Review of Weighted Average Cost of Capital estimate proposed by Goldfields Gas Transmission

RESPONSE TO SUBMISSIONS

FINAL REPORT PREPARED FOR THE ECONOMIC REGULATION AUTHORITY

15 March 2010

Review of Weighted Average Cost of Capital estimate proposed by Goldfields Gas Transmission

1 Scope of this report

Frontier Economics (Frontier) is pleased to provide this Final Report to the Economic Regulation Authority (the Authority) in relation to proposed revisions to the Goldfields Gas Pipeline (GGP) Access Arrangement submitted by the operators of the GGP, Goldfields Gas Transmission Pty Ltd (GGT).

We have previously provided a Draft Report to the Authority titled *Review of Weighted Average Cost of Capital Estimate Proposed by Goldfields Gas Transmission*, dated 6 August 2009. That report addresses GGT's submission in respect of the proposed rate of return (or Weighted-Average Cost of Capital, WACC) submitted by GGT.

The Authority then issued its *Draft Decision on GGT's Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline* on 9 October 2009.

A number of submissions have been received, responding to the Authority's Draft Decision. These submissions are from GGT itself and from other interested parties.

This Final Report contains our response to the various submissions on issues relating to WACC.

Frontier engaged SFG Consulting (SFG) as a sub-contractor to prepare the Draft Report and this Final Report in response to the submissions on the Authority's Draft Report on Frontier's behalf. SFG has considerable experience in regulatory determinations and has advised on WACC issues for a number of regulated entities and regulatory authorities.

This report is structured as follows:

- Section 2 sets out the rate of return definition used in this report
- Section 3 discusses issues surrounding WACC parameter estimates
- Section 4 provides relevant references.

2 Rate of return – definition

GGT proposed to use the pre-tax nominal definition of WACC as follows:

$$WACC_{\text{Pre-tax nominal}} = r_e\left[\frac{1}{1-T\times(1-\gamma)}\right]\frac{E}{V} + r_d\,\frac{D}{V}.$$

The Authority notes that GGT's proposed method of ascertaining a Rate of return is a method recognised as being consistent with Section 8.31 of the Code.[1]

No other submissions were received on the issue of the definition of the rate of return, and the corresponding definition of cash flows.

[1] Draft Decision, Paragraph 403.

3 Specific WACC Parameter estimates

3.1 Risk-free rate

The ERA, AER and GGT agree that an appropriate estimate of the risk-free rate is the yield to maturity on ten-year Commonwealth government bonds, estimated as an average over 20 trading days shortly before the start of the regulatory control period.[2] In our Draft Report, we concluded that the proposed method was appropriate for determining the risk free rate.[3]

In its Draft Decision, the Authority approved GGT's proposal in relation to the calculation of the nominal risk free Rate of Return.[4]

3.2 Market risk premium

3.2.1 Original submissions from GGT and BHP Billiton

GGT proposed that the market risk premium be set at 7% in light of the available historical data and the current state of financial markets.

BHP Billiton (BHPB) proposed a market risk premium of 5.75%. This estimate is the average of six estimates of MRP that have been used in equities reports published by various broking houses over the last six months. BHPB also notes that the very strong Australian regulatory precedent has been to adopt an estimate of 6% for MRP, and suggests that the 7% estimate proposed by GGT is too high in the circumstances.

3.2.2 Conclusions and recommendations in Draft Report

In our Draft Report, we concluded that "6 per cent is an appropriate estimate of the market risk premium in normal market conditions – consistent with historical average returns and regulatory precedent."

We also noted that the market risk premium is likely to vary over time as the risk of holding equities[5] rises and falls and as investor willingness to bear risk rises and falls. We examined a range of empirical indicators including dividend yields, interest rate spreads, option implied volatilities, and relative stock prices. We

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[2] ERA (2009, p.132), AER (2009, p.173) and GGP (2009, p.15). The AER considers an averaging period of anywhere from 10 – 40 days to be appropriate. The AER also emphasised that it would only accept an averaging period as close as practically possible to the start of the regulatory control period.

[3] Draft Report, p. 8.

[4] Draft Decision, Paragraph 424.

[5] As a proxy for aggregate wealth under the CAPM.

concluded that all of these indicators pointed toward a higher than average market risk premium in the current circumstances. We concluded that we considered market risk premium estimates in the range of 6-7% to be reasonable in the current circumstances. We also noted that this is consistent with the AER's recent estimate of 6.5%.

3.2.3 Draft Decision

In its Draft Decision, the Authority adopted a reasonable range of values for the MRP of 5-7%.[6] This was consistent with the Authority's recent Draft Decision in relation to the South West Interconnected Network (SWIN) and is based on "all of the evidence of realised equity premia over recent decades and market practice."[7]

3.2.4 Submissions in response to Draft Decision

GGT has submitted that it is prepared to accept a range of 6-7% for the estimated MRP.[8] GGT further submits that the market risk premium in the current circumstances in financial markets is likely to be in the upper part of a range that is based on long-term historical averages.

FIG has submitted that current financial market conditions should lead to an estimated MRP "at the higher end of a reasonable range based on the historical evidence."[9]

APIA has submitted that, in light of current conditions, "a value of 6.5% or above remains an appropriate estimate for the long-term MRP."[10]

The common theme in all of these submissions is that one can estimate a reasonable range for MRP based on a whole range of historical evidence, economic models and past regulatory decisions. This would then represent a reasonable range that covers the whole range of different market conditions that might be observed from time to time. It is then argued that the current circumstances in financial markets indicate higher than average MRP. Consequently, it is proposed, one should presently select an estimate (or range) from the upper end of the long-term historical range.

In our Draft Report, we indicated our view that 6% is an appropriate point estimate of the market risk premium in normal market conditions.[11] We then

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[6] Draft Decision, Paragraph 454.

[7] Draft Decision, p. 83.

[8] GGT Submission, Paragraph 440.

[9] FIG Submission, p.13.

[10] APIA submission, Section 5.

[11] Draft Report, p. 15.

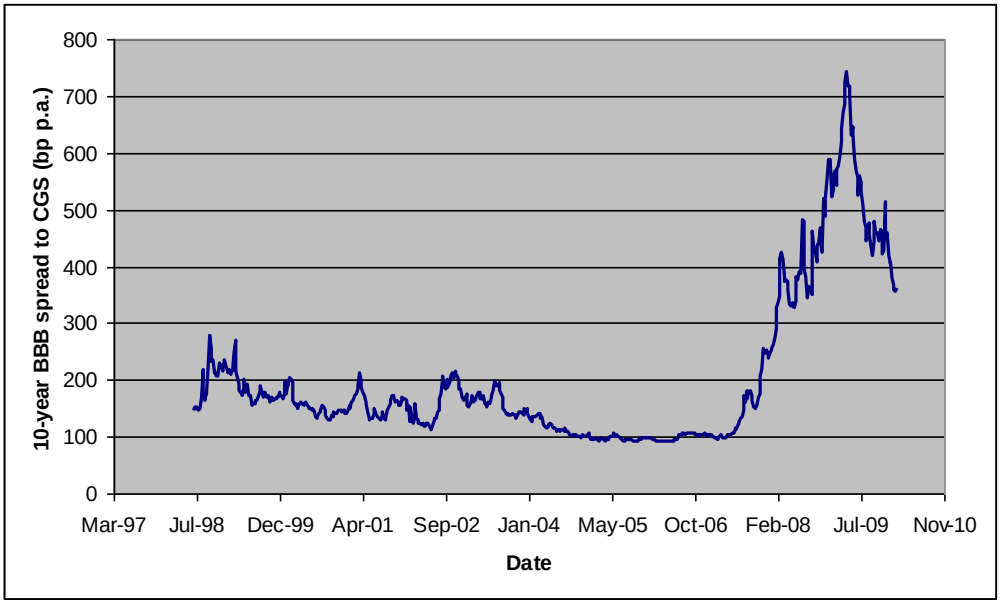
concluded that in light of the current data on dividend yields, option implied volatilities and so on, that a range of 6-7% was reasonable in the current circumstances.

We cannot see anything in the GGT, FIG or APIA submissions to contradict these conclusions or to lead us to revise those conclusions.

BHP Billiton has submitted that market circumstances have changed since the date of our Draft Report. BHPB submits that "the market has stabilised, with debt spreads and market volatility returning to near historical levels." Some empirical evidence is presented to show that certain interest rates and spreads are now lower than their peaks and, in some cases, approaching 2007 levels.

In our view, it is not clear that the evidence supports the strength of BHPB's conclusions. For example, 10-year BBB debt spreads reported by CBA Spectrum remain substantially above historical levels, as indicated in Figure 1 below.

Figure 1: 10-year BBB spread to Commonwealth Government Securities



Source: CBA Spectrum

Moreover, implied volatilities in global markets also remain substantially above historical levels as illustrated by the VIX index prices in Table 1 below. The VIX index measures the implied volatility of US equities markets and is measured in units of implied annualised standard deviation. Average values over recent years are summarised in Table 1 below, which shows that the average level of the VIX index is not at its peak, but remains 183% of the levels observed in 2005 and 2006.

Table 1: VIX index

Year	Average VIX index	Volatility relative to 2005
2005	12.70	100%
2006	12.72	100%
2007	17.64	139%
2008	33.08	261%
2009	31.09	245%
2010	23.25	183%

3.2.5 Conclusions and recommendations

In summary, we are not persuaded that the market has now stabilised to near historical levels. In our view, the current market conditions are such that the MRP is likely to be above its long-term average level. Consequently, we maintain our view that a range of 6-7% is reasonable in the current circumstances.

3.3 Value of imputation credits (gamma)

3.3.1 Original submissions from GGT and BHP Billiton

The original proposal from GGT was that gamma should be set to 0.2, based on a range of arguments and supporting work from its consultants.

BHPB proposed that a reasonable range for gamma is 0.5 to 0.65, based on regulatory precedent (i.e., 0.5 being a value commonly adopted by Australian regulators and 0.65 being the value currently being proposed by the AER).

3.3.2 Conclusions and recommendations in Draft Report

In our Draft Report, we noted that the estimation of gamma has been a contentious issue in the Australian regulatory environment and that a consensus view has not yet emerged. We also noted that a consensus *has* emerged in commercial practice, where the dominant approach is to make no adjustment for franking credits when estimating WACC.

We noted that the AER has recently departed from regulatory precedent in adopting a value of 0.65 for gamma. Our Draft Report sets out in some length our reasons for concluding that "the AER analysis in relation to gamma is fundamentally flawed and should receive no weight."[12]

[12] Draft Report, p.22.

We concluded that "we consider the estimated value for imputation credits of 0.2 by GGT to be appropriate and that a reasonable range for this parameter, based on all of the evidence and analysis that is now available, is 0 to 0.4."[13]

3.3.3 Draft Decision

In its Draft Decision, the Authority concluded that it "has recently determined a value of gamma in its Draft Decision on Proposed Revision to the Access Arrangement for the South West Interconnected Network."[14] The Authority further noted that in the SWIN Decision, it had concluded that "a reasonable range for gamma was 0.57 to 0.81."[15] The Draft Decision does not set out the Authority's reasons for its conclusions in relation to gamma in detail, but rather refers to the reasons set out in the SWIN Draft Decision: "The Authority adopts the same approach in relation to this Draft Decision, for the same reasons as those expressed by the Authority in the Draft Decision on Proposed Revision to the Access Arrangement for the South West Interconnected Network." [16]

In the SWIN Draft Decision, the Authority discusses the estimation of gamma on pp. 206-8. This discussion summarises the conclusions reached by the AER on this issue in its recent review of WACC parameters. Specifically, the Authority first notes that gamma is the product of two components, which the Authority refers to as the distribution rate and the utilisation rate.[17] The Authority then notes that "The AER has adopted a distribution rate of 1.0"[18] and that the AER had regard to two estimates of the utilisation rate – an estimate of 0.57 from market data (Beggs and Skeels, 2006) and an estimate of 0.74 from tax statistics.[19] We note that the AER then averaged these two estimates to obtain its currently preferred value of 0.65.

The Authority further notes in the SWIN Draft Decision that the AER's point estimate of 0.74 from tax statistics can be further broken down into estimates of 0.67 and 0.81 from different sub-periods.[20]

The Authority concludes in the SWIN Draft Decision that "The distribution rate of 1.0 in combination with a range of values of the utilisation rate of 0.57 to 0.81

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[13] Draft Report, p. 23.

[14] Draft Decision, Paragraph 526.

[15] Draft Decision, Paragraph 527.

[16] Draft Decision, Paragraph 528.

[17] SWIN Draft Decision, Paragraph 752.

[18] SWIN Draft Decision, Paragraph 753.

[19] SWIN Draft Decision, Paragraphs 755-756.

[20] SWIN Draft Decision, Paragraph 756.

indicates a reasonable range in the value of gamma of 0.57 to 0.81,"[21] and that "The Authority has taken into account a range of possible values of gamma of 0.57 to 0.81, consistent with evidence considered by the AER." [22]

3.3.4 Submissions in response to Draft Decision

GGT's submission in relation to gamma concludes that "GGT's proposed value of 0.2 is seen to concur with the range specified by Frontier Economics (which was zero to 0.4)."[23]

The majority of GGT's submission in relation to gamma addresses two points:

(a) A submission that "the Draft Decision does not provide sufficient reasoning for taking a position which departs from that proposed by GGT or recommended by Frontier Economics" [24]; and

(b) A summary of a range of evidence that is inconsistent with and highly critical of the AER's conclusion that 0.65 represents a reasonable estimate of gamma.

In relation to the first point, GGT submits that "At no point does the Draft Decision express any disagreement with Frontier Economics' assessment" [25] and that "where the Authority chooses to depart from Frontier Economics' recommendations, it is obliged to provide logical reasoning for doing so."[26] The submission on this point concludes that "In the Draft Decision, the Authority did not seem to specifically respond to GGT's proposal or Frontier Economics' advice…It is reasonable to expect that the Authority would provide some justification or reasoning as to why it is not considered acceptable…GGT therefore finds it difficult to either respond to the Authority's reasoning or possibly amend its own position." [27]

In relation to the second point, the GGT submission summarises a more comprehensive paper prepared by its consultants. This sets out a number of new pieces of evidence that are inconsistent with the conclusions that have been reached by the AER and which are critical of the approach and reasoning of the AER on this issue.

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[21] SWIN Draft Decision, Paragraph 757.

[22] SWIN Draft Decision, Paragraph 758.

[23] GGT Submission, Paragraph 563.

[24] GGT Submission, Paragraph 519.

[25] GGT Submission, Paragraph 520.

[26] GGT Submission, Paragraph 521.

[27] GGT Submission, Paragraph 523.

FIG has not submitted a particular value or range of values for gamma. Rather the FIG submission proposes that the Authority should either have adopted the range of 0 to 0.4 set out in our Draft Report, or provided detailed reasons for its departure.[28]

APIA has submitted that "a reasonable estimate for gamma is less than 50%."[29] The basis for this conclusion is that:

(a) The range proposed by the Authority is based on only two studies and places zero weight on all other evidence on the issue;

(b) The evidence of Beggs and Skeels (2006) has since been updated and the more recent estimate should be used;

(c) Market prices of traded securities are used to estimate all other WACC parameters. Tax statistics are not market prices and cannot be used to estimate gamma;

(d) The Authority has apparently agreed with the AER in assuming a 100% payout rate for franking credits (imposed by theoretical assumption), even though the empirical evidence suggests a value of 71%; and

(e) The values of gamma adopted by the AER and the Authority are higher than the range of reasonable values recommended by their respective consultants.

BHPB has made no further submission on this issue.

3.3.5 Conclusions and recommendations

We note that none of the submissions in response to the Draft Decision are inconsistent with, or critical of, our Draft Report in relation to this issue. We also note that there is no reference in the Draft Decision to the reasoning or analysis that supported the conclusions on this issue in our Draft Report. Consequently, we conclude that there is no basis for us to change the conclusions on this issue that are set out in our Draft Report, which is that a reasonable range for gamma is 0 to 0.4.

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[28] FIG Submission, pp.10-11.

[29] APIA submission, Section 5.

3.4 Equity beta

3.4.1 Original submissions from GGT and BHP Billiton

The original proposal from GGT was that 1.0 to 1.8 represented a reasonable range for the equity beta of the GGP.

BHPB proposed an equity beta point estimate of 0.7. The BHPB submission noted that the GGT proposal to increase the top of the reasonable range to 1.8 is based largely on (a) a "first principles" or conceptual analysis of the risks involved with the GGP, and (b) an analysis of the beta estimates of a group of mining companies that are said to be representative of the customers of the GGP.

BHPB submitted that the GGT first principles analysis is incomplete, it considers only those characteristics of the GGP that imply higher than average risk and ignores a number of characteristics that imply lower than average risk – and that the omitted "low risk" characteristics might more than offset the "high risk" characteristics that formed the basis of the GGT submission.

BHPB also submitted that the GGT analysis of mining companies was inappropriate, and in the alternative that even if this was an appropriate analysis it was not properly performed.

3.4.2 Conclusions and recommendations in Draft Report

In our Draft Report, we concluded that "GGT has not presented persuasive evidence that the systematic risk faced by GGP is any different to that which applies to the average gas pipeline business."[30]

We further concluded that "Taking all of the information available to us, our view is that an appropriate range for the equity beta estimate is 0.8 – 1.2.

This conclusion is based on:

(a) The mid-point estimate for any equity beta is 1.0, the beta for the average firm. One would only adopt an estimate different from 1.0 to the extent supported by reliable empirical analysis;

(b) The ACCC has consistently adopted an equity beta of 1.0 for gas pipeline businesses;

(c) The ERA has previously used a range of 0.8 to 1.33 for the GGP and we are unaware of any reason why its systematic risk is any higher or lower than it was previously;

(d) After considering a range of equity beta estimates for the available "comparable" firms, the AER has adopted an equity beta estimate of 0.8

[30] Draft Report, p.32.

for electricity transmission and distribution firms (also with 60% assumed gearing);

(e) The GGT submission on this point notes that there are some aspects suggesting that the pipeline's systematic risk is higher than that faced by the average pipeline business and some evidence that systematic risk is below average. There is no compelling evidence to suggest which of these effects might dominate the other; and

(f) Even if the approach that was submitted by GGT was adopted (which we do not accept) application of the beta estimates in Table 3 using the ERA's favoured approach for re-levering betas produces an equity beta estimate of 1.23, as explained above. In our view, there is no empirical evidence to support an equity beta higher than this."[31]

3.4.3 Draft Decision

In its Draft Decision, the Authority concludes that "The Authority accepts Frontier's advice, that a reasonable equity beta range for the GGP is 0.8 to 1.2."

3.4.4 Submissions in response to Draft Decision

Analysis of lower bound of 0.8

Our proposed lower bound of 0.8 has been contested as being too high in the BHPB submission. BHPB submits that the appropriate range for the GGP equity beta is 0.5 to 0.8. The basis for this conclusion is that:

(a) APA, who holds an 88% interest in the GGP, presently has a Reuters equity beta estimate of 0.69;

(b) APA is seen to have relatively stable cash flows; and

(c) A number of recent regulatory decisions in electricity and gas transmission and distribution have adopted equity beta point estimates somewhat below 1.0.

BHPB concludes that it is "inconsistent that the parent company…has an equity beta significantly less than 1.0 (as measured by the market), but one of its key regulated and contracted revenue streams is viewed as having an equity beta between 0.8 and 1.2."[32]

Again, our approach is to consider the totality of the available evidence. Equity beta *estimates* for individual firms are well known to be unreliable, to have wide standard errors, and to vary considerably over time. Even if the true systematic risk of the firm is perfectly constant, the beta *estimate* can vary considerably due to sampling error. The precision with which an individual beta is estimated can be

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[31] Draft Report, p.32-33.

[32] BHPB Submission, p. 21.

measured by its standard error. The September-2009 AGSM beta estimate for APA was 0.74 with a standard error of 0.20. The upper bound of the standard 95% confidence interval is 1.14, so according to the standard statistical definition that beta estimate for APA is *not* "significantly less than 1.0."

We do not want to overstate the importance of this point or to begin a semantic debate about betas, beta estimates, and statistical significance. Rather, we use this example to illustrate why the standard approach (including that adopted by other regulators) is to examine estimates for a range of comparable firms, or for a portfolio of comparable firms, in order to reduce sampling error as much as possible. We have sought to determine a reasonable range for beta based on the totality of relevant information and data available to us. The beta estimate of APA is one relevant consideration, but our view is that the BHPB submission overstates the importance of that single data point.

We do agree with BHPB that WACC parameters should not be the subject of mechanical estimation and that judgment, common sense, and an assessment of whether the outcomes are economically reasonable are all important aspects of the process. However, one aspect of this assessment of reasonableness is a comparison of the relative returns on debt and equity, as discussed in Appendix C of our Draft Report.

The lower bound of BHPB's estimates for equity beta and MRP are 0.5 and 5% respectively. This implies a risk premium (over and above the risk free rate) of 250 basis points. The debt margin in the Draft Decision is 280 basis points, and present debt margins appear to be higher than that (whether based on CBA Spectrum or Bloomberg data). In our view, it is not reasonable that residual share holders would require a return that is lower than the return on fixed-rate investment grade debt in the same firm. That is, the BHPB estimates of the required return on equity appear to be too low, relative to the required return on debt.

The BHPB submission also contests the notion that gas pipeline businesses are likely to have higher systematic risk than electricity transmission and distribution businesses due to greater exposure to commercial and industrial customers. We note that on p. 36 of our Draft Report we re-produce Table 9.4 from the AER's recent WACC review, in which the AER notes that "gas networks are exposed to more volume risk."

We also note in this regard that "The AER has previously acknowledged in its explanatory statement that gas businesses may have a higher business risk than electricity businesses due greater volatility in cash-flows from relatively higher volume risk compared to electricity network businesses. That said, the AER continues to consider gas businesses as close but not perfect comparators as

these businesses exhibit relatively stable cash flows; natural monopoly characteristics and inelastic demand."[33]

An analysis setting out the reasons for this conclusion, which is frequently cited in regulatory determinations and submissions, is Lally (2004) who concludes that (pp. 33-34) "The supply of gas or electricity to commercial and industrial users constitutes an intermediate product whose demand will be driven by the demand for the final goods and services. The demand for these final goods and services is likely to be more sensitive to macro economic shocks than the demand for gas or electricity by residential users. So, with gas supply more heavily tilted towards commercial and industrial users than for electricity, the demand for gas is likely to be more sensitive to macro economic shocks. This implies a higher asset beta for the gas pipeline businesses than for the electricity lines businesses."

Our conclusion, after considering all of the available data and analysis including the BHPB submission, is that our proposed lower bound of 0.8 is not unreasonably high. The basis for this conclusion is as follows:

(a) The AER has proposed an equity beta estimate of 0.8 for electricity transmission and distribution, and it is the view of the AER that gas pipelines have higher systematic risk than electricity network businesses;

(b) The ERA adopted a lower bound of 0.8 in its previous GGP determination;

(c) The equity beta estimates proposed by BHPB are too low to be economically plausible – they imply that residual equity holders would require lower returns than first-ranking debt holders would require from the same business; and

(d) The importance of a single beta *estimate* for APA is overstated in the BHPB submission.

Analysis of upper bound of 1.2

Our proposed upper bound of 1.2 is contested as too low in the GGT and FIG submissions.

FIG submission

The FIG submission notes that the equity beta range adopted in the previous access arrangement review was 0.8 to 1.33. FIG submits that "The risk characteristics of the GGP have not changed. What has changed is the price of risk and as a result, investors are now demanding higher rates of return for investing than they have in the past. Reducing the equity beta relative to what is currently being allowed is not logical within this context."[34]

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[33] AER Electricity WACC Review, Final Decision, p. 108.

[34] FIG submission, p.13.

In responding to this submission, we note that beta is an estimate of the *amount* of systematic risk, not the *price* of systematic risk. We agree that current circumstances in financial markets may be such that investors are demanding higher rates of return on risky assets, and our recommendations in relation to MRP are consistent with this. Indeed, FIG's own submission is that the risk characteristics of the GGP (which is what beta seeks to measure) have not changed.

The second aspect of the FIG submission is the suggestion that if the risk characteristics of the pipeline have not changed, the beta range adopted in the previous determination should be maintained. We have sought to provide a best estimate of the reasonable range for beta based on all of the data and information available to us at the time of writing the Draft Report. For the reasons set out in our Draft Report, we concluded that the upper bound of this range – based on *all* available information – was 1.2.

GGT submission

In its response to the Draft Decision, GGT has modified its proposed reasonable range to 1.0 to 1.4.[35] The lower end of the range is the same as in the original submission, but the top of the range has been reduced from 1.8 to 1.4. There are two reasons for this reduction:

(a) GGT's consultants have re-estimated the betas of a sample of mining companies including data that has become available since their original submission. The relevant beta estimates are substantially lower, on average, when the updated data is used; and

(b) The relative weights assigned to various mining companies have been re-adjusted. The new estimate places 50% weight on BHP and RIO and 50% weight on the other mining companies in the sample.

GGT maintains that the "first principles" approach used to estimate the upper bound remains valid and that it is also appropriate to exclude from consideration comparable firms with beta estimates that have *t*-statistics less than 2.[36]

Elimination of estimates with t-statistics less than 2

We maintain our view that it is incorrect to mechanically eliminate beta estimates with a *t*-statistic less than 2. There are two reasons why the beta estimate for a particular company may have a *t*-statistic less than 2: Either the true systematic risk of the firm really is low and the beta estimate properly reflects this, or the true systematic risk is higher but sampling/estimation error results in an estimate that is so imprecise that it cannot be statistically differentiated from zero. If all of these estimates are mechanically eliminated, the inevitable result is that firms

[35] GGT Submission, Paragraph 482.

[36] GGT Submission, pp. 78-81.

really do have low systematic risk will be routinely excluded. This causes an upward bias in betas estimated from the resulting set of firms that have not been eliminated.[37] More precisely, the t-statistic is formed by dividing the parameter estimate by its standard error, which is a measure of the precision of that estimate. Suppose a sample contains two firms that have true betas of 0.5 and 1.5 respectively. Also suppose that the estimation procedure works perfectly such that the beta estimates are 0.5 and 1.5 (i.e., the resulting estimates are equal to the true values). Finally, suppose that the standard error for both estimates is 0.3, so both estimates have the same precision. In this case, both estimates are equally valid, equally precise, and unbiased. Yet the 0.5 estimate would be thrown out and the 1.5 estimate would remain. This creates an upward bias in the beta estimate. Consequently, it is our view that beta estimates with *t*-statistics less than 2 should not be mechanically excluded from the sample.

GGT approach for estimating beta

The GGT proposal sets out a proposed approach for constructing an empirical estimate of the equity beta of the GGP. GGT proposes that 83% of the GGP revenues are effectively standard pipeline revenues for which the standard regulatory beta estimate of 1.0 is appropriate. We note that this is consistent with the mid-point of our proposed range, so there seems to be agreement about this component of the equity beta estimate – which receives a weighting of 83% in the calculation of the overall beta estimate.

GGT then proposes that the remaining 17% weighting is applied to its estimate of mining company betas. This 17% weighting is further disaggregated, with 25% of that weight being applied to each of BHP and Rio, and the remaining 50% weight being applied to smaller mining firms.

In terms of equity betas, GGT proposes an upper bound of 1.4 computed as follows:

$$\begin{aligned}\beta_{e,GGP} &= 0.83\times\beta_{e,Pipeline} + 0.17\times\beta_{e,Mining}\\ &= 0.83\times 1.0 + 0.17\times 3.4\\ &= 1.4.\end{aligned}$$

We continue to have a number of concerns with this approach:

(a) The systematic risk of a firm's customers is one of the qualitative considerations in determining a reasonable estimate of equity beta. To the extent that a vendor firm's customers have more risk of defaulting on or delaying payments or reducing volumes during economic downturns, this can impact the systematic risk of the vendor firm itself. This does

[37] We address this point in further detail in our Draft Report, pp. 27-28.

not imply that one can simply apply the beta estimate for that customer to the vendor firm itself. For example, a construction company that performs almost exclusively government contracts would not have a beta of zero, even though the customer is effectively risk-free. That company may indeed have a beta that is lower than a similar firm that performs work for highly-geared property developers – so the identity of the customer is a relevant consideration – but simply inserting the customer's beta is likely to overstate the importance of this effect;

(b) The relative weights assigned to the standard gas pipeline operations (0.83) and the volume-at-risk mining operations (0.17) are based on revenues. Technically, this allocation should be based on value,[38] and the mining revenues are riskier and would be discounted at a higher rate producing a lower present value. That is, if anything, the weight assigned to the high-beta component is too high;

(c) The mining company beta estimates that form the basis of the GGT submission appear to be based on historical data over the last 4-5 years. GGT notes that these estimates have varied considerably even since their original submission: "we have observed a marked reduction in the average betas in our sample of mining companies (noting that within the sample, some had fallen and some had risen)."[39] This is most likely due to sampling/estimation error, which is accentuated when small amounts of data are used. In our Draft Report, we prepared beta estimates using much longer histories of data and produced more stable and precise estimates. We noted that our estimates were somewhat lower, on average, than those used as the basis for the GGT submission;

(d) The mining company equity beta of 3.4 appears to be implausibly high – especially considering that BHP and RIO receive a 50% weighting in this estimate. This estimate implies that the mining revenues are subject to nearly three and a half times as much risk as would apply to the average Australian firm – which seems highly unlikely. This has been caused by the GGT estimation process effectively re-gearing the mining company betas to 60% leverage. The mining companies in the sample actually have equity betas that are considerably lower than 3.4. The GGT estimates of equity beta for BHP and RIO are 1.1 and 1.5 respectively. But these companies also have considerably less than 60% leverage. Consequently, the re-gearing process considerably increases the equity beta estimates. But now consider why these equity beta estimates have been computed in the first place. The idea is that a portion of the pipeline revenues are at risk from mining companies such as BHP, RIO and others, and that the beta estimates of these customer firms can be used as a proxy for that risk. But those revenues are coming from BHP as it currently is, and with the leverage it currently has. The GGT

[38] As set out in our Draft Report, p. 27.

[39] Synergies Report, p. 25.

> approach effectively assumes that those revenues are at risk as though they were coming from a firm like BHP, but with 60% gearing. A firm like BHP, but with 60% gearing is a much riskier proposition than BHP as it actually is. Consequently, the GGT approach overstates the risk of the volume-at-risk mining revenues as it assumes they are subject to more risk than they actually are.

For the reasons set out above, and in our Draft Report, we are not persuaded that there is evidence to increase the upper bound of our range for equity beta and we maintain that upper bound at 1.2.

Qualitative considerations

GGT makes two further submissions that are of a more qualitative nature in line with their "first principles" analysis. First, they compare the take-or-pay arrangements of the GGP with two other pipelines in the APA Group. GGT concludes that "on average, across the RBP and MSP, the proportion of revenue subject to take-or-pay approximates the proportion of GGP's revenue subject to take-or-pay."[40] We note that this is a very small sample, but necessarily so. We also note that this is consistent with the regulatory precedent of an equity beta of 1.0, which is the mid-point of our proposed range and with the weighting that is applied to the standard pipeline revenues in GGT's empirical analysis above.

GGT then submits that it has revenues that are subject to volume risk from mining companies. On this point it submits that "Frontier Economics does not recognise that BHPB and Rio Tinto are not the actual contracted Users. Typically, BHPB or Rio Tinto subsidiaries are the contracted Users and there are no ultimate parent company guarantees."[41]

The core of this issue is not one of whether the contracted party will default on a payment, but whether volume is likely to be withdrawn during an economic downturn. While it is highly likely that BHPB or Rio Tinto would ensure that legitimate invoices are paid even in the absence of formal parent company guarantees, this is not the key issue. The key issue in terms of impact on equity beta is the extent to which volume might be withdrawn during an economic downturn.

This depends on the nature of the contract and on the competitive position of the customer. Even where the customer is free to reduce volume without consequence, volume is likely to be maintained so long as continued operations are viable for the customer. This, in turn depends upon the customer's own sale contracts and its costs of production. So long as the mining company customer's operation continues to be economically viable (profitable), that customer is

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[40] GGT Submission, Paragraph 457.

[41] GGT Submission, Paragraph 460.

unlikely to withdraw volume from the pipeline. But no evidence has been presented about substantial withdrawal of volumes during the present global economic downturn.

In any event, the empirical analysis presented in the GGT submission *does* use the beta estimates for BHP and RIO directly, as discussed in some detail above.

3.4.5 Conclusions and recommendations

We maintain our recommendation that an appropriate equity beta range for the GGP is 0.8 to 1.2.

3.5 Credit rating

3.5.1 Original submissions from GGT and BHP Billiton

GGT submitted that the credit rating should be set at BBB-, based primarily on the analysis of a small set of what it considered to be comparable firms.

BHPB submitted that the credit rating should be set at BBB+, consistent with the last GGP determination by the ERA.

3.5.2 Conclusions and recommendations in Draft Report

In our Draft Report, we concluded that "an appropriate range for the credit rating is a lower bound of BBB to an upper bound of BBB+. This is based on assumptions of 60% gearing and an interest coverage ratio of approximately 2.0. A lower credit rating could be justified by:

a) evidence that comparable firms with (approximately) 60% gearing *and* an interest coverage ratio of (approximately) 2.0 have credit ratings of BBB- or lower; or

b) evidence that the final allowed return is insufficient for GGP to maintain an interest coverage ratio of (approximately) 2.0."[42]

3.5.3 Draft Decision

In its Draft Decision, the Authority concludes that "it does not agree with Frontier that the credit rating should be subject to a range considered as reasonable" because "Regulators typically do not apply a range to credit ratings."[43]

[42] Draft Report, pp. 38-39.

[43] Draft Decision, Paragraph 489.

The Authority also concludes that it "agrees with BHPB that there does not appear to be justification to change the current credit rating for the GGP."[44]

Consequently, the Authority adopts a credit rating of BBB+.

3.5.4 Submissions in response to Draft Decision

In its response to the Draft Decision, GGT concludes that "a rating of BBB- is appropriate and its rating should certainly be no higher than BBB."[45] GGT supports this conclusion with two additional pieces of evidence:

(a) APA, who holds an 88% interest in the GGP, has recently been assigned a BBB rating; and

(b) GGT has provided some calculations of forecast interest coverage ratios that it argues are consistent with a rating of BBB- and no higher than BBB.

In relation to the APA credit rating, GGT submits that "APA is a large company holding a diversified portfolio of gas network assets…The Authority rating GGP at BBB+ implies that the Authority views GGP as being less risky than the much larger and more diversified APA Group."[46]

In general, the stand-alone credit rating for a subsidiary company would be expected to be equal to or below the rating of the combined group. Exceptions to this general rule would be where the subsidiary is considered to have a lower credit risk than the other components of the group. This might be the case, for example, where the subsidiary operates in an industry that is less risky than the remainder of the group and/or where the subsidiary has lower leverage than the remainder of the group.

In the case at hand, all of the major assets of the APA group are gas pipelines and the subsidiary in question is also a gas pipeline. Moreover, the APA Group has leverage of approximately 63%,[47] whereas the GGP is assumed to have leverage of 60%. That is, it is difficult to distinguish the GGP from the APA Group generally in terms of these aspects of credit risk. This implies that it is difficult to consider that a credit rating of BBB lies outside the range of what could be considered reasonable.

In relation to the forecast interest coverage ratios, we note that the calculations provided by GGT indicate interest coverage ratios between 1.77 and 1.86 over the five-year regulatory period. We also note that GGT have indicated that

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[44] Draft Decision, Paragraph 488.

[45] GGT Submission, Paragraph 494.

[46] GGT Submission, Paragraph 493.

[47] Net debt / (Net debt + Market Capitalisation) where Net Debt is short and long-term debt less cash, taken from the 2009 annual report for the APA Group.

Standard and Poor's indicative interest coverage ratio for BBB transmission utilities is the range of 1.5 to 2.0. This range includes BBB-, BBB, and BBB+ ratings. We note that the middle third of this range is 1.67 to 1.83, which corresponds closely to the pro-forma interest coverage ratios submitted by GGT.

In our view, the two pieces of evidence submitted by GGT on this issue support a BBB credit rating. The conclusion in our Draft Report was that an appropriate range for the credit rating was BBB to BBB+. The new evidence submitted by GGT supports a BBB rating, which is within the range that we considered reasonable in our joint report. The Authority has determined that the appropriate credit rating is BBB+, which is also within the range that we considered to be reasonable based on an analysis of comparable firms and the other reasons set out in our Draft Report.

3.5.5 Conclusions and recommendations

The submissions and analysis set out above leads us to re-affirm our view that the appropriate range for the credit rating of the GGP is BBB to BBB+. We note that the Authority has decided to adopt a single credit rating of BBB+, rather than a reasonable range. The conclusion in our Draft Report was that there was insufficient evidence to support the conclusion that a BBB+ rating was reasonable but that a BBB rating was not. Consequently, we recommended a reasonable range bounded by these two ratings. In our view, the new evidence submitted by GGT is consistent with a BBB rating. This leads us to re-affirm the conclusion in our Draft Report.

3.6 Debt margin

3.6.1 Original submissions from GGT and BHP Billiton

GGT proposed a debt margin of 3.6% based on a 10-year BBB- corporate bond yield. GGT applied the AER/Bloomberg approach to first obtain an estimate of the debt margin for 10-year BBB corporate bonds. This is because Bloomberg does not provide estimates for ratings qualifiers – it provides a single estimate for the group of BBB-, BBB and BBB+ bonds.

GGT then proposed to adjust this BBB estimate to their proposed BBB- credit rating by adding one third of the difference between the estimated yield on 8-year A and BBB rated bonds, where both estimates were available from Bloomberg at the time of the original GGT proposal.

3.6.2 Conclusions and recommendations in Draft Report

In our Draft Report, we noted that CBA spectrum provides estimates of debt premiums for 10-year BBB and BBB+ corporate debt. We also noted that Bloomberg does not, but that the AER had devised an approach to extrapolate

the available Bloomberg estimates to obtain an estimate of the 10-year BBB debt premium. We also noted that the AER had determined that it was appropriate to place 100% weight on its extrapolated Bloomberg estimates and to place zero weight on the CBA Spectrum estimates.

Our Draft Report considers the relative merits of the two approaches and the AER's reasoning for using only the extrapolated Bloomberg estimate. We concluded that "the reasons for relying on the AER/Bloomberg approach are flimsy at best. We do not consider it appropriate to place 100% weight on the estimates constructed by the AER from Bloomberg data and to place zero weight on the estimates from CBA Spectrum."[48]

Our Draft Report adopts a range that uses the AER's extrapolated Bloomberg estimate as the lower bound, and an estimate at the mid-point of the AER-Bloomberg and CBA Spectrum estimates as the upper bound. We noted that this upper bound was also consistent with recent estimates published by the Reserve Bank of Australia.

3.6.3 Draft Decision

In its Draft Decision, the Authority notes that it adopted the AER's extrapolated Bloomberg approach in its recent SWIN Draft Decision. The authority notes that "the same approach was taken by the AER in the AER electricity WACC Review. The AER concluded that CBASpectrum estimates were not an appropriate data source. Frontier has suggested that estimates produced by CBASpectrum should also be taken into account. However the Authority does not agree."[49]

The Draft Decision then sets out the AER's reasons for concluding that CBA Spectrum estimates should not be used and concludes that "for these reasons the Authority maintains its view that the CBASpectrum estimates should not be taken into account."[50]

3.6.4 Submissions in response to Draft Decision

In its response to the Draft Decision, GGT notes that "…Bloomberg has ceased publishing the key yields that were previously used by the regulators such as the AER to estimate the ten year BBB cost of debt."[51]

GGT also notes that "the AER has also since changed its position on this issue" and that in one recent case "the AER has applied the mid-point between

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[48] Draft Report, pp. 44-45.

[49] Draft Decision, Paragraph 491-492.

[50] Draft Decision, Paragraph 494.

[51] GGT Submission, Paragraph 495.

Bloomberg and CBA Spectrum," and that in several other cases the AER has "solely relied on CBA Spectrum."[52]

GGT also notes that "In its final decision in relation to the SWIN the Authority has also recognised the use of both CBA Spectrum and Bloomberg in coming up with its range for the debt margin."[53]

That is, there has been movement on this issue from Australian regulators since our Draft Report and the Draft Decision such that CBA Spectrum estimates are now considered as being relevant data. As set out in our Draft Report, we concur with this view.

At the time of the AER WACC Review there was a substantial divergence between the CBA Spectrum and extrapolated Bloomberg estimates of the debt margin for 10-year BBB corporate debt. The GGT submission indicates that this difference has now closed substantially, being 458 basis points for CBA Spectrum and 437-438 bp for the extrapolated Bloomberg approach, depending on the method used for extrapolation.[54] That is, in the current market circumstances, the estimated debt margin is considerably less sensitive to the question of which data source is used.

Our view remains that CBA Spectrum and Bloomberg are the two commercial data sources that provide relevant data in relation to debt margins and that both should be afforded weight in regulatory estimates of debt margin. If Bloomberg data is to be used, some form of extrapolation (from the 7-year BBB yields that are published by Bloomberg) is required. The two extrapolation approaches set out in the GGT submission (and based on regulatory use) are both reasonable in our view, as would be an average of those two approaches.

Finally, we note that "GGT had previously recommended making an adjustment to the debt margin to reflect the difference between a BBB and BBB-…GGT is no longer proposing to make any further adjustment on this basis."[55] In effect, this amounts to GGT accepting the BBB debt premium – at least to the extent that Bloomberg data is used. This is because Bloomberg does not distinguish between BBB-, BBB and BBB+ debt, but rather simply publishes a single set of "BBB" estimates. To the extent that regulators have used Bloomberg estimates, they have also adopted the BBB estimates without adjustment for ratings modifiers. The net effect of this is that the same data will be used and the same estimate obtained whether one submits that the appropriate rating is BBB- (as GGT does) or BBB+ (as the Authority does).

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[52] GGT Submission, Paragraph 497.

[53] GGT Submission, Paragraph 498.

[54] GGT Submission, Paragraph 499.

[55] GGT Submission, Paragraph 506.

3.6.5 Conclusions and recommendations

Our view remains that CBA Spectrum and Bloomberg are the two commercial data sources that provide relevant data in relation to debt margins and that both should be afforded weight in regulatory estimates of debt margin. If Bloomberg data is to be used, some form of extrapolation (from the 7-year BBB yields that are published by Bloomberg) is required. The two extrapolation approaches set out in the GGT submission (and based on regulatory use) are both reasonable in our view, as would be an average of those two approaches.

3.7 Debt issuance costs

3.7.1 Original submissions from GGT and BHP Billiton

In its original submission, GGT proposed an allowance for debt issuance costs of 12.5 to 30 basis points.

3.7.2 Conclusions and recommendations in Draft Report

In our Draft Report, we concluded that debt issuance costs would be better accommodated in the cash flows rather than as an adjustment to the cost of debt. This is because the debt issuance costs will be paid as cash flows, usually in lump sum form at the time of issuing the debt. The adjustment to the cost of debt seeks to approximately amortise this cost over the assumed life of the debt. This adjustment flows through to the estimated WACC and (through the regulatory model) to prices. Since this approach is somewhat indirect and involves a series of compounding steps, we concluded that the more direct approach is to set out reasonable estimates of debt issuance costs directly into the cash flows as an operating cost.

3.7.3 Draft Decision

In its Draft Decision, the Authority concluded that "The Authority does not agree that it is appropriate to adopt a ranges approach to the cost of raising debt. To do so would be inconsistent with recognised regulatory practice and the Authority's usual approach. The Authority is not satisfied that GGT has established any reason for departing from the approach adopted by most Australian regulators." [56]

"Similarly, the Authority does not accept Frontier's suggestion to include debt raising costs in cash flows. Again, to do so would be contrary to established

[56] Draft Decision, Paragraph 508.

regulatory precedent and with the approach traditionally taken by the Authority, and taken in recent times." [57]

The Authority also noted that "it has considered BHPB's submission but is not satisfied that it is appropriate to make no allowance for debt raising costs, again on the basis that such an allowance is ordinarily appropriate and provided for by Australian regulators." [58]

The Authority ultimately determined that an allowance of 0.125% would be appropriate based on regulatory precedent, including the Authority's SWIN Draft Decision and noting that "The same approach was taken by the AER in the AER electricity WACC review." [59]

3.7.4 Submissions in response to Draft Decision

In its response to the Draft Decision, GGT provides some evidence of debt issuance costs actually incurred by the APA Group during 2009. This information is provided in a confidential appendix and includes legal costs, arrangement fees, investment banking advisory fees, fees on syndicated and bilateral facilities and so on. In all cases, the fees were payable up front.

The GGT submission proposes two methods of amortising the fees over the terms of the various facilities and concludes that "Based on the information provided, the estimate for debt raising costs is over 75 basis points per annum…GGT therefore revises its recommended range for debt raising costs to be 0.75% per annum."[60] We note that this is a material increase relative to the present allowance of 8-12.5 basis points and the original GGT proposal of 12.5 to 30 basis points.

3.7.5 Conclusions and recommendations

Approach

Our preferred approach remains for debt issuance costs to be accommodated within the cash flows rather than as an adjustment to the WACC. We note that this approach is mandatory under the National Electricity Rules. For example, in its recent Review of WACC Parameters, the AER noted that "the NER prevents debt and equity raising costs from being compensated through the WACC. However the NER do not prevent such costs from being compensated through other mechanisms such as the capital or operating expenditure allowances."[61]

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[57] Draft Decision, Paragraph 509.

[58] Draft Decision, Paragraph 511.

[59] Draft Decision, Paragraph 510.

[60] GGT Submission, Paragraphs 512 and 515.

[61] AER Review of WACC Parameters, Final Decision, p. 3.

However, we note the Authority's Draft Decision in this regard and we also note that the GGT proposal is in terms of an adjustment to the WACC. Consequently, we address the issue in these terms in the remainder of this section.

Available evidence

The relevant evidence and benchmarks that are available on this issue are as follows:

(a) The Draft Decision proposes an allowance of 0.125%, consistent with the Authority's approach in recent determinations;[62]

(b) The AER has recently reviewed debt issuance costs in some detail in its TransGrid Final Decision. In that decision:

   a. The regulated entities (TransGrid and a number of electricity distribution entities) proposed an allowance of 12.5 bppa. in relation to debt issuance costs;

   b. The AER applied what has become known as "the ACG methodology" and concluded that a reasonable allowance was 8.1 bppa. based on information available at the time of the decision (April 2009);

   c. The regulated entities proposed an additional allowance of 3 bppa in relation to indirect debt issuance costs, but this was rejected by the AER.

(c) GGT has proposed an allowance in relation to debt issuance costs of 75 bppa, based on evidence of a substantial increase in debt issuance costs for the APA Group in 2009.

Consideration of new evidence

Some of the considerations in relation to the applicability of the issuance costs of the APA Group as an estimate for the debt issuance cost allowance are as follows:

(a) The data presented is for debt raised during 2009. GGT acknowledges that some of the increase in debt raising costs is likely to be due to "the significant tightening in the availability of credit" [63] that occurred during 2009. It is possible that this component of the increase in issuance costs may have mitigated somewhat since the APA issuances during 2009. Offsetting this, GGT submits that part of the increase is a more permanent "step change" in relation to commitment facilities due to new Basel requirements that have increased the cost of holding facility

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[62] The Draft Decision (Paragraph 510) refers to the AER Electricity WACC Review. It appears that the correct reference is to the AER's Final Decision for TransGrid.

[63] GGT Submission, Paragraph 511.

commitments."[64] In this regard, we note that the regulatory precedent for an allowance of 12.5 bps in relation to debt issuance costs is largely based on empirical estimates provided in a 2004 report by the Allen Consulting Group. This was based on data up to and including 2004 – a time that is not necessarily reflective of current conditions in debt markets.[65]

(b) GGT argues that the APA Group is large and may benefit from some economies of scale that are not available to the efficient benchmark firm: "APA therefore enjoys economies of scale benefits in accessing debt markets and raising debt in those markets. This has been recognised by the AER who has applied a sliding scale in determining the debt margin to apply to different businesses (that is, the more the amount of debt raised, the lower the margin applied)."[66] This would need to be weighed up against the possibility that in 2009 debt issuance costs may have been higher for large debt raisings than was previously the case – reflecting the much lower liquidity in those markets, a lower supply of corporate debt funding, and a reduced willingness to finance large debt issues, particularly over long terms. In this regard, we note that the economies of scale reference in the GGT submission pre-dates the financial crisis.

(c) The terms of the debt raised by the APA group are considerably shorter than the 10-year assumption for the efficient benchmark firm. To examine the impact of this, we have estimated annual debt issuance costs if amortised over 10 years, rather than the actual life of each facility raised by APA. (This treats the costs as being entirely fixed, and unrelated to the term of the loan. We do not suggest that this is necessarily the case in practice, but rather present this calculation to measure the sensitivity of the amortisation calculation to the assumed term of the loans). If the debt issuance costs set out in the confidential appendix are amortised over 10 years, they amount to approximately 35 bp per year.

Conclusion

It is our view that the 12.5 bppa allowance proposed in the Draft Decision is a reasonable estimate of debt issuance costs. In reaching this conclusion, we have placed considerable weight on the fact that this allowance is consistent with the submissions of TransGrid and a number of electricity distribution utilities, made one year ago.

We have placed less weight on the evidence in relation to the debt issuances of APA during 2009. The Australian regulatory setting has developed a more sophisticated framework for estimating debt issuance costs. This is set out in

[64] GGT Submission, Paragraph 511.

[65] GGT Submission, Paragraph 513.

[66] GGT Submission, Paragraph 513.

some detail, for example, in Table 5.8 of the AER's TransGrid Final Decision.[67] The approach involves setting out the different components of the debt issuance costs, estimating the cost of each, and then amortising over the relevant period. A proposed six-fold increase[68] in debt issuance costs could be better substantiated by setting out which of the components have increased, by how much, the reason for the increase, and some comments about whether the increase is likely to be permanent or temporary.

3.8 Other parameters

We note that there is agreement about the proposed parameter estimates for a number of WACC parameters as follows:

(a) The corporate tax rate should be set at 30%;

(b) The assumed level of gearing should be set at 60% debt finance; and

(c) Expected inflation should be set at 2.4%. (Although there is a difference of views about whether arithmetic or geometric averaging should be used to obtain this estimate, the difference is not material.)

3.9 Summary of conclusions

In **Table 1** below, we set out WACC parameter estimates from:

(a) The ERA's Draft Decision;

(b) The current GGT submission;

(c) The current BHPB submission; and

(d) Our recommended parameter estimates and ranges.

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[67] AER, TransGrid Final Decision, p. 360.

[68] That is, from 12.5bppa. to 75 bppa.

Table 1. Proposed parameter estimates

Parameter	ERA Draft Decision	GGT submission	BHPB submission	FE/SFG Conclusions
Risk free rate	20-day averaging period prior to start of regulatory control period	20-day averaging period prior to start of regulatory control period		20-day averaging period prior to start of regulatory control period
Equity beta	0.8 – 1.2	1.0 – 1.4	0.5 – 0.8	0.8 – 1.2
Market risk premium	5.0 – 7.0%	6.0 – 7.0%	5.75%	6% - 7%
Capitalisation of franking credits (gamma)	0.57 – 0.81	0.2	0.5 – 0.65	0 – 0.4
Gearing	60%	60%	60%	60%
Credit rating	BBB+	BBB- to BBB	BBB+	BBB – BBB+
Debt margin	Bloomberg extrapolation approach only, applied over same averaging period used for risk-free rate	Bloomberg extrapolation approach and CBA Spectrum, applied over same averaging period used for risk-free rate		Bloomberg extrapolation approach and CBA Spectrum, applied over same averaging period used for risk-free rate
Debt issuance costs	0.125%	0.75%	0	0.125%
Corporate tax rate	30%	30%		30%

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