Appendix X.1 – SFG Report – An Appropriate Equity Beta Estimate for Western Power

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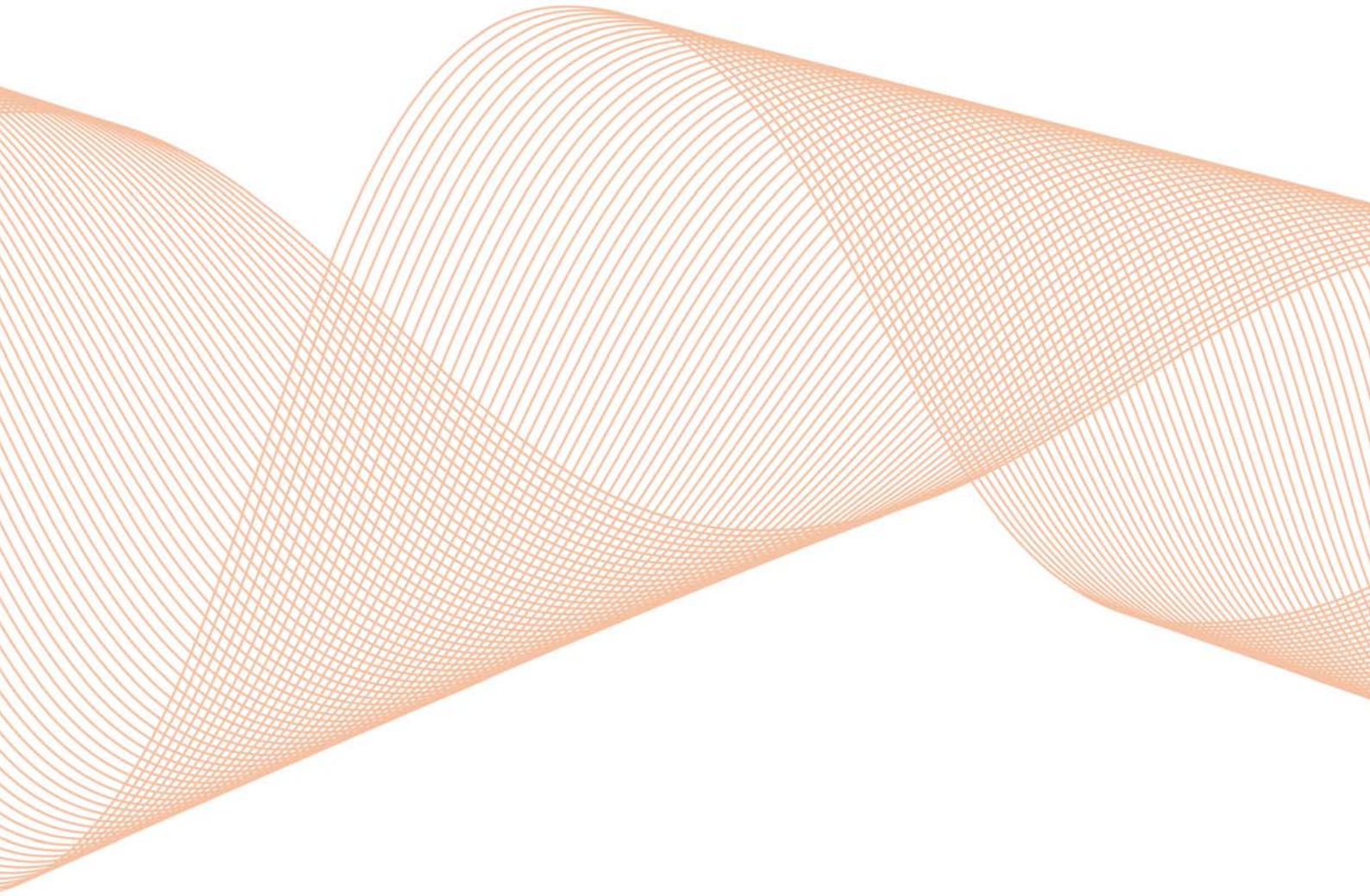

An appropriate equity beta estimate for Western Power

Report prepared for Western Power

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Executive summary and conclusions

Instructions and context

1. SFG Consulting (SFG) has been engaged by Western Power to consider estimates of equity beta in the context of the Western Australian Electricity Networks Access Code (the **Code**), which requires that the allowed regulatory return give the service provider an opportunity to earn sufficient revenue to meet the forward-looking and efficient costs of providing covered services, including a return on investment commensurate with the commercial risks involved.[1] In particular, the Code requires that the allowed return must be sufficient to attract the required amount of capital, given the prevailing conditions in the market.[2]

2. This report has been authored by Professor Stephen Gray. I am Professor of Finance at the UQ Business School, University of Queensland and Director of SFG Consulting. I have honours degrees in commerce and law from the University of Queensland and a PhD in Finance from the Graduate School of Business at Stanford University. I have extensive experience in advising companies, government, and regulatory agencies on issues relating to weighted-average cost of capital.

Appropriate default equity beta estimate is 1.0

Average equity beta is 1.0

3. By definition, the average equity beta for all listed companies is 1.0. Consequently, 1.0 is the natural starting point or default value when estimating equity betas.

No reason for a priori view that the equity beta for an electricity transmission or distribution firm is less than 1.0

4. There are two things that determine the relative systematic risk, or equity beta, of a particular firm:

   a. The type of business that the firm operates; and

   b. The amount of financial leverage employed by the firm.

5. It is generally accepted that the business activities of regulated network transmission and distribution businesses have lower than average systematic risk. But it is also clear that such businesses have much higher financial leverage than the average firm. These two effects operate in different directions for regulated network businesses:

   a. Their business activities would suggest lower than average systematic risk; but

   b. Their financial leverage would suggest higher than average financial risk.

Only move from the default beta of 1.0 if there is reason to do so

6. Since transmission and distribution businesses have business activities that are of below average risk, but financial leverage that is much higher than average, the two components of equity beta operate in different directions and will tend to offset one another. Consequently, the appropriate

[1] Code, s. 6.4a.
[2] Code, Introduction.

a priori expectation is that the equity beta for these businesses is no different from that of the average firm, which is 1.0.

7. One would only move from this default position to the extent that:

   a. Appropriate analysis of the available data suggested that a move away from the default of 1.0 was warranted; and

   b. The resulting equity beta value resulted in an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

Recent regulatory estimates vs. default estimate of 1.0

8. An equity beta estimate of 0.8, based on leverage of 60%, has been used in a number of recent regulatory determinations for electricity network businesses. This estimate emanates from the Review of WACC Parameter Estimates performed by the Australian Energy Regulator (**AER**) and has subsequently been adopted in recent determinations by the AER and the Economic Regulation Authority of Western Australia (**ERA**).

9. In this report, we examine the recent regulatory estimate of 0.8 in detail and consider:

   a. Whether appropriate analysis of the available data does warrant a move away from the default value of 1.0 to an estimate of 0.8; and

   b. Whether the equity beta estimate of 0.8 produces an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

10. For the reasons set out below, we conclude that the regulatory estimate of 0.8:

    a. Is statistically unreliable and that proper analysis of the available data does not warrant a move away from the default value of 1.0; and

    b. Produces an estimate of the required return on equity that is economically unreasonable and commercially implausible in the circumstances,

    and consequently the regulatory estimate of 0.8 does not produce a regulatory return that is commensurate with the commercial risks involved or sufficient to attract the required amount of capital, given the prevailing conditions in the market.

11. By contrast, the default estimate of 1.0 produces an estimate of the required return on equity that is economically reasonable and commercially plausible.

Regulatory estimate of 0.8 is statistically unreliable

12. We conclude that the statistical analysis on which the regulatory estimate of 0.8 is based is so unreliable that it should be afforded little weight. The reasons for this conclusion include:

    a. The data set on which it is based is so small and incomplete that no econometric technique applied to it (no matter how carefully applied) can produce estimates that are precise and reliable;

    b. The individual estimates on which the AER's estimate is based are, in many cases, implausible;

c. The individual estimates on which the AER's estimate is based are inconsistent between firms and over time;

d. The AER's estimate ignores important information about the precision of beta estimates (i.e., the AER does not consider standard errors, which is inconsistent with standard statistical and econometric practice);

e. The AER's estimate ignores important information about the reliability and informativeness of beta estimates (i.e., the AER does not consider R^2 statistics, which is inconsistent with standard statistical and econometric practice);

f. The AER's estimate ignores the issue of bias in beta estimates, which is inconsistent with standard statistical and econometric practice and with the practice of commercial beta services.

Regulatory estimate of 0.8 is commercially implausible

The approach on which the 0.8 is based produces implausible estimates over time

13. The 0.8 estimate is based on information from a very small set of comparable firms, most of which have been exchange-listed for only a short time. Consequently, it is not possible to examine what estimates of beta the empirical approach would have produced for earlier periods of time. However, when this approach is applied to other industries, it produces estimates that vary so wildly over time that those estimates cannot possibly be a reliable reflection of systematic risk.

The required return on unlevered equity cannot be lower than the required return on debt

14. In Australian regulatory determinations for energy transmission and distribution businesses, it is standard to assume that the optimal capital structure of the benchmark firm consists of a 60/40 mix of debt and equity funding. It is also standard to set out the mathematical formula that is used for converting between unlevered and levered equity returns. This formula is used to determine the return that would be required on equity in the benchmark regulated firm if there was no debt in the capital structure – the required return on unlevered equity. An equity beta estimate of 0.8 produces an estimate of the required return on unlevered equity that is lower than the directly observable return to the debt in the same firm, which is impossible. The AER expresses agreement with this proposition.[3]

15. It is impossible for the required return on equity to be lower than the required return on debt in the same firm because the debt return is fixed and guaranteed to be made (but for a default by the borrowing firm) whereas the returns to equity are uncertain. Debt holders have a first-ranking claim over the cash flows of the firm – they are entitled to be paid in full before any cash flows are paid to the residual equity holders. Only if 100% of the firm's cash flows are insufficient to pay the return on the 60% of debt financing[4] would there be a default, and this is highly unlikely given the assumed strong investment grade rating. By contrast, the return to equity holders is not fixed; it is uncertain and will vary with the fortunes of the firm from time to time. Consequently, the equity beta estimate of 0.8 fails this test of economic reasonableness and commercial plausibility.

[3] Review of WACC Parameters, Final Decision, p.42.
[4] 60% debt financing is the standard regulatory assumption.

16. Moreover, an equity beta estimate that produces an estimate of the required return on unlevered equity that is lower than the directly observable return to the debt in the same firm is inconsistent with the whole regulatory framework. The WACC framework is based on the optimal capital structure being 60/40 mix of debt and equity funding. However, it would be quite irrational for a firm to employ *any* debt at all if it could finance the entire firm with equity at a lower cost – and this is what a beta estimate of 0.8 implies. If a higher estimate of equity beta were used, this obvious inconsistency would not arise.

The required return on equity cannot be materially lower than the return on equity that investors could reasonably expect to receive from comparable firms

17. An important consideration when determining whether a proposed regulatory return on equity, r_e, is consistent with the Code is a comparison between that allowed regulatory return on equity and the return on equity that investors might reasonably expect to receive from comparable firms. If the reasonably expected return on equity in the comparable firms is materially higher than the allowed return on equity for the regulated firm, there must be questions about the reasonableness of the regulatory estimate (and the individual parameter estimates that led to it) and whether:

    a. That allowed return provides a return on investment commensurate with the commercial risks involved;[5] and

    b. That allowed return is sufficient to attract the required amount of capital, given the prevailing conditions in the market.[6]

18. The most up-to-date equity analyst forecasts of dividend yields for comparable firms suggest that the forward-looking yield is approximately 9%. We add to this a conservative estimate of future capital gains of 2.5% - 3.5%. This suggests that share prices experience real growth of 0% – 1%, and so is quite conservative.[7] This produces a forecasted return on equity of 11.5% - 12.5% for the set of comparable firms.

19. The allowed return on equity based on an equity beta estimate of 0.8 provides equity holders in the benchmark firm with a return of 8.4% from dividends and capital gains.[8] This can be compared with a return from dividends and capital gains, from comparable firms, of 11.5% to 12.5%.

20. If the allowed return is materially less than the return that investors might reasonably expect to receive from an investment in comparable firms, there must be questions about the reasonableness of the regulatory estimate (and the individual parameter estimates that led to it) and whether that regulatory estimate is commensurate with prevailing conditions in the market. Specifically, if the regulatory estimate of equity beta is reduced and this results in an allowed return on equity that is materially below the return that would reasonably be expected from comparable firms, it follows that the reduction in the equity beta estimate has resulted in an allowed return on equity that is not commensurate with the prevailing conditions in the market for funds.

[5] WA Electricity Networks Access Code, s. 6.4a.

[6] WA Electricity Networks Access Code, Introduction; NER 6.5.4 (e).

[7] The AER's Envestra Draft Decision also uses this conservative estimate of share price growth in its calculations of "the most appropriate return on equity that can be derived from analyst reports." Envestra Draft Decision, p. 260.

[8] For example, using the parameter estimates in the ERA's DBP Draft Decision.

For non-resident investors the implied return on levered equity is materially lower than the implied return on debt

21. The regulatory estimate of equity beta implies that non-residents are willing to supply equity capital at a lower cost than debt capital for the same firm, which is implausible.

Reasonable range for equity beta

Range for benchmark efficient transmission and distribution business

22. The implausible implications of an equity beta of 0.8 are effectively removed when an equity beta of 1.0 is adopted:

    a. The allowed return on equity is not materially below the return that investors might reasonably expect to receive from comparable firms;

    b. The implied return on unlevered equity is not lower than the observable return on debt in the same firm; and

    c. The return on equity available to non-resident investors is not lower than the return on debt available to those same investors.

23. Consequently, our conclusions are as follows:

    a. The default, and previously adopted, equity beta estimate is 1.0;

    b. One would only move from this default position to the extent that:

        i. Appropriate analysis of the available data suggested that a move away from the default of 1.0 was warranted; and

        ii. The resulting equity beta value resulted in an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

    c. The current regulatory estimate of equity beta is 0.8, however that estimate:

        i. Is statistically unreliable and that proper analysis of the available data does not warrant a move away from the default value of 1.0; and

        ii. Produces an estimate of the required return on equity that is economically unreasonable and commercially implausible in the circumstances,

    and consequently the regulatory estimate of 0.8 does not produce a regulatory return that is commensurate with the commercial risks involved or sufficient to attract the required amount of capital, given the prevailing conditions in the market.

    d. By contrast, the default and previously adopted estimate of 1.0 produces an estimate of the required return on equity that is economically reasonable and commercially plausible.

24. In our view, 1.0 remains an appropriate point estimate for the equity beta of an electricity transmission and distribution businesses with 60% gearing. Estimates of 0.8 and below fail the tests of reasonableness and plausibility. Symmetrically, estimates well above 1.0 imply implausibly high returns on equity. Consequently, our view is that 0.9 to 1.1 provides a

reasonable range for the equity beta of an electricity transmission and distribution businesses with 60% gearing and meets the requirements of the Code.

Issues specific to Western Power

25. In most respects the Western Power transmission and distribution businesses are comparable to the benchmark efficient business that underlies the AER's analysis and estimates. One key point of difference is that the Code contains a New Facilities Investment Test (**NFIT**) that must be satisfied before new investment can be included in the asset base. In effect, the regulator must perform an ex-post assessment of the efficiency of capital expenditure. Consequently, there is a risk to investors that some capital expenditure will be disallowed and no return will be generated from it. The ERA has previously acted to reduce the proposed opening capital base for the Southwest Interconnected Network (**SWIN**) under this provision.[9] Comparable entities regulated under the National Electricity Rules (**NER**) face no such risk.

26. The AER is of the view that risks related to an ex-post review of the efficiency of capital expenditure is systematic in nature and affects the appropriate estimate of equity beta.[10]

27. In summary, our view is that 0.9 to 1.1 provides a reasonable range for the equity beta of a benchmark electricity transmission and distribution business with 60% gearing. We note that the AER's interpretation of the NFIT suggests that the equity beta estimate for the SWIN should be higher than that of the benchmark firm regulated under the NER. This would be a relevant consideration when selecting an appropriate point estimate from within the reasonable range.

[9] SWIN Final Decision, Paragraph 744.
[10] AER, Final Decision, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters, May 2009, page 248-249.

1. Legal and economic context

28. The Western Power network is regulated under the Electricity Networks Access Code of Western Australia (the **Code**). For the purposes of this report, the relevant part of the objective of the Code is:

> …to promote the economically efficient investment in networks and services of networks in Western Australia.[11]

29. The Code provides more detail about the return that the regulated business should be allowed:

> The price control in an access arrangement must have the objectives of:
> (a) giving the service provider an opportunity to earn revenue (target revenue) for the access arrangement period from the provision of covered services as follows:
> (i) an amount that meets the forward-looking and efficient costs of providing covered services, including a return on investment commensurate with the commercial risks involved;[12]

30. In its most recent decision in relation to Western Power's South West Interconnected Network (SWIN), the ERA set out the relevant objectives for the allowed return as follows:

> 816. Relevant objectives for the WACC under section 6.4 of the Access Code and the Code objective are that the WACC should be set at a value that:
> (i) gives the service provider an opportunity to earn revenue that meets the forward-looking and efficient cost of funds;
> (ii) is commensurate with the commercial risks involved in the provision of covered services; and
> (iii) promotes the economically efficient investment in, and operation and use of, the SWIN and the services provided by the SWIN.[13]

31. The Code also has the aim of being consistent with the corresponding national legislation:

> The Code aims to be, where appropriate given conditions prevailing in Western Australia: consistent with the National Electricity Code and National Gas Code.[14]

32. Under the relevant national legislation, the regulatory estimate of the required return on equity, r_e, is an estimate of the expected return that is required by potential equity investors before they will commit the required amount of equity funding to the benchmark regulated firm. More specifically, the National Electricity Rules (the **Rules**) 6.5.2 (b) requires that:

[11] WA Electricity Networks Access Code, s. 2.1.
[12] WA Electricity Networks Access Code, s. 6.4(a)(i).
[13] WA Electricity Networks Access Code, s. 6.4(a)(i).
[14] WA Electricity Networks Access Code, Introduction.

> The rate of return for a Distribution Network Service Provider for a regulatory control period is the cost of capital as measured by the return required by investors in a commercial enterprise with a similar nature and degree of non-diversifiable risk as that faced by the distribution business of the provider… .[15]

33. Moreover, NER 6.5.4 (e) requires that, in undertaking a review, the regulator must have regard to:

> The need for the rate of return calculated for the purposes of clause 6.5.2 (b) to be a forward looking rate of return that is commensurate with prevailing conditions in the market for funds and the risk involved in providing standard control services.[16]

34. Consequently, to be consistent with the Code objective and Section 6.4(a)(i) of the Code, the allowed return must:

    a. Give the service provider an opportunity to earn revenue that meets the forward-looking and efficient cost of funds;

    b. Provide a return on investment commensurate with the commercial risks involved; and

    c. Be commensurate with the return that is required to attract funds, given the prevailing conditions in the market.

35. An important consideration when determining whether a proposed return on equity, r_e, is consistent with the Code is a comparison between the allowed regulatory return on equity and the return on equity that is available to investors in other comparable firms. For example, if the allowed return on equity were materially lower than the return on equity available from other comparable firms, that allowed return would not be commensurate with prevailing conditions in the market for funds, nor would it be likely to provide a return on investment commensurate with the commercial risks involved. Consequently, it is important to estimate the expected return on equity that is presently available to investors in firms that are comparable to the benchmark firm that is the subject of regulation.

36. In this regard, we note that it is *not* our recommendation that the analysis set out in this report should be used to *determine* the allowed return on equity in regulatory cases. Our view is that the allowed return on equity must be estimated using the CAPM or other well-accepted financial model, as part of the estimation of the WACC of the covered network, as required by the Code.[17] The role of the analysis in this report is as a cross-check of the output produced by the model.

37. In this regard, we note that there are two reasons why the CAPM (or any well-accepted financial model) may produce an estimate of the allowed return on equity that is not commensurate with the risk involved or the prevailing conditions in the market:

    a. Every model requires the estimation of a number of input parameters, some of which may be difficult to estimate with great precision and reliability. If these input parameters are mis-estimated due to statistical noise or small sample sizes or for any other reason, the

[15] National Electricity Rules Version 42, Rule 6.5.2 (b).
[16] National Electricity Rules Version 42, Rule 6.5.4 (e)(1).
[17] Code s. 6.64 (a) and s. 6.66(b).

resulting estimate of the allowed return on equity will also be mis-estimated. That is, the use of the CAPM or other well-accepted financial model does not, and cannot possibly, automatically correct for mis-estimated input parameters. There is no guarantee that the output from the CAPM or other well-accepted model will be reasonable and sensible and commensurate with the risks involved and the prevailing conditions in the market – because that output depends on imprecise estimates of several input parameters; and

b. The ability of a particular model to produce reasonable estimates of the required return on equity may vary, depending on the particular market conditions and on the type of firm. There can be no guarantee that a particular model, even with the best possible estimates of input parameters, will always produce an estimate of the required return on equity that is commensurate with the risks involved and the prevailing conditions in the market.

2. Role of equity beta

38. Under the CAPM, the required return on a firm with an average level of systematic risk is equal to the risk-free rate plus the market risk premium. That is, investors require a base return of the risk-free rate plus compensation for bearing systematic risk. If a particular company has half the systematic risk of the average firm, its investors will only require half as much compensation for bearing systematic risk. Conversely, if a particular company has twice the systematic risk of the average firm, its investors will require twice as much compensation for bearing systematic risk. Equity beta is a measure of the systematic risk of a particular firm relative to that of the average firm.

39. There are two things that determine the relative systematic risk, or equity beta, of a particular firm:

    a. The type of business that the firm operates; and

    b. The amount of financial leverage employed by the firm.

40. This was explicitly recognised by the AER in its Review of WACC Parameters where the *Explanatory Statement* correctly notes that a firm's systematic risk (its equity beta) depends "on its business activities and its level of financial leverage."[18]

41. In relation to business activities, firms that operate in industries that tend to generate stable cash flows that are largely uncorrelated with changes in aggregate wealth (proxied by the returns on a broad stock market portfolio) tend to have lower betas, other things equal.

42. Financial leverage refers to the relative amounts of debt and equity financing used by a firm. Other things equal, firms with relatively more debt tend to have higher equity betas. This is because the introduction of prior-ranking debt results in greater variation in the residual cash flows to equity.

43. These two effects can be disaggregated using a process known as "un-levering." For example, the approach that the AER uses to disaggregate equity beta into its two components is:

$$\beta_e = \beta_a\left(1+\frac{D}{E}\right)$$

where β_a is the asset beta, which reflects the systematic risk of the business activities of the benchmark firm but not the effect of leverage, and D/E reflects the relative amounts of debt and equity financing.

44. It is generally accepted that the business activities of regulated electricity network distribution and transmission businesses have less systematic risk than average. But it is also clear that such businesses have much higher financial leverage than the average firm. It has become standard to assume 60% debt financing for a regulated network distribution or transmission business, whereas the average firm has 30% debt financing.[19] That is, the two effects operate in different directions for regulated network distribution and transmission businesses:

[18] AER *Review of WACC Parameters: Explanatory Statement*, p.181.
[19] See, for example, ACG (2008) p. 6.

a. Their business activities would suggest lower than average systematic risk; but

b. Their financial leverage would suggest higher than average financial risk.

45. There is no compelling *a priori* reason to suggest which of these effects should dominate the other. To see this, first note that the asset beta for the average firm is 0.7:

$$\beta_e = \beta_a\left(1+\frac{D}{E}\right)$$
$$1.0 = 0.7\left(1+\frac{30}{70}\right)$$

and that an asset beta of 0.4 would imply an equity beta of 1.0 for the distribution or transmission business:

$$\beta_e = \beta_a\left(1+\frac{D}{E}\right)$$
$$1.0 = 0.4\left(1+\frac{60}{40}\right).$$

46. That is, setting the equity beta for the distribution or transmission business to 1.0 is consistent with the business activities of the average firm having 75% more systematic risk. Whereas it is generally agreed that the business activities of the average firm have more systematic risk than those of a distribution or transmission business, there is no consensus about the quantum of that additional risk and whether there is more or less than 75% additional risk.

47. Consequently, the appropriate *a priori* expectation is that the equity beta for these business is no different from that of the average firm, which is 1.0.

48. One would only move from this default position to the extent that:

a. Appropriate analysis of the available data suggested that a move away from the default of 1.0 was warranted; and

b. The resulting equity beta value resulted in an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

49. In summary there are a number of reasons why 1.0 is an appropriate starting or default point:

a. The mean equity beta across all firms is 1.0;

b. There are two components of equity beta. For electricity distribution and transmission firms, one of these components suggests lower than average systematic risk and the other suggests higher than average systematic risk;

c. The regulatory precedent prior to the AER's Review of WACC Parameter Estimates was to set equity beta to 1.0 for electricity transmission and distribution firms. The AER subsequently concluded that a lower value of equity beta would be appropriate, based on an empirical analysis of the available data. However, as set out below, there are reasons to

conclude that the results of that analysis are unreliable. If this is the case, that analysis should not be relied upon for departing from the previously adopted value of 1.0; and

d. The ERA's statement of Preferred WACC Methodology sets out a default equity beta estimate of 1.0. The Preferred WACC Methodology has since expired and in its SWIN Final Decision the ERA has also subsequently concluded that a lower value of equity beta would be appropriate. However that conclusion is based on the same empirical analysis on which the AER relies. That is, we argue below that there is no statistically reliable empirical analysis to support a departure from the previously adopted value of 1.0.

3. Recent regulatory estimates

Overview

50. An equity beta estimate of 0.8, based on leverage of 60%, has been used in a number of recent regulatory determinations for network distribution and transmission businesses. This estimate emanates from the AER's Review of WACC Parameter Estimates and has subsequently been adopted in recent determinations by the AER and the ERA.

51. In this section, we examine the reliability and robustness of the AER's estimate of 0.8. We conclude that this estimate is unreliable for a number of reasons including:

    a. The data set on which it is based is so small and incomplete that no econometric technique applied to it (no matter how carefully applied) can produce estimates that are precise and reliable;

    b. The individual estimates on which the AER's estimate is based are, in many cases, implausible;

    c. The individual estimates on which the AER's estimate is based are inconsistent between firms and over time;

    d. The AER's estimate ignores important information about the precision of beta estimates (i.e., the AER does not consider standard errors, which is inconsistent with standard statistical and econometric practice);

    e. The AER's estimate ignores important information about the reliability and informativeness of beta estimates (i.e., the AER does not consider R^2 statistics, which is inconsistent with standard statistical and econometric practice);

    f. The AER's estimate ignores the issue of bias in beta estimates, which is inconsistent with standard statistical and econometric practice and with the practice of commercial beta services.

52. We also examine the plausibility of this 0.8 estimate and show that it implies the return on unlevered equity is lower than the return on investment grade debt in the same firm, which is simply impossible. This also implies that firms are behaving quite irrationally in having any debt finance at all.

53. We conclude that the recently adopted regulatory estimate of 0.8 is statistically unreliable and commercially implausible.

Present regulatory estimate of equity beta is 0.8

54. The ERA's 2009 Final Decision in relation to the SWIN contains an extensive review of the empirical analysis of equity beta that was conducted in the AER's Review of WACC Parameter Estimates, and the ERA's Final Decision on an appropriate range for beta is based on that analysis.[20] In the SWIN Final Decision, the ERA has not undertaken any new or independent empirical analysis. Consequently, any criticisms of the reliability of the empirical analysis that underpins the AER's Review of WACC Parameter Estimates also applies to the ERA's SWIN Final Decision.

[20] ERA, SWIN Final Decision, 2009, Page 238 and following.

55. As part of its Review of WACC parameter estimates, the AER commissioned a consultant report in relation to the empirical estimation of equity betas from the available data. The empirical evidence on which the AER's 0.8 estimate is based is set out in that report, Henry (2008).

56. The present regulatory estimate of 0.8, based on leverage of 60%, implies an asset beta of 0.32:

$$\beta_e = \beta_a\left(1+\frac{D}{E}\right)$$
$$0.8 = 0.32\left(1+\frac{60}{40}\right).$$

57. That is, the regulatory estimate of 0.8 implies that the business operations of the average firm have 2.2 times the systematic risk of a network distribution or transmission business.[21]

58. As set out above, it is generally accepted that the business operations of the average firm have more systematic risk than those of a benchmark network distribution or transmission business. The key question concerns the quantum:

    a. Setting the equity beta of the distribution business to 1.0 implies the business operations of the average firm have 75% more systematic risk;[22] and

    b. Setting the equity beta of the distribution business to 0.8 implies the business operations of the average firm have more than twice as much systematic risk.[23]

59. That is, the equity beta estimate of 0.8 implies a very wide gap between the systematic risk of the business activities of distribution business and the average firm.

The basis of the regulatory estimate of 0.8

60. In this sub-section, we summarise the empirical analysis that was performed by Henry (2008) and how the AER evaluated and interpreted that evidence. The reason for the focus on this work is that the ERA has relied upon these empirical estimates in selecting a reasonable range for equity beta in its most recent decision in relation to the SWIN.

61. Henry (2008) and the AER consider beta estimates for a set of Australian firms and for a set of international firms. It is clear that the AER considers the estimates in relation to the Australian firms to be most relevant and the international firms to provide only a cross check. Specifically:

> …the AER will be exercising extreme caution when examining foreign beta estimates for the purposes of setting a benchmark efficient equity beta…The AER considers that it may be appropriate to use the point estimates of foreign equity betas as a cross check.[24]

[21] The asset beta of the average firm is 0.7 and the regulatory estimate implies an asset beta of 0.32 for the distribution or transmission business.
[22] An equity beta of 1.0 for a firm with 60% debt financing implies an asset beta (using the unlevering formula set out above) of 0.4. The average firm, with an equity beta of 1.0 and 30% debt financing, has an asset beta of 0.7, which is 75% higher than 0.4.
[23] An equity beta of 0.8 for a firm with 60% debt financing implies an asset beta (using the unlevering formula set out above) of 0.32. The average firm, with an equity beta of 1.0 and 30% debt financing, has an asset beta of 0.7, which is more than twice 0.32.
[24] *Explanatory Statement*, p.197.

62. In relation to beta estimates for Australian firms, the AER was specific in the instructions given to its consultant in terms of the time period to be examined. Henry (2008) notes that:

> The consultant was instructed by the ACCC to examine data over the period January 1st 2002 to 1st September 2008.[25]

63. Henry (2008) examines a total of ten firms. Four of these firms are ultimately excluded from the analysis due to concerns that they are not representative:

> Given the concerns about the impact of takeover activity and the quality of the data available for AAN and GAS expressed in section 5.1 below, we exclude these stocks from our portfolio analysis. Moreover, data on these stocks is not available for the full sample period January 1st 2002 – September 1st 2008 as both stocks were delisted prior to the end of the sample. Similarly, AGKX was excluded because of concerns about the impact of corporate restructuring on the price data. Finally, given that the focus of ORGX is retail rather generation [sic] we do not consider this stock.[26]

64. This leaves only six firms. Of these six firms, only two had data available for the (relatively short) period specified by the AER.[27]

65. The most standard approach for estimating equity betas uses returns sampled at the monthly frequency. However, the paucity of the data that is available is clearly a concern for the AER's consultant, who concludes that:

> Given the short sample available for firms such as DUEX, HDFX, SPAU and particularly SKIX, the use of monthly data is unlikely to produce statistically valid inference.[28]

66. Due to these problems with the availability of data, Henry (2008) uses returns sampled at the (non-standard) weekly frequency. It appears that Henry uses weekly returns due to the fact that the more standard monthly returns would produce such a small number of observations that nothing of any use could be derived from it. He refers to the weekly returns as nothing more than a "best compromise" in the circumstances.[29]

67. In the remainder of this section, we set out a number of reasons why the empirical analysis on which the regulatory estimate of 0.8 is based is statistically unreliable and commercially implausible.

[25] Henry (2008, p.4). Note that Henry (2008, p.6) does mention estimates for two firms based on longer time periods, but these periods include the tech bubble and use a price index instead of the universally adopted accumulation index as the proxy for the market return, and should therefore be ignored.
[26] Henry (2008, p. 8).
[27] Henry (2008, p. 5).
[28] Henry (2008, p. 5). As a result, Henry uses returns sampled at the weekly frequency. I discuss this further below.
[29] Henry (2008, p.20).

Lack of relevant data

68. The sample of data that forms the basis of the AER's empirical estimates of beta consists of returns for only six firms, none of which is a pure play distribution or transmission business, and for only two of which is data available for the (short) period specified by the AER.

69. In our view, the scant and incomplete data set that is relied upon by the AER is not sufficient to produce beta estimates that are robust or reliable.

70. In this regard, we note the view of the AER that:

> The AER considers that a sample of four firms is unlikely to provide a robust equity beta estimate.[30]

and that the data set on which the AER's estimates are based consists of four firms or less for the majority of the sample period.

71. The problem is that there is simply not enough data. That problem cannot be remedied by measuring returns in different ways or applying variations to the estimation methodology. If there is not enough food to feed a family, slicing or dicing it in different ways will not help. Henry (2008) has analysed the data set in accordance with his instructions – but it is so small and incomplete that nothing can be done to it to produce reliable results. No econometric technique applied to the Henry data set (no matter how carefully applied) will produce estimates that are precise and reliable. It is not surprising that, as set out below, the analysis of this data set produces results that are implausible.

Individual estimates are implausible and inconsistent at face value

72. The AER states that it supports the view that:

> reliability of the empirical estimates, availability of data (cross-sectional and across time), consistency of empirical estimates (over time, across businesses, across empirical methods)[31]

are all "key objective criteria" for estimating WACC parameters.

73. Table 1 of Henry (2008) sets out equity beta estimates based on returns measured in continuous and discrete form and based on the OLS and LAV regression methodologies.[32] All of the different combinations of return measures and empirical techniques are applied to the same limited data set. There are several features of the resulting estimates that point to their unreliability:

    a. Several of the estimates in the table are clearly implausible and could not possibly be taken seriously as estimates that one would use in the CAPM to estimate the required return on equity. For example, the estimated equity beta of 0.13 for Envestra implies an asset beta of 0.0375[33] in which case the firm would be able to finance *all* of its assets with equity by offering a return only 23 basis points above the risk-free rate; [34]

[30] *Explanatory Statement*, p. 195.
[31] *Explanatory Statement*, p. 48.
[32] Henry (2008, p.5) and reproduced in the *Explanatory Statement*, p. 200.
[33] Using the approach adopted by the AER to convert between asset and equity betas.
[34] 0.0375 × 6% = 0.225%.

b. There is also substantial variation in beta estimates across firms. The re-levered beta estimates for different firms reported by Henry (2008) (which are all supposed to be estimates of the same thing) range from less than 0.3 to more than 1.0.[35]

c. There is also substantial variation in beta estimates across empirical methods, including different estimation techniques (OLS, LAD, etc.) and different sampling frequencies (weekly, monthly, etc.). For example, Henry (2008) reports that some of the "comparable" firms have equity beta estimates that are more than five times the estimates for other firms. For some individual firms the estimate doubles or halves if a different variation of the empirical method is used. Indeed Henry (2008, p. 6) notes that "it is clear that the estimates themselves vary across estimator, which may suggest the presence of outliers or structural instability;"

d. The estimates that have been produced also vary substantially over time. For example, the recursive estimates computed by Henry (2008) show that it is quite common for equity beta *estimates* for the same firm to double or triple over the course of several months.[36] These figures also illustrate the tremendous width of the confidence intervals, which in almost every case contain the value of 1.0. That is, the data cannot reject the hypothesis that the equity beta is 1.0.

74. In summary, it is difficult to imagine any set of estimates faring worse on the AER's "key objective criteria."[37]

The AER's estimate ignores important information about the imprecision of the beta estimates: Standard errors

75. The precision of any empirical estimate is, in general, one of the relevant considerations to take into account when determining whether to afford material weight to that estimate. The precision of an estimate is quantified by the standard error of that estimate – other things equal, a more precise estimate has a lower standard error. The standard error can then be used to construct a confidence interval – a range that contains the true value of the parameter with a certain probability. It is standard statistical and econometric practice to report standard errors and to consider parameter estimates within the context of a statistical confidence interval.

76. The AER's *Explanatory Statement* discusses standard errors of beta estimates at some length and states among other things that:

> The width of the confidence interval is an indicator of the precision of the point estimate.[38]

We agree with this and consider it to be uncontroversial.

77. However, the AER ultimately concludes that it will not use standard errors and the resulting confidence intervals when determining the appropriate equity beta. The *Explanatory Statement* sets out the AER's rejection of confidence intervals in relation to estimates of equity beta:

[35] Henry (2008), p.18.
[36] Henry (2008), Appendix 1 and 2.
[37] *Explanatory Statement*, p. 48.
[38] *Explanatory Statement*, p. 216.

> …it is likely that a forward-looking equity beta will be represented by a the [sic] point estimate of the equity beta rather than the upper and lower bounds.[39]

and that in relation to beta estimates:

> …the AER has had regard to the point estimates rather than the range of possible estimates within confidence intervals.[40]

78. It is our view that one cannot possibly determine the weight to apply to a particular empirical estimate without proper consideration of the statistical precision and reliability of that estimate.

79. In rejecting the use of standard errors, confidence intervals, and R^2 statistics (dealt with in the subsequent section) the AER has no basis at all for determining the precision or reliability of empirical beta estimates.

80. In the present regulatory environment there are two other specific reasons to employ standard errors and the associated confidence intervals:

    a. A confidence interval allows one to conclude whether a particular econometric method applied to a particular sample of data produces an estimate that is significantly different from a particular value. For example, if the default estimate of equity beta is set at 1.0 a confidence interval allows one to test whether or not a particular estimate is significantly different from 1.0. For this reason, it would seem that confidence intervals and standard errors would be relevant considerations; and

    b. It follows logically that higher regulatory beta estimates will (other things equal) result in higher regulatory returns and a commensurately higher probability that the regulatory return will be sufficient for network service providers to recover at least the efficient cost of capital employed. If the probability of the regulated return being sufficient to recover the efficient cost of capital is a relevant consideration, some way of estimating this probability is required. This is exactly what the standard error and confidence interval is designed to do.

The AER's estimate ignores important information about the reliability of the beta estimates: R^2 statistics

Estimates are statistically unreliable when the R^2 statistic is low

81. When performing the sort of regression analysis that is used in beta estimation, it is standard practice to report an R^2 statistic. This statistic determines the degree to which the data is informative about the relationship that is being measured. An R^2 statistic close to 1.0 indicates that the data is highly informative, whereas a value close to 0 indicates that the data is uninformative about the relationship that is to be measured.

82. In the context of beta regression analysis, there is general agreement that:

[39] *Explanatory Statement*, p.219, error in original.
[40] *Explanatory Statement*, p.219.

> A low R-squared indicates that more of the variation in the variables is noise that is unrelated to the effect that is being measured, making it more difficult to obtain statistically reliable estimates.[41]

83. Consequently, the R^2 statistic is directly informative about the statistical reliability of empirical beta estimates, which in turn is a key consideration when determining the weight to be afforded to those estimates. It is standard practice to report the R^2 statistic with any regression results – consistent with the relevance and informativeness of that statistic

84. The *Explanatory Statement* and the AER's consultant report[42] do not report, consider, or give weight to any R^2 statistics. Consequently, the AER estimate of 0.8 has been arrived at without any consideration of this important information.

*R^2 statistics **are** low for relevant firms*

85. Table 1 below reports the R^2 statistics for the sample of firms on which the AER estimate is based, as reported by the AGSM-RMS Beta Service. These R^2 statistics are uniformly very low and in some cases are zero (meaning that the available data is completely uninformative in identifying the relationship between stock and market returns that the beta regression is seeking to measure). The AER itself has recognised that in these conditions it is "difficult to obtain statistically reliable estimates." [43] In our view, this itself is highly relevant in determining how much weight to apply to those estimates – if an estimate is obtained in circumstances in which it is "difficult to obtain reliable estimates," one should be very cautious about affording any material weight to that estimate.

Table 1. R^2 statistics of regression analysis using Australian data

Company	*R*-squared March 2008	*R*-squared September 2010
SP Ausnet	0.06	0.04
Duet Group	0.14	0.20
Spark Infrastructure	0.19	0.15
APA Group	0.21	0.26
Envestra Limited	0.28	0.28
Hastings Diversified	0.10	0.00

Source: AGSM-RMS Beta service.

Mis-estimation is a material issue when R^2 statistics is low

86. To quantify how unreliable beta estimates with low R^2 statistics might be, we performed a Monte Carlo simulation analysis. We generated stock and market return data in a setting where the true equity beta is 1.00 (the signal) and where there is random variation in the data (the noise) commensurate with what is observed in practice, as follows:

    a. For each simulation, the market has an expected monthly return of 1% and monthly standard deviation uniformly distributed between 1 – 10%. This means that, on average,

[41] *Explanatory Statement*, p. 215.
[42] Henry, O.T. (2008), *Econometric advice and beta estimation*, November 28.
[43] *Explanatory Statement*, p. 215.

we expect a market return of 12.7% per year, with volatility of returns that range from 3.5 – 34.6% per year. In one simulation, the market will be quite stable; in another it will be more volatile.

b. For each month within each simulation, we generate market returns as the sum of the expected value of 1% plus a draw from a normal distribution with mean zero and standard deviation equal to the volatility generated above. For example, in a simulation that happened to be for a benign market environment, in which monthly volatility was just 1%, there is a 68% chance that a given month's return will range from 0 – 2% and a 95% chance that a given month's return will range from –1 to + 3%. By contrast, in an extremely volatile market, there is a 68% chance that a given month's return will range from –9 to +11% and a 95% chance that a given month's return will range from –19 to +21%.

c. For each of the simulations, the company-specific volatility also has an expected monthly value which is drawn from a uniform distribution ranging from 1 – 10%. This means that, in addition to market risk, stock returns fluctuate according to company-specific factors. In some cases, company-specific volatility will be very high, and in other cases it will be quite low. The company-specific volatility is assumed to be entirely independent of market volatility.

d. For each month within each simulation, we generate stock returns as the sum of the market return plus a company-specific return drawn from a normal distribution with mean zero and standard deviation equal to the company-specific volatility generated above. Hence, we have assumed that the stock in question has an equity beta of one, so on average it will generate returns equal to the market. But in a given month the stock return could be much higher or lower than the market return.

87. We then use the standard regression technique to obtain a beta estimate. This estimate will differ from the true value (of 1.00) due to the noise in the data. We then repeated this procedure one million times and we summarise the results in Table 2 below.

Table 2. Simulation results illustrating the relationship between R-squared and beta estimates

Decile	Mean R-squared (%)	Mean beta estimate	Standard deviation of beta estimate	Proportion in which estimates are below 1.0 (%)	Proportion in which estimate is reported as significantly [a] below 1.0 (%)	Proportion in which estimate is reported as significantly [a] above 1.0 (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	4	0.66	0.50	80	13	0
2	15	1.06	0.42	55	5	1
3	25	1.07	0.34	51	5	4
4	36	1.05	0.24	49	4	5
5	46	1.04	0.18	46	4	5
6	56	1.04	0.15	43	3	6
7	65	1.04	0.12	42	3	7
8	75	1.02	0.10	43	4	8
9	86	1.01	0.07	45	4	7
10	95	1.00	0.04	46	4	6
Overall	50	1.00	0.29	50	5	5

a: Significance is determined with reference to a 95% confidence interval.

88. The key result in the table above is the shaded row. What this shows is that where the true beta is 1.00 and the noise in the data is such that the R^2 statistic is very low, the standard regression approach is likely to produce beta estimates that are substantially below the true value of 1.00. That is, the noise in the data, which manifests itself in a low R^2 value, results in beta estimates being downwardly biased. The table shows that it is likely that the standard regression approach will produce beta estimates of 0.66 even where the true beta is 1.00 – in circumstances where the noise in the data is such that the R^2 statistic is very low.

89. That is, it is most likely that one will obtain beta *estimates* that are lower than the true value, and even lower than the AER's estimate of 0.8, even when the true value is 1.0 – if the noise in the data is such that the R^2 statistic is low.

Mis-estimation is a material issue when R^2 statistics is low

90. There is general agreement that in circumstances where the R^2 statistic is low it is "more difficult to obtain statistically reliable estimates."[44] Consequently, the R^2 statistic is directly informative about the statistical reliability of empirical beta estimates. This is an important consideration that goes to the weight that should properly be afforded to the empirical estimates. However the AER does not consider (or even report) any R^2 statistics, which is inconsistent with standard statistical and econometric practice.

The AER's estimate makes no adjustment to correct for the demonstrated bias in beta estimates

91. Beta estimates derived from an OLS regression of stock returns against market returns are known to be systematically biased in that low estimates have a high probability of understating the true risk of the stock. This statistical bias exists even though "noise" or "random error" in the data is perfectly symmetric – being equally likely to increase or decrease stock prices.

92. To see why this is the case, consider the following example:

> Suppose that every firm is known to have a *true beta* of 1, but when we run regressions there is estimation error, so the regression *estimates* can be above 1 or below 1. Those estimates that are below 1 are known to have negative estimation error (as that is the only way the estimate could have been below 1 in this setting) and those that are above one are known to have positive estimation error. That is, by observing the beta estimate, we can infer something about how it has been affected by estimation error.

[44] *Explanatory Statement*, p.215.

> Now suppose that all firms have a beta of either 0.8, 1.0 or 1.2, with one third of stocks in each group. But we don't know which is which, so we have to rely on our beta *estimates*. Also suppose that every time we estimate beta there is a one-third chance that we recover the true value or that our estimate is over- or under-estimated by 0.2. That is, there are a range of true betas, and estimation error for any individual beta estimate is perfectly symmetric. Now suppose you estimate a particular firm to have a beta of 0.8. There are two possibilities here (a) the true beta is 0.8 and the estimation error was 0; or (b) the true beta is 1.0 and the estimation error was -0.2. In this case, we know from observing the beta estimate of 0.8 that it has either zero or negative estimation error – this is a negative bias. To correct this bias we would adjust the estimate towards 1.0. In this case, our statistical estimate of 0.8 tells us that there is a 50/50 chance that the true beta is either 0.8 or 1.0. Consequently, the best unbiased estimate would be 0.9 as this is an estimate that is equally likely to be above or below the true value.
>
> But does this negative bias disappear when we introduce the possibility that some stocks might have a true beta of 0.6, so that our estimate of 0.8 has been contaminated by *positive* estimation error? No – imagine betas being normally distributed around 1.0. There are more firms with a beta close to 1.0 than with beta far from 1.0. So there will always be more chance that a beta estimate of 0.8 will be from a true beta of 1.0 with negative estimation error than from a true beta of 0.6 with positive estimation error. Moreover the further our beta estimate is below 1.0, the more likely it is to have been affected by negative estimation error.

93. That is, all equity beta estimates that are less than 1.0 are downwardly biased – when we obtain a beta estimate that is less than 1.0 we know that it is more likely to have been affected by negative estimation error than by positive estimation error. Consequently, our best estimate of the true value of beta is *higher* than the estimated value. This effect is well-known in the relevant literature[45] and the use of methods to adjust for this bias are commonplace among commercial providers of beta estimates.

94. The materiality of the statistical bias in beta estimates can be illustrated by the following simulation. Suppose that the true betas for all stocks in the market are normally distributed with a mean of one and a standard deviation of 0.5. This means that 68% of stocks have betas within the range of 0.5 – 1.5 and 95% of stocks have betas within the range of 0.0 – 2.0.[46] Also suppose that estimation errors are normally distributed with mean zero and standard deviation of 0.8. That is, any individual beta estimate is equally likely to have been affected by positive or negative estimation error. This implies that beta estimates are normally distributed with a mean estimate equal to their true beta and standard deviation of 0.8.

95. We have used Monte Carlo simulation to generate a sample of one million true betas and beta estimates in accordance with the values set out above. We then form deciles based on the simulated beta estimates. For each decile we report the mean beta estimate and the mean true beta in Table 3 below.

[45] See, for example, Vasicek (1973).

[46] This just comes from the standard statistical properties of a normal distribution – 68% of observations are within one standard deviation of the mean and 95% are within two.

Table 3. Simulation results illustrating the bias in beta estimates

Decile	Mean actual beta	Mean beta estimate	Prob Estimate > Actual Beta (%)
(1)	(2)	(3)	(4)
1	0.53	−0.66	1
2	0.72	0.02	5
3	0.82	0.36	14
4	0.90	0.64	27
5	0.97	0.88	42
6	1.03	1.12	58
7	1.10	1.37	73
8	1.18	1.64	86
9	1.28	1.99	95
10	1.46	2.66	99

96. In Table 3, the average *true* beta for the firms in each decile is reported in Column (2) and the average beta *estimate* is reported in Column (3). What the results show is that in *all* cases where the estimate is less than 1.0 it is downwardly biased (less than the true value) – consistent with the conceptual argument above. For example, in Decile 4 for the average firm the beta estimate is 0.64 whereas the true value is 0.90. Of course, the reverse is true for estimates above 1.0.

97. The AER's beta estimate of 0.8 is based on a range of estimates that are less than 1.0. All beta estimates that are less than 1.0 are downwardly biased. The simulation analysis in Table 3 shows that the degree of bias can be material. Yet the AER's analysis does not recognise the existence of bias and does nothing to quantify or correct for that bias in the estimates of equity beta – even though the existence of bias is well-recognised in the relevant literature and bias correction methods are commonplace among commercial data service providers.

Conclusions

98. As set out above, the move from the default equity beta estimate of 1.0 to the revised estimate of 0.8 should only be made if:

    a. Appropriate analysis of the available data suggested that a move away from the default of 1.0 is warranted; and

    b. The resulting equity beta value results in an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

99. In this section of the report we have addressed the first of two elements set out above and conclude that the statistical analysis on which the regulatory estimate of 0.8 is based is so unreliable that it should be afforded little weight. The reasons for this conclusion include:

    a. The data set on which it is based is so small and incomplete that no econometric technique applied to it (no matter how carefully applied) can produce estimates that are precise and reliable;

    b. The individual estimates on which the AER's estimate is based are, in many cases, implausible;

c. The individual estimates on which the AER's estimate is based are inconsistent between firms and over time;

d. The AER's estimate ignores important information about the precision of beta estimates (i.e., the AER does not consider standard errors, which is inconsistent with standard statistical and econometric practice);

e. The AER's estimate ignores important information about the reliability and informativeness of beta estimates (i.e., the AER does not consider R^2 statistics, which is inconsistent with standard statistical and econometric practice);

f. The AER's estimate ignores the issue of bias in beta estimates, which is inconsistent with standard statistical and econometric practice and with the practice of commercial beta services.

100. As a consequence of the conclusions set out above, it is our view that an equity beta estimate of 0.8 does not meet the requirements of the Code.

4. The economic reasonableness and commercial plausibility of the regulatory estimate of 0.8

Overview

101. In this section of the report, we consider whether an equity beta estimate of 0.8 produces an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

The approach on which the AER's estimate is based produces nonsensical outcomes in other industries

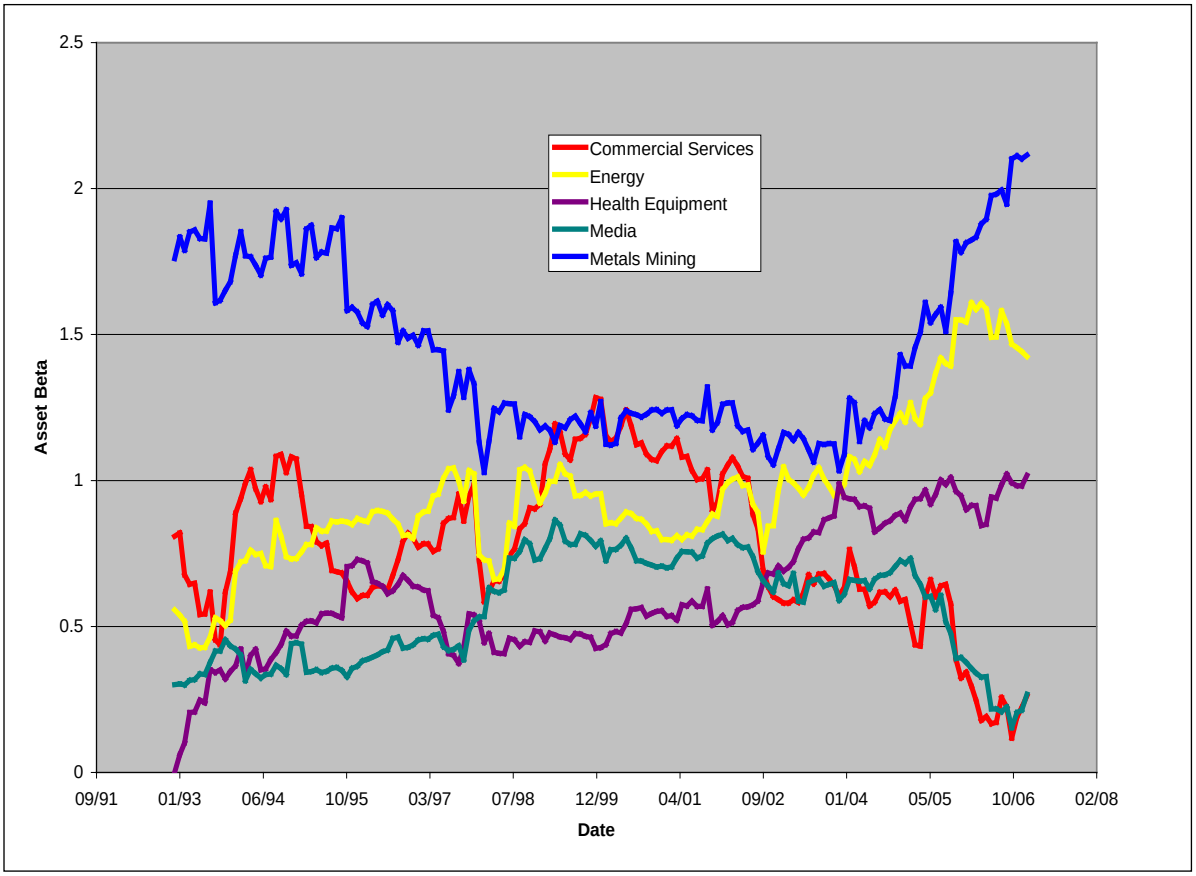
102. The AER beta estimate is based on data for a set of 4-6 comparable firms over a period of approximately five years. One test of the reliability of this approach would be to examine the characteristics of the beta estimates produced over a period of time. If that approach produced economically reasonable and relatively stable estimates over time, one would have more confidence in the veracity and reliability of the results. Conversely, if the approach produced beta estimates that varied wildly over time for no apparent reason, one would have much less confidence in them.

103. Unfortunately, we cannot examine the performance of the AER technique over time. Australian data only allows one such estimate – it is only the most recent five year period for which data is available even for the 4-6 firms.

104. However, we can examine the historical performance of the AER technique as applied to other industries. To examine this, we sorted firms by the GICS industry classification scheme used by the ASX. Within each industry, we selected five comparable firms that had stock return and annual report data available from December 1988 to December 2006 (to avoid the effects of the GFC). We then follow the AER approach by estimating the equity beta for each firm using five years of returns data. We convert these estimates into asset betas using the same un-levering process adopted by the AER. We take the average asset beta over the five comparable firms and we repeat this every month over our sample period.[47] We show the results of this procedure in Figure 1 and provide some detail about the sample composition and variability in beta estimates in Table 4.

[47] There are several reasons why we plot the (unlevered) asset beta rather than a re-levered equity beta. First, the true asset beta is expected to be relatively constant over time – the true systematic risk of the business activities of a particular industry is expected to be stable with very little variation from quarter to quarter. By contrast, the true re-levered equity betas could vary from time to time if leverage was changing, so the interpretation of a comparable figure based on re-levered equity betas would be slightly more complex. Also, it is not clear what degree of leverage should be used in the re-levering calculation. For regulated businesses, the regulatory value of 60% debt is an obvious benchmark, but this is less clear for the case of unregulated commercial businesses.

Figure 1: Time series of asset betas from average of five comparables



Source: Returns data from Risk Management Service, CRIF, AGSM. SFG calculations.

Table 4: Summary of ACG approach applied to different industries

Quantity	Commercial Services	Energy	Health Equipment	Media	Metals Mining
Firms included in sample	HMC	PSA	SDI	BYI	AMS
	ESI	BPT	VSS	STV	OXR
	ZEL	OSH	DVC	PRT	NCM
	CPB	ERA	MAY	SBC	RIO
	BIL	WPL	SHL	PBL	BHP
Mean asset beta over the period	0.77	0.95	0.61	0.55	1.44
Minimum asset beta over the period	0.12	0.43	0.00	0.15	1.03
Maximum asset beta over the period	1.28	1.61	1.02	0.86	2.11
Minimum (% below mean)	85%	55%	100%	72%	29%
Maximum (% above mean)	66%	69%	67%	56%	47%

105. Figure 1 and Table 4 show that the AER technique produces asset beta estimates that vary wildly over time. By any measure, the variation in these beta estimates over time is extreme. The results of this approach suggest that:

    a. the asset beta of the Metals and Mining industry has halved and then doubled over the sample period;

b. the Health Services and Equipment industry had zero systematic risk at the start of the sample period, but average risk by the end of it;

c. the systematic risk of the Commercial Services industry halves and doubles on a regular basis, and was all but eliminated by the end of the sample period.

106. Moreover, even the ranking of beta estimates among industries is not stable using this approach. The approach suggests that Commercial Services has the second greatest systematic risk during the early 1990s but was the least risky industry by 2006. Also, the suggestion is that Health Services and Equipment had the lowest systematic risk for most of the 1990s (even being completely free of risk in the early 1990s), yet was substantially riskier than Commercial Services and Media by 2006.

107. The conclusion from all of this is that the approach of taking the mean beta estimate from five comparable firms does not produce estimates of beta that are reliable, economically reasonable or are in any way commensurate with the market for funds.

Unlevered equity return less than debt return

108. Consider the case where the estimates of risk-free rate and market risk premium are 5% and 6% respectively, and where the equity beta is set to 0.8. This implies a return to unlevered equity of:

$$\begin{aligned} r_e &= r_f + \beta_a \times MRP \\ &= 5\% + 0.32 \times 6\% = 6.9\%. \end{aligned}$$

109. That is, the implication is that shareholders in an unlevered benchmark distribution or transmission firm require a return of 6.9%.

110. However, the most recent determination of the ERA sets the debt risk premium at 3.179% for a distribution firm with a BBB+ credit rating.[48] This implies that debt holders in the benchmark distribution firm require a return of:

$$\begin{aligned} r_d &= r_f + DRP \\ &= 5\% + 3.179\% = 8.2\%. \end{aligned}$$

111. It is impossible for the required return on equity to be lower than the required return on debt in the same firm. This is because the debt return is fixed and guaranteed to be made (but for a default by the borrowing firm) whereas the returns to equity are uncertain. According to the estimates set out above:

a. Debt holders provide 60% of the financing needs of the benchmark distribution firm, in return for a promised return of 8.2%. They have a first-ranking claim over the cash flows of the firm – they are entitled to be paid in full before any cash flows are paid to the residual equity holders. Only if 100% of the firm's cash flows are insufficient to pay the return on the 60% of debt financing would there be a default, and this is highly unlikely given the assumed strong investment grade rating.

[48] ERA, WA Gas Networks Final Decision, 28 February 2011, p. 92.

b. By contrast, equity holders in an unlevered benchmark distribution firm provide equity capital, expecting a return of only 6.9%. This return is not fixed; it is uncertain and will vary with the fortunes of the firm from time to time.

112. The AER has expressed its agreement with the notion that required returns on equity must logically be greater than required returns on debt:

> The AER agrees that, given the residual risk resulting from greater uncertainty of cash flows borne by equity holders, economic reasonableness would imply that the cost of equity would be greater than the cost of debt. Accordingly, to ensure that service providers are provided with a reasonable opportunity to recover efficient costs the regulatory return on equity should be greater than the regulatory cost of debt.[49]

113. Next, we note that the estimates of the debt risk premium are more direct than the estimates of beta and market risk premium. In particular, the ERA's approach is to estimate the debt risk premium from an analysis of the returns (yields) available on a specific set of traded bonds where these returns are effectively directly observable in financial markets. By contrast, beta and MRP are notoriously difficult to estimate given the statistical noise in the available data.

114. The conclusion from this analysis is that an equity beta estimate of 0.8 produces an estimate of the required return on unlevered equity that is lower than the directly observable return to the debt in the same firm, which is impossible. This implies that the equity beta estimate of 0.8 fails this test of economic reasonableness and commercial plausibility.

115. Moreover, an equity beta estimate that produces an estimate of the required return on unlevered equity that is lower than the directly observable return to the debt in the same firm is inconsistent with the whole regulatory framework. The WACC framework is based on the optimal capital structure being 60/40 mix of debt and equity funding. But it would be quite irrational for a firm to employ any debt at all if it could finance the entire firm with equity at a lower cost – and this is what a beta estimate of 0.8 implies.

Implied required return on equity materially lower than the return available from comparable firms

Use of current and forecasted dividend yields

116. An important consideration when determining whether a proposed regulatory return on equity, r_e, is economically reasonable and commercially plausible is a comparison between that allowed regulatory return on equity and the return on equity that investors might reasonably expect to receive from comparable firms. If the reasonably expected return on equity in the comparable firms is materially higher than the allowed return on equity for the regulated firm, there must be questions about the reasonableness of the regulatory estimate (and the individual parameter estimates that led to it) and whether that regulatory estimate is commensurate with prevailing conditions in the market.

117. To determine the return on equity that investors might reasonably expect to earn from comparable firms, we begin by examining the research reports of equity analysts that are produced for market participants.

[49] AER Review of WACC Parameter Estimates, Final Decision, p.42.

118. Table 5 below summarises the most recent dividend yield forecasts by firm and year. Each cell contains the average dividend yield forecast across equity analysts in the sample.

Table 5. Average dividend yield by firm and year

	2011	2012	2013	Average
APA	8.46	8.87	9.30	8.88
DUE	11.94	12.01	12.03	12.00
ENV	9.56	9.56	9.63	9.59
HDF	6.36	6.48	6.39	6.41
SKI	8.02	8.16	8.35	8.18
SPN	9.00	9.20	9.40	9.20
Average	8.87	9.02	9.14	9.01

Source: Various broker research reports.

119. From Table 5 we conclude that 9% is a reasonable estimate of the dividend yield available from this set of comparable firms.

120. We have also obtained consensus (average) analyst forecasts of distributions (expressed in cents per unit) compiled by Morningstar. These estimates are set out in Table 6 below, which indicates that distributions are expected to increase for all companies in the set of comparable firms. That is, investors who buy shares in the comparable firms today can reasonably expect to receive dividends over the coming year that will be sufficient to provide a yield of approximately 9%. The dividends that are expected to be paid in subsequent years are even higher, thereby providing a yield above 9% relative to today's stock price. In summary, this table establishes that the dividends that investors might reasonably expect to receive are sufficient to provide a yield of 9% or above, relative to the current stock price, for the foreseeable future.

Table 6. Consensus distribution payments by firm and year

	2011 (cents per unit)	2012 (cents per unit)	2013 (cents per unit)
APA	34.3	36	37.6
DUE	20	20.5	21.2
ENV	5.5	5.5	5.7
HDF	12	13.5	
SKI	9.1	9.6	
SPN	8.1	8.1	8.6

Source: Morningstar, 25/02/2011

121. In summary, we conclude that the best currently available estimate of the dividend yield available on comparable firms is 9% p.a. and that there is no indication of an expected decline in dividends for any of the comparable firms.

Reasonable expectation of return on equity from comparable firms

122. If investors expect a dividend yield of 9% (on average) from comparable firms, and if the expected return in the form of capital gains is considered to be in the range of 2.5% to 3.5% p.a., this amounts to a combined return on equity in the range of 11.5% to 12.5% from comparable firms. We note that the 2.5% to 3.5% nominal capital gain is consistent with share prices just maintaining their real value, and was used by the AER in the Envestra Draft Decision as part of the AER's calculation of "the most appropriate return on equity that can be derived from analyst

reports." [50] Consequently, when determining whether a proposed allowed return on equity is commensurate with current conditions in the market for funds, one important consideration is the 11.5% to 12.5% return on equity that investors might reasonably expect to able to obtain on equity investments in comparable firms.

Adjustment for assumed value of franking credits

123. When comparing the allowed return on equity from the DBP Draft Decision (the most recent relevant decision of the ERA) with the return on equity that can reasonably be expected from comparable firms, it is important to ensure that the comparison is performed on a like-with-like basis. In particular, the 11.5% to 12.5% range consists of dividends and capital gains only, whereas the regulatory allowed return also includes an assumed value of franking credits. Specifically, the component of the regulatory return on equity that is due to dividends and capital gains only, using parameter estimates from the DBP Draft Decision, is:

$$r_e \frac{1-T}{1-T(1-\gamma)} = 10.26\% \frac{1-0.3}{1-0.3(1-0.53)} = 8.4\%.$$

124. The derivation of this formula appears in Officer (1994). Appendix 1 to this report demonstrates that it is perfectly consistent with the way that the assumed value of franking credits is used to adjust the return to equity holders under the National Electricity Rules, National Gas Rules and the AER's Post-tax Revenue Model.

Conclusions

125. The allowed return on equity in the DBP Draft Decision provides equity holders in the benchmark firm with a return of 8.4% from dividends and capital gains. This can be compared with an allowed return from dividends and capital gains, from comparable firms, of 11.5% to 12.5%.

126. Logically, there are three possible reasons for such a divergence between the regulatory estimate of the return on equity and the return that investors might reasonably expect from comparable firms:

    a. The regulatory estimate is too low because the regulator has adopted estimates of beta or MRP (or both) that are too low; or

    b. The regulatory estimate is too low because the regulator has relied on the CAPM and even with the best possible input parameter estimates:

        i. The CAPM systematically under-estimates the required return for firms such as the benchmark firm, and/or

        ii. The CAPM under-estimates the required return for firms such as the benchmark firm in the current market circumstances; or

    c. Our estimate of the return that investors would reasonably expect from comparable firms is too high.

[50] Envestra Draft Decision, p. 260.

127. That is, there is a divergence between the two estimates either because the regulatory estimate is too low, or because the market-based estimate is too high. There are a number of reasons to support the conclusion that the market-based estimate is not too high:

    a. As set out in Section 3 below, our conclusions remain unchanged if we use current observed dividends rather than equity analyst forecasts. Investors will receive a return of 9%, on average, if the comparable firms are simply able to maintain the dividends that they currently pay, and there is no evidence to suggest that they will be unable to do this; and

    b. As set out in Appendix 2 below, we have adopted a conservative estimate of future capital gains that the AER has recently adopted in its calculations of "the most appropriate return on equity that can be derived from analyst reports."[51]

128. Consequently, if the market-based estimate is not too high, the conclusion must be that the regulatory estimate is too low to be commensurate with current conditions in the market for funds. Specifically, if the regulatory estimate of equity beta is reduced and this results in an allowed return on equity that is materially below the return that would reasonably be expected from comparable firms, it follows that the reduction in the equity beta estimate has resulted in an allowed return on equity that is not commensurate with the prevailing conditions in the market for funds.

Response to previous regulatory comment

129. We note that some of the issues in this section of the report have been raised in the context of other regulatory proceedings. Specifically, we have previously prepared a report in relation to the Dampier to Bunbury Natural Gas Pipeline addressing similar issues with respect to the estimation of the return on equity that is commensurate with prevailing conditions in the market for funds:

    SFG, 2010, "The required return on equity commensurate with current conditions in the market for funds," 31 March 2010. (**DBP report**).

130. A response to that report appears in the recent DBP Draft Decision:

    Economic Regulation Authority (2011), "Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline," 14 March 2011, www.erawa.com.au. (**DBP Draft Decision**).

131. We have also prepared a report that traverses similar issues for Envestra as part of the regulatory review of its gas networks by the AER:

    SFG, 2010, "The required return on equity commensurate with current conditions in the market for funds," 27 September 2010. (**Envestra report**).

132. A response to that report appears in the recent Envestra Draft Decision:

    Australian Energy Regulator (2011), "Draft Decision: Envestra Ltd: Access arrangement proposal for the SA gas network: 1 July 2011 – 30 June 2016," February, www.aer.gov.au. (**Envestra Draft Decision**).

[51] Envestra Draft Decision, p. 260.

133. Our responses to the comments on this approach in the DBP and Envestra Draft Decisions are set out in Appendix 2 and Appendix 3, respectively. Notwithstanding the comments and reasons set out in those decisions, investors could reasonably expect to receive a materially higher return from comparable firms than from the benchmark regulated firm – even if the comparable firms are only just able to maintain the level of dividends that they are currently paying.

For non-resident investors the implied return on equity is materially lower than the implied return on debt

134. As set out in the previous sub-section, the parameter estimates adopted by the ERA in its recent DBP Draft Decision imply that the required return on equity in the form of dividends and capital gains is 8.4%, with an assumed return of 1.86% coming in the form of dividend imputation franking credits. These components together provide the required 10.26% return to equity holders.

135. Of course, non-resident investors receive no benefit from franking credits, so the return on equity available to them is 8.4%. But in the same DBP Draft Decision, the required return on debt was set at 8.71%. This implies that non-residents are willing to supply equity capital at a lower cost than debt capital. But, for the reasons set out above, it is implausible that any group of investors would require a lower return on equity than on debt in the same firm.

Conclusions

136. As set out above, the move from the default equity beta estimate of 1.0 to the revised estimate of 0.8 should only be made if:

a. Appropriate analysis of the available data suggested that a move away from the default of 1.0 is warranted; and

b. The resulting equity beta value results in an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

137. In this section of the report we address the second of the two elements set out above and conclude that the regulatory estimate of 0.8 is economically unreasonable and commercially implausible. The reasons for this conclusion include:

a. The regulatory estimate is based on the mean beta estimate from approximately five comparable firms. When this approach is applied to other industries, it produces estimates that vary so wildly over time that those estimates cannot possibly be a reliable reflection of systematic risk;

b. An equity beta estimate of 0.8 produces an estimate of the required return on unlevered equity that is lower than the directly observable return to the debt in the same firm, which is impossible;

c. An equity beta estimate that produces an estimate of the required return on unlevered equity that is lower than the directly observable return to the debt in the same firm is inconsistent with the whole regulatory framework. The WACC framework is based on the optimal capital structure being 60/40 mix of debt and equity funding. But it would be quite irrational for a firm to employ any debt at all if it could finance the entire firm with equity at a lower cost – and this is what a beta estimate of 0.8 implies;

d. The regulatory estimate of equity beta produces an allowed return on equity that is materially below the return that would reasonably be expected from comparable firms; and

e. The regulatory estimate of equity beta implies that non-residents are willing to supply equity capital at a lower cost than debt capital.

5. Implications of setting equity beta to 1.0

138. In previous sections of this report we concluded that an equity beta of 0.8 or lower is economically unreasonable and commercially implausible. In this section, we examine the reasonableness and plausibility of the default equity beta estimate of 1.0. Table 7 below sets out a number of comparisons based on different sets of WACC parameters. In particular, the table sets out three key comparisons:

    a. The allowed return on equity is compared with the return on equity that is available from comparable firms. A return on equity that is materially lower than the return that is available on comparable firms cannot be considered to be a return that is commensurate with the commercial risks involved or to be sufficient to attract the required amount of capital, given the prevailing conditions in the market.

    b. The unlevered return on equity is compared with the return available on debt. An estimate of the required return on equity that is less than the estimate of the required return on debt in the same firm is implausible given the relative risks involved in equity and debt investments. Moreover, a return on unlevered equity that is less than the return on debt implies that the firm could reduce its cost of capital by employing 100% equity finance, which is inconsistent with the assumed capital structure of 60% debt.

    c. The return on levered equity (to 60% gearing) that is available to non-resident investors is compared with the return available on debt in the same firm. However, it is implausible that any group of investors would require a lower return on levered equity than the return on debt that is available to them from the same firm.

139. Column A is based on a recent estimate of the risk-free rate, equity beta of 0.8, and MRP and gamma set to values recently adopted by the ERA. This column establishes that the set of parameter estimates are jointly implausible because:

    a. The allowed return on equity is materially below the return that investors might reasonably expect to receive from comparable firms;

    b. The implied return on unlevered equity is lower than the observable return on debt in the same firm; and

    c. The return on equity available to non-resident investors is lower than the return on debt available to those same investors.

Table 7: Implications of different equity beta estimates

Column	[A]	[B]	[C]	[D]	[E]
Risk free rate	5.2%	5.2%	5.2%	5.2%	5.2%
MRP	6%	6%	6%	6%	7%
Equity beta	0.8	0.8	1	1	1
Gamma	0.53	0.25	0.53	0.25	0.25
Allowed return on equity	10.0%	10.0%	11.2%	11.2%	12.2%
Return available from comparable firms	11.5-12.5%	11.5-12.5%	11.5-12.5%	11.5-12.5%	11.5-12.5%
Un-levered return on equity	7.1%	7.1%	7.6%	7.6%	8.0%
Return available on debt	8.38%	8.38%	8.38%	8.38%	8.38%
Return on equity to non-resident investors	8.15%	9.03%	9.13%	10.12%	11.02%
Return available on debt	8.38%	8.38%	8.38%	8.38%	8.38%

140. Table 7 demonstrates that the implausible implications of an equity beta of 0.8 are effectively removed when an equity beta of 1.0 is adopted. In particular, Column [E] shows that the allowed return on equity is within the range of returns available from comparable firms, the implied unlevered return on equity is close to the return on debt, and the return on equity available to non-resident investors is above the return on debt.

141. In our view, 1.0 remains an appropriate point estimate for the equity beta of an electricity transmission and distribution businesses with 60% gearing. Estimates of 0.8 and below fail the tests of reasonableness and plausibility. Symmetrically, estimates well above 1.0 imply implausibly high returns on equity. Consequently, our view is that 0.9 to 1.1 provides a reasonable range for the equity beta of a benchmark electricity transmission and distribution business with 60% gearing.

142. Table 8 below sets out estimates for the proposed equity beta range of 0.9 to 1.1. Estimates of equity beta within this range produce estimates of equity returns that are generally reasonable in terms of the three comparisons that are set out above. Of course it is not possible, nor is it intended, to use these comparisons to reverse-engineer precise point estimates of the lower and upper bounds of a reasonable range. Rather, these tests are used as checks of reasonableness and plausibility. As such, the conclusion that can be drawn from these checks is that an equity beta range of 0.9 to 1.1 produces estimates of the required return on equity that are generally plausible and economically reasonable.

Table 8: Implications of different equity beta estimates – Proposed reasonable range

Column	[A]	[B]
Risk free rate	5.2%	5.2%
MRP	7%	7%
Equity beta	0.9	1.1
Gamma	0.25	0.25
Allowed return on equity	11.5%	12.9%
Return available from comparable firms	11.5-12.5%	11.5-12.5%
Un-levered return on equity	7.7%	8.3%
Return available on debt	8.38%	8.38%
Return on equity to non-resident investors	10.39%	11.65%
Return available on debt	8.38%	8.38%

6. Conclusions and recommendations

Range for benchmark efficient transmission and distribution business

143. Our conclusions are as follows:

a. The default, and previously adopted, equity beta estimate is 1.0;

b. One would only move from this default position to the extent that:

i. Appropriate analysis of the available data suggested that a move away from the default of 1.0 was warranted; and

ii. The resulting equity beta value resulted in an estimate of the required return on equity that is economically reasonable and commercially plausible in the circumstances.

c. The current regulatory estimate of equity beta is 0.8, however that estimate:

i. Is statistically unreliable and that proper analysis of the available data does not warrant a move away from the default value of 1.0; and

ii. Produces an estimate of the required return on equity that is economically unreasonable and commercially implausible in the circumstances,

and consequently the regulatory estimate of 0.8 does not produce a regulatory return that is commensurate with the commercial risks involved or sufficient to attract the required amount of capital, given the prevailing conditions in the market.

d. By contrast, the default and previously adopted estimate of 1.0 produces an estimate of the required return on equity that is economically reasonable and commercially plausible.

144. In our view, 1.0 remains an appropriate point estimate for the equity beta of an electricity transmission and distribution businesses with 60% gearing. Estimates of 0.8 and below fail the tests of reasonableness and plausibility. Symmetrically, estimates well above 1.0 imply implausibly high returns on equity. Consequently, our view is that 0.9 to 1.1 provides a reasonable range for the equity beta of a benchmark electricity transmission and distribution business with 60% gearing.

Issues specific to Western Power

145. In most respects the Western Power transmission and distribution businesses are comparable to the benchmark efficient business that underlies the AER's analysis and estimates. One key point of difference is that the Code contains a New Facilities Investment Test (**NFIT**) that must be satisfied before new investment can be included in the asset base. In effect, the regulator must perform an ex-post assessment of the efficiency of capital expenditure. Consequently, there is a risk to investors that some capital expenditure will be disallowed and no return will be generated from it. The ERA has previously acted to reduce the proposed opening capital base for the Southwest Interconnected Network (**SWIN**) under this provision. Comparable entities regulated under the National Electricity Rules (**NER**) face no such risk.

146. In summary, it is clear that investors in the SWIN face a risk that investors in comparable entities regulated under the NER do not face. This risk must be addressed in some manner within the regulatory framework. In this regard, we note that the AER is of the view that risks related to an ex-post review of the efficiency of capital expenditure is systematic in nature and affects the appropriate estimate of equity beta:

> The regulatory regime for electricity transmission and distribution network service providers includes design features such as [t]he rolling forward of the service provider's RAB, rather than the re-valuing or re-optimisation of the RAB at each reset. Under the ex-ante regime actual capex is rolled into the RAB, without any ex post prudency assessment. This approach means that at the end of each regulatory period a benchmark efficient NSP's prices and / or revenues are adjusted back to reflect their underlying cost base. This means that any increase in costs from forecast due to changes in GDP (which may affect the growth in peak demand), or from changes in commodity prices are automatically rolled into the RAB. The AER considered this was highly likely to reduce exposure to systematic risk compared with the market in general.[52]

147. Of course it is impossible (due to lack of empirical data) to obtain a reliable measurement of the amount by which the NFIT might affect estimates of equity beta. What is clear, though, is that:

    a. The AER is of the view that the NFIT acts to increase equity beta; and

    b. The operation of the NFIT is a risk to investors that must be addressed somewhere in the regulatory determination.

148. In summary, our view is that 0.9 to 1.1 provides a reasonable range for the equity beta of a benchmark electricity transmission and distribution business with 60% gearing. While we are not aware of any arguments to suggest that the equity beta estimate for the SWIN should be lower than that of the benchmark firm regulated under the NER, we note that the AER's interpretation of the NFIT suggests that it should be higher. In our view, an equity beta range of 0.9 to 1.1 meets the requirements of the Code.

[52] AER, Final Decision, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters, May 2009, page 248-249.

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Appendix 1: Consistency between cash flow and discount rate adjustments for gamma

149. The following calculations set out the ERA's implementation of the building block approach under the National Electricity Rules (**Rules**). The point of this exercise is to show that the adjustment in relation to franking credits that is required under the Rules is equivalent to the adjustment to the discount rate in Paragraph 122 above. For ease of exposition, we present all calculations in nominal terms and we adopt the ERA's parameter estimates from its recent DBP Draft Decision. We note that the practice of the ERA is to model returns on a pre-tax real basis by making the appropriate adjustments to a post-tax nominal WACC that is estimated in the manner set out in Paragraph 122 above. This appendix shows that the formula set out in Paragraph 122, the approach adopted by the ERA, and the post-tax revenue model of the AER are all entirely consistent.

150. Rule 6.5.2(b) requires the use of the CAPM to estimate the required return on equity. In the DBP Draft Decision, the ERA implemented the CAPM as follows:

$$\begin{aligned} k_e &= r_f + \beta \times MRP \\ &= 5.46\% + 0.8 \times 6.0\% = 10.26\%. \end{aligned}$$

151. Rule 6.5.2(b) also requires that the required return on debt is to be calculated by adding a debt risk premium to the risk-free rate. In the DBP Draft Decision, the ERA implemented of this step as follows:

$$\begin{aligned} k_d &= r_f + DRP \\ &= 5.46\% + 3.25\% = 8.71\%. \end{aligned}$$

152. Rule 6.5.2(b) also requires the rate of return to be computed according to the nominal post-tax WACC formula that is usually called the "vanilla" WACC. In the DBP Draft Decision, the ERA's implementation of this step was as follows:

$$\begin{aligned} WACC &= k_e \frac{E}{V} + k_e \frac{D}{V} \\ &= 10.26\% \times 0.4 + 8.71\% \times 0.6 = 9.33\%. \end{aligned}$$

153. Consider a generic benchmark firm with initial RAB of 1,000. Consequently, the cash flow that must be available to provide a return to investors over the first year of the regulatory control period is:

$$9.33\% \times 1{,}000 = 93.3.$$

154. The amount of equity financing is 40% of the RAB, or 400. The return to equity holders is computed by multiplying the amount of equity by the required return on equity:[53]

$$10.26\% \times 400 = 41.0.$$

[53] The amount of debt financing is 60% of the RAB, or 600. The return to debt holders is computed by multiplying the amount of debt by the required return on debt: $8.71\% \times 600 = 52.3$. Note that the return to equity plus the return to debt is equal to the total required return from applying the aggregated WACC to the RAB, as above: $41.0 + 52.3 = 93.3$.

155. Rule 6.5.3 requires the estimated cost of corporate tax to be computed as a function of the pre-tax income, the corporate tax rate (30%), and the ERAs assumed value of gamma (0.53) from the DBP Draft Decision.

156. In the absence of certain firm-specific complexities,[54] the firm's pre-tax income is computed as:

$$ETI = \frac{\text{Total Return to Equity}}{(1 - r(1-\gamma))} = \frac{41.0}{(1 - 0.3(1-0.53))} = 47.7$$

157. Rule 6.5.3 is then implemented as follows:[55]

$$\begin{aligned} ETC_t &= (ETI_t \times r_t)(1-\gamma) \\ &= (47.7 \times 0.3)(1-0.53) = 6.7. \end{aligned}$$

158. Rule 6.4.3 provides that the annual revenue requirement is to be computed as the sum of a number of "building block" components. For this illustration, we assume that regulatory depreciation is 50 and operating expenses are 100. We note that the choice of values for these two elements is irrelevant to the calculations being performed below as they simply wash out of the analysis – whatever these costs are, the revenue requirement is simply increased to accommodate them and the pre-tax profit, tax paid, and assumed value of franking credits is unchanged. The implementation of Rule 6.4.3 is then as follows:[56]

Return on Equity		41.0
Return on Debt		52.3
Regulatory Depreciation		50
Operating Expenses		100
Tax Payable	14.3	
Less Value of Imputation Credits	-7.6	6.7
Annual Revenue Requirement		250.0

159. Note that the estimated cost of corporate tax (6.7 in the last two rows of the table above) is *added* here and has the effect of *increasing* the annual revenue requirement. That is, annual revenues must be sufficient to pay the expected tax cost.

160. Now consider the equity holders, who are entitled to the residual cash flow, after all expenses have been met. The cash flow to equity holders is set out in the following table:

Total revenue	250.0
-Interest to debt holders	52.3
-Regulatory Depreciation	50
-Operating Expenses	100
-Corporate tax	14.3
Cash flow to equity	33.4

[54] Such as a difference between tax and regulatory depreciation, and customer contributions that are outside the regulatory framework except for the effect they have on tax paid.

[55] The PTRM sets this out as the difference between corporate tax payable and the assumed value of franking credits. In this case, corporate tax payable is pre-tax income multiplied by the corporate tax rate $47.7 \times 0.3 = 14.3$ and the assumed value of franking credits is equal to the amount of tax paid (which is also the amount of franking credits created) multiplied by the assumed value of gamma $14.3 \times 0.53 = 7.6$ in which case the expected tax cost is $14.3 - 7.6 = 6.7$.

[56] Note that some items may not add exactly due to rounding.

161. That is, the equity holders receive the residual cash flow of 33.4. In addition, the firm pays corporate tax of 14.3, which creates franking credits with a face value of 14.3. Each of these franking credits is assumed to be worth 53% of its face value, giving a total value of $0.53 \times 14.3 = 7.6$. The total return to equity holders is then:

$$\begin{aligned}\text{Return to Equity} &= \text{Residual Cash Flow} + \text{Assumed Value of Franking Credits} \\ &= 33.4 + 7.6 = 41.0.\end{aligned}$$

162. Consequently the proportion of the total return to equity that is assumed to be delivered in the form of franking credits is:

$$\frac{\text{Assumed Value of Franking Credits}}{\text{Return to Equity}} = \frac{7.6}{41.0} = 18.5\%.$$

163. Non-resident investors do not benefit from franking credits. Consequently, they receive only the 81.5% of the return to equity that is provided by means other than franking credits. This means that the return on equity available to non-resident investors is:

$$0.815 \times 10.26\% = 8.36\%.$$

164. Note that the return available to non-resident investors (or the return available from dividends and capital gains) here is:

$$k_e \frac{1-T}{1-T(1-\gamma)} = 0.1026 \times \frac{1-0.3}{1-0.3(1-0.53)} = 8.36\%,$$

exactly as set out in Paragraph 122 above.

165. In summary, this appendix shows that the formula set out in Paragraph 122, the approach adopted by the ERA, and the post-tax revenue model of the AER are all entirely consistent.

Appendix 2: Response to AER Envestra Draft Decision

166. The AER's recent Envestra Draft Decision[57] identifies four key points in rejecting the use of equity research analyst reports as a cross-check for whether the regulator's estimate of the required return on equity (which is based on the regulator's estimates of input parameters) is commensurate with the prevailing conditions in the market for funds, and consequently whether it passes the regulatory test.[58] This section addresses each of those points in turn.

Use of broker research forecasted price targets

167. Equity research analysts from broking houses produce research reports on individual firms on a regular basis. These research reports contain many pieces of information including a forecast of the dividend yield of the particular firm for each of the following three to four years, and a 12-month forecast of the firm's stock price. The forecasted dividend yields provide a useful estimate of market expectations, but that for various reasons one should *not* rely on the 12-month price forecasts, except to note that no analysts were expecting a price decline in any of the set of comparable firms.[59] In our report in relation to the Envestra Review, we concluded that:

> …we place little weight on the forecasts of price appreciation other than to note that they are uniformly positive on average. That is, the equity research analysts are of the view that the stock prices of the comparable firms will be increasing over time. This implies that the return in the form of dividends (i.e., the dividend yield forecasts above) must be considered to be an absolute lower bound for the return available to shareholders in the comparable firms – shareholders will receive the dividend yield and there is expected to be some stock price appreciation in addition to that.[60]

168. Our Envestra Report goes on to propose that, rather than adopt the price forecasts set out in broker research reports, we use a conservative estimate of stock price appreciation. This is in keeping with the purpose of the analysis – to determine whether the return on equity allowed by the regulator is reasonable in light of conservative estimates of the returns available to equity investors in other comparable assets. In this regard, we concluded that:

[57] Envestra Draft Decision, pp. 258-263.
[58] As noted above, National Electricity Rule 6.5.2 (b), read in conjunction with Rule 6.5.4 (e)(1) imposes an equivalent requirement to National Gas Rule 87(1).
[59] See paragraph 28 of our earlier DBP report.
[60] SFG (2010), Paragraph 42.

> Rather than extrapolating the forecasted one-year stock price appreciation forward through time, we consider a very conservative range of 0-1% for real stock price appreciation. Note that under standard long-term equity valuation models, the growth rate in stock prices is the same as the growth rate in dividends. Consequently, the range of 0-1% real can be thought of as a growth rate in stock prices or dividend payments. The lower end of this range reflects no real growth in which case stock prices and dividends would only increase to keep pace with inflation. The upper end of the range reflects growth of only 1% real, which can be compared with forecasted real growth of 2.5 to 3.5% across the broad economy. [OECD Economic Outlook, http://www.oecd.org/dataoecd/7/0/20209193.pdf, GDP growth forecasts for 2010 and 2011 are 2.5% and 3.5% respectively.] [61]

169. In its Envestra Draft Decision (pp. 258-259), the AER also sets out some reasons why broker price forecasts should not be relied upon for the purpose of testing the allowed return on equity against returns available on comparable investments. These reasons largely mirror those set out in our Envestra report. However, the Draft Decision then concludes that the SFG Envestra report has erred in its reliance on broker price forecasts, concluding that:

> Overlooking this mispricing component is a further shortcoming of SFG's analysis.[62]

170. However, the SFG Envestra report clearly does *not* rely on broker price forecasts, but rather substitutes very conservative estimates of future price appreciation.

171. Moreover, the AER itself uses the SFG conservative estimates of future price appreciation (2.5% to 3.5% nominal) in determining what it considers to be:

> …the most appropriate return on equity that can be derived from analyst reports…[63]

172. In summary, the AER Draft Decision and the SFG Envestra report are in perfect harmony in adopting a conservative estimate of 2.5% to 3.5% nominal stock price appreciation for the set of comparable firms.

173. The SFG Envestra Report does *not* rely on broker price appreciation forecasts, so there can be no "shortcoming" in that regard, notwithstanding any suggestion to the contrary.

Impact of stapled security structure

Background and context

174. The Envestra Draft Decision notes that some of the securities in the set of comparable firms are stapled securities rather than ordinary shares and that the estimated dividend yield requires some adjustment:

[61] SFG (2010), Paragraph 29.
[62] Envestra Draft Decision, p. 259.
[63] Envestra Draft Decision, p. 259.

> …the AER notes that the 10.5 per cent dividend is upward biased due to it being partially composed of a return of capital (depreciation) component.[64]

175. In this regard, the Envestra Draft Decision quotes a passage from Davis (2010):

> To the extent that this is the case, the capital component of those payments should be deducted from the "dividend" in performing the calculation… it is not apparent that for many such entities these are estimates of dividends *per se* as opposed to estimates of distributions which encompass dividends, interest payments on loan and returns of capital.[65]

176. The particular passage from Davis (2010) is in the context of the use of the dividend discount model rather than the SFG comparables analysis, but the point is potentially relevant to both. However, the returns of capital within a stapled structure have no bearing on any of our conclusions – what is relevant is the total distribution to equity holders, and the likely maintenance of that distribution into the future, as set out below.

177. The details of the securities in the set of comparable firms are as follows:

a. Envestra securities now trade as ordinary shares. The loan notes that were previously part of a stapled structure have been repaid. Consequently any forecasted dividends are standard dividends paid on ordinary shares;

1. A number of firms in the set of comparables trade as stapled securities whereby a number of units in different companies and trusts are stapled together. For example, a security in SP Ausnet consists of one share in SP Ausnet Transmission Limited, one share in SP Ausnet Distribution Limited and one unit in SP Ausnet Finance Trust. This kind of security is a collection of equity investments in a number of different business units and should consequently be considered to be an equity investment. Indeed one could think of any shares in a multi-divisional firm to be effectively the same as such a stapled equity security. For example, a share in Wesfarmers is effectively a stapled security consisting of equity in Coles, equity in Bunnings, equity in Office Works, and so on. Securities in APA Group, DUET and HDF have a similar structure. One difference between a stapled security/trust structure and ordinary shares is the technical form of payments in excess of profits in a particular year. Dividends can be paid to shareholders out of profits generated in the current financial year and out of retained profits generated in earlier years. For a trust structure, a "dividend" can only be paid out of current year trust income. Any distribution of non-assessable income, such as a distribution of free cash flow in excess of accounting profit is treated as a return of capital under CGT event E4.[66] The key point here is that all of the trust structures in the set of comparable firms intend the aggregate distribution to equity holders to be maintained or increased for the foreseeable future. There is no intention, suggestion, or need for a decline in distributions in the future; and

2. Spark Infrastructure trades as a stapled security consisting of a unit in the Spark Infrastructure Trust and a loan note. For this firm also there is no suggestion that the

[64] Envestra Draft Decision, p. 259.
[65] Envestra Draft Decision, p. 260.
[66] Income Tax Assessment Act 1997 (Cth), s 104-70(1).

aggregate distribution to equity holders would not be maintained or increased for the foreseeable future. Also, the removal of this firm from the set of comparables would not change any of our conclusions.

178. In summary, a number of the comparable firms are structured as trusts rather than companies, but this does not affect the fact that equity holders can reasonably expect that the current level of distributions will be maintained or increased over the foreseeable future.

Maintenance or growth of future distributions to equity holders

179. Even for those companies that do have stapled securities that include loan notes, it is unlikely that any adjustment would be required for the purpose at hand. What is required here is an estimate of the future dividends that an owner of the security could reasonably expect to receive. Over time, the capital of the loan note will be repaid. But this does not imply that the annual distribution to owners will fall materially when the loan note is repaid. Consider, for example, a stapled security that consists of one share and a 10% loan note with capital balance of 20 cents. Suppose the firm generates distributable cash flows of 25 cents per year. Also suppose that in one year it pays a dividend of 12 cents, interest of 2 cents and a capital return of 10 cents. In the next year the firm pays a dividend of 13 cents, interest of 1 cent and a capital return of 10 cents. At this point the loan note is fully repaid. The following year, the company may pay all of its distributable cash flows as a dividend of 25 cents. Over this period, the assets of the firm have stayed the same and have generated the same cash flows. Also, the security holder continues to receive the same total distribution.

180. The important issue for the purpose at hand is whether equity investors in the comparable firms might reasonably expect distributions to be maintained, increased or materially decreased sometime in the future. The firms in the set of comparables are well known to be high-yielding companies with stable dividends that appeal to "yield investors" such as retired individuals and some superannuation funds. The management of these companies are acutely aware of their investor bases and seek to provide stable and growing distribution streams into the future. For example:

181. For many years APA group has articulated its goal of increasing dividends by at least the level of inflation. In 2006, APA defined this to be their primary strategic goal:

> Our growing asset base further underpins our strong cash flows, enabling us to deliver on our primary strategic goal, to increase distributions to unit holders by at least CPI annually.[67]

182. By 2009, APA had adopted a higher and more specific growth target:

> The board has adopted financial goals which closely reflect APA's strategic goals, the foundation of which is increasing security holder distributions annually by at least 5% over the cycle.[68]

183. APA re-affirmed this growth target, and noted its past success in achieving it, in its 2010 Annual Report:

[67] APA 2006 Annual Report, Chairman's Report, p. 2.
[68] APA 2009 Annual Report, p. 46.

> We declared a final distribution for the year of 17.0 cents per security taking the total distribution for the year to 32.75 cents, an increase of 5.6% on last year. This represents APA's sixth consecutive year of increasing distributions…Since listing in 2000, APA has delivered a 5% compound annual growth rate on its distribution…APA's ongoing distribution policy balances the group's need to retain equity in the business to support the funding of its growth prospects whilst also increasing returns to security holders by, on average, at least 5% per annum over the medium term. Barring unforeseen circumstances, APA expects that this distribution increase will be maintained for the 2011 financial year. [69]

184. Similarly, DUET's annual report for at least the last four years has stated that its objective is:

> to provide stable and predictable distributions for security holders and fund these distributions from operating cash flows. [70]

185. HDUF is also clear about its intention and ability to maintain a stable flow of distributions to investors:

> The ability of the Fund to provide stable ongoing distributions to Security Holders is supported to a significant extent by long term gas haulage contracts entered into with customers. [71]

186. In its most recent annual report, Envestra is also clear in relation to the returns that its investors should expect, in stating its objective of:

> achieving long-term (pre-tax) annual returns to…shareholders (including distributions and capital gains) of at least 12.5%.[72]

187. In summary, it is clear that the firms in the set of comparables have every intention of maintaining or increasing the flow of distributions to equity holders.

Proposed adjustment in Envestra Draft Decision

188. The Envestra Draft Decision proposes that an adjustment should be made to deduct from the forecasted dividend yield the amount that relates to any return of capital so that the balance "reflects pure return expectations." [73] The Envestra Draft Decision concludes that a downward adjustment of 5.5% should be applied to the forecasted dividend yield of 10.5% to produce a pure return expectation of 5%. The Envestra Draft Decision provides no details of the AER's calculation of the 5.5% downward adjustment other than to note that it is the outcome of "AER analysis" and is said to be an estimate of "the difference in yield forecast and the maximum yield attributed to profits." [74] There are a number of problems with this calculation:

    a. The details of the calculation have not been provided, so it is impossible to verify;

[69] APA 2010 Annual Report, Chairman's Report, pp. 8-9.
[70] DUET Annual Reports, 2007-2010, p. 1.
[71] Hastings Diversified Utilities Fund, Annual Report, 2009, p. 5.
[72] Envestra Annual Report, 2010, p. 12.
[73] Envestra Draft Decision, p. 260.
[74] Envestra Draft Decision, p. 260, Footnote 10.

b. It appears as though the calculation uses data from firms that have either no return of capital or no loan note interest as part of their distributions, in which case it cannot represent an estimate of an adjustment in relation to the payment of a return of capital and loan note interest;

c. In any event, the difference between forecasted dividends and profits does not provide an estimate of the future distributions that equity holders in the six comparable companies should reasonably expect. If it did, the statements made by the firms in their annual reports (as set out above) must be grossly misleading; and

d. The economic implications of the proposed adjustment are implausible. The Envestra Draft Decision's conclusion is that the most appropriate way to interpret a set of analyst reports that forecast dividend yields of 10.5% is that the forecasted dividend yield is 5%. In our view, no reasonable person could interpret the set of analyst reports as indicating that a reasonable expectation of the dividend yield on these comparable firms is 5%.

189. For the reasons set out above, we conclude that the adjustment technique proposed in the Envestra Draft Decision[75] should be given no weight.

Purpose of analysis

190. At this point it is useful to reconsider the purpose of this analysis. It is clear that the CAPM is unable to correct poorly estimated parameter inputs. Consequently, it is important to test the output of the model (i.e., the estimated required return on equity) for economic reasonableness – not as a test of the model, but as a check of whether a particular set of input parameter estimates produces an output that is reasonable. If the output is considered to be unreasonable, one should be led to re-examine one or more of the parameter input estimates, especially those parameters that are known to be estimated with a high degree of statistical imprecision.

191. One key test of whether the output estimate of the required return on equity is economically reasonable is a comparison with the return on equity that investors might reasonably expect to earn from other comparable firms. That is, a potential investor can either contribute equity capital to the benchmark firm or buy shares in a comparable listed firm. If the reasonably expected return on equity in the comparable firms is materially higher than the allowed return on equity for the regulated firm, there must be questions about the reasonableness of the regulatory estimate (and the individual parameter estimates that led to it) and whether the regulatory estimate is commensurate with prevailing conditions in the market.

192. This then leads to the question of what return a reasonable investor might reasonably expect to receive from an investment in a comparable firm. In this regard, the evidence from a range of research reports from equity analysts is that:

a. Investors can reasonably expect to receive a return from comparable firms of 9% p.a. by way of dividends alone;

b. There is no suggestion of any expected future decline in the amount of dividends paid on each share; and

c. There is no suggestion of any expected future decline in the share price.

[75] Envestra Draft Decision, p. 260.

193. In summary, if an investor were to buy shares in one of the comparable firms, and if that firm simply maintained its current dividend (no growth at all) and maintained the real value of its shares (no real growth), the expected return (from dividends and capital gains) would be 9% + 2.5% = 11.5%. This should lead one to question whether the 8.4% regulatory return on equity (also from dividends and capital gains to ensure a like-with-like comparison) would really be sufficient to attract the required amount of equity capital in the current conditions of the market for funds. Moreover, this should also lead one to re-examine any reduction in CAPM input parameter estimates, especially those that are known to be statistically imprecise.

194. Rather, the AER has effectively argued that the set of comparable firms *in toto* will be unable to maintain their current level of dividends into the future. But there is no evidence of this:

a. The forecasts for all firms from all equity analysts are for maintained or increasing dividends; and

b. The comparable firms themselves have clear statements in their annual reports about their objective and intention to maintain or increase distributions to equity holders, and about the means by which they intend to do this.

Conclusion

195. In summary, the allowed regulatory return in the Envestra Draft Decision is materially lower than the return available on comparable investments, unless one assumes that those comparable investments will be unable to maintain their current level of dividends into the future. That is, the allowed return is not commensurate with prevailing conditions in the market for funds, unless one assumes (as the Envestra Draft Decision does) that comparable firms will have to halve their dividends in future. Consequently, whether or not the regulatory test of whether the allowed return is commensurate with the prevailing conditions in the market for funds is satisfied appears to hinge on the reasonableness of this assumption. Our view is that it is wrong to make the assumption that comparable firms will have to halve their dividends into the future as such an assumption is unsupported by any evidence and contradicted by the available evidence.

Comparability of companies selected

196. Our Envestra report uses the same six comparable firms that the AER has used as the basis for its beta estimation and for other purposes including considerations of capital structure and credit ratings. In relation to forecasts of dividend yields, the Envestra Draft Decision concludes that at least one of the firms in this set of firms is not comparable and consequently that the forecasts of equity analysts cannot be relied upon:

> The AER further considers that broker report forecasts can not be relied upon as the firms analysed are not reflective of the benchmark service provider. For instance, the broker reports suggest that Envestra's gearing ratio is approximately 71 per cent, which is well above 60 per cent assumed for the benchmark service provider. The higher actual gearing of Envestra would be expected to move the equity return upward relative to an equity return based on a benchmark 60 per cent gearing.[76]

197. In response to the Envestra Draft Decision's conclusion on this issue, we note that:

[76] Envestra Draft Decision, p. 263.

a. Our report uses the same set of comparable firms as the AER uses as the basis for estimates of other parameters, such as equity beta;

3. The results and conclusions are unchanged if Envestra, which is the only firm that is mentioned in this regard in the Envestra Draft Decision, is removed from the sample; and

4. It is unclear that higher gearing does lead to higher dividend yields. The Envestra Draft Decision correctly notes that higher gearing results in a higher expected return on equity. But that gearing itself constrains the firm's ability to pay dividends. In the extreme, equity in a firm that continued to increase gearing to the point that cash inflows were only just sufficient to meet interest payments would be very risky and require a high return (other things equal), but none of this return could be paid in the form of dividends.

Updated broker research reports

198. The Envestra Draft Decision states that the most recently available data should be used for the purpose of determining the allowed return:

> Further, the AER considers the majority of the broker reports provided are outdated and maybe of limited use in estimating the cost of equity for the 2011-2016 access arrangement period. Given that broker reports usually provide 3 year forecasts, Envestra latest broker report (28 April 2008) would be of limited use in determining capital appreciation and dividend yield forecasts that are expected to prevail over the 2011-16 period. The AER questions why SFG did not use more up to date broker reports in its analysis when assessing the cost of capital.[77]

199. We agree that the most up-to-date data should be used for the estimation of all parameters and have now obtained a set of the most recently available broker research reports. These updated figures are set out in Section 2 above.

[77] Envestra Draft Decision, p. 262.

Appendix 3: Response to ERA Draft Decision

Overview and context

200. The recent DBP Draft Decision[78] rejects the use of equity research analyst reports as a cross-check for whether the regulator's estimate of the required return on equity (which is based on the regulator's estimates of input parameters) is commensurate with the prevailing conditions in the market for funds. In support of this position, the ERA argues that:

> While forecasters have been reluctant to evaluate their own performances, there exists enough evidence to say that the record of economic forecasting is not encouraging.[79]

201. From this, the ERA draws the following conclusion:

> Given the poor record of economic forecasting on which the brokers' research reports are based, the Authority is of the view that it is inappropriate to use the brokers' research reports to derive an estimated cost of equity, particularly for a period with a high level of uncertainty.[80]

202. In our view, this conclusion is unjustified for the following reasons:

a. No evidence is presented to support the assertion that there is a "poor record of economic forecasting on which the brokers' research reports are based." The Draft Decision merely presents a time series graph of dividend yields, real GDP growth rates and inflation and then reports the standard deviation of each series. This is no way supports the assertion of a poor record;

5. As set out in Paragraphs 202 to 208 below, the point being made in our previous report remains even with *no* forecasts at all. One can simply take the *current* dividend yield based on the current dividend payment and the current stock price, all of which is directly observable. The point is that if the comparable firms continue to pay the same dividend that they are currently paying, investors can earn materially higher returns from those comparable firms than they are allowed from the benchmark firm; and

6. The conclusion in the DBP Draft Decision is based on the present market conditions being characterised as "a period with a high level of uncertainty," but when considering the market risk premium, the ERA concluded that the turmoil associated with the financial crisis was now having zero effect on financial markets.

Role of this analysis is as a cross-check

203. As set out in Section 1 above, it is important to note that our goal in this report is not to produce a point estimate of the allowed return on equity. Rather our purpose is to produce a conservative estimate of the return that a reasonable investor may reasonably expect to receive from an investment in a comparable firm. We then compare the regulator's allowed return with this conservative estimate of the returns available from comparable firms to determine whether the

[78] DBP Draft Decision, pp. 130 – 131.
[79] DBP Draft decision, Paragraph 452.
[80] DBP Draft decision, Paragraph 457.

regulator's process for estimating the allowed return has produced an estimate that is commensurate with the prevailing conditions in the market for funds.

Use of broker forecasted dividend yields

204. Contrary to the suggestion in the DBP Draft Decision, our approach does not require that analysts are able to accurately forecast dividend yields, inflation and GDP growth. Rather, our intention in presenting information from analysts' research reports was merely to demonstrate that even *the most conservative estimates* that could reasonably be derived from these reports exceed the allowed return on equity proposed in the DBP Draft Decision.

205. As outlined in Section 3 above, our previous DBP report notes that analysts' forecasted dividend yields provide a useful estimate of market expectations, but that for various reasons, one should not rely on the 12-month price forecasts, except to note that no analysts were expecting a price decline in any of the set of comparable firms. We concluded that:

> …we place little weight on the forecasts of price appreciation other than to note that they are uniformly positive on average. That is, the equity research analysts are of the view that the stock prices of the comparable firms will be increasing over time. This implies that *the return in the form of dividends must be considered to be an absolute lower bound for the return available to shareholders in the comparable firms* – shareholders will receive the dividend yield and there is expected to be some stock price appreciation in addition to that.[81]

206. Our previous DBP report thus presents estimates of the forecast dividend yield as an estimate of the absolute lower bound for the return available to shareholders in comparable firms.

207. An even more conservative estimate of the absolute lower bound for the required return on equity is the realised dividend yield in the most recent year. Importantly, this statistic is directly observable and, accordingly, is not subject to any problems of estimation error that could affect any forecast. Table 9 below summarises the dividend yields of comparable firms by firm and year. The first column presents the realised dividend yield in the most recent year, while the second, third and fourth columns present analysts' dividend yield forecasts for each of the first, second and third forecast years respectively. Each cell contains the average dividend yield forecast across brokers.

Table 9. Average dividend yield by firm and year

	2010A	2011E	2012E	2013E	Average
APA	8.48	8.46	8.87	9.30	8.78
DUE	11.86	11.94	12.01	12.03	11.96
ENV	9.40	9.56	9.56	9.63	9.54
HDF	7.29	6.36	6.48	6.39	6.63
SKI	9.40	9.00	9.20	9.40	9.25
SPN	11.51	8.02	8.16	8.35	9.01
Average	**9.66**	**8.89**	**9.05**	**9.18**	**9.20**

Source: Broker research reports

208. The average realised dividend yield across all comparable firms in the most recent year is 9.66%, while the average dividend yield across the entire historic and forecast period is 9.20%. Note that, with the exception of DUET Group and Envestra, the one-year ahead forecast dividend yield for

[81] SFG (2010), Paragraph 28.

each of the firms is lower than the realised dividend yield in the last year. This simply reflects the analysts' expectation of share prices increasing at a faster rate than dividends.

209. In summary, if an investor were to buy shares in one of the comparable firms, and if the firm simply maintained its current dividend – with no growth in dividends over time and with no increase in the stock price, ever – that investor would receive a return of 9.66% p.a. on average.

210. This is materially higher than the 8.4% that is available to investors from dividends *and* capital gains *combined* under the DBP Draft Decision, as set out in Paragraph 122 and the Appendix. In our view, the fact that an investor can reasonably expect to receive a materially higher return from an investment in a comparable firm suggests that the allowed return in the DBP Draft Decision is not commensurate with the prevailing conditions in the market.