Jemena Gas Networks (NSW) Ltd

Access Arrangement Information

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9 Cost of Capital

The cost of capital aims to compensate JGN's debt and equity holders for the opportunity cost of lending/investing their funds in the JGN network. The NGR require that this compensation reflect the prevailing market conditions for funding a benchmark efficient gas distribution business with a benchmark capital structure and risk profile.

This chapter sets out the approach adopted by JGN in determining its cost of capital, and the proposed value for cost of capital and is structured as follows:

- *Section 9.1 Summary* – summarises JGN's proposed cost of capital over the current AA period
- *Section 9.2 Law and rules requirements* – describes the rule requirements that JGN's cost of capital must provide for returns that reflect the prevailing market conditions for funding and rely on a well accepted model for forecasting these funding costs
- *Section 9.3 Background* – provides background on IPART's 2005 decision on pre-tax real cost of capital of 7 per cent using a Sharpe-Lintner capital asset pricing model (**CAPM)**
- *Section 9.4 Treatment of tax* – describes JGN's current pre-tax revenue approach to calculate its building blocks revenue and its proposal to do so for the next AA period
- *Section 9.5 Business risk* – provides the basis for JGN's view that gas distribution businesses are more risky than electricity distribution businesses due to higher volume risk. This means that gas businesses have lower credit ratings than electricity businesses
- *Section 9.6 WACC model* – details JGN's proposed approach of using a Fama-French three-factor model to determine its WACC that is fit for purpose
- *Section 9.7 WACC parameters* – sets out JGN's proposed parameters that are consistent with prevailing market conditions and the risks of an efficient gas distributor, as required by rule 87 of the NGR
- *Section 9.8 RIN and rule 72 requirements* – maps the RIN and NGR rule 72 requirements to the relevant sections and chapters.

9.1 Summary

JGN has set its cost of capital using the domestic version of the Fama-French three-factor model **(FF model)** to estimate the cost of equity component of its WACC. JGN proposes a pre-tax nominal WACC of 12.63 per cent.

JGN considers that moving to the FF model to estimate the cost of equity provides an estimate that better reflects the prevailing conditions in the market for funds than the Sharpe-Lintner model as currently applied. Providing a return commensurate with market conditions is critically important to JGN in order for it to be able to fund its required capital program.

JGN's proposed cost of capital reflects the risks of an efficient gas distributor and the prevailing market conditions, in compliance with the NGR. Importantly, JGN considers that gas distributors are inherently more risky businesses than electricity distributors, with higher debt premia. This view has been supported by the AER in previous decisions as well as by other regulators and academics as discussed in section 9.5.

Table 9-1 summarises JGN's proposed WACC parameters as well as resulting WACC variants.

Table 9-1: JGN's proposed WACC Parameters

Parameters	JGN Proposal
Inflation (i)	2.38%
Nominal risk free rate (R_f^n)	5.60%
Real risk free rate	3.15%
Debt margin (D^n)	5.04%
Nominal pre-tax cost of debt	10.64%
Real pre-tax cost of debt	8.08%
Market risk premium (MRP^n)	6.50%
Growth risk premium (HML^n)	6.24%
Size risk premium (SMB^n)	-1.23%
Equity beta (β_e)	Na
Market beta (β_m)	0.59
Growth beta (β_{HML})	0.48
Size beta (β_{SMB})	0.30
Post-tax nominal return on equity	12.06%

Parameters	JGN Proposal
Gearing (D/V)	60%
Dividend imputation (γ)	0.20
Tax rate on equity (T_e)	28.35%
Corporate tax rate (T_c)	30%
Pre-tax real WACC ($WACC^r$)	10.01%
Pre-tax nominal WACC ($WACC^n$)	**12.63%**
Nominal vanilla WACC	11.21%
Real vanilla WACC	8.63%

Notes:

1. Real costs of debt and equity and the risk free rate are calculated from the nominal equivalents using the Fisher equation and forecast inflation.
2. Debt margin is based on an efficient gas business with a BBB credit rating.
3. JGN does not rely on a debt or asset beta to estimate its proposed WACC.

9.2 Rule requirements

JGN must provide the proposed rate of return, the assumptions used to calculate that rate of return and a demonstration of how the rate of return is calculated (rule 72(1)(g)). This return must be:

> commensurate with prevailing conditions in the market for funds and the risk involved in delivering the reference services.[42]

In estimating this return, JGN must assume that the return:

> (i) meets benchmark levels of efficiency; and (ii) uses a financing structure that meets benchmark standards as to gearing and other financial parameters for a going concern and reflects in other respects best practice.[43]

And use:

> a well accepted approach that incorporates the cost of equity and debt, such as the Weighted Average Cost of Capital,...and a well accepted financial model, such as the Capital Asset Pricing Model.[44]

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[42] NGR, rule 87(1).

[43] NGR, rule 87(1).

[44] NGR, rule 87(1).

Further, the governing pricing principles in the NGL require that JGN is "provided with [the] reasonable opportunity to recover at least [its] efficient costs".[45]

9.3 Background

JGN was allowed a pre-tax real cost of capital of 7.0 per cent for its last AA.[46] IPART used the Sharpe-Lintner CAPM to calculate this cost of capital.

For the purpose of the next AA period, JGN has assessed the prevailing market conditions affecting its cost of capital. This has included examination of the relevant requirements of the NGR and well accepted methods for estimating the cost of capital for assets with JGN's risk profile.

9.3.1 Factors affecting JGN's cost of capital

JGN's cost of capital adjusts over time to reflect changes in the financial markets and the performance and position of its business. The key factors affecting JGN's cost of capital are set out below.

Tax

Imputation credits make up part of the return that equity holders get for supplying funds to a firm. Equity holders use these credits to offset against their tax liabilities. The value of these credits varies depending on when they are paid out, whether they are paid out at all and whether equity holders can use them.

Risk

A firm uses its cash flows to compensate equity and debt holders via dividends and interest. These cash flows are inherently risky due to changes in demand and input prices and so the compensation is risky also.

Capital structure

Capital structure refers to the level of debt funding relative to equity funding. The higher the amount of debt funding the higher the risk of bankruptcy as the costs of servicing this debt rises.

Availability of capital

Firms must compete for funding in the market for funds. In the current financial crisis, the supply of funds has fallen while the demand for funds has remained

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[45] *National Gas (South Australia) Act 2008*, section 24(2).

[46] IPART Final Decision, *Revised Access Arrangement for AGL Gas Networks*, April 2005, p. 107.

constant. This excess demand has pushed up the cost of attracting funds from debt and equity holders.

These factors are discussed further below.

9.4 Treatment of tax

JGN must provide its proposed method for dealing with taxation and how the tax allowance is calculated to comply with rule 72(1)(h).

In the last three AA reviews, IPART adopted a pre-tax approach to determine JGN's revenue requirement. That is, IPART allowed for taxation by applying a pre-tax rate of return to the value of assets from time to time. The NGR do not stipulate how to make an allowance for tax.

JGN has elected to determine its building block revenue requirement using a pre-tax approach as provided for under rule 72(1)(h)). This means the rate of return used to determine the return on capital is a pre-tax rate of return. As a consequence of this election, it is not necessary to itemise "the estimated cost of corporate income tax for [each] year" as a separate revenue building block consistent with rule 76(c).

Instead, JGN converts its proposed nominal vanilla rate of return to a pre-tax rate of return using an estimated effective tax rate of 28.35 per cent as discussed in section 9.7.8.

Previously, IPART adopted the statutory tax rate of 30 per cent when establishing JGN's pre-tax rate of return. JGN considers this is consistent with the principle of allowing for the costs of a benchmark efficient firm. Notwithstanding this view, JGN has calculated an effective tax rate in line with the AER's draft AA Guideline. To do this, JGN has relied upon the calculation method specified in the AER's published 'Post Tax Revenue Model' for electricity distribution businesses (**PTRM**).[47]

9.5 Business risk

JGN considers that gas networks are riskier than electricity networks because of higher volatility in cash flows from higher volume uncertainty. As a result, an efficient gas network generally has a lower credit rating and higher equity beta (when using the Sharpe-Lintner CAPM) or market beta (when using the FF model) than an efficient electricity network.

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[47] AER, *Final Decision on Electricity Distribution Network Service Providers' Post-tax Revenue Model*, 26 June 2008, Appendix B.

Gas volumes are more uncertain than electricity demand because:

- gas networks have more options to expand their networks to enable new, but uncertain demand to connect
- gas is a discretionary fuel, particularly in coastal NSW where the climate is relatively benign
- unlike an electricity network, JGN does not have an exclusive franchise[48] and is therefore subject to ongoing asset bypass risk
- unlike electricity, JGN is subject to a capital redundancy mechanism.

This view is supported by the AER who in its recent review of WACC parameters for electricity distributors and transmitters noted that:

> [It] has previously acknowledged in its explanatory statement that gas businesses may have a higher business risk than electricity businesses due [to] greater volatility in cash-flows from relatively higher volume risk compared to electricity network businesses.[49]

In its draft decision on WACC, the AER presents data that shows that private gas networks tend to have lower credit ratings than private electricity networks.[50] Based on this data, JGN considers that efficient gas networks have credit ratings of BBB or lower (see Table 9.10 of the AER's draft decision). The AER's final decision reinforces this view:

> The AER observes that gas businesses tend to have a lower credit rating (and a higher level of gearing) than electricity businesses....[51]

On this basis, JGN proposes to retain a BBB credit rating for the purpose of assessing its cost of debt.

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[48] JGN's network license is non-exclusive thereby allowing other firms to build competing gas assets within JGN's current network footprint.

[49] AER, *Electricity Transmission and Distribution Network Service Providers Review of the Weighted Average Cost of Capital (WACC) Parameters, Explanatory Statement*, 1 May 2009, p. 108.

[50] AER, *Electricity Transmission and Distribution Network Service Providers Review of the Weighted Average Cost of Capital (WACC) Parameters, Explanatory Statement*, December 2008, Tables 9.4, 9.5, 9.7 and 9.10.

[51] AER, *Electricity Transmission and Distribution Network Service Providers Review of the Weighted Average Cost of Capital (WACC) Parameters*, Explanatory Statement, 1 May 2009, footnote 794, p.348.

9.6 Weighted average cost of capital model

JGN proposes the Officer version of the WACC[52] for which it uses:

- the Fama-French three-factor model to estimate the cost of equity
- observed domestic corporate bond performance to estimate the cost of debt.

9.6.1 WACC proposal

JGN proposes using a nominal pre-tax WACC as defined by Officer[53] as follows:

$$WACC^n = \frac{R_e^n}{1-T_e(1-\gamma)}\frac{E}{V} + R_d^n \frac{D}{V},$$

where:

- R_e^n is the nominal return on equity
- R_d^n is the nominal return on debt
- $\frac{E}{V}$ is the level of equity
- $\frac{D}{V}$ is the level of gearing
- γ is the level of imputation utilisation
- T_e is the effective tax rate on equity.

[52] R. R. Officer, 1994, *The cost of capital of a company under an imputation tax system*, Accounting and Finance, vol.34, p.10.

[53] R. R. Officer, 1994, *The cost of capital of a company under an imputation tax system*, Accounting and Finance, vol.34, pp 1–17.

9.6.2 Cost of equity proposal

Summary

Nominal cost of equity is estimated using the FF model as follows:

$$R_e^n = R_f + MRP^n \times \beta_m + SMB^n \times \beta_{SMB} + HML^n \times \beta_{HML},$$

where:

- R_f^n is the nominal risk free rate
- MRP^n is the nominal market risk premium
- HML^n is the risk premium for high book-to-market firms compared to low book-to-market firms.
- SMB^n is the risk premium for small firms compared to big firms
- β_m is the market beta
- β_{HML} is the beta on the high minus low firm factor
- β_{SMB} is the beta on the small minus big firm factor.

This compares to the Sharpe-Lintner CAPM as follows:

$$R_e^n = R_f + MRP^n \times \beta_e,$$

where β_e is the equity beta.

Model selection

The NGR and NGL allow a distributor to propose a financial model provided that:

- the outcome of the estimation process be as accurate as possible (but not less than) an estimate of the cost of capital associated with the relevant activity (see rule 87(1), rule 74(2)(b) and sections 24(2) and (5) of the NGL)
- the financial model that is used to estimate the rate of return be 'well accepted' (rule 87(2)) and any forecast or estimate be 'arrived at on a reasonable basis' (rule 74(2)(b)).

There are a number of financial models available to estimate the cost of equity that differ in the factors that are assumed to be priced. The financial model historically employed by the AER for this task has been a version of the Sharpe-Lintner CAPM, i.e.:

$$E(R_j) = R_f + \beta_j[E(R_m) - R_f],$$

where

$E(R_j)$ is the expected return on asset j

R_f is the risk-free rate

β_j is asset j's beta, which measures the contribution of the asset to the risk, measured by standard deviation of return, of the market portfolio

R_m is the expected return to the market portfolio of risky assets.

Reasons for adopting the FF model

The CAPM is one of the simplest available financial models and hypothesises that an asset's riskiness is explained by the extent to which it contributes to the risk of the market portfolio. However, since the CAPM's development in the early 1960s a number of more sophisticated pricing models have been developed that either relax the assumptions of the CAPM and/or attempt to reflect the observed behaviour of investors more closely.

One such model that has now gained wide acceptance is the FF model, which seeks to eliminate the errors associated with the way the CAPM prices value and small stocks.[54] More specifically, this model takes account of the fact that the systematic premium that is earned by a stereotypical value or small stock indicates that value and size are characteristics that proxy for risk for which investors require a return.[55] The FF model can be expressed by the following formula:

$$E(R_j) - R_f = b_j[E(R_m) - R_f] + h_j HML + s_j SMB,$$

where

b_j, h_j and s_j are the slope coefficients from a multivariate regression of R_j on R_m, *HML* and *SMB*.

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[54] A value stock is one that has a high ratio of the book value of the equity to its market value.

[55] JGN note's that the evidence available in Australia does not permit a conclusion that a premium is earned by small stocks; however, this relationship is clear in the long-term data from the US.

While the AER has traditionally used a version of the Sharpe-Lintner CAPM, the FF model meets all the requirements of the NGR and NGL.

The FF model demonstrably provides an estimate of the required returns that is more accurate than the CAPM. This conclusion is supported by the weight of empirical evidence which suggests that factors other than market beta explain the cross-section of mean returns—namely the book-to-market ratio and market capitalisation of a firm's equity. The FF model explicitly accounts for these factors and as a result leads to a better estimate of the cost of equity than models such as the CAPM. While this relationship was first found in the US, similar results have been found in other major capital markets, namely in Europe, the UK and Japan. A similar relationship has also been found in Australia with evidence supporting the use of book-to-market ratio, although it is less clear that the size factor has been priced in Australia. Furthermore, it has been demonstrated that the FF model substantially reduces the pricing errors associated with the returns to energy utilities compared with the CAPM.

The FF model is a well accepted financial model since:

- it has gained wide acceptance in the academic literature as a reliable predictor of equity returns
- surveys report that a sizable proportion of US managers apply multifactor risk models in investment decision-making, with a significant subset of these managers using size and value factors
- Australian investment portfolios are also more consistent with the predictions of the FF model than with the predictions of the CAPM since investors do not all hold the same portfolio of assets – rather the evidence indicates that different investors hold different portfolios
- the investment strategies of Australian active managers allow investors to tilt their portfolios in a manner consistent with the FF model.

Whilst no regulator is currently using the FF model to set regulated returns, there is a growing acceptance of the FF model. For example, a number of eminent economic experts engaged by the New Zealand Commerce Commission (**the Commission**) identified it as an appropriate model to check the allowed returns on equity for regulated businesses.[56] Subsequently, the Commission updated its draft guideline on the approach to estimating the cost of capital for regulated business,

[56] Julian Franks, Martin Lally and Stewart Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, Report to the New Zealand Commerce Commission, 2008, p. 8.

recommending that businesses may use the FF model as a cross-check on the CAPM.[57]

NERA report on the FF model

JGN engaged NERA to compute an estimate of the cost of equity for an Australian gas distributor using the FF model. Their report is provided in Appendix 9.1. This report evaluates the FF model for compliance with the NGR and NGL and estimates the parameters for the FF model for an efficient gas business using current market data. The report also compares the FF model with the Sharpe-Lintner CAPM, including past performance.

JGN relies upon this report to support its proposed WACC and for the parameters of the FF model. Appendix 9.1 provides NERA's full computations, which are summarised below.

FF model parameters

Where appropriate, NERA has populated the FF model with the same data and parameters as those employed by the AER in its recent review of the WACC parameters for electricity lines businesses. Those parameters not shared with the CAPM, have been estimated from data provided by DFA. DFA is an investment group affiliated with Fama and French that explicitly invests along the lines suggested by their research.

Table 9-2 sets out the FF model parameters that JGN relies upon for its proposed cost of equity.

Table 9-2: Domestic Fama-French three-factor model

Parameters	Market	HML	SMB
Risk Premium	6.50%	6.24%	-1.23%
Beta	0.59	0.48	0.30

Note. Estimated using data sampled up to the end of May 2009.

Applying these parameters to a domestic version of the FF model leads to a return on equity that is 6.46 percentage points above the risk-free rate. A risk-free rate of 5.60 per cent was observed over the 20 days up to and including the 31 July 2009, which results in an estimated cost of equity of 12.06 per cent for a gas distributor.[58]

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[57] New Zealand Commerce Commission, *Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 19 June 2009, p. 21.

[58] In their report, NERA estimate the risk-free rate at 5.11 per cent for the 20 business days to the end of May 2009. Using this rate, NERA estimate the cost of equity as 11.57 per cent.

9.6.3 *Cost of debt proposal*

Nominal cost of debt:

$$R_d^n = R_f^n + D^n,$$

where:

- R_f^n is the nominal risk free rate
- D^n is the nominal debt margin.

JGN proposes a debt margin of 5.04 per cent. This margin is added to the nominal risk free rate of 5.60 per cent to give JGN's proposed cost of debt of 10.64 per cent.

The AER's Statement of Regulatory Intent on WACC stipulates that the debt margin be determined as follows:

- the observed annualised Australian benchmark corporate bond rate used in the calculation is to relate to corporate bonds with a term to maturity of 10 years
- the debt risk premium over the risk free rate is to be estimated with reference to a bond with a BBB+ credit rating.

JGN notes that a credit rating of BBB reflects the riskiness of gas businesses and is consistent with the AER's WACC decision, see above, which shows that gas businesses typically have this credit rating. Therefore, JGN has determined its debt margin with reference to BBB credit rating.

JGN has determined its debt margin employing the approach submitted by the five Victorian electricity distribution networks for their June 2009 AMI charges applications.[59] This approach relies upon quantitative assessment of the Tabcorp bond as a 5-year fixed rate bond to estimate a debt premium of 4.84 per cent for a BBB+ rated bond with a 10 year term. It also benchmarks favourably against an important alternative source of funds to Australian businesses at the present time, which is to issue corporate bonds in the US and then to purchase the required swaps to convert the US dollar fixed-rate debt into fixed-rate Australian dollar debt.

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[59] Citipower, Powercor, United Energy, Jemena and SP AusNet, *Debt risk premium for use in the initial AMI WACC period*, 1 June 2009 provided in Appendix 9.2.

JGN adds a premium of 20 basis points to the AMI debt premium to estimate a debt premium for BBB rated gas businesses of 5.04 per cent. Table 9-3 summarises this calculation.

Table 9-3: Debt premium

	Value
Debt premium from AMI charges application (for BBB rated electricity businesses)	4.84%
Premium between BBB and BBB+ rated bonds	0.20%
Debt premium for gas businesses	5.04%

Notes.

1. Debt premium for the AMI charges application is estimated over the last 10 business days of November 2008 and the first 5 business days of December 2008.
2. Premium between BBB and BBB+ rated bonds is JGN's assessment of the premium from current market data.

JGN recognises that its proposed debt margin will require updating for the final measurement period agreed with the AER. On this basis, JGN submits the method contained in Appendix 9.2 for approval. JGN further submits that, provided the adjustment proposed herein is made to make the debt margin consistent with a BBB corporate bond, its application during the agreed measurement period will result in a cost of debt that is compliant with the NGR.

JGN notes that it is still examining the arguments in support of this position and, if relevant further information becomes available to JGN, it will make that information available to the AER immediately.

9.7 Weighted average cost of capital parameters

Based on the above, JGN calculates a pre tax WACC of 12.63 per cent in accordance with the NGR.

Table 9-4 provides a summary of the parameter values that JGN proposes for its WACC calculation and resulting WACC estimates.

Table 9-4: JGN's proposed WACC parameters for the next AA period

Parameters	Current AA period	Next AA period
Inflation (i)	2.80%	2.38%
Nominal risk free rate (R_f^n)	5.70%	5.60%
Real risk free rate	2.82%	3.15%
Debt margin (D^n)	1.13%–1.22%	5.04%
Normal pre-tax cost of debt	6.83%–6.92%	10.64%
Real pre-tax cost of debt	3.92%–4.01%	8.08%
Market risk premium (MRP^n)	5.5%–6.5%	6.50%
Growth risk premium (HML^n)	Na	6.24%
Size risk premium (SMB^n)	Na	-1.23%
Equity beta (β_e)	0.8–1.0	Na
Market beta (β_m)	Na	0.59
Growth beta (β_{HML})	Na	0.48
Size beta (β_{SMB})	Na	0.30
Post-tax nominal return on equity	10.10%–12.20%	12.06%
Gearing (D/V)	60%	60%
Dividend imputation (γ)	0.5–0.3	0.20
Tax rate on equity (T_e)	30.00%	28.35%
Corporate tax rate	30%	30%
Pre-tax real WACC ($WACC^r$)	5.9–7.3%	10.01%
Selected Pre-tax WACC ($WACC^r$)	7.00%	10.01%
Pre-tax nominal WACC ($WACC^n$)	**10.00%**	**12.63%**
Nominal vanilla WACC	8.14%–9.03%	11.21%
Real vanilla WACC	5.19%–6.06%	8.63%

Source: Current AA period parameters from Table 8.6 of IPART (2005). [60]

[60] IPART, *Final Decision, Revised Access Arrangement for AGL Gas Networks*, April 2005, p. 104.

JGN estimates these parameters in accordance with rule 87 and the Draft AA Guidelines.

9.7.1 Inflation

JGN proposes an inflation forecast of 2.38 per cent. Here, forecast inflation is the geometric average of the forecast annual inflation for each of the ten years from 2010 to 2019 as follows:

Table 9-5: Forecast Inflation

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inflation Forecast	2.50%	1.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Geometric Average										**2.38%**

Note: Inflation forecasts are for the year to June.

Source: Reserve Bank of Australia, *Statement on Monetary Policy*, 8 May 2009, page 69.

The ten annual inflation forecasts:

- for the first two years, are the expected inflation outcomes stated in the Reserve Bank of Australia's (RBA's) most recent Statement on Monetary Policy
- for the subsequent eight years, are the midpoint of the RBA's long term inflation target range. The range is 2 per cent to 3 per cent, so the midpoint is 2.50 per cent.

This approach is consistent with the AER's approach in the recent price determinations for NSW and ACT electricity distributors.

9.7.2 Gearing

JGN proposes a gearing ratio of 60 per cent, consistent with the assumed efficient level of debt chosen by the AER in its final WACC decision and in the current IPART decision.

This ratio is considered efficient for a stand-alone gas distribution business. It is consistent with the proposed figure for the cost of equity and the allowance for debt margin.

9.7.3 Nominal risk free rate

The nominal risk free rate is 5.60 per cent, based on the 20-day historical average of the annualised yield on 10 year Commonwealth Government Securities (**CGS**) to 31 July 2009 using the indicative mid rates published by the RBA.

JGN estimates the yield on a 10 year CGS maturing at the 20 business days to 31 July 2019 by interpolating on a straight-line basis the yields on the CGS bonds maturing at 15 March 2019 and 15 April 2020.

9.7.4 Market risk premium

JGN proposes a market risk premium (**MRP**) of 6.5 per cent, based on the AER's final WACC decision. This estimate reflects the minimum premium that an efficient gas business needs to compensate for the non-diversifiable risk that is influenced by the current financial and economic crises.

Historical based estimates of the MRP, particularly those spanning long time periods, are the most appropriate and relevant proxy for the forward–looking equity risk premium that is taken into account in the CAPM.

9.7.5 Fama-French factors and betas

JGN relies upon NERA's report for the parameters of the FF model. Appendix 9.1 provides NERA's full computations, which are summarised in Table 9-2 above.

9.7.6 Debt margin

JGN proposes a debt margin of 5.04 per cent. This margin is added to the nominal risk free rate of 5.60 per cent to give JGN's proposed cost of debt of 10.64 per cent as set out in section 9.6.3.

9.7.7 Dividend imputation

JGN proposes a value of imputation credits (or gamma) of 0.2.

Gamma is the subject of much debate between regulators and regulated businesses. It is JGN's strongly held view that the best and most credible evidence and analysis supports a value for gamma of zero.

Gamma is the market value of the imputation credits that are created by a firm, and is the product of the assumed proportion of the credits created that are distributed to investors (the payout ratio **F**) and the market value of imputation credits once in the hands of investors (**theta**). In its final decision on WACC, the AER adopts an assumed payout ratio of one. This assumption is discussed further below.

JGN considers that dividend drop-off studies are the most reliable and accurate method for estimating theta, but recognises that the AER also relies on tax statistics to estimate a value of 0.65 in the recent WACC decision for electricity businesses.

Dividend drop-off studies

SFG Consulting (**SFG**) recently quantified the value of theta between 0.2 and 0.35 using a dividend drop-off study.[61] Even if a payout ratio of one is assumed (see below), these results suggest a gamma of less than 0.5.

JGN considers that the SFG study is more comprehensive than the 2006 Beggs and Skeel study[62] that the AER relies on in its final decision on WACC[63] because the SFG results are based on:

- a much larger cross section of firms
- a longer and more recent data period.

Moreover, after correcting for perceived deficiencies in the SFG study, the AER found that the study suggests a theta of between -0.23 and 0.47.[64] Again assuming a payout ratio of one, these results suggest a gamma of less than 0.5 and certainly less than 0.65.

Tax statistics

JGN considers that taxation statistics do not provide an accurate estimate of the value of imputation credits. These statistics measure the quantum of corporate taxation, the amount of credits distributed and the amount of credits claimed.

But the amount of credits claimed is not the value of those credits. Shareholders bear risk when earning the dividends and imputation credits, and must wait before they are distributed. Necessarily, shareholders discount that value of these credits for risk and the time value of money—a process that tax statistics do not capture.

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[61] SFG Consulting, *Market practice in relation to franking credits and WACC: Response to AER proposed revision of WACC parameters*, Report prepared for ENA, APIA, and Grid Australia, 1 February 2009.

[62] D. Beggs and C. L. Skeels, *Market arbitrage of cash dividends and franking credits,* The Economic Record, volume 82, number 258, September 2006, p. 247.

[63] AER, *Electricity Transmission and Distribution Network Service Providers Review of the Weighted Average Cost of Capital (WACC) Parameters, Explanatory Statement*,1 May 2009, p. 400 footnote 794.

[64] AER, *Electricity Transmission and Distribution Network Service Providers Review of the Weighted Average Cost of Capital (WACC) Parameters, Explanatory Statement*, 1 May 2009, p. 400, footnote 794 and p. 441 footnote 1081.

Synergies Economic Consulting (**Synergies**) has undertaken new research using tax statistics from the ATO covering the period 2003 to 2007. This study observed that the payout ratio over this period was between 58 per cent and 77 per cent—with an average of 66 per cent. This average is largely consistent with the findings of Hathaway and Officer that estimates the payout ratio at 0.71,[65] but is significantly different from the payout ratio of 1 assumed by the AER in the electricity WACC decision.

JGN considers that the best estimate of the payout ratio is 0.66 based on the Synergies study because it uses observable market data.

The Synergies study also estimates that investors only utilise 35 per cent on average of the credits that they receive, which means that the maximum possible value for theta is 0.35 if a payout ratio of 1 is assumed, or 0.23 if the average observed payout ratio of 0.66 is assumed instead.[66] Synergies highlight that the lowest feasible value for gamma is zero, which is consistent with JGN's view that the most appropriate value for gamma is also zero.

JGN considers that the Synergies study sets an upper bound for gamma of 0.23 based on a payout ratio of 0.66.[67] This upper bound is consistent with the findings of the SFG study, which estimates a gamma range of between 0.13 and 0.23 if a payout ratio of 0.66 is used.

Proposal

For the purpose of this submission, JGN proposes a gamma range of 0 to 0.23, relying on the Synergies study to set the upper end of this range and the theoretical argument that gamma is zero to set the lower end. JGN proposes a gamma of 0.2 from this range.

To be clear, JGN considers that the AER's conclusions in the electricity WACC decision about the value of imputation credits in the hands of investors and the payout ratio are incorrect and do not meet the requirements of the NGR.

9.7.8 Tax rate on equity

JGN calculates an effective tax rate on equity of 28.35 per cent using the method contained in the AER's PTRM.

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[65] N. Hathaway and B. Officer, *The Value of Imputation Tax Credits – Update 2004*, Capital Research Pty Ltd, November 2004, pp.13 and 24.

[66] Synergies Economic Consulting, *Gamma: New Analysis Using Tax Statistics*, 28 May 2009, p. 6.

[67] Synergies Economic Consulting, *Gamma: New Analysis Using Tax Statistics*, 28 May 2009, p. 8.

Under the IPART approach, JGN did not need to calculate an effective tax rate. So, for the next AA period, JGN proposes using the calculation method adopted by the AER in its post-tax revenue model. This method is summarised in Appendix 9.3.

9.8 RIN and rule 72 requirements

Table 9-6 sets out RIN and rule 72 requirements met in chapter 9.

Table 9-6: Summary of RIN responses

RIN/rule 72 reference	RIN requirement	Where addressed in AAI
WACC		
RIN 2.3.1.14	**Weighted average cost of capital and CAPM**	
	(a) Provide in pro forma 2 the values of parameters that comprise the weighted average cost of capital (WACC) methodology and CAPM methodology	(a) Table 9-1 and Table 9-4
	(b) Provide in the access arrangement proposal submission a justification for the value for each of the parameters used in the WACC derivation	(b) Not applicable as alternative methodology used
	(c) Provide in the access arrangement proposal submission an explanation about how the proposed rate of return complies with rule 87.	(c) Not applicable as alternative methodology used
RIN 2.3.1.14 Rule 72(1)(g)	**Method other than weighted average cost of capital** Provide in the access arrangement proposal submission	
	(d) An outline of the proposed methodology for the rate of return	(d) Section 9.6
	(e) A quantification of the rate of return using this methodology including any justification for the use of parameters in this methodology	(e) Section 9.7
	(f) An explanation about how the proposed rate of return complies with rule 87	(f) Section 9.6. Appendix 9.1: NERA report on Fama French cost of equity model
RIN 2.3.1.14 Rule 72(1)(h)	**Rate of return and taxation method** Provide in the access arrangement proposal submission	
	(g) Details of the proposed method for dealing with taxation and a demonstration of how tax allowance is calculated	Section 9.4
	(h) Where a pre-tax rate of return is proposed provide an explanation of how the proposed tax rate complies with rule 74(2)(a)	Section 9.7.8

RIN/rule 72 reference	RIN requirement	Where addressed in AAI
Estimated cost of corporate income tax		
RIN 2.3.3	If applicable (a) Provide in pro forma 5 i. an estimate of the cost of corporate income tax over the access arrangement period (b) Provide in the access arrangement proposal submission details of how the estimated cost of corporate tax was calculated (c) Refer also to section 2.4 of this notice for further information requirements in relation to the treatment of taxation.	Not applicable. As stated in section 9.4, JGN has elected to determine its building block revenue requirement using a pre-tax approach as provided for under rule 72(1)(h). This means the rate of return used to determine the return on capital is a pre-tax rate of return.
Tax asset base		
2.4	Regardless of the methodology adopted for taxation provide in pro forma 5 the following information forecast as at 1 July 2010 (a) Tax standard life for each asset class (b) Remaining tax life for each asset class (c) Tax asset base or remaining tax asset value for each asset class (d) An estimate of the carry forward tax loss	Building blocks regulatory model Appendix 9.3: JGN effective tax rate