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Hedging for regulated businesses

AER

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1. Introduction

NERA has been asked to advise the Australian Energy Regulator (AER) on Powerlink's view that it should receive compensation for certain activities associated with ensuring that its actual debt costs accord closely with those that the AER assumes in its regulatory modelling. The AER's draft decision did not allow Powerlink's proposed compensation for such activities and Powerlink has since submitted that the AER has not properly considered its arguments.

The remainder of our report is structured as follows.

- Section 2 provides a summary of the positions put by Powerlink and the AER to date;
- Section 3 provides a summary of our high level views and recommendations; and
- Section 4 addresses some specific issues raised in Powerlink's submissions.

2. Summary of positions to date

This section summarises the positions taken by Powerlink and the AER to date.

2.1. Powerlink's original submission

In Powerlink's original submission it argued:

> *"The regulatory framework establishes a weighted average cost of funds that will apply for the duration of the next regulatory period. As part of the WACC calculation, the cost of debt is normally set prior to the start of the regulatory period consistent with the risk-free rate-setting period.*
>
> *"From a risk management perspective, it is prudent for a TNSP to refinance its existing debt portfolio over the same period as the risk-free rate is set. …"* (Page 43.)

Powerlink goes on to estimate that the cost of doing so by refinancing all its debt in a short time period will result in a debt margin that is 7.5bp above that estimated by the AER. Powerlink argues that this 7.5bp should be included in its cost of debt.

Powerlink also notes that the above refinancing strategy does not address the possibility that changes to interest rates will impact on its costs of financing net additions to its regulatory asset base during the regulatory period.

> *"During the course of the next regulatory period, Powerlink will need to progressively borrow additional funds in order to undertake its capital expenditure program. This presents a potential interest rate risk issue to Powerlink. If funds are drawn down at prevailing market rates as required to finance the capex program, there is a real risk that the actual cost of debt achieved will exceed the cost of debt determined by the AER at the start of the regulatory period.*
>
> *"One means of managing the risk associated with a possible rise in the cost of borrowing is to hedge expected future debt requirements at the start of the regulatory period, during the risk-free rate setting period. This can be achieved by entering into forward rate agreements (FRAs) during the period over which the regulated cost of debt is established. In undertaking this strategy, Powerlink will incur a number of costs…"* (Page 46.)

Powerlink goes on to estimate these costs at between $1.5m to $0.5m per annum.

In stating the above views, Powerlink appears to make the following three distinct arguments:

1. That it is prudent for Powerlink to attempt to achieve an actual cost of debt that is 'closely aligned' to the AER's benchmark forecast of the cost of debt allowance for Powerlink;

2. That this will involve an efficient TNSP undertaking certain 'hedging' strategies that will raise its costs. Specifically:

    a. refinancing all debt over the same sampling period the AER estimates the average yield on Commonwealth Government Securities(CGS) as a proxy for the risk free rate; and

b. purchasing forward (interest) rate agreements (FRAs) during the sampling period that 'lock in' the cost of borrowing to finance net capex over the regulatory period.

3. That the AER should allow Powerlink to recover these costs in its estimate of operating costs.

Powerlink only directly addresses the first and second point and appears to presume that the third point follows directly from the first two. As we shall discuss, we do not believe that this is true.

2.2. The AER's Draft Decision

In relation to Powerlink's proposed 7.5bp 'clearing spread', the Draft Decision responds that the AER has set a cost of debt on the basis of reasonable benchmark information and that this gave Powerlink an incentive to achieve lower costs if it could. The AER rejected increasing compensation to Powerlink on the basis of Powerlink's stated plan to follow a strategy that incurred higher costs.

> *"Australian regulators have adopted benchmark assumptions about the financing structure of regulated entities when estimating the costs of debt and equity. The benefit of the benchmarking approach is that regulated entities have incentives to adopt more efficient financing arrangements, including the size of the bond issue. In particular, businesses retain the benefits from adopting more efficient arrangements than that assumed by the regulator and customers are protected if regulated entities act inefficiently."*
>
> …
>
> *"Accordingly, the AER considers that Powerlink's proposal for an additional allowance for a spread to clear its proposed debt issue is not consistent with the AER's benchmark approach. Powerlink's allowance for debt raising costs includes an appropriate amount for the cost associated with determining a market clearing price based on a benchmark debt issue. To provide an additional allowance for clearing spread would amount to a cost of service approach to regulation that is inconsistent with incentive based regulation."* (Page 106 to 107.)

In relation to the cost of hedging interest rates to finance net capex, the AER argued that Powerlink was already compensated for this risk in its equity beta.

> *"The AER considers that the interest rate risk that Powerlink may face is already factored in its equity beta and it would not be appropriate to provide an additional allowance for interest rate risk hedging costs. Allowing for such hedging costs would lead to the estimate of the cost of capital being overstated and not reflecting the risk adjusted cash flow rate of return required by investors in commercial businesses facing similar business risks to those faced by a TNSP. Therefore, the AER has not provided Powerlink with an additional allowance for interest rate risk hedging costs."* (Page 107)

2.3. Powerlink's submission on the Draft Decision

Powerlink argues that the only basis for the Draft Decision's rejection of a 7.5bp 'large bond issue' premium was a mistaken belief that no such premium would exist. Powerlink's submission on the Draft Decision argues that such a premium has been demonstrated and that, therefore, the AER must allow it.

> *"Powerlink is strongly of the view that the AER has incorrectly interpreted ACG's methodology for establishing 'gross underwriting fees'. Having demonstrated that the AER's benchmark does not incorporate costs associated with determining a market clearing price for large bond issues, Powerlink remains of the view that an upwards adjustment of 7.5 basis points to the debt margin is both appropriate and required."* (Page 55.)

Powerlink also argues that the CAPM does not appear to properly price interest rate risk and that, as a consequence, it would be appropriate for the AER to allow Powerlink to eliminate interest rate risk.

> *"Powerlink acknowledges that, under the CAPM framework, investors are compensated for market (non-diversifiable or systematic) risk by means of beta. The model also assumes that investors will not be compensated for risks they can cost effectively avoid through diversification. Therefore, in theory, to the extent that interest rate risk is considered non-diversifiable, this risk should be captured in the WACC. However, in practice, Powerlink is not aware of any evidence that demonstrates the CAPM framework appropriately values interest rate risk, particularly in the case of regulated utilities."* (Page 55.)

Powerlink goes onto argue that, based on quotations from two academic studies, one can not be confident that the CAPM model adequately compensates for interest rate risk.

> *"Powerlink notes that a recent empirical investigation of traded property stocks which applied the Arbitrage Pricing Model (APT) concluded that:*
>
> > *"… the interest rate risk of property stocks is systematic and is priced in the APT framework.[95]"*
>
> [95] K H Liow, J Ooi and L K Wang (2003), 'Interest Rate Sensitivity and Risk Premium of Property Stocks', Journal of Property Research, Volume 20, No. 2, June, p117. Page 56
>
> *"A study of stock returns by Professor Michael Ehrhardt also found that while interest rate sensitivity is present in virtually every industry, it is particularly strong in utilities and financial institutions. Professor Ehrhardt concluded that:*
>
> > *"In particular, interest rate sensitivity is related to systematic market risk, as measured by CAPM beta. Because interest-rate sensitivity is related to beta, naïve ranking on the basis of beta will not diversify away interest-rate risk. Cross-sectional tests are performed to identify any premium for bearing interest-rate risk. The results of these tests are inconclusive.[96]" "It is not clear, then, whether securities are also compensated for bearing interest-rate risk. However, results from this study period do not provide evidence that securities are compensated for interest rate risk.[97]"*

[96] Michael Ehrhardt (1991), 'Diversification and Interest Rate Risk', *Journal of Business Finance and Accounting*, Volume 18, January, p43.
[97] Ibid, p56.

"The results showed that over the 16-year study period, the inclusion of interest rate risk as well as beta risk was superior in explaining the distribution of share price movements. …"

"In the absence of any evidence to verify the ability of the CAPM framework to adequately compensate regulated businesses for interest rate risk, Powerlink believes that that AER must make allowance for costs associated with hedging against interest rate changes. As provided in its Revenue Proposal, Powerlink seeks compensation in the amount of $4.98 million total ($06/07) to be treated as an additional operating cost line item. The AER should therefore include an allowance for interest rate risk management costs in its Final Decision." (Page 55 to 56.)

3. Summary of our views

The AER, and other Australian regulator's, set the real cost of debt based on the average observed yield on indexed CGS over a specified sampling period. Under the AER's incentive framework, a predetermined benchmark 'debt margin' for the corporate entity is added to that yield to determine the forecast cost of debt for the regulated business.

This means that any change in the general level of interest rates during the regulatory period is not reflected in the regulated businesses allowed revenues. If interest rates rise during the regulatory period, and the business needs to raise/refinance debt at those higher interest rates, then it will incur higher debt costs than have been allowed by the regulator. Similarly, if interest rates fall then it will incur lower costs.

As such, Powerlink is correct to argue that changes in prevailing interest rates creates uncertainty as to the actual return on equity that regulated businesses will be able to achieve. Moreover, this uncertainty may create 'risk' that requires compensation in capital market sense if it is not able to be diversified away by investors.

Powerlink has argued that it is prudent for Powerlink to hedge against such movements in interest rates and that this will involve it incurring material costs not allowed for by the AER. Powerlink has also argued that the AER should allow Powerlink to recover these costs in its estimate of efficient operating expenditures.

3.1. What is efficient hedging

In this section we use the term 'hedging' to cover all of Powerlink's proposed strategies aimed at 'locking in' interest rates prevailing at the time of the AER's sampling of CGS. This includes refinancing all of its existing debt at that time and entering into FRA's to 'lock in' the interest rates paid on expansions of that debt.

Powerlink states that it is 'prudent' to hedge against movements in interest rates but does not argue why this is so. To make a case that interest rate hedging is prudent requires one to establish criteria by which prudency is established and then explain why the proposed strategy satisfies this criteria. In the context of a regulatory review a prudently incurred cost will be one that promotes economic efficiency. The relevant cost promotes economic efficiency if:

- It is the least cost way of producing an output/benefit; and
- The benefit/output produced has value that exceeds the cost of deriving it.

In the context of hedging the relevant output/benefit is a risk reduction in risk. In order for hedging to be efficient the value of any reduction in risk must be greater than the cost of achieving it. In order to satisfy this criteria, Powerlink's hedging strategies must deliver reductions in risk that are of equal or greater value.

Powerlink have not demonstrated, nor seemingly attempted to demonstrate, that this is the case. Powerlink has only asserted that:

> *"From a risk management perspective, it is prudent for a TNSP to refinance its existing debt portfolio over the same period as the risk-free rate is set."*

In our view, this is far from obviously true. To show it is true one must demonstrate that the 'risk management' benefits exceed the incremental costs.

Even if this could be shown to be the case it does not follow that the AER should allow Powerlink to recover those costs. That is, even if interest rate hedging is accepted as being efficient, it does not follow that Powerlink's customers should pay for it.

It is important to note that the beneficiaries of this reduction in risk are not Powerlink's customers but rather are Powerlink's owners. Unlike operating expenditure required to ensure the network's ongoing reliability, expenditure on interest rate hedging only benefits the owners of the asset. This raises the obvious question:

> *"Why should Powerlink be compensated for risk reductions that, if they are efficient, will pay for themselves?"*

3.2. When should efficient hedging costs be paid by customers?

The above point can be illustrated clearly by way of an extreme example. However, to understand this example we must first summarise how regulated revenues are set by the AER. The AER sets a revenue cap using a 'building block' approach where revenues over the five year regulatory period are set equal (in NPV terms) to forecasts of the:

- cost of equity associated with financing:
  - the regulatory asset base (RAB) in existence at the beginning of the regulatory period;
  - additions to that RAB as a result of net capital expenditure over the period;
- expenditure on debt associated with financing;
  - the RAB in existence at the beginning of the regulatory period;
  - additions to that RAB as a result of net capital expenditure over that period;
- expenditure on operating costs;
- return of capital (depreciation allowance).

In order to establish compensation for each of these the regulator must forecast/benchmark each of the above elements. The AER assumes a benchmark gearing level of 60%. (Actual gearing may differ from this but, consistent with the Modigliani-Miller theorem, any consequent change in the expenditure on debt will be offset by an equal and opposite change in the overall cost of equity - leaving the overall cost of capital unchanged.) Thus, in order for a regulated business to earn the AER's target return on equity it must:

1. finance its debt at the level of interest rates assumed by the regulator;
2. have operating expenditure equal to the level assumed by the regulator; and
3. have capital expenditure equal to the level assumed by the regulator.

Powerlink has argued that, in order to be certain of achieving the first of these, it will need to incur material hedging costs (around $3m dollars per year). Let us assume that these estimates are accurate and that they would be efficient (ie, the value of risk reduction will exceed $3m per year). It does not follow that the AER should automatically allow these costs to be recovered.

Consider how the AER should respond to a proposal from Powerlink that it also be allowed compensation for the additional costs of hedging operating and capital expenditure.[1] Such hedging would guarantee a certain net cash flow. This is because 'guaranteed' revenue[2] (under the revenue cap) less guaranteed expenditure (on debt, operating and capital investments) implies guaranteed net cash flows. However, the risk attached to guaranteed net cash flows is, by definition, zero.

If Powerlink is compensated for such an all encompassing hedging strategy it will guarantee that it earns the AER's target return on equity (based on positive assumed risk) at close to zero actual risk. This illustrates the error in presuming claims for efficient hedging costs by regulated businesses should be compensated *per se*. Doing so would lead to the *reductio ad absurdum* result described above.

The question remains as to what, if any, level of hedging costs should be compensated? The AER already compensates business owners for risk through the level of the assumed equity beta. Paying Powerlink to reduce risk is only justifiable if the level of risk Powerlink faces without hedging is greater than the level of risk it is already compensated for through the equity beta. Properly construed, Powerlink's requested compensation for hedging costs is, in reality, an argument that the equity beta has been set too low.

Powerlink comes closest to arguing this directly in the above quote from its submission on the draft decision. In that quote Powerlink argues that empirical tests of the CAPM suggest that it does not fully explain stock returns.

Moving away from the CAPM in setting the required return on equity would involve a very significant regulatory change. Moreover, given that the use of the CAPM, and CAPM parameters, is prescribed by the Australian Energy Market Commission (AEMC) this is a change that the AER may not be able to implement without a Rule change by the AEMC.

Even if it were open to the AER to make such an adjustment, Powerlink cites only two academic studies that it alleges support its view. (Although, as described in Appendix A, it is unclear that Powerlink's citation from those articles actually support its view). The number of finance articles that empirically test the validity of the CAPM is measured in the hundreds. Given the magnitude of the regulatory change involved in moving away from the CAPM, one would reasonably have expected a fuller analysis of the academic literature on this issue.

Such an analysis would show that the finance literature is replete with empirical tests suggesting that the CAPM does not fully explain stock returns - most famously by Fama and

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1 For example, by signing fixed price outsourcing contracts that covered all operating and capital expenditure required to meet relevant license conditions and service standards.

2 In so far as a regulator can guarantee revenues. In reality, a regulator can not insure infrastructure owners against the risk of expropriation by future regulators and/or legislators.

French.[3] Fama and French's empirical testing of the CAPM has been at the heart of a great deal of research on the power of the CAPM and alternative models of risk pricing. However, in the face of this uncertainty about how to price risk *nobody* suggests that businesses' optimal risk management strategy is to eliminate all risk. Powerlink's submission, in effect, argues that the CAPM does not price interest rate risk properly so it should be paid to eliminate interest rate risk. While the first part of this statement could be true, the second part of the statement does not follow from the first. Just because interest rate risk is not priced by the CAPM does not mean that Powerlink should be paid to eliminate these risks (at a cost of around $3m per annum).

One could equally argue, based on the work of Fama and French, that the CAPM does not price most risks properly. It does not follow from this statement that Powerlink should be paid to eliminate all risks. Even if the CAPM is a poor predictor of how the market prices risk, the AER's use of the CAPM does provide Powerlink compensation for risk. Powerlink does not present, or attempt to present, an argument that the total compensation for risk would be higher if a superior model to the CAPM were applied. In the absence of such evidence, there is no compelling case to pay Powerlink to further reduce its risks.

Primary conclusion

Powerlink has not provided a persuasive case for the AER to allow recovery of hedging costs.

[3] Fama, Eugene F., and French, Kenneth R. 1992. The cross-section of expected stock returns. *Journal of Finance* 47 (June): 427–65.

Appendix A. Powerlink's Interpretation of Ehrhardt Citations

Powerlink provides two quotes from a paper by Michael Ehrhardt that Powerlink believes justifies a presumption that exposure to interest rate risk is costly and that it is not priced by the CAPM.

> *"In particular, interest rate sensitivity is related to systematic market risk, as measured by CAPM beta. Because interest-rate sensitivity is related to beta, naïve ranking on the basis of beta will not diversify away interest-rate risk. Cross-sectional tests are performed to identify any premium for bearing interest-rate risk. The results of these tests are inconclusive.[96]"*
>
> *"It is not clear, then, whether securities are also compensated for bearing interest-rate risk. However, results from this study period do not provide evidence that securities are compensated for interest rate risk.[97]"*
>
> [96] Michael Ehrhardt (1991), 'Diversification and Interest Rate Risk', *Journal of Business Finance and Accounting*, Volume 18, January, p43.
> [97] Ibid, p56.

It is not clear to us why Powerlink believes that these quotes support its view. The first sentence of the first quote appears to be a statement that the CAPM *does* price interest rate risk. The second, appears to restate this sentiment. The third and fourth sentences appear to suggest that empirical tests as to whether interest rate risk is priced is 'inconclusive'. The second quote appears to repeat the finding that the study does **not** "*provide evidence that securities are compensated for interest rate risk"*. It is unclear to us why Powerlink believes that these quotes support a view that interest rate risk is a risk that equity markets price.

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