end of the day, costs incurred in operating State Water's network are largely fixed and incurred regardless of volumes delivered. These costs need to be recovered from the users of the system – if not now then in the future. If they are not, then the users are effectively being subsidised by the NSW Government – i.e. taxpayers. Indeed, the conclusion that State Water should bear the majority of demand risk seems to be based on a presumption that State Water is able to do so simply because it is a government-owned business with 'deep pockets' by virtue of that ownership or recourse to taxpayer-funded subsidies.

Materiality of impacts from such a risk assignment

The ACCC do not appear to have undertaken any assessment of the materiality of this issue in practice, for example:

- how many farmers are there who can be characterised in this way?
- what proportion of these farmers' costs is typically accounted for by water costs (i.e. what impact would State Water's proposed tariff structure have on the costs incurred by farmers in dry years?)
- what factors do financiers actually take into consideration in their lending decisions to farmers and how significant is the volatility of annual revenues?

We have undertaken an analysis based on farm budgets to help put the proposed changes to fixed water charges in perspective in our review of Appendix A. We find that the proposed change to lower delivery fees results in small changes in farm business financials as compared to many other risks that they face. We therefore question whether this change would significantly affect farm viability to the extent that the change in tariff structure could be said to be a prime cause of farmers not being able to obtain finance.

Is there a market failure?

In effect, the ACCC appears to be implying that there is some failure in the capital market which is inefficiently preventing these farmers from obtaining finance from banks or other financial institutions and that the proposed tariff change would be sufficient to trigger credit-access problems. No evidence is presented for this proposition. If such enterprises have difficulty in raising finance, this may simply reflect an assessment by the financial institutions of the underlying long-term viability of the business in question, rather than the annual volatility of their cashflows. Biggar is effectively arguing that State Water should

assume the role of banker for farm businesses which cannot obtain finance in the market.

Other measures to address water users' risks and financial difficulties

A recent report by Frontier Economic for the National Water Commission revealed that there are a number of sophisticated water trading contracts, that are based on transactions of water entitlements or allocations, which are already on offer in the southern MDB. Brokers and large investors are the principal providers of these offerings, which include forward contracts (NWC 2013). We also note that Waterfind has recently announced the launch of its Forward Water Market (Waterfind 2014). It notes:

> As Australia's first live forward water market it enables the contracting of temporary or permanent water parcels at a set price to be delivered at a future date. This enables clients to remove market uncertainty and plan for future irrigation requirements.

Clearly, the risk management products to which the ACCC refers are in fact becoming available, which would as the ACCC suggests remove any need to use the tariff structure as a risk management tool.

Finding 4

Risk-management tools in the water market already exist and are becoming more widely available and therefore their absence should not be used to justify the use of the tariff structure as a risk management tool.

The ACCC also does not appear to have recognised that there are already a number of mechanisms in place to more directly assist famers who may experience financial difficulty during periods of low water availability.

These include the existing hardship provisions that State Water provides to its customers (see box).

Box 1: State Water's hardship provisions

State Water can negotiate a payment plan for your account if you are experiencing genuine hardship. This will reduce the risk of your licence being suspended for non-payment.

To be eligible for a deferred payment plan longer than three months, you must satisfy one or more of the following conditions:

- You are receiving direct benefits from the Commonwealth Exceptional Circumstances Scheme
- You are receiving benefits under a State-operated drought or other natural disaster relief scheme
- You are suffering conditions arising from a drought of record in your valley/area, and have no carryover water or access to other water
- You are experiencing conditions that create a direct and significant impact on your ability to pay water charges.

Your application must be supported by one or more of the following:

- Documentary evidence from Centrelink or the Rural Assistance Authority that demonstrates financial hardship
- Evidence that farm income has been reduced by at least 70% due to the abnormal conditions being experienced
- A Statutory Declaration of off-farm income and investment levels, with evidence that annual off-farm income is less than $20,000 per annum
- Evidence that you have attempted to trade any available water on the temporary or permanent market, e.g. copies of water transfer applications.

Overdue bills will continue to attract interest.

We carefully and confidentially consider all applications to defer payments. However, requests for negotiated payments are not automatically approved.

Source: State Water nd.

There is also a range of government schemes and policies in place to assist farm businesses to manage farm income volatility and periods of hardship such as drought. These include:

- the Farm Management Deposits (FMD) Scheme — assists primary producers to deal more effectively with fluctuations in cash flow. It is designed to increase the self-reliance of Australian primary producers by helping them manage their financial risk, meet their business costs in low-income years and facilitate increased financial self-reliance.
- Interim Farm Household Allowance — income support (similar to other Newstart/Centrelink payments) which have a different asset test so that more farmers, including those affected by drought, will be able to access income support when they need it.
- Drought Concessional Loans — available to drought-affected farm businesses for debt restructuring, operating expenses and drought recovery activities.

- Emergency Water Infrastructure Rebate Assistance — available to primary producers in drought affected areas as a 50% rebate to establish infrastructure to supply water for emergency animal welfare needs.
- Other assistance in drought-affected areas, including assistance in reducing the impact of pest animals and increased funding for the delivery of social support services.

Finding 5

There are more direct and targeted measures to address any concerns about the financial position of water users at times of low water availability than to distort the tariff structure for all users and to impose risks on State Water which it is not in a position to manage.

Other effects of the ACCC's proposal which could lead to perverse or unintended outcomes

There is a range of other potential consequences from the adoption of the ACCC's proposal which could lead to outcomes which could in our view far more legitimately be seen as "perverse or unintended". These include:

- Adverse impacts on State Water's financial position and the ability of Directors to fulfil their fiduciary duties
  - the potential for a very large balance to be built up in the 'unders and overs' account during extended dry period which could lead to a significant increase in debt for State Water which could put it in an adverse financial position and compromise its ability to deliver services and/or to borrow to invest. It could also place the Directors of Stare Water in an invidious position where they are effectively forced to borrow simply to find ongoing operations thereby accruing a debt over which they had no control.
- The need to resort to a taxpayer-funded subsidy to avoid the above outcomes (as occurred during the recent drought).
- Arbitrary inter-generational equity impacts:
  - Large accumulations are not consistent with concepts of intergenerational equity (providing either an implicit subsidy to current irrigators funded by future irrigators, or alternatively providing an implicit subsidy to future irrigators by over-recovering from current irrigators). We note that IPART previously rejected State Water's proposal to create an 'unders/overs' account on the basis that this would "shift costs across determinations", and therefore, potentially across different groups of customers, raising intergenerational equity concerns (IPART 2010, p. 54).
- Impediments to interstate trade:

- As discussed above, State Water's current tariff structure could inhibit the development of risk-management products in the water market.

Finding 6

The ACCC's argument that State Water's proposed tariff structure could fail to "avoid perverse or unintended pricing outcomes" would require accepting a range of propositions:

- that State Water's proposed tariff structure involves transferring an "unreasonable" amount of volume-related risk from State Water to customers which is inappropriate
- that State Water's proposed change to the tariff structure would have such a material impact on irrigator's cashflows particularly during dry years as to itself be a major cause of irrigators not being able to obtain finance
- that any impacts of assigning more volume-related risks to water users are "perverse" or "unintended" and represent some sort of market failure to be addressed by State Water
- that no better instruments for farmers to manage such risks or to address any concerns about the financial viability of some farmers exist.

None of these propositions withstand rigorous scrutiny. In contrast, a number or perverse or unintended outcomes are very conceivable under the ACCC's proposed tariff structure and associated form of price control. The ACCC cannot credibly maintain this argument as the dominant rationale for its Draft Decision on State Water's tariff structure.

Pricing transparency

The ACCC contends with respect to the current 40:60 tariff structure that it "is transparent in that customers understand this tariff structure and can relate their volume of water use to the level of charges they pay" (ACCC 2014a, p.17).

The ACCC fails to explicitly acknowledge, however, in its Draft Decision that State Water's proposed 80:20 tariff structure clearly meets this BWCOP as it also simple to understand.

In fully assessing this criterion, however, as with other BWCOP criteria, it is necessary to consider the proposed tariff structure together with the associated form of price control.

As discussed in more detail in section 3 below, the ACCC propose to adopt a Loss Capitalisation Model or 'unders and overs' mechanism to operate in conjunction with the 40:60 tariff structure as a means of seeking to ensure revenue adequacy for State Water.

In our view, any system that involves a potentially extended carry-forward of capitalised under–recovery over long periods becomes inherently complicated and much less transparent than one where costs attributable each year are reflected in bills each year (or any under- or over-recoveries are recouped in a timely manner).

Moreover, the ACCC has not demonstrated that customers would understand and accept such a mechanism as an essential accompaniment to the retention of the current tariff structure, particularly as it could give rise to significant shifting of cost recovery from one regulatory period to another or even between different generations of farmers. This would be a quite conceivable result of this adjustment mechanism if there were prolonged periods of extensive under-recoveries (e.g. due to drought) or over-recoveries. This could understandably lead water users to question why their bills were far in excess of State Water's efficient costs during a particular regulatory period, if they included a significant component of 'catch up' of under-recoveries from periods well in the past.

It is difficult to see how the ACCC's proposal (the current tariff structure accompanied by a loss capitalisation model) can be said to meet the water charging objective in relation to pricing transparency.

Consumption-based component

The ACCC observes that the current 40:60 tariff structure contributes to the BWCOP objective to include a consumption-based component (ACCC 2014a, p.17).

However, the ACCC fails to explicitly acknowledge in its Draft Decision that State Water's proposed 80:20 tariff structure equally meets this BWCOP as it also contains a significant consumption-based component.

Principle of user pays

The Water Charging Objectives are also required to give effect to the principle of user pays.

The primary economic rationale for the ACCC's proposed approach appears to be that State Water is better able to manage the cashflow concerns of its customers than they are themselves. This argument presumes that all general security licence holders have such cashflow issues and that State Water can address these at lower cost.

Moreover, it ignores the fact that some of State Water's customers may not face any serious cashflow constraints or may already have other options for hedging this risk and so do not require this service. This would mean that these customers would be paying for State Water to provide a service that they do not require. Given they would be required to contribute to funding State Water's shortfalls they would be effectively cross-subsiding other users. This would not be

consistent with the Water Charging Objectives which are to give effect to the principle of user pays. Neither would the transfer of costs across generations of water users as could occur under the ACCC's approach.

2.3 Overall conclusions

The ACCC's obligations

As noted above, under the WCIR the ACCC must not approve the regulated charges set out in an application unless it is satisfied that:

- The applicant's total forecast revenue (from all sources) for the regulatory period is reasonably likely to meet the prudent and efficient costs of providing infrastructure services in that regulatory period; and
- The forecast revenue from regulated charges is reasonably likely to meet that part of the prudent and efficient costs of providing infrastructure services that is not met from other revenue.

If the ACCC is not satisfied that the regulated charges were calculated in accordance with these criteria, it must determine the charges so as to be satisfied that these criteria are met.

It must also have regard to whether the regulated charges would contribute to achieving the BWCOP set out in Schedule 2 of the Water Act when approving or determining regulated charges.

The ACCC's approach

It would appear that the ACCC has not accepted State Water's proposed tariff structure (and related revenue cap) not because it considers they would not meet the criteria above in relation to generating sufficient revenue to meet State Water's prudent and efficient costs, but rather because in its view they do not contribute to the BWCOP set out in Schedule 2 of the Water Act.

As noted above, in having regard to the BWCOP, the ACCC stated that it considered the following aspects of the BWCOP to be particularly significant:

- to avoid perverse or unintended pricing outcomes
- to ensure sufficient revenue streams to allow efficient delivery of the required services
- to promote the economically efficient and sustainable use of water resources.

The ACCC stated that it placed more weight on these aspects of the BWCOP as it considered them to be the most relevant to determining water charges for MDB valleys. The ACCC stated that it considered that the current tariff structure best contributes to the BWCOP.

Our assessment

The Explanatory Statement for the WCIR states that the purpose of the Rules is to address the various issues that arise from operators having market power as natural monopoly service providers, and to introduce a more consistent approach to pricing across Basin jurisdictions. It notes that:

> The Water Act, which builds on earlier reform initiatives including the National Water Initiative (NWI), creates new institutional and governance arrangements to improve the sustainability and management of water resources in the Murray-Darling Basin (Basin).
>
> A key element of this reform is a consistent approach to the pricing of water storage and delivery services across the Basin to promote the efficient use of and investment in water infrastructure, and to improve the efficiency of water markets.
>
> The infrastructure associated with water supply and delivery exhibits natural monopoly characteristics, which means that competition is unlikely to develop between water infrastructure operators (operators). In the absence of competition, prices, quality, service levels and innovation can diverge from competitive levels, which could result in less efficient market outcomes.
>
> Each of the Basin jurisdictions currently has different arrangements in place for regulating fees and charges levied by operators on water users. Inconsistent pricing policies across interconnected markets can create trade distortions with ramifications for the economically efficient use of, and investment in, water infrastructure. (p.2–3)

This clearly suggests that in assessing the BWCOP, primary emphasis should be given to economic efficiency considerations and in particular efficient use and investment in water infrastructure and the development of efficient water market in the MDB.

Finding 7

The ACCC has not adequately assessed its own and State Water's proposed tariff structure and form of price control against each of the BWCOP criteria and has also given undue weight to (and problematic interpretation of) the BWCOP relating to perverse or unintended price outcomes.

Our detailed analysis of both the ACCC's and State Water's proposed tariff structure against each of the key requirements of the WCIR and BWCOP demonstrates clearly that State Water's proposal meets all of the criteria (and should therefore have been approved) while the ACCC's proposal does not.

Finding 8

The ACCC's Draft Decision does not comply with the requirements under the WCIR because:

- State Water's proposed tariff structure (and associated revenue cap) proposal does meet the WCIR requirements and meets all of the BWCOP. It should therefore have been approved by the ACCC.
- The ACCC's proposed tariff structure (and associated LCM) does not meet the WCIR requirements and the BWCOP:
  - it cannot reasonably be assessed as meeting the WCIR requirements regarding revenue adequacy
  - it does not meet some of the BWCOP or at least does not meet them as well as State Water's proposal.

3 Form of price control

3.1 Introduction

3.1.1 State Water proposal

State Water proposed:

- A revenue cap with annual price adjustments and carryover of any shortage or excess revenue between regulatory periods
- A 15% annual rebalancing constraint on annual price adjustments.

3.1.2 ACCC draft decision

The ACCC's draft decision is to impose a price cap (based on a 40:60 fixed: variable price structure) together with a Loss Capitalisation Model termed an 'unders and overs' mechanism whereby an adjustment to revenue in any single year is calculated by multiplying the rate of return (WACC) by the balance in the under and overs account.

The ACCC explicitly recognised that State Water may need to debt fund shortfalls:

> If there are dry periods, with an 'unders' and 'overs' account State Water will receive a return on the balance in the account, thereby recognising any additional borrowing costs needed by State Water to manage its cash flows during such periods. (ACCC 2014b, p. 256)

It proposed to treat Murray Darling Basin Authority (MDBA) and Border River Commission (BRC) charges differently, by recovering in the subsequent regulatory year the full revenue shortfall arising from a variation in water usage from that forecast in the previous year.

3.1.3 Stated reasons for draft decision

The ACCC's decision appears to be based primarily on balancing objectives in the pricing principles

> ... the decision in applying a form of price control will largely reflect a decision about achieving revenue stability for the operator and price stability for customers (ACCC 2011a, p. 51)

In making its decision the ACCC stated that it had considered the WCIR, the ACCC pricing principles (ACCC 2011) and the BWCOP. The ACCC placed particular importance on the BWCOP under Schedule 2 of the Water Act, and in particular the two pricing principles:

- to avoid perverse or unintended pricing outcomes.

- to ensure sufficient revenue streams to allow efficient delivery of the required service.

The ACCC is concerned that many customers have cashflows that are positively correlated to water availability, and that therefore the State Water proposed revenue cap and 15% constraint will have too detrimental an impact on price.

The ACCC considers that a 40:60 tariff structure in conjunction with the Loss Minimisation Model account will allow State Water to recover sufficient revenue streams to allow efficient delivery of the required services

The ACCC believes its decision balances adequacy and stability of revenue outcomes for state water and price stability and relative certainty for its customers.

3.2 Analysis of ACCC's Draft Decision

Frontier does not support the ACCC's conclusions:

- The ACCC's decision on the form of price control is a by-product of the ACCC's decision to maintain a 40:60 tariff structure. Were the ACCC to approve a more cost-reflective tariff structure, the need for a Loss Capitalisation Model would be reduced or removed.
- The effectiveness of the Loss Capitalisation Model depends on equalisation of under-recoveries and over-recoveries over the long run. The ACCC assumes that over the long run the net present value of the over-recoveries will equate with the under-recoveries. This conclusion depends on a number of assumptions which do not hold in practice.

Frontier's analysis of the ACCC's proposal focuses on:

- How the mechanism would work and its potential impacts in practice
- Consistency with the BWCOP and WCIR
- Regulatory precedent.

3.2.1 How the mechanism would work

As noted above, the mechanism would work by the establishment of an 'unders and overs' account which increase or decreases each year by the difference between the forecast demand (i.e. 20 year long-term average) and the actual demand multiplied by the variable delivery charge.

By definition any shortfall must be funded outside of regulated revenue. This implies that any shortfalls must be funded either through injections from the shareholder or through the acquisition of debt. The structure of the Loss Capitalisation Model means that State Water can only earn a return on the RAB (i.e. the balance in the unders and overs account). Where the RAB is funded

through debt this means that State Water can only recover the costs of capital and cannot recover a return of capital through price adjustments. In this sense the Loss Capitalisation Model is analogous to an interest-only loan. Rather than having a defined repayment period, however, in this case the principal is only ever retired when a corresponding offsetting over-recovery occurs (i.e. during periods of above-average deliveries).

A further implication of this is that the effectiveness of the Loss Capitalisation Model depends quite strongly on the assumption that under- and over-recoveries will be symmetric, given that regulated prices are set on the 20 year average consumption levels. Issues will arise if the distribution of unders and overs around the average is not symmetric within a reasonable timeframe. If in the medium or short term they are not then State Water has the potential to accrue materially large balances (positive or negative) in its Loss Capitalisation Account. To the extent that theses balances are not annulled for many years, the model would have the effect of re-allocating costs over generations rather than being a price smoothing mechanism. Moreover, as discussed in more detail in the companion report reviewing Appendix A, periods of prolonged under- or over-recoveries will impact on the NPV neutrality of the Loss Capitalisation Model for State Water.

3.2.2 Consistency with BWCOP and WCIR

The following discussion examines the consistency of the ACCC's proposed loss capitalisation mechanism (in conjunction with a 40: 60 fixed: variable tariff structure).

The WCIR make no explicit reference to the form of price control which should be applied. The ACCC pricing principles (ACCC2011a) provide very little guidance in terms of form of price control — a regulator may apply any form of price control – subject to meeting the requirements of the WCIR.

The pricing principles note that the main choice is between price cap and revenue cap and when choosing a form of price control the regulator will need to weigh up revenue stability for regulated businesses and price stability for customers.

This statement in itself raises the question as to why the ACCC feels the need to invent a new mechanism like the LCM to address this trade-off. As noted below, we are not aware of any previous regulatory precedent for using a LCM merely for the purposes of smoothing prices to existing customers (as opposed to dealing with growth of a network). In our view a standard revenue cap provides ample scope to optimise such trade-offs (e.g. by varying the cap on annual price adjustments). More fundamentally, we would argue that State Water's proposal of a progressive shift to a more cost-reflective tariff structure in combination with a revenue cap (subject to a 15% price cap) would in fact provide both revenue

stability and price stability thus largely avoiding the need to balance such trade-offs that arise from the ACCC's proposal.

Given that it makes sense to assess how well the proposed form of price control meets the various WCIR and BWCOP by looking at it in conjunction with the proposed tariff structure, the analysis of this in section 2.2.1 above has already undertaken this assessment. To briefly recap, the ACCC's proposed approach (tariff structure together with form of price control) fails to meet the WCIR and the BWCOP. In particular, the LCM 'unders and overs' mechanism fails to ensure sufficient revenue streams to allow efficient delivery of the required services, and could cause rather than avoid perverse or unintended pricing outcomes arising where the proposed ACCC form of price control leads to large positive or negative accumulations.

3.2.3 Regulatory precedent

It would appear that such a loss capitalisation mechanism has been applied previously only in very limited circumstances, mainly related to network development.

Frontier is only aware of two other instances where the ACCC has approved a Loss Capitalisation Model. These are:

- Australian Rail Track Corporation's Hunter Valley Rail Network Undertaking (29 June 2011)
- NBN Co.

In both instances the Loss Capitalisation Model was adopted as a mechanism to allow or facilitate investment in network growth. The LCM was seen as providing the business with the ability to incur losses while the network expansion occurs during the initial period when the growth assets may be under-utilised. In the case of Hunter Valley the LCM was approved for zone 3 expenditures on the basis that:

> a key benefit of the capitalisation approach is that it seeks to provide greater flexibility to facilitate expansion of the network, particularly in the outer limits of the network where the investment is likely to be more risky due to uncertainty about future volumes. As such, it will result in a pattern of access charges over time that is consistent with utilisation of the asset. (Australian Rail Track Corporation 2009, p. 101)

In the Hunter Valley decision the ACCC even expressed concerns that the LCM may be applied to existing assets:

> The ACCC therefore has some reservations with the proposal from ARTC that seeks to allow the capitalisation of losses in relation to existing assets in Pricing Zone 3. The ACCC is, however, prepared to accept incorporation of loss capitalisation as proposed in the June 2011 HVAU on the basis that users of the network in Pricing Zone 3 have provided to the ACCC statements not objecting to its implementation in this manner. (ACCC 2011c, p. 44)

In the ACCC position paper for 2010 Hunter Valley access undertaking (withdrawn) the ACCC stated:

> … in relation to loss capitalisation, and considers that in order for the undertaking to be appropriate, it should clearly state that ARTC may only utilise loss capitalisation in relation to new investment in Pricing Zone 3. The ACCC has revised its view for the following reasons.
>
> The intent of loss capitalisation is to allow under-recovery of economic cost for a period and then recovery of the relevant shortfall at a later date. In appropriate circumstances loss capitalisation may therefore operate to facilitate investment in new assets where there is limited initial demand, by allowing initial under-recovery of relevant costs in the expectation of 'making up' the shortfall when demand reaches an appropriate level. Loss capitalisation may not, of course, be the only method of encouraging investment in these circumstances, and the particular form of its implementation may require scrutiny.
>
> As ARTC has indicated, it does not expect to recover the economic cost of the network in Pricing Zone 3 in the immediate term. However, the ACCC understands that Pricing Zone 3 serves mines in the Gunnedah Basin, which include new mines by companies such as Whitehaven and Idemitsu, as well as potential new entrant Shenhua Coal.58 The use of loss capitalisation in relation to Pricing Zone 3 may, therefore, facilitate ARTC investing in track infrastructure to service those mines, and therefore facilitate increased coal exports via the Port of Newcastle. This is consistent with a conservative application of the above understanding of loss capitalisation.
>
> Further, the ACCC considers that using loss capitalisation in relation to new investment in Pricing Zone 3 is consistent with the ACCC's general views in the Additional Capacity and Investment chapter regarding investment in the Hunter Valley rail network, and should be seen in that light. (ACCC 2010, p. 81)

In the case of the NBN a loss capitalisation model was adopted to allow for systemic under-recovery of revenue during the early stages when infrastructure is being rolled out and uptake is low. These shortfalls would then be recovered from future customers once the infrastructure is in place and uptake has occurred. Note that there are quite severe pricing restrictions placed on the NBN

Based on regulatory precedent the LCM is clearly intended to be a mechanism to allow businesses to alleviate the risk associated with investment in growth assets. This is not the case with State Water. In the case of State Water the LCM is being applied to existing assets, and may simply transfer costs from one generation of customers to another.

3.3 Alternative mechanisms to ensure revenue adequacy

Based on the analysis presented above, Frontier does not consider that the ACCC's proposed tariff structure and associated LCM meets the revenue

adequacy provisions of the WCIR or the BWCOP and considers that it exposes State Water to considerable financial risk.

In Frontier's view the approach proposed in State Water's Application, namely progressively moving to a more cost-reflective tariff structure together with a revenue cap represents the best alternative to the ACCC's proposal.

If, despite the many cogent arguments to move to a more cost-reflective tariff structure the ACCC were to retain the current tariff structure in its Final Decision, there would be a need to develop an alternative form of price control which avoided the major deficiencies of the ACCC's proposed LCM.

The following discussion identifies and assesses a number of alternative approaches:

- State Water's proposed cost-reflective tariff structure together with a revenue cap subject to a constraint on price impacts (proposed at 15%)
- the current tariff structure as proposed by ACCC with a revenue cap mechanism
- a revenue volatility allowance as adopted by IPART
- an adjusted LCM 'unders and overs' mechanism
- an increase in the allowed WACC.

3.3.1 State Water's proposed tariff structure with a revenue cap subject to a constraint on price impacts

In Frontier's view the approach proposed in State Water's Application, namely progressively moving to a more cost-reflective tariff structure together with a revenue cap represents the best alternative to the ACCC's proposal.

Importantly, it involves moving to a tariff structure that best meets the WCIR and the BWCOP (as discussed above) including ensuring revenue adequacy for State Water.

In our view it provides a good balance between revenue certainty and stability for State Water and price impacts on customers.

Unlike the ACCC's proposal, the revenue cap form of price control ensures that State Water can in fact recover its efficient revenue requirement (while also ensuring that any over-recoveries are returned to customers) and does so within a reasonable timeframe.

It is also important to note that because the tariff structure is more cost-reflective, the monetary value of any unders or overs would be much lower under this approach.

The proposed revenue cap form of price control would help address the volume risk facing State Water, particularly during any transition to a more cost-reflective

pricing structure. On its own, however, a simple revenue cap may increase the variability of charges. The State Water proposal addresses this issue by applying constraints to annual price changes. It is worth noting that the imposition of constraints on annual price changes coupled with a period of prolonged under recovery (such as a drought) may result in State Water not being able to recover sufficient revenue within the regulatory period. However, the proposed carry-over mechanism would help to address these concerns.

There are several other examples of revenue cap regimes in operation. A revenue cap regime is applied by the Victorian ESC in regulating Victorian rural water businesses including GMW. The ESC also applies a revenue cap (with a carryover mechanism) to GMW. The ESC noted in its submission to the ACCC draft pricing principles that:

> Fixed prices could lead to large under or over-recoveries of revenue. Given that the variability of rainfall and revenue cannot be controlled by water businesses, it is inappropriate to apply the incentive properties of a price cap regime to them. Providing businesses with the option of a revenue cap or hybrid cap has proven in practice to be the most prudent choice. (quoted in ACCC 2011a, p. 69)

GMW has suggested its customers are satisfied with a revenue cap regime in its submission to the ACCC draft pricing principles:

> Customers are used to and accept the current pricing arrangements for a rural water business (in Victoria). The current pricing method enables G-MW to manage risk jointly with customers, which ultimately arrives at a more stable price over time and customers only paying for the cost of the service. (quoted in ACCC 2011a, p. 69)

We also note that this approach would facilitate a potential move to a price choice model in the future whereby customers could choose to pay slightly more for a more variable tariff structure.

Revenue cap regimes are also applied in electricity and gas transmission. In both these examples the businesses' costs are largely independent of the volumes transmitted. A revenue cap was considered an appropriate mechanism to manage the demand risks faced by these network industries. A revenue cap is also sometimes chosen in order to remove any disincentives for a company to promote excessive consumption (water or energy) efficiency.

3.3.2 Current tariff structure as proposed by ACCC with revenue cap mechanism

This alternative would involve supplementing the current 40:60 tariff structure with a revenue cap along the lines of that in State Water's proposal (rather than the ACCC's proposed 'unders and overs' LCM).

This approach would have a number of advantages in common with State Water's original proposal. Again, the revenue cap component ensures that State Water can in fact recover its efficient revenue requirement (while also ensuring

that any over-recoveries are returned to customers) and does so within a reasonable timeframe. As noted above, the underlying revenue cap mechanism is consistent with precedent in the water and other sectors

However, because the current tariff structure departs significantly from State Water's underlying cost structure, the monetary value of any unders or overs would be higher under this approach than if State Water's proposed tariff structure was adopted. This highlights that in fact State Water's proposed approach does in fact provide very stable prices for users.

The higher monetary value of the unders and overs generated by any given variation of actual deliveries from forecast deliveries will mean that increases in prices will need to extend for longer than under State Water's original proposal (assuming the same cap on annual price increases is adopted). Alternatively, the annual cap on prices could be adjusted.

3.3.3 Current tariff structure as proposed by ACCC with Revenue Volatility Allowance

An alternative approach for addressing State Water's revenue volatility is to continue to include some form of 'revenue volatility allowance' in the revenue requirement which would be recovered through the general security entitlement charge. This is the approach previously applied by IPART and would largely represent a continuation of the status quo.

The revenue volatility allowance was designed by IPART to recover the costs State Water faces in managing the risk of revenue volatility – such as the holding costs it will incur if it needs to borrow funds to conduct its business in years when its revenue is low due to lower than forecast extractions. During the current regulatory period it added around $9 million to State Water's notional revenue requirement (over the 4 years of the 2010 Determination), all of which is allocated to the user share through the general security entitlement charge.

IPART (2010) calculated the current revenue volatility allowance based on the mean of the absolute differences between the 20 year average of extractions and actual extractions for each of the 20 years.

IPART calculated the extraction volatility on an individual valley basis. It measured the level of volatility experienced for each valley over the last 20 years. The volatility was measured in ML and was multiplied by the WACC of 7.4% to derive the holding costs, in revenue terms, which arise from bearing extraction volatility. The allowance was cumulatively applied over the price path, recognising the compounding nature of borrowing costs. The IPART approach resulted in an allowance of around $9 million over the 4-year price path. Annually, the charge is $2.2 million. Consistent with the 'impactor pays' principle, IPART set the price of general security entitlement charges to recover this allowance.

IPART (2010) calculated the revenue volatility allowance as follows:

- IPART calculated the extraction volatility for each individual valley.
- The extraction volatility (in ML) is multiplied by the usage charge for each year of the 2010 Determination to determine State Water's revenue shortfall.
- This revenue shortfall is multiplied by the WACC to determine the holding costs of carrying this shortfall over each year over the 2010 Determination.
- The holding costs that occur over this period are compounded for each year that they are carried over the 2010 Determination.
- IPART derived an annual payment (using an annuity approach) to recover the NPV sum of the holding costs. The annual payment calculated the value of the annual revenue volatility allowance for each of the four years of the 2010 determination. The value of the annual payment is $2.2 million.

The annual revenue volatility allowance for each valley was attributed to the general security entitlement charge.

Depending on how a revenue volatility allowance is calculated it could partially address State Water's volume-related risk within the constraint of the current tariff structure. Given it is largely the continuation of the status quo it may also be more acceptable to some of State Water's stakeholders.

However, it is not clear that a revenue volatility allowance adequately addresses State Water's revenue volatility risk. IPART itself in its 2010 determination of bulk price for State Water noted:

> Although we expect the new approach for forecasting extractions will reduce the risk associated with forecasting error, the inherent difficulties of forecasting variable climatic conditions mean that this risk will not be eliminated. State Water will remain exposed to the risk of revenue volatility due to annual variability in the water available for extraction. (IPART 2010, p. 8)

In any one regulatory period, there may still be a significant under-recovery of State Water's revenue requirement (e.g. where water sales fall dramatically during a drought). Similarly, in periods of water abundance, State Water would receive revenues in excess of those required to efficiently undertake its functions.

This approach also effectively assumes that variations around the long-term average demand will balance out so that State Water recovers its efficient costs over the long run, including the efficient cost of financing revenue shortfalls in period of low sales.

The revenue volatility allowance option also does not appear to consider the potential impact on State Water's financing costs of the possible sequencing of water sales volume outcomes – for example if the first five years under this option are characterised by very low water delivery volumes, State Water's financial position may deteriorate substantially, notwithstanding the revenue

volatility allowance, which would in turn affect its ability and/or cost to access external funding.

Another risk with the approach is that it may be difficult to sustain the 'regulatory contract' into the future. Long-term revenue adequacy will be dependent on State Water receiving the revenue volatility allowance every year, regardless of seasonal conditions. In practice, there is likely to be particular customer resistance to State Water receiving a revenue volatility allowance in times of relative water abundance when it may be perceived as "unnecessary". State Water would therefore be highly exposed to changes in future regulatory decisions.

Another concern with the revenue volatility allowance as developed and implemented by IPART is that it is based on a 'worst case scenario' which sees the continuation of drought into the regulatory period.

3.3.4 Current tariff structure as proposed by ACCC with adjusted LCM 'unders and overs' mechanism

This alternative would seek to address one of the main deficiencies of the ACCC's proposed LCM, namely that the recovery of any extended under-recoveries or the return of any over-recoveries to customers may never occur or may occur at a time a long way into the future (which may also raise significant inter-generational equity concerns).

Under this option rather than the next year's revenue requirement being adjusted only by the balance in the 'unders and overs' account multiplied by the WACC, the adjustment would also incorporate a component covering repayment of the 'principal'. These payments (which would appropriately be incorporated into fixed charges[1]) would be calculated to repay the principal over a defined time period (e.g. 10-15 years which would correspond to a typical term for commercial debt).

This option would ensure that State Water would recover any under-recoveries (or return any over–recoveries) over a defined time period, rather than being dependent on uncertain water availability patterns or being deferred indefinitely. Unlike the ACCC's proposed LCM, this approach would ensure that the cashflows to State Water were NPV neutral, but would also provide a more stable price path for customers which would mitigate any inter-generational equity concerns.

It is also arguable that if the ACCC's LCM model were to be adopted, the LCM should commence with a balance reflecting the substantial accrued under-

[1] This would be consistent with the approach adopted for the revenue volatility allowance set by IPART and should also apply under the ACCC's proposed LCM.

recoveries from previous regulatory periods, rather than the zero balance implied by the ACCC. As noted below, IPART committed in its previous Determination to review the performance of its approach to calculating State Water's revenue volatility allowance should it set prices for State Water at the next determination. This implies an intent that the future regulatory arrangements would need to take into account and/or correct for under-recoveries carried forward under the current arrangements.

3.3.5 Current tariff structure as proposed by ACCC with increase in allowed WACC

Another potential option would be to adjust the WACC to take account of the volume-related risk borne by State Water under the current tariff structure.

While in-principle there may be a case for an increase in the WACC to account for the additional risk imposed by the current tariff structure, calculating the appropriate adjustment would be problematic. It would also not ensure that State Water was able to achieve revenue adequacy under a range of possible water delivery scenarios.

We also note that the ACCC stated in its Pricing Principles that it considers that a change to the WACC is not an appropriate means for compensating an operator for bearing revenue volatility risk, given this is not a risk which is systematic to the business but is created by the tariff structure in place. This is consistent with IPART's rejection of such a mechanism in its 2010-14 Determination. However, by not accepting State Water's proposed shift to a more cost-reflective tariff structure, it is the ACCC which is imposing this risk on the business.

3.4 Assessment of alternative approaches

In order to compare the alternative approaches described above (with the exception of the WACC adjustment approach), Frontier undertook a stylised modelling exercise.

3.4.1 Frontier's approach

Frontier has constructed a model based on a simplified water business that is assumed to have a simple two-part tariff structure (a fixed and a variable component) and prices that are applied uniformly across all of its customers — a single fixed price per ML of entitlement and a single volumetric price per ML of water delivered.

The alternative forms of price control have been applied to the stylised water business in order to illustrate the potential for under- and over-recovery of revenue and the impact such recoveries could potentially have on the financial,

position of the business (specifically the level of debt) and on price impacts on customers.

While the underlying model used by Frontier adopts a simplified version of State Water's actual tariff structure, Frontier has used actual data provided by State Water and by IPART in order to ensure that the results of the model are illustrative of price movements and State Water's actual financial position.

3.4.2 Sources of data

In its application to the ACCC, State Water reported its allowed and actual revenue for the period 2006-07 to 2012-13. Frontier Economics has adopted the allowed revenue stream for the 7 year period as a proxy for the maximum revenue requirement over the period of the model (see Table 2).

The modelling also adopts the assumed extractions allowed by IPART in its previous pricing decisions and the actual extractions that underlie revenue over the same time period (as outlined by State Water in its application). These extractions have been used as a proxy for the volume of water delivered for the modelled business.

Table 2: Revenue and extraction data

Year	unit	2007	2008	2009	2010	2011	2012	2013
Allowed revenue	$mill	77.3	75.0	68.1	75.2	92.0	100.1	107.8
Allowed revenue (net of Vol allowance)	$mil	75.1	72.8	65.9	73.0	89.8	97.9	105.6
Assumed extractions	ML	5,450.0	5,450.0	5,450.0	4,627.0	4,627.0	4,627.0	4,627.0
Actual extractions	ML	2,200.0	1,124.0	1,450.0	1,682.0	3,025.0	4,500.0	5,986.0
Revenue Volatility Allowance	$mill	2.2	2.2	2.2	2.2	2.2	2.2	2.2

Source: State Water 2013; IPART 2010.

For the purposes of modelling the option of a revenue volatility allowance, Frontier Economics has adopted the annual amount of $2.2 million as approved by IPART in its previous decision. Frontier Economics adjusted the allowed revenue reported by State Water to account for the volatility allowance approved by IPART — in effect we reduced the allowed revenue in each year by $2.2 million in recognition that the revenue volatility allowance was included in the

building block revenue approved by IPART in its previous decisions, but would not have been included under the alternative price control approaches.

The fixed prices generated by the model are based on the volume of both general and high security entitlement (in ML) across all valleys as previously provided by State Water of approximately 7.7 million ML. Where the model uses a discount rate we have assumed the 7.44% adopted by the ACCC in its draft decision to represent the WACC.

3.4.3 The alternative forms of price control.

Frontier has considered five alternative forms of price control (and tariff structure).

1. State Water's proposed long-term tariff structure (20% fixed and 80% variable) coupled with State Water's proposed form of price control of a revenue cap with a 15% constraint on annual price adjustments.
2. The tariff structure adopted by the ACCC in its draft decision (40% fixed and 60% variable) coupled with State Water's proposed form of price control of a revenue cap with a 15% constraint on annual price adjustments.
3. The tariff structure adopted by the ACCC in its draft decision (40% fixed and 60% variable) coupled with a continuation of the IPART revenue volatility allowance. The revenue volatility allowance is applied to the fixed charge.
4. The tariff structure adopted by the ACCC in its draft decision (40% fixed and 60% variable) coupled with a LCM as proposed by the ACCC that only allows for a return (based on the WACC of 7.44%) on the accumulated balance to be passed through to annual price adjustments. Under the ACCC's proposal the LCM increment is applied equally to both fixed and variable charges.
5. The tariff structure adopted by the ACCC in its draft decision (40% fixed and 60% variable) coupled with a Loss Capitalisation Model (LCM) that includes an allowance for the retiring of accumulating debt (this option allows for both a return on the LCM balance and a return of the LCM balance). The return of component of the incremental LCM charge is attached to the fixed charge.

3.4.4 Comparisons across the alternative price controls

Price Volatility

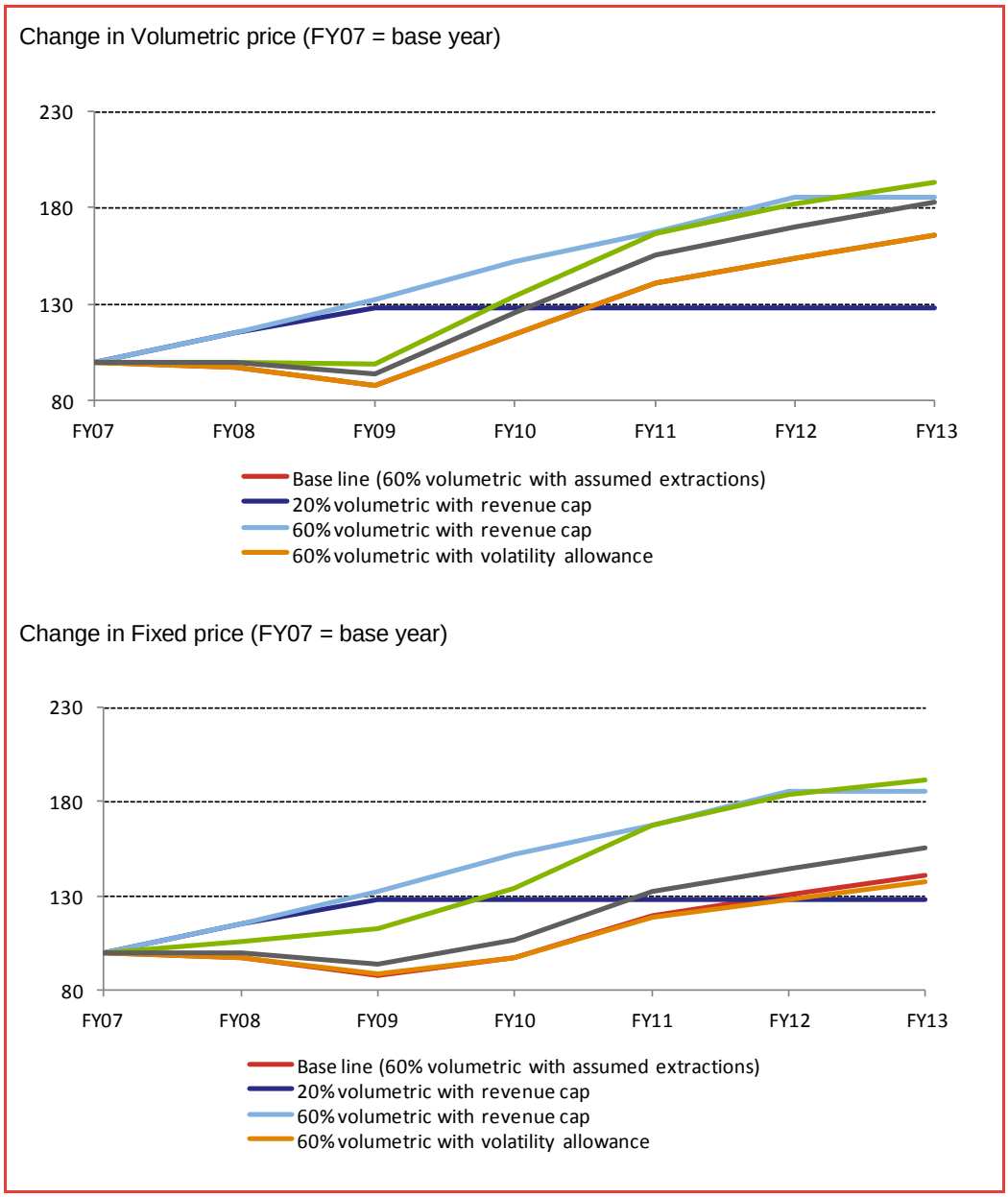
The potential impacts of the different forms of price control on prices over the period are set out in Figure 2. The graphs show the annual change in prices over

the period for both the fixed charge and the volumetric charge. The Baseline series depicted in the graph shows the price movements implied by the approved revenue requirement and the assumed volume of water extractions. The Baseline equates with series for the '60% volumetric with volatility allowance'. The reason the two series equate is that the revenue volatility allowance is $2.2 million per annum. Given that it is applied consistently over the time period it does not impact on the underlying year on year growth of prices implied by the Baseline.

Both the '60% vol with LCM (return on)' and the '60% vol with LCM (return on and of)' exhibit higher year-on-year growth in prices. This is consistent with expectations and reflects the increase in prices of increases from applying a return on and of the accumulated asset base associated with the balance in the unders and overs account.

Both revenue cap forms of price control allow for periods of price stability, the longest of which is associated with the 20% volumetric tariff option. Under both of these options the price cap allows for prices to be changed year on year by up to 15%. This enables State Water to manage its price increases to reduce the volatility of prices and to address revenue shortfalls or excesses within reasonably short timeframes. The primary reason that the 80:20% fixed to volumetric tariff with revenue cap option provides for the most stable prices over time is that the more cost-reflective tariff structure materially limits the potential size of under- or over-recoveries. Under the 60% volumetric tariff option the under-recoveries are much higher and require longer to recover through prices.

Figure 2: Pricing Volatility



Source: Frontier Economics analysis.

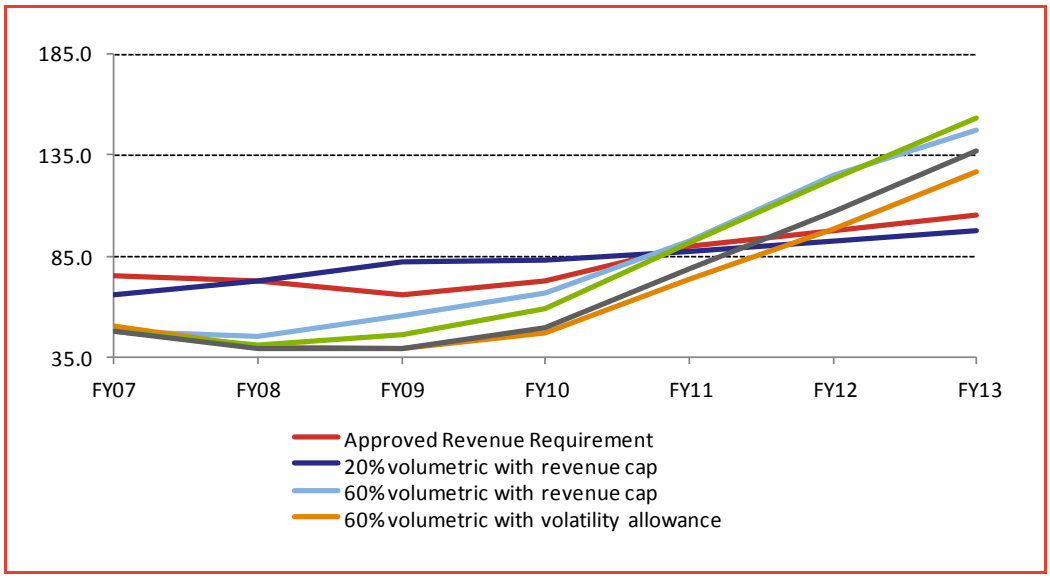
Revenue outcomes

Frontier Economics has also considered the impacts of the different forms of price control on State Water's revenue. Figure 3 shows the outcomes of the different forms of price control on revenue. The approved revenue requirement is shown in red on the graph.

Given the profile of available water extractions each of the options results in an under-recovery in the first year of the time series. As expected the option with the 20% volumetric tariff provides for revenues most resembling the approved

revenue requirement. Under the options based on a 60% volumetric tariff the initial shortfalls are much more material. Both the 60% options with the revenue cap and LCM (return on and of) provide for a quicker recovery of revenue compared to the LCM (return on) option.

Figure 3: Revenue outcomes



Source: Frontier Economics analysis.

Accumulated under- and over-recoveries

One of the principal observable differences between the approaches is the degree to which they allow for growth in an accumulated balance in the unders and overs account.

With the exception of the Revenue Volatility option, this accumulation can be carried forward by State Water over time and recovered either through adjusted prices and/or through unanticipated changes in demand that increase volumes.

In the case of the revenue volatility allowance option it is not clear how the accumulated balance should be treated, so for the purposes of this analysis we have assumed that it is not carried forward. In its last price determination IPART engineered the Volatility Allowance to recover only the holding cost of capital (based on the WACC) and not the underlying accumulated balance. That is, IPART made no explicit allowance for the carry forward of accumulated losses or gains. But it did state:

> We intend to review the performance of our approach to calculating State Water's revenue volatility allowance should we set prices for State Water at the next determination. We will assess whether the allowance has operated satisfactorily over the 4 years of the 2010 Determination in light of the observed variation between forecast and actual extractions and the volatility of State Water's revenue (IPART 2010, p. 60)

Presumably IPART's intention was to review the adequacy of the Volatility Allowance at the end of the regulatory period and account for any revenue shortfall in the next period. In the absence of such a review, we can only assume that the 2010 Revenue Volatility Allowance approach is carried forward and that consequently the accumulated balance represents windfall losses or windfall gains over the period that are unrecoverable by State Water.

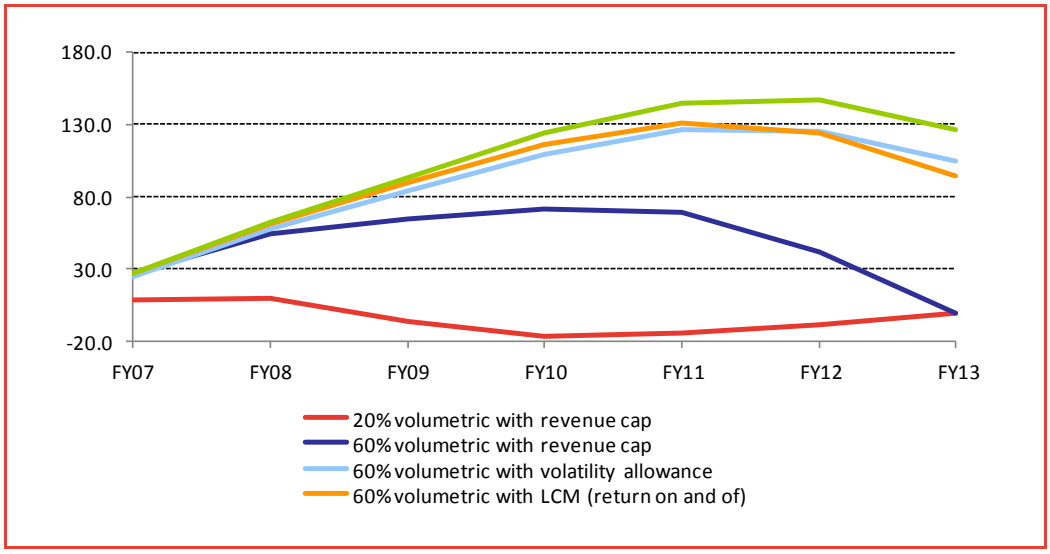
The ACCC's draft decision to adopt an LCM refers to the unders and overs account as a RAB (regulatory asset base). Unlike capital expenditure, however, the ACCC is not proposing to provide for both a return on and of the RAB but rather for the revenue requirement to only allow State Water to earn a return on the value of the LCM RAB (i.e. no component which recoups the principal of the associated debt). Under the ACCC proposal the only way in which State Water can retire or reduce the cumulative balance in the LCM is through offsetting unanticipated excess revenue.

This is an important aspect of the ACCC's proposal because it implies that the revenue requirement in any given year will only allow State Water to recover the costs associated with servicing the debt incurred by State Water in funding the associated shortfall. The revenue requirement will not make explicit allowance for State Water to retire any of the principal associated with this debt.

Depending on the profile of water extractions over time there is a potential under the ACCC's proposal for State Water to accumulate large LCM RABs and correspondingly large levels of debt to fund the revenue shortfalls.

Figure 4 shows that this potential to accumulate large RABs is most evident under the ACCC's proposed approach of **60% vol with LCM (return on)**.

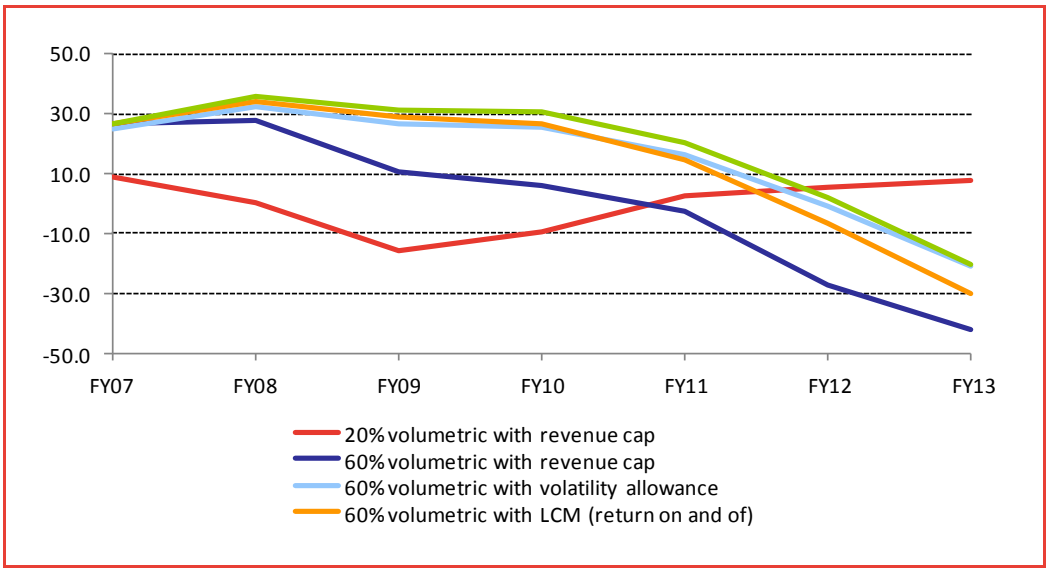
Figure 4: Value of the Unders/Overs asset base (LCM RAB)



Source: Frontier Economics analysis.

Figure 5 contains the annual shortfalls or gains observable over the period. As expected the LCM based options and the volatility allowance option provide for the greatest revenue shortfalls over the period while the revenue cap options allow State Water to minimise under- and over-recoveries.

Figure 5: Annual shortfall or gain



Source: Frontier Economics analysis.

In summary:

- The price control options based on a revenue cap generally provide State Water with the ability to lower price volatility and to minimise revenue shortfalls or gains during the period.
- The LCM options potentially lead to large accumulated balances in the LCM RAB or unders and overs account. These balances represent either large accumulations of debt (after successive periods of under-recovery) or alternatively large cash reserves (after successive periods of over-recovery).
- Of the non revenue cap based options only the LCM (return on and of) allow State Water to explicitly retire either principal (debt) or return excess earnings.
- One of the principal shortcomings of the Revenue Volatility Allowance approach is that there is no certainty the State Water will be able to recover the accumulated balance associated with the Revenue Volatility Allowance. The accumulated balance may be unrecoverable.
- The ACCC's proposed approach only allows for debt to be retired or earnings to be returned when State Water experiences unanticipated excess earnings. In reality this means that the only way State Water can retire the debt accrued through under-recovery is to wait for actual water extractions to exceed anticipated water extractions. In this respect State Water is fully

exposed to volume-related risk and the ACCC's proposed form of price control gives the business no mechanism to control or mitigate this risk. It also does not provide customers with a clearly defined price path.

3.4.5 ACCC Unders and Overs model

The ACCC has provided State Water with an unders and overs model that shows the impact on prices and revenues of its proposed 60% volumetric tariff and LCM (return on) form of price control.

The modelling undertaken by the ACCC is more detailed than the simplified model adopted by Frontier Economics reported above. The ACCC's model takes into account the actual tariff structure employed by State Water and includes the impact of its proposal on high security and general security tariffs (including the high security premium).

Frontier Economics has run the ACCC's model based on the same data used in the preceding analysis (allowed revenue, assumed and actual water extractions, 7.44% WACC) over a seven year period. A comparison of the results from Frontier Economics' simplified model of the ACCC's proposed approach and the results from the ACCC's own model of its proposed approach are provided in Table 3:

Table 3: Comparison of Frontier's simplified model and the ACCC's model.

Year	2007	2008	2009	2010	2011	2012	2013
Price volatility Vol							
FE model (%)	0	0	-6	33	24	10	7
ACCC model (%)	0	0	-6	33	24	10	7
LCM RAB (closing balance)							
FE model ($m)	27	63	94	124	145	147	126
ACCC model ($m)	28	62	94	124	145	146	126
Annual shortfall/gain (shortfall is positive)							
FE model ($m)	27	36	31	31	21	2	-21
ACCC model ($m)	27	36	31	31	21	2	-21

Source: Frontier Economics estimates based on ACCC unders and overs model.

As can be seen in Table 3, Frontier Economics' simplified model provides for outcomes that are consistent with the ACCC's model. It is worth noting that

under the same circumstances as those used for our simplified modelling the ACCC produces balances of accumulated shortfalls that exceed those of Frontier's model by approximately $6 million.

3.5 Conclusions

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The form of price control proposed by the ACCC in its Draft Decision has many major deficiencies. Such a complex and non-transparent LCM mechanism should only be adopted in the absence of better alternative instruments to address the various policy issues of concern. In our view, a cost-reflective tariff structure, supplemented by direct measures (e.g. CSOs or hardship schemes) to address concerns about the cashflows of a small subset of irrigators, is a much superior policy response than distorting the tariff structure for all customers.

If the ACCC nevertheless adheres to its decision to retain the current 40:60 fixed to variable tariff structure, it should couple this with a revenue cap subject to a constraint on annual price adjustments which it deems acceptable. Alternatively, but less preferably, it should adopt an adjusted version of its LCM approach that includes an allowance for the retiring of accumulating debt (this option allows for both a return on the LCM balance and a return of the LCM balance). The return of component of the incremental LCM charge would be attached to the fixed charge. This approach would have the effect of (a) amortising losses/gains over a reasonable but defined timeframe, thereby smoothing the effect on allowed revenues, and (b) compensating State Water for the time value of any losses by allowing a return (i.e. the WACC) to be earned on any past under-recovery of efficient costs.

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4 Proposed 'base and step' operating expenditure methodology

4.1 Introduction

4.1.1 State Water Proposal

In its application to the ACCC, State Water forecast approximately $145 million of operating expenditure to be incurred over the financial years 2014-15, 2015-16 and 2016-17. State Water forecast its operating expenditure to increase by 8.4 per cent in real terms over the 2013-14 baseline of $44.1 million.

4.1.2 ACCC Draft Decision

In assessing State Water's application the ACCC adopted a 'base and step' methodology. In simple terms the base and step approach involves identifying an appropriate base year that is deemed to be representative of general trends in costs, and then extrapolated the base year forward over the forecasting period. Assumptions regarding specific changes to costs over the regulatory period are imposed on the base through 'step' changes.

In its Draft Decision the ACCC established a base operating expenditure amount that it believes represents the expenditure required by State Water to fulfil its obligations given all the relevant circumstances expected to ordinarily and consistently occur over the forecast period.

In developing its own operating expenditure forecasts the ACCC made a number of adjustments to the base operating expenditure. For example, it adjusted expenditure for indexing to reflect changes in input costs over time — specifically to reflect increases in premiums for the NSW government insurer.

It is worth noting that the ACCC did not adjust the base year expenditure to reflect wage increases, on the basis that it believes forecast corresponding productivity gains offset its forecast step increase in operating expenditure due to wage growth. Similarly the ACCC did not adjust the base year expenditure for energy and chlorine costs (chlorine costs are driven by energy).

In addition to changes in input prices, base year expenditures are commonly amended to account for changes in productivity. Productivity adjustments proposed by the ACCC in its draft decision are:

- no step changes to base operating expenditure for catch up efficiencies
- ongoing efficiency gain of 1 % per annum.

4.2 Using a base and step approach

4.2.1 Conditions for appropriateness for using base and step

The appropriateness, from an economic efficiency perspective, of a single base year forecasting approach – as opposed to a bottom-up forecasting approach or a multi-base year approach – to forecasting total controllable operating expenditure depends on the following three conditions being met:

- The regulated business must have incentives to minimise total controllable operating expenditure, subject to meeting its stipulated objectives and providing levels of service performance valued by consumers.
- The business must not have incentives to 'game' the regulatory process. Such gaming could take the form of shifting expenditure within a regulatory period to or from the single base year in order to, for example, secure a higher forecast allowance or a higher future efficiency benefit.
- Total controllable operating expenditure needs to be broadly recurrent, in that past actual expenditure can provide (with the aid of transparent adjustments) a reasonable reflection of future efficient expenditure.

If these conditions are met, it is reasonable for regulators to apply a single base year forecasting approach and to avoid using bottom-up forecasts or an adjustment to the base year to reflect a multi-base year approach.

4.2.2 Need for expenditures to be 'recurrent'

One of the key reasons why a single base year approach is commonly applied for operating expenditure forecasting but not for capital expenditure forecasting is the different nature of expenditures that tend to be associated with each type of spending. As a generalisation, controllable operating expenditure tends be fairly stable or 'recurrent', both on a year-by-year basis and even moreso when comparing total spending across successive regulatory periods.

Where total controllable operating expenditure is not broadly recurrent and not reflective of future expenditures the base step approach breaks down and leads to inadequate revenue allowances:

- if operating expenditure follows similar long (multi-year or multi-decade) cycles as does capital expenditure, then a single base year forecasting approach will provide an inadequate allowance.
- if operating expenditure is in a long downward cycle, continuously applying a base year forecasting would provide systematically excessive revenue.

- if operating expenditure is in a long upward cycle, continuously applying a base year forecasting would provide systematic revenue shortfalls.

4.3 Analysis of ACCC's Draft Decision

The base and step methodology is a well established component of the ACCC's regulatory approach. While Frontier's analysis has identified a number of issues with the logic applied by the ACCC in its implementation of the base and step approach, a comprehensive appraisal of the ACCC's draft decision in this regard is essentially an engineering task that requires the assessment of the ACCC's assumptions and alternative forecasts.

While the approach itself is well established, the validity of the ACCC's application of the approach depends to a large degree on:

- The representativeness of the base year:
  - In determining expenditure of its base year the ACCC adopted actual expenditures for 2012-13, rather than budgeted expenditure for 2013-14. The ACCC decision is based on the ACCC guidelines which require actual costs (revealed costs) to be used. Frontier note that there does not appear to be detailed historical analysis to show the degree to which 2012-13 is consistent with historical trends and levels of expenditure in other years.
  - One of the reasons that the base year may not be representative of trends in expenditure relates to the way in which State Water have accounted for costs associated with routine maintenance. State Water have indicated that the forecasts for costs associated with routine maintenance activity is built from the bottom up and considers the individual tasks at various frequencies. This results in a maintenance program that fluctuates across individual years and across valleys as identified and confirmed by Deloitte in their review of State Water on behalf of the ACCC. These fluctuations in expenditure need to be accounted for either through adjustments to the base year or alternatively through annual non-recurrent or step changes.
- The appropriateness of the adjustments made to the base year:
  - The ACCC adjusted the base year to include actual 2012-13 costs incurred for Lowbidgee Valley, exclude actual 2012-13 costs incurred for environmental gauging stations and correct for error relating to radio tower lease costs. It is not clear to Frontier that the adjustments are exhaustive. For example, there appears to be a strong case to adjust expenditure to include flood related overtime.
- The appropriateness of the productivity assumptions:

- The ACCC decided not to include catch-up efficiency and a 1% annual ongoing performance improvement (net of wages growth). Once the 1% real growth in wages and the corresponding offset in productivity are accounted for, there is an actual productivity assumption of 2%.

- The appropriateness of the cost escalators:
  - The ACCC disallowed escalators for both wage growth and electricity. The ACCC acknowledged a wage growth escalator proposed by its expenditure consultants, Deloitte (3.5%), but did not approve an escalator on the basis that it believes productivity growth overshadows wage growth. The ACCC's acceptance of Deloitte's proposed 3.5% escalator, after accounting for inflation (2.5%) gives a 1% real growth in wages. However, the ACCC did not allow for any wage increase in their decision on the basis that there is a corresponding productivity gain that has not been accounted for in the assumed ongoing efficiencies. The ACCC also assumes a zero growth in prices for electricity.

Step Changes

One of the most important aspects of the base and step approach and its validity is the appropriateness of the non recurrent and step changes applied to the base over the course of the regulatory period. The base and step method is premised on the assumption that:

> Setting base opex at the level of opex incurred in the most recently completed full financial year ensures that the base opex reflects the current obligations and circumstances faced by State Water. (ACCC 2014b, p. 36)

The above statement is not technically correct, as the base year only reflects the obligations and circumstances of that particular year. Technically the only way in which base year expenditure can reflect the obligations and circumstances of future years in the regulatory period is if State Water is a steady state and there will be no changes in its circumstance or to its obligations. In reality this is not likely to be the case.

The validity of the whole Base and Step approach then rests on the appropriateness of the step changes allowed for over the regulatory period. There are several examples in the ACCC's draft decision where the underlying assumptions or the argument justifying the ACCC's decisions on the step changes allowed are not satisfactory. Examples include:

- Operating cost increases for implementation of the Murray Darling Basin Plan — the ACCC rejected these on the basis that the Basin Plan has been in place since 2011-12 and historical operating expenditure should reflect the trend. The ACCC's decision is based on the assumption that costs follow a linear growth path. The ACCC's logic does not hold if costs escalate over time.

- The ACCC rejected expenditure relating to a new hydrometric monitoring agreement with the NSW Office of Water on the basis that the associated increase in expenditure was not prudent and did not have the endorsement of customers. The justification for the ACCC's decision is questionable. The increase in expenditure results from an obligation levied on State Water by the NSW Office of Water (NOW). State Water must comply with the obligation irrespective of whether such compliance has broader customer endorsement or not. In addition State Water is also obliged to purchase the required hydrometric monitoring services from NOW and as a result cannot seek efficiencies by sourcing the service from third parties. These expenditures are directly related to State Water meeting an obligation and under the circumstances (given the monopoly provision of the services by NOW are consistent with the concept of cost minimisation. By not allowing this revenue the ACCC is effectively enforcing an under-recovery of efficient expenditure.

4.4 Conclusions

Our key conclusions are as follows:

- The base and step methodology is a well established component of the ACCC's regulatory approach. However, Frontier is concerned that the base and step methodology may not always be appropriate (e.g. if expenditure associated with routine maintenance is not in a steady state then any base year that included routine maintenance will not be an adequate predictor of expenditure incurred over the regulatory period). If this is the case then the ACCC needs to either amend the base year or to account for year-on-year differences through annual non-recurrent or step changes.
- Representativeness of the base year — in determining expenditure of its base year the ACCC adopted actual expenditures for 2012-13, rather than budgeted expenditure for 2013-14 as proposed by State Water in its application. The ACCC's approach in this regard is reasonable.
- The appropriateness of the adjustments made to the base year. The ACCC adjusted the base year to include a number of costs and correct for error. However, these adjustments do not appear to have been exhaustive. For example, there appears to be a strong case to adjust expenditure to include flood-related overtime.
- The appropriateness of the productivity assumptions — the ACCC decided not to include catch up efficiency and a 1% annual ongoing performance improvements (net of wage growth).
- Despite advice from its consultants to the contrary, the ACCC have not approved a cost escalator for wage growth. The ACCC does not allow for any wage increase in their decision on the basis that there is a corresponding

productivity gain that has not been accounted for in the assumed ongoing efficiencies. The ACCC needs to provide evidence of the claimed corresponding productivity gain.

- Frontier has identified a number of examples where the ACCC's decisions regarding the appropriateness of the non recurrent and step changes applied to the base over the course of the regulatory period are questionable.

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The base and step methodology is a well established component of the ACCC's regulatory approach, the validity of this approach depends heavily on its appropriate application. The ACCC adjusted the base year to include a number of costs and correct for error, however, these adjustments do not appear to have been exhaustive. There are a number of examples in the ACCC's draft decision where the underlying assumptions or the argument justifying its decisions on the step changes allowed are not satisfactory.

5 Elements of the WACC

5.1 Introduction

The ACCC has disagreed with State Water's proposed approach to the rate of return on three issues. Specifically, the ACCC disagreed with State Water's approach of:

1. Adopting a long term historical average risk-free rate in estimating the return on equity. Rather, the ACCC indicated a preference to adopt a short term averaging period as close as practicably possible to the start of the regulatory period.
2. Adopting an equity beta of 0.9, based on a combination of estimates of equity betas from Australian energy networks and water networks in the UK and US. Instead, the ACCC has adopted an equity beta of 0.7, which is consistent with the pricing principles.
3. Using a DRP based on a 10 year historical average. Rather, the ACCC has estimated a DRP based on prevailing debt spreads.

State Water's proposed approach to the DRP (issue 3, above) was to ensure internal consistency with its proposed approach to the risk-free rate (issue 1, above). Therefore, our review of the ACCC's proposed approach to the rate of return focuses on two issues:

- The need for a consistent treatment of the risk-free rate and the market risk premium (MRP) which, in our opinion, the ACCC has not achieved; and
- The need for the ACCC to re-examine its evidence base for its estimate of beta.

5.2 The ACCC's approaches to estimating the risk-free rate and MRP

Contrary to the ACCC's claim, it has not provided an internally consistent treatment of the risk-free rate and the MRP. In fact, the ACCC's approaches to estimating the risk-free rate and MRP are deeply inconsistent. In our view, it is essential that these two WACC parameters be estimated in a consistent manner. The ACCC's failure to do so has resulted in an unreasonably low rate of return allowance.

5.2.1 Characterisation of State Water's submission on the risk-free rate and the MRP

The ACCC has suggested that State Water has mischaracterised the ACCC's approach to the risk-free rate and the MRP (ACCC 2014b, p. 172). In fact, it appears that the ACCC has misunderstood State Water's submission. State Water submitted that:

> The Pricing Principles couples low risk-free rate estimates (due to the recent decline in government yields) with relatively low risk premiums (due to long averaging periods that capture relatively stable times prior to the GFC). Such an approach would imply that the cost of equity finance is also at historic lows. Given the high degree of market uncertainty at present, this outcome clearly fails a basic reasonableness test.…
>
> The fallacy of mixing short-term estimates of the risk-free rate with long-term estimates of the MRP has been commented on by leading finance experts. (State Water 2013, p. 101)

A proper reading of State Water's submission would reveal that the inconsistency in the ACCC's approach that State Water wished to draw attention to was <u>not an inconsistency in the assumed maturity of the risk-free rate and MRP</u>. Yet, the ACCC appears to have understood that as the source of State Water's concern. The ACCC dismisses State Water's concern by asserting that because it strives to estimate a "10 year forward looking" risk-free rate <u>and</u> MRP, there is no inconsistency in its approach.

This misses the point. As we understand it, State Water's concern is that ACCC's approach uses, exclusively, <u>short-run market data</u> to estimate a contemporaneous risk-free, but places heavy reliance on <u>long-run, historical market data</u> to estimate the MRP. The effect of this is that the risk-free rate estimated will tend to be volatile and, in recent times, declining sharply, whereas the ACCC's MRP will tend to be very stable over time. In fact, there is very credible evidence, which the ACCC has dismissed incorrectly, that movements in the MRP are negatively related to movements in the risk-free rate.

Under a consistent treatment of the risk-free rate and the MRP, the ACCC has open to it two options:

- If the ACCC wishes to use only short-run market data (i.e. averaged over a period of 10-40 business days commencing as close as possible to the start of the regulatory period), it should recognise the negative relationship discussed above and adopt a commensurately high MRP.
- If, however, the ACCC wishes to use a MRP estimate derived primarily using long-run, historical market data (which, despite the ACCC's assertions, it has done), then it should be consistent and use (relatively) long-run historic data (e.g. 10 years) to estimate the risk-free rate.

In our view, the second of these options is less preferable, conceptually, than the first. However, both would result in internally consistent cost of equity estimates.

5.2.2 The ACCC's MRP has given primacy to long-run, historical data

Despite suggestions to the contrary, the ACCC's MRP has clearly given primacy to long-run, historical data. The ACCC has suggested that its estimate of the MRP is not simply a long-term average of historical excess returns on the market but, rather, "a 10 year forward looking rate based on prevailing market conditions at the start of the regulatory period" that takes account of wider evidence. For instance, the ACCC states:

> Moreover, including historical excess returns (in the broad set of evidence the ACCC uses to estimate the MRP) does not constitute estimating the MRP on the basis of a long term average. We use historical excess returns on the basis that they are likely to influence investors' expectations of the future. We also consider forward looking evidence, like survey evidence. (ACCC 2014b, p. 172)

It further states:

> …we adopt 10 year forward looking rates based on prevailing market conditions for both the risk free rate and MRP. (ACCC 2014b, pp. 173–4)

The ACCC has not said explicitly in its draft decision what weight it has given to long-run historic excess returns or other evidence when deriving its MRP estimate. However, it is very clear that its estimate of 6% is heavily influenced by long-run historic averages of excess market returns. This is evidenced by the fact that the ACCC's estimate of the MRP is equivalent to the value it has "generally used", i.e. the ACCC's estimate has remained constant over time. If the ACCC were genuinely taking account of forward-looking evidence on MRP, or "prevailing market conditions", we would expect to see much more variation in the ACCC's estimates of the MRP over time. Given the changes in market conditions over time, especially in recent times, it would be remarkable if all the forward-looking evidence were to point consistently, over time, to a value of 6%.

Moreover, ACCC's pricing principles makes clear that the ACCC's MRP estimate of 6% reflects long term averages:

> However, economic and capital market conditions appear to be improving to pre-global financial crisis levels18, meaning that an MRP of 6 per cent, reflecting long term average values of the MRP, appears appropriate over the period to which these principles will apply. As these pricing principles are not likely to come into effect until 2013, it is appropriate to give more focus to historic rather than current market conditions.
>
> Therefore, a long term historic estimate of the MRP appears appropriate on the basis that:

> - the first approval or determination that will be made under these pricing principles will not be until 2013, meaning that a longer term estimate is a more robust measure at this juncture
>
> - economic conditions appear to be returning to pre-global financial conditions.
>
> Hence, an MRP of 6 per cent appears the most appropriate estimate of the cost of equity at this point in time. [emphasis added] (ACCC 2011a, p. 32)

This supports our view that:

- the ACCC's MRP estimate is derived primarily using long-run, historical market data, whereas the ACCC's risk-free rate estimate is derived using government bond yield data over the very short-term; and, therefore
- there is an inconsistency in the ACCC's approach to determining the risk-free rate and the MRP.

5.2.3 Use of other evidence to estimate the MRP

The ACCC claims that, in deriving a forward looking estimate of the MRP, it has taken account of survey evidence. Although the ACCC has not actually presented any such evidence in its draft determination, the AER's 2013 Rate of Return Guidelines does consider such evidence. We presume that this is the survey evidence that the ACCC has taken into account.

We note that survey evidence can be difficult to interpret and unreliable (due to, for instance, framing problems or interpretation of the questions by respondents). Therefore, survey evidence, whilst not completely unhelpful, needs to be viewed with caution.

The ACCC has not examined at all the other main piece of forward-looking evidence on the MRP that many regulators use: estimates from the Dividend Growth Model. In its draft determination, the ACCC asserts incorrectly that "State Water proposed that the ACCC should not estimate a contemporaneous MRP using a dividend growth model (DGM)." (ACCC 2014b, pp. 170). The ACCC has mischaracterised State Water's position. State Water did not submit that the DGM estimates of the MRP should not be considered. For the avoidance of doubt, State Water submitted that:

- DGM estimates of the MRP can be sensitive to the inputs to the model
- estimates can also be sensitive to the form of the model (i.e. constant growth or multi-stage).

Recognising these challenges, State Water suggested that a simpler and more transparent approach would be to estimate the MRP <u>and the risk-free rate</u> using long-run market data. However, if the ACCC wishes to not use the approach proposed by State Water, and wishes to claim credibly that it is estimating a forward-looking MRP, it should take into account DGM estimates, but interpret these estimates with care.

We note that many respected bodies (e.g. the Bank of England) and regulators (e.g. the UK Competition Commission, and IPART) make use of DGM estimates when thinking about forward-looking evidence on the MRP. Indeed, it is striking that whilst it is not evident if/how the ACCC has made use of DGM estimates, the AER has in its 2013 Rate of Return Guidelines signalled that it would make use of such estimates:

> These implementation issues, however, are less prevalent when using DGMs to determine an estimate for the return on the market. DGM estimates, therefore, may be used (in addition to other evidence) to inform the MRP. Alternatively, they could be used as directional information for the return on equity. For the following reasons, we consider that DGMs may add the most value to our approach by informing the range and point estimate of the MRP:
>
> - It allows these estimates to directly impact the range and point estimate of the foundation model. Although our approach also considers additional information to select a final return on equity value, the foundation model estimate may be more robust.
> - It recognises that DGM estimates may have more informative value than just providing an indication of the directional change in return on equity. For example, DGMs provide actual values for the return on the market. In contrast, information such as debt spreads do not indicate what value the return on equity should be, but instead, only provide relative information. (AER 2013, p. 16)

5.2.4 Relationship between the risk-free rate and the MRP

The ACCC has dismissed lightly the notion of a negative relationship between the risk-free rate and the MRP, which was articulated most clearly by Professor Stephen Wright.

State Water's application referred the ACCC to a report written by Professor Wright, which critiqued the AER's (and the ACCC's) proposed approach to determining the risk-free rate and MRP. That report provided cogent reasons as to why a negative relationship between the risk-free rate and the MRP should be expected, empirical evidence, and regulatory precedent based on this relationship.

The ACCC appears to have considered Professor Wright's report only superficially. The reasons given by the ACCC for dismissing Professor Wright's evidence are unsatisfactory. Instead of conducting its own original analysis, the ACCC has simply cited advice provided to the AER by its consultants, McKenzie and Partington, and CEPA, on the existence or otherwise of a relationship between the risk-free rate and the MRP. In our view, that advice has shortcomings and cannot be used to justify the ACCC's approach to the risk-free rate and MRP.

As it is essential that the ACCC understands clearly the logic and evidence set out by Professor Wright, it is worth repeating these here. In doing so, we refer the ACCC to very recent advice that Professor Wright and Andrew Smithers (Wright

and Smithers 2014) have provided to Ofgem, Great Britain's regulator for the energy sector. That advice sets out clearly the case for a negative relationship between the risk-free rate and the MRP.

The key strands of the Wright and Smithers 2014 analysis are as follows:

- The cost of equity (i.e. the required rate of return) for a firm, or the market as a whole, is an **expected** return and, hence, inherently unobservable. However, the realised returns on any asset may be decomposed as follows:

$$\text{Realised return} = \text{Expected return} + \text{"Surprise"}$$

- This means that:

$$\text{Expected return} = \text{Realised return} - \text{"Surprise"}$$

- Over a long enough period, the surprises should cancel out, so realised returns averaged over a long enough history should reveal the **average expected return**.
- Unlike the cost of equity, the risk-free rate (at a given maturity) is, more or less, observable.
- The MRP is equal to:

$$\text{MRP} = \text{Expected market return} - \text{Risk-free rate}$$

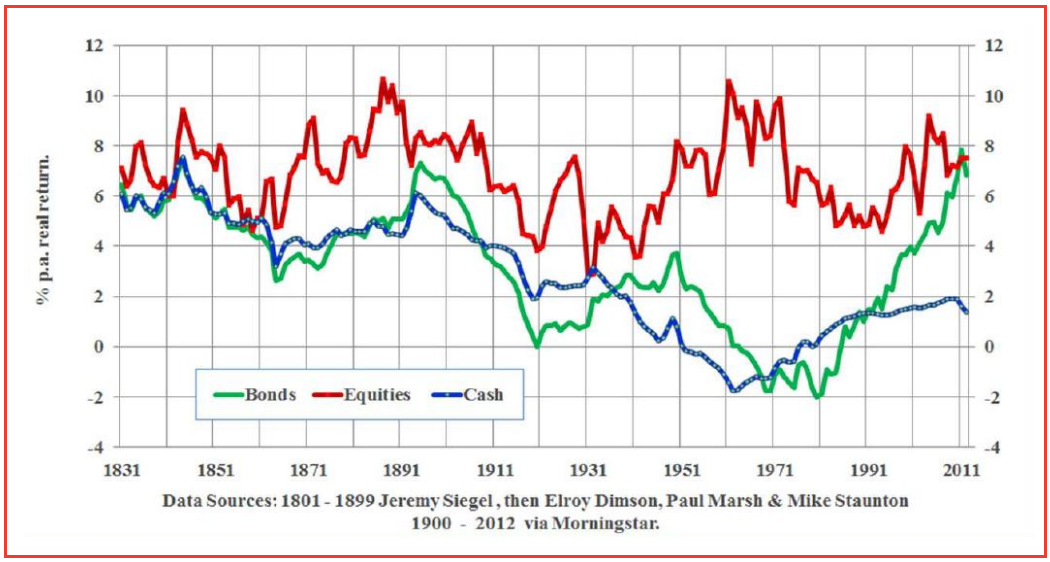
  Since the expected market return is inherently unobservable, the MRP is also inherently unobservable. However, it is possible to estimate the MRP by calculating the average expected market return and subtracting from this the observed risk-free rate.

- Empirical evidence suggests that the **average** expected market return has remained fairly constant, whilst the risk-free rate has tended to be much less stable (see Figure 6). Given this, and the simple arithmetic of the MRP formula above, the MRP should be negatively related to the risk-free rate.

Note that Wright and Smithers 2014 acknowledge that the average expected return may not be perfectly constant over time (this is because: not all surprises may cancel out; large valuation shifts can change average realised returns non-trivially; so average realised returns may not be stable over time). Nevertheless, this does not invalidate the point that over a sufficiently long history, a good estimate of the average expected return on equity may be derived by averaging realised returns. Nor does it invalidate the point that, over a long period of history, average realised equity returns have been very stable (certainly much more stable than average yields on risk-free assets).

The main (but not only) empirical evidence that Wright and Smithers 2014 offer for their argument that the average expected market return has been stable are the data represented in Figure 6 below.

Figure 6: 30 year rolling real returns



Source: Wright and Smithers 2014, Figure 1.1, p.4.

It should be noted that:

- the 'equities' curve represents the real return on a broad-based equity portfolio
- the 'bonds' curve represents the return on (a portfolio of) long-dated government bonds
- the 'cash' curve represents the return on short-dated treasury bills
- the curves represent compound average rolling real returns over a 30 year horizon to limit the impact of short-run volatility.

The chart above shows clearly that the average expected market return, as estimated by the average realised market return, has been remarkably stable. By contrast, the risk-free rate (as represented by the bonds and cash curves) has been much more volatile.

The ACCC has dismissed this analysis on the basis of several perceived limitations. In our view, the reasons given by the ACCC for dismissing Professor Wright's analysis (ACCC 2014a, p. 173) are unconvincing, as discussed below:

- **"the evidence used in this study did not relate to Australia"**. The data used by Wright and Smithers 2014 in Figure 6 are US returns. In their recent report to Ofgem, Wright and Smithers 2014 state that "We continue to regard evidence from the US stock market as extremely important, both because it is such an important market in global terms, and because its history is so well-documented" (p.4). In the context of advising a UK regulator, they also argue that "…we argued strongly that, in highly integrated global stock markets, we should not look exclusively at data from the UK, which is (at least in recent data) a relatively small market in global terms" (p.6). The same

argument holds in the case of Australia. There is no reason to think that evidence from the US tells us nothing about average expected equity returns in Australia. Further, the analysis developed by Professor Wright builds on a frequently-cited study he co-authored for several UK regulators (Wright, Mason & Miles 2003). Wright and Smithers 2014 note (p.3) that the results from that study were derived by examining returns data from several countries.

If the ACCC felt that it could only be persuaded by Australian evidence, the appropriate response would have been to collect and analyse Australian data. Instead, the ACCC has dismissed altogether the analysis without conducting any original analysis. We note that academics in from the UK — Paul Marsh, Elroy Dimson and Mike Staunton — have compiled returns data for Australia from 1900, and if the ACCC feels compelled to only accept data relating to Australia it could investigate that dataset.

- **"the study used bond returns rather than yields".** This is a trivial concern. The inverse relationship between bond prices and bond yields (i.e. the internal rate of return on the bond) is a well-established economic concept. Rising bond returns must be indicative of falling yields, and vice versa. The fact that government bond yields have been falling over the period that bond returns are shown in Figure 7 to have been rising is well-known and evident from data for a range of countries (see, for instance, Figure 7).

Figure 7: Volatility and decline in the real risk-free rate

Source: Credit Suisse 2013, p.7.

- **"the study did not show a time series of MRP estimates".** It is unclear what such a time series would add to the analysis. The intention of Professor Wright's analysis was to demonstrate that the average expected market return has remained very stable over time, whereas the risk-free rate has been much more volatile and declining over time. Under these circumstances, it follows from the simple arithmetic of the MRP formula that the MRP has been increasing over the period that the risk-free rate has been declining.
- **"the study relied on visual rather that statistical evidence".** The ACCC appears to have missed the point of the analysis. The analysis intended to show, and did show, that the average expected market return has remained very stable over time, whereas the risk-free rate has been much more volatile and declining over time. A visual inspection of the data in Figure 7 is all that is required to demonstrate this, and more formal statistical analyses would add little value.

In our view, the supposed limitations of Professor Wright's analysis are unfounded, based on only a superficial consideration of the analysis offered, and do not invalidate his key conclusions.

5.2.5 Analysis provided by AER's advisers

As noted above, rather than conducting its own original analysis on the issue, the ACCC has referred to advice provided to the AER by consultants McKenzie and Partington (2013) and CEPA (2013). We have examined the original reports provided by these advisers and conclude that they suffer from some key shortcomings.

McKenzie and Partington

McKenzie and Partington (2013) examine at length the question of whether the cost of equity is constant or not. They conclude that (McKenzie and Partington 2013, pp. 5–6):

- It is implausible that the overall cost of equity is a constant in either nominal or real terms; and
- The relation between the MRP and the level of interest rates is an open question and that the relation, if any, is not sufficiently well established to form the basis for a regulatory adjustment to the MRP.

The key problem with this analysis is that when analysing the question of the stability of the cost of equity, the authors appear to conflate realised and expected returns. For instance, they note that:

> Our conclusion is that the cost of equity varies in nominal and real terms. It would be fair to say that this is the modern, although not universal, view in the research literature and with respect to realised returns it is clearly evident in the data. Consider, for example, the plot reproduced from Wright (2012) in Section 1.1. It is

> clear from this plot that there is variation in real equity returns through time even after the data smoothed by using a 30 year moving average. [emphasis added] McKenzie and Partington 2013, p. 17)

In other words, McKenzie and Partington observe that that realised returns have varied over time and conclude, incorrectly, that the cost of equity must also be varying. They do not address Professor Wright's point that the data suggest that the **average expected return** on the market has been very stable, though realised returns have clearly varied (particularly over the short run). As explained above, it is the average expected return that is relevant to the cost of equity and not short-run variations in realised returns.

CEPA

CEPA (2013) has also investigated the theoretical and empirical evidence for a stable expected market return, and the evidence for a negative relationship between the risk-free rate and the MRP. In a number of places in its report CEPA's view coincides closely with Professor Wright's view that the expected return on the market has tended to be fairly stable:

> Overall the available academic literature contains more evidence in favour of a stable real long run cost of equity than against it, and therefore we consider this to be a reasonably robust proposition....On balance, our judgement is that there is reasonably strong evidence that the real cost of equity is stable in the long run, both in absolute terms and in relation to the ERP. Although the evidence is not overwhelmingly strong, given a choice that the long run real cost of equity is either stable or not stable in absolute terms, we would assume the former.…In general, CEPA's approach to the cost of capital is to utilise long-term estimates for these components based on market evidence, which would include the cost of equity. (CEPA 2013, p. 24)

Having expressed this view, inexplicably, CEPA goes on to display ambivalence over whether there exists a negative relationship between the risk-free rate and the MRP.

> Overall, we do not think that there is enough evidence to justify making a firm conclusion about the relationship between the MRP and risk-free rate. Our research indicates that there may be a relationship, but that we have been unable to conclude either that this relationship definitely does or definitely does not exist. (CEPA 2013, p. 25)

This does not make sense. If the expected return on the market is stable but the risk-free rate is not, then **it must follow** from the simple arithmetic of the MRP formula that the risk-free rate and the MRP are negatively related.

5.2.6 Conclusion and suggested approach to the risk-free rate and MRP

The disagreement between State Water and the ACCC over the risk-free rate is really a disagreement over the MRP. State Water submitted that if the ACCC

were to continue to adopt an estimate of the MRP of 6%, approximately equal to the long-term historical average difference between equity market returns and government bond yields, it should also adopt an estimate of the risk-free rate which is approximately equal to the historical average. Alternatively, if the ACCC were to continue to adopt a contemporaneous risk-free rate (based on very short-run government bond yield data) in its rate of return estimation, it should adopt a contemporaneous estimate of the MRP (State Water 2013, p. 106).

The ACCC has rejected this submission in favour of adopting a contemporaneous estimate of the risk-free rate in combination with a MRP of 6%. A key issue is whether the ACCC's MRP estimate of 6% is an estimate that reflects prevailing market conditions, or is an historical average estimate that the ACCC continues to adopt regardless of prevailing market conditions. The ACCC claims the former interpretation, stating that "including historical excess returns (in the broad set of evidence the ACCC uses to estimate the MRP) does not constitute estimating the MRP on the basis of a long-term average" (ACCC 2014b, p. 172). The ACCC goes on to state that it "also consider[s] forward looking evidence, like survey evidence" (ACCC 2014b, p. 172).

The ACCC has not given any reasonable consideration to forward-looking evidence, and so the MRP estimate of 6% simply represents an estimate of the historical average difference between equity market returns and government bond yields. The ACCC itself points to one single instance in which the AER adopted an estimate of 6.5% for the MRP, at the height of the global financial crisis (ACCC 2011a, p. 32). As far as we are aware, the ACCC has never deviated from an estimate for the MRP of 6%.

State Water presented DGM-based estimates of the MRP from 2008 to 2012 that had been compiled by Bloomberg and relied upon by IPART which suggested a most recent market risk premium of 8.7%. The ACCC did not present any rationale as to why the estimates compiled by Bloomberg had no relevance to its 6% estimate for the MRP. It also did not give any consideration to the analysis conducted by IPART on this issue and which was referred to by State Water itself (IPART 2012). In short, the ACCC has provided no indication that any piece of current, forward-looking market-based evidence will lead it to deviate from its estimate of the market risk premium of 6%. Under these circumstances it is simply implausible for the ACCC to argue that its MRP estimate of 6% is a forward-looking estimate based on prevailing market conditions. The only logical interpretation is that the ACCC's estimate relies very heavily on historical average excess returns and little else.

One indicator that the true MRP could be higher than the level estimated by the ACCC is the risk-free rate itself. State Water submitted that government bond yields are currently low and that, if the ACCC was to continue to adopt an estimate of the MRP of 6%, a risk-free rate of 5.26% is more appropriate (State

Water 2013, p. 104). The ACCC appears to dismiss the idea that a declining risk-free rate is evidence of a rising MRP.

The implication of the ACCC's view that the MRP is constant over time, even as the risk-free rate varies, is that the expected market return moves in lock-step with government bond yields (i.e. low bond yields suggest low expected market returns, and high bond yields suggest high expected market returns). Why is this a better assumption than the alternative proposition that expected market returns have no relationship with government bond yields? The ACCC has provided no convincing evidence that this proposition is correct. In fact, the ACCC has dismissed the evidence that suggests that not only is the MRP not constant over time, but that it is related negatively to movements in the risk-free rate.

The ACCC has applied a threshold for acceptance or rejection of the submission that it has not applied to its default position, which is to add 6% to the current government bond yield. The determination means that the ACCC has a view that expected market returns move in synch with government bond yields, which has less empirical support than the State Water submission that expected market returns do not exhibit such a relationship with government bond yields. The weight of evidence suggests that the average expected market has remained fairly stable over time. So a better estimate of the cost of equity would result from either:

- Applying a long-term average government bond yield as the risk-free rate; or
- Using the current risk-free rate with a MRP calculated as the difference between the long-term average return on the market and the current risk-free rate. Dimson, Marsh and Staunton calculate that the real historic average return on equities (between 1900 and 2012) in Australia was 7.3%, and average realised inflation over the same period in Australia was 3.8% (Credit Suisse 2013, p. 8). This implies a nominal long-term average return on equities in Australia of approximately 11.4%. If the ACCC's estimate of the contemporaneous risk-free rate of 4.28% were adopted, the resulting estimate of the MRP under this approach would be approximately 7.10%.

Finding 11

The ACCC's approaches to estimating the risk-free rate and MRP are deeply inconsistent, and it has misunderstood State Water's submission on these issues:

- Despite suggestions to the contrary, the ACCC's MRP has clearly given primacy to long-run, historical data.
- The ACCC has not given any reasonable consideration to forward-looking evidence.
- The ACCC has inappropriately dismissed evidence of the negative relationship between the risk-free rate and the MRP.

5.3 Equity beta

The ACCC has rejected State Water's proposed equity beta of 0.9 in favour of its default position of 0.7 contained in the pricing principles. This estimate is based largely on estimates of betas for Australian energy networks. The ACCC's baseline position is that Australian energy networks are the best proxies for water businesses when estimating beta. There are no Australian listed water businesses.

Whilst there are a number of listed water businesses overseas, the ACCC has rejected all evidence provided by State Water on the betas of these companies. Instead, it has relied on:

- the AER's assessment of the equity beta estimates for Australian-listed energy network businesses
- estimates of betas for water businesses by other Australian regulators.

The range of 0.4 to 0.7 reported by the AER and referred to by the ACCC is formed entirely with respect to nine Australian-listed energy network businesses, of which there are now just five listed businesses available for analysis. The use of such a small sample raises significant doubts about the statistical reliability of the ACCC's estimates.

State Water submitted analysis by SFG that aimed to address this small sample problem in two ways.

Firstly, SFG suggested that overseas-listed water utilities could provide **some** useful information for estimating equity beta. We note that SFG's approach was not to place exclusive reliance on the betas of overseas water businesses. Rather, SFG put some weight on this evidence and some weight on Australian energy networks. By contrast, the ACCC has put exclusive reliance on a very small sample of Australian energy networks, and has ignored potentially useful evidence on the betas of water businesses. The ACCC has provided no explanation as to why overseas water networks should contribute no useful information at all about State Water's beta.

Secondly, SFG proposed that the statistical robustness of the estimates could be improved by taking account of other business characteristics (i.e. size, book-to-market ratio, leverage, and industry) that could influence systematic risk. The ACCC has objected to both the selection of the overseas-listed water utilities and the use of other characteristics in estimating beta.

This section considers the ACCC's estimate of beta, and the basis for the ACCC's dismissal of State Water's proposed beta.

5.3.1 Australian energy networks as the sole basis for estimating the beta of a water businesses

The basis for the ACCC's beta estimate of 0.7 in the pricing principles is that:

> the level of systematic risk faced by rural water businesses is likely be similar to that faced by energy businesses [and that] based on the most recent empirical data collected as part of the AER WACC review, the historical equity betas of energy transmission and distribution businesses were estimated to be between 0.4 and 0.7. (ACCC 2011a, p. 38).

The ACCC has justified its reliance on energy network businesses as proxies for water businesses on the basis of two reports by Frontier Economics (2010, 2013). Our 2010 report concluded that, as a default position, "energy based equity betas are appropriate to apply to water businesses." (Frontier Economics 2010, p. 31). It should be noted that we did not advise the ACCC or the AER that when estimating the betas of water companies, exclusive reliance should be placed on the estimated betas of Australian energy networks. This interpretation of the advice is entirely the ACCC's. In fact, our 2010 and 2013 reports suggested that evidence on overseas water networks could be helpful, but should be interpreted with some care.

In our view, SFG's use of such evidence is compatible with our advice to the ACCC and the AER as SFG did not place 100% weight on overseas evidence; it also took account of evidence from Australian energy networks.

Furthermore, our 2010 report noted that rural water businesses (such as State Water) could have higher betas than energy networks given the nature of their customer base:

> Part 7 water businesses are likely to be more sensitive to market risk due to their exposure to a greater commercial customer base (other things being equal). This implies that their equity beta would be greater than an energy business. In addition, those part 6 rural water businesses that can evidence relatively greater exposure to commercial customers may also justify a relatively higher equity beta to reflect the commercial nature of their customer base. (Frontier Economics 2010, p. 15)

We noted that these higher risks may be mitigated by certain strategies:

> the relationship between risks associated with elasticity of demand and any other risk mitigation strategies that businesses may have adopted. In particular, tariff and pricing practices have an ability to counter such risk through the adoption of cost reflective volumetric charging ratios. (Frontier Economics 2010, p. 31)

In addition, we noted that:

> The higher risk associated with commercial customers (at least in the short term) would have a greater impact on volumetric based prices and the water businesses variable revenue stream than it would on fixed prices. Where costs are largely fixed, prices should also be largely fixed. Alternatively where costs are largely variable or volume dependent prices should also be variable in nature. In this manner the risks associated with the nature of the customer base may be mitigated. (Frontier Economics 2010, p. 15)

The ACCC has rejected State Water's proposed charging structure (80% fixed charges), which would have helped mitigate the risks associated with revenue volatility. Instead, the ACCC has proposed an overs-and-unders account (ACCC

2014a, p. 6), which is unlikely to address adequately the risk of under-recovery of costs. The rejection of State Water's tariff structure proposal could well mean that State Water's beta exceeds the betas of Australian energy networks.

5.3.2 The ACCC's dismissal of the overseas water businesses identified by SFG

The ACCC has objected to a number of overseas water businesses used by SFG when estimating State Water beta, on the basis that these companies have lower gearing than State Water, they are involved with residential water delivery and wastewater services and some have diversified operations (ACCC 2014b, p. 180). In relation to these concerns, it is worth considering the following:

- How close does the average gearing need to be to benchmark gearing for a comparable firm set to be accepted?
- Why is it reasonable to think that energy distribution carries the same risks as bulk water supply, but delivery of residential water is so different to delivery of bulk water as to be entirely irrelevant?
- What is the degree to which some diversity of operations means that a firm can be included or excluded from the comparable firm set?

The ACCC has singled out a number of overseas water businesses as inappropriate comparators to State Water on the grounds that they are diversified into other, potentially risky activities that State Water does not engage in. However, in most instances, the objections raised by the ACCC are unfounded, as discussed below:

- **SJW Corporation.** The ACCC criticises SFG's use of SJW Corp on the grounds that it "invests in underdeveloped land and operates commercial buildings" (ACCC 2014b, p. 160). The ACCC's source for this information is a NASDAQ summary of the company's activities. An examination of SJW Corp's statutory filings to the US Securities and Exchange Commission (SEC) shows that the company has two main segments: Water Utility Services (comprised of San Jose Water Company, Canyon Lake Water Service Company, and Texas Water Alliance Ltd); and Real Estate Services (comprised of SJW Land Company and its subsidiaries) (SJW Corp 2014, p. 3). According to these filings, Real Estate Services (the business segment that the ACCC seems concerned might make SJW Corp a poor comparator to State Water) contributed just 2.2% of SJW Corp's operating revenues in 2013, and just 1.9% of its operating revenues in 2012 and 2011 (SJW Corp 2014, p. 24). Given how small this business segment is, it seems very unlikely that SJW Corp's beta would be influence materially by its non-water activities.
- **Pennon Group.** Based on a Reuters company summary, the ACCC notes that Pennon "provides recycling, renewable energy generation and waste

management". Pennon's annual report shows that Pennon has two segments: Water and sewage (i.e. South West Water, which operates the water and sewerage network for Devon, Cornwall, and parts of Dorset and Somerset in the UK); and waste management (i.e. Viridor) (Pennon Group 2013). The company's annual report shows that the water and sewage segment contributed approximately 80% of the Group's EBITDA in 2013, and approximately 74% of the Group's EBITDA in 2012 (Pennon Group 2013, p.100).

- **Cadiz Inc.** Based on a summary of activities on the company's website, the ACCC claims that "Cadiz Inc. is predominately a renewable resource company and it is involved with organic agricultural operations". In fact, Cadiz's statutory SEC filings state that: "Our primary business is to acquire and develop land and water resources. Our agricultural operations are confined to limited farming activities at the Cadiz Valley property. As a result, our financial results are reported in a single segment" (Cadiz Annual 2014, p. 3). In other words, the firm's non-water operations that the ACCC is concerned about are so trivially small that Cadiz does not even report the financial performance of those segments separately. Cadiz describes the activities of its water resources development segment as follows: "The Water Project is designed to supply, capture and conserve billions of gallons of renewable native groundwater currently being lost annually to evaporation from the aquifer system underlying our Cadiz/Fenner Property, and provide a reliable water supply to water users in Southern California." (Cadiz Annual 2014, p. 23).Cadiz has signed a water supply and storage option agreements with several public and private water utilities in Southern California, and is presently in negotiations with several more water networks (Cadiz Annual 2014, p. 6). Given its focus on developing infrastructure for storing and supplying water to utilities, Cadiz's activities are similar to State Water's bulk water operations.
- **Northumbrian Water Group.** Based on information gathered from Northumbrian's website, the ACCC states that Northumbrian "provides plant and vehicle leasing, has a leisure business, a business that undertakes searches for homeowners and provides analytical laboratory and scientific services". However, the ACCC has not investigated the significance of these activities. Northumbrian's latest annual report states that: "NWG owns a number of companies which, together with NWG, form the Group. The emphasis given to Northumbrian Water Limited (NWL), throughout this report, reflects its importance to the overall performance of the Group…NWL's principal activities comprise the supply of potable water in both the north east and south east of England and the collection, treatment and disposal of sewage and sewage sludge in the north east of England" (Northumbrian Water Group 2012, p. 1). Further, the annual report shows that over the 12 months to 31 March 2012 (nine months to 31 December

2012), NWL contributed approximately 93% (95%) of the Group's total revenues (Northumbrian Water Group 2012, p. 3).

The reason for the large inaccuracies in the ACCC's descriptions of the activities of the comparators used by SFG appears to be because the ACCC has undertaken only a cursory investigation of these comparators, based on incomplete information gathered from secondary sources. The ACCC appears not to have checked primary information sources in most cases. This has led to mistakes. As a further example of this, in Table 5-5 of its draft determination, the ACCC references a Bloomberg company profile on the United Utilities Group, which states that the company "Manages and operates regulated electricity distribution, water and wastewater networks in England" [emphasis added]. This description is several years out of date. United Utilities used to operate and maintain the electricity distribution network in the North West of England. However, this business was sold in 2010, and since then United Utilities has focussed its operations on water and wastewater networks in England.

Where it has identified evidence that the comparator firm is involved in a range of activities in addition to the operation of water networks, the ACCC appears not to have investigated the materiality of those activities. These shortcomings have evidently led the ACCC to incorrect conclusions about the suitability of the companies used by SFG as comparators.

In dismissing the various comparators proposed by SFG, the ACCC has failed to acknowledge that in such an exercise it is generally impossible to find perfect comparator firms. Compromises in terms of the comparability of firms are generally unavoidable. Usually, the best that can be achieved is to identify a reasonable number of firms with similar (not identical) characteristics. The estimated beta of each such firm will be a combination of relevant information about the true systematic risk of the activity of interest, plus 'noise' (i.e. due to statistical estimation error, and due to the fact that each firm is an imperfect comparator to the firm of interest). The purpose of averaging estimates over several comparators is to eliminate as much of this noise as possible. Clearly, the larger the number of comparators used, the more noise surrounding the 'true' beta will be eliminated. The flaw in the ACCC's approach is that it has sought to rely exclusively on a very small number of Australian energy networks. Such an approach is likely to lead to very large estimation errors.

The issue is not whether overseas-listed water networks are better proxies than Australian-listed energy businesses. The issue is whether use of information from overseas water networks will lead to more reliable beta estimates than the exclusive reliance on the estimated betas of Australian energy networks. The ACCC has provided no convincing reasons why this should not be so.

The analysis relied upon by State Water uses a larger sample of firms in order to mitigate estimation error associated with the very small sample of Australian energy networks relied upon by the ACCC. Of course there is some variation in

firm characteristics across the sample – that is one reason that more firms are required – but the common characteristic of being a water utility is ultimately what will be most influential in the beta estimate.

Finally, the ACCC notes that:

> State Water's operations involve rural bulk water delivery. However, the majority of the international comparators are involved in residential water delivery and wastewater services. We expect this would place a downwards bias on State Water's estimated systematic risk since these international comparators would have a larger proportion of residential customers. This is because, 'generally residential or domestic customers exhibit much lower demand elasticity than commercial customers'. (ACCC 2014b, p. 159)

This reasoning suggests that overseas water networks should, if anything, provide a conservative (rather than inflated) view of State Water's beta.

5.3.3 The estimation techniques used by SFG

Another reason the ACCC has given no consideration to State Water's submission on beta is that the ACCC has rejected the estimation techniques used by SFG on the basis that these techniques are "fundamentally inconsistent with well accepted methods for estimating beta, such as OLS" (ACCC 2014b, p. 163).

As discussed above, the problem faced in estimating State Water's beta is a lack of comparable listed firms — there are no Australian-listed water utilities. A second problem is that, even if there are some comparable firms (like the Australian-listed energy networks and the overseas-listed water utilities) there simply are not enough comparable firms to draw reliable inferences on systematic risk. The additional estimation techniques (i.e. fitted and pooled estimation, taking account of additional firm characteristics) used by SFG were designed to mitigate this deficiency.

None of the various estimation techniques considered by the AER during its 2009 WACC review address the fundamental small sample problem facing the ACCC and State Water (ACCC 2014b, p. 164). It does not matter how many different ways a regression is run over the same set of returns from five to nine firms (e.g. using weekly returns or monthly returns; using different outlier-resistant techniques; forming portfolios or individual estimates; or using post-estimation adjustments). None of these techniques address the scope for estimation error caused by the small sample problem.

Furthermore, while OLS beta estimates are commonly used by regulators, it is not the case that such estimates are free of problems. In its critique of the techniques relied upon by State Water the ACCC states that the models used by SFG:

> are essentially unproven. The report has not provided adequate theoretical justification for these models, nor evidence that these models explain the distribution of returns well (ACCC 2014b, p. 165)

In this statement the ACCC applies a threshold for acceptance of an estimation technique which it does not apply to its own use of OLS estimation. It is well established, following empirical testing over four decades, that standard OLS estimation results in beta estimates that are too low for low-beta stocks and too high for high-beta stocks (Fama and French 2004). It is not the case that the ACCC's preferred estimation approach is uncontroversial or has universal acceptance.

The estimation techniques proposed by SFG do not result in a fundamentally different model to the CAPM. They simply employ more characteristics in grouping firms together, in order to obtain more reliable CAPM beta estimates. For a beta estimate from comparable firms to be useful those comparable firms need to meet two criteria. They need to be similar to the firm of interest, and they need to be similar to each other. When dealing with only a handful of comparator firms (on the basis of being a water utility or an energy network) it is especially important to take account of characteristics other than being a water utility or an energy network.

The techniques adopted by SFG use a handful of additional criteria to essentially group firms together according to common characteristics, in a systematic manner using all available information. Put another way, the techniques used by SFG control for different firm characteristics that may be relevant. This is a relatively small step towards more informative beta estimates, through augmentation of the approach used by the ACCC. It is not, as the ACCC appears to suggest, a radically different approach.

The ACCC's criticisms of SFG's approach of taking account of wider, potentially relevant firm characteristics, are overstated and are addressed below.

- Firstly, the ACCC merely asserts that it is not satisfied that incorporating industry and firm characteristics can improve equity beta estimates (relative to simple OLS estimates). The ACCC offers no analysis to support this assertion. State Water notes that controlling for industry and firm characteristics allows the model to incorporate relevant information into the estimate. If the additional characteristics contribute no useful information to the beta estimate, the resulting beta would be unaffected.[2] This point was explained by SFG in its report:

  > The important issue to understand is that, if industry is the only characteristic which has information for beta estimations, the coefficients on market capitalisation, book-to-market ratio and debt-to-equity ratio will be zero. The beta estimate for each industry will be the same as if we ran a pooled regression of excess stock returns on excess market returns for separately for each industry. But if the three accounting and market based characteristics do have information which is relevant for beta

[2] It is a very standard result in statistics that the omission of relevant explanatory variables results in biased estimates, but the inclusion of irrelevant explanatory variables does not bias estimates.

> estimation, then this will mitigate against some of the estimation error associated with consideration only of industry. (SFG 2013, p. 7)

- Secondly, the ACCC objects to the estimation techniques because they produce significantly different results. They should produce different results, because they account for more information (ACCC 2014b, p. 165). It is fallacious to reject a new estimation technique, used to address a limitation of another technique, on the basis that the new estimation technique provides a different result.
- Thirdly, the ACCC is concerned that, in reality, different industries may exhibit different risk exposures associated with the additional firm characteristics considered by SFG (size, book-to-market ratio, and leverage), and that this exposure is not captured by the analysis. However, the ACCC's approach to estimation is likely to be an even poorer approximation of reality. The ACCC's approach assumes, without any justification, that size, book-to-market and leverage do not influence at all the estimation of systematic risk. The SFG approach is strictly better because instead of assuming that these characteristics do not matter, the estimation techniques allow the data to inform this issue. As noted above, if the additional characteristics genuinely have no explanatory power, this would be reflected in the resulting estimates.
- Finally, the ACCC is concerned that the analysis imposes the systematic risk of a firm's industry, when different firms classified within the same industry could have quite different levels of systematic risk (ACCC 2014b, p. 165). For instance, the ACCC notes that energy networks that have previously been relied upon by the AER are classified by the Industry Classification Benchmark (ICB) in the same industry as electricity generators. The ACCC seems to imply that the pooling and fitting techniques 'drag up' the estimates of network businesses in the sample by virtue of the inclusion of generators, who are likely to be more risky than network businesses. This is really a criticism about the most suitable classification of firms within an industry, and does not invalidate the general rationale behind the fitted and pooled estimation techniques. A reasonable response from the ACCC would have been to argue for a better industry classification. Instead, the ACCC has dismissed the approach entirely. Furthermore, the ACCC's implication that the pooled and fitted betas are inflated due to imposed industry effects ignores the possibility that the increase in the estimates (relative to the OLS values) is due to a better accounting of firm-specific characteristics. The ACCC's concern about distorted beta estimates through the imposition of industry effects is purely speculative.

5.3.4 The ACCC's reliance on estimates from other Australian regulators

Having given reasons why the sample of overseas water utilities relied upon by State Water is inappropriate, the ACCC refers to determinations by other Australian regulators that use estimates for overseas water businesses as a means to justify its own estimate. For instance, the ACCC cites decisions by:

- IPART and ESCOSA, which reference the same sample of overseas-listed water utilities relied upon by State Water
- the QCA, which relies upon a sample of 14 business listed in the U.S. and the U.K., and compiled by NERA (ACCC 2014b, p. 162; NERA 2011). The alternative firms relied upon by NERA in its advice to the QCA include a number of the firms singled out by the ACCC in its critique of the comparable firm set relied upon by State Water (SJW Corp, Pennon and Northumbrian), have leverage below 60%, are metropolitan businesses and are diversified.

The ACCC criticises the set of overseas water utilities relied upon by State Water as inappropriate. However, at the same time, the ACCC considers determinations that use a number of the same comparators as relevant evidence when supporting its own estimate of beta.

If proper reference is made to the beta estimates from the alternative sample used by the QCA and NERA, it becomes quite plausible for even the OLS beta estimate to support the State Water submission of 0.9. The equal-weighted average beta estimates reported by NERA are as follows.

- For five UK water businesses the average is 0.54 (with a standard error of 0.07) which implies a 90 per cent confidence interval of 0.39 to 0.70.
- For nine US water businesses the average is 1.02 (with a standard error of 0.09) which implies a 90 per cent confidence interval of 0.86 to 1.18 (NERA 2011, p. 36).

In contrast to the ACCC's interpretation of the evidence, these estimates are not consistent with its estimate of 0.7 for State Water. On average across all 14 businesses the beta estimate is 0.85, and even if equal weight was placed upon the US and UK markets the mean beta estimate is 0.78.

Whilst the ACCC has used advice from Frontier Economics to base its estimate of State Water's beta exclusively on the estimated betas of Australian energy networks, it has ignored our caution about relying on past regulatory determinations to inform its estimates. Our 2013 report noted that:

> There are three possible sources of evidence on the covariance risk component of the cost of equity for water companies:
>
> - Market evidence on regulated Australian water networks;

> - Regulatory precedent from various Australian regulators; and
> - Market evidence on regulated overseas water networks.
>
> At present, there are no listed water companies in Australia. Without share price data on these companies, it is not possible to calculate sufficiently reliable historic returns for these firms to implement the asset pricing models (surveyed in McKenzie and Partington, 2013) used conventionally to estimate the covariance risk of these firms. That effectively rules out the first possible source of evidence.
>
> Precisely because of this data limitation, State regulators of water businesses in Australia have tended to evidence the AER's assessment of the covariance risk of regulated Australian energy networks to inform their estimates of covariance risk for the water companies they regulate. If the AER were to then employ precedents from these state regulators, it would introduce circularity to the analysis by effectively referencing its own past decisions. We think that this would be misleading and unhelpful. Therefore, we recommend that the AER not rely on precedent from Australian regulators of water businesses to inform its estimate of covariance risk for energy networks. (Frontier 2013, pp. 92–93)

We went on to recommend that if the AER is interested in evidence on the betas of water networks, it should look at overseas evidence, but interpret that data carefully:

> Therefore, the only source of evidence remaining to the AER is market evidence on regulated water networks overseas. Listed, regulated water networks do exist in the UK and the US, and market data on these companies could be collected. However, it is important that this evidence be treated with some caution because:
>
> - the structure of the water companies overseas may differ from water and energy networks in Australia;
> - the regulatory arrangements governing water networks overseas may differ from water and energy networks in Australia; and
> - water networks overseas may be exposed to different macroeconomic factors and risk drivers than water and energy networks in Australia.
>
> Notwithstanding these caveats, we think it is worthwhile to at least explore the overseas evidence available. (Frontier 2013, p. 93)

5.3.5 Conclusion on beta

In summary, there are presently no listed water networks in Australia. Therefore, in order to get direct evidence on the betas of such networks, it is necessary to appeal to evidence from abroad. State Water based its beta estimate partly on evidence on overseas water networks, and partly on the betas of Australian energy networks. The ACCC has dismissed this approach and has instead based its beta estimate exclusively on the evidence related to Australian energy networks.

The ACCC has provided no plausible explanation as to why estimates of the betas of overseas water networks provide no information at all on the beta of State Water. This is unreasonable.

The ACCC's assessment of the suitability the overseas comparators proposed by State Water's adviser, SFG, is superficial, and the objections raised in relation to almost all those comparators are unfounded.

In addition, none of the estimation techniques advocated by the ACCC address the scope for estimation error arising from the small sample problem arising under the ACCC's approach. Furthermore, these techniques simply assume away the importance of firm-specific characteristics that could influence systematic risk. By contrast, the techniques proposed by SFG address the small sample problem (i.e. by drawing on information from a large set of firms), and allow the data to inform on the importance of firm-specific characteristics (i.e. by not assuming in advance that these characteristics have no influence).

Based on the discussion above, in our view the ACCC should reconsider the evidence it has used to derive its estimate of the equity beta.

Finding 12

The ACCC has provided no plausible explanation as to why estimates of the betas of overseas water networks provide no information at all on the beta of State Water. The ACCC should reconsider the evidence it has used to derive its estimate of the equity beta.

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FRONTIER ECONOMICS | MELBOURNE | SYDNEY
Frontier Economics Pty Ltd 395 Collins Street Melbourne Victoria 3000
Tel: +61 (0)3 9620 4488 Fax: +61 (0)3 9620 4499 www.frontier-economics.com
ACN: 087 553 124 ABN: 13 087 553 124