Regulatory estimates of gamma in light of recent decisions of the Australian Competition Tribunal

Report prepared for DBP

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Executive summary and conclusions

Instructions and background

1. This report has been prepared by Professor Stephen Gray, Professor of Finance at the University of Queensland Business School and Managing Director of SFG Consulting (SFG), a corporate finance consultancy specialising in valuation, regulatory and litigation support advice.

2. For the purposes of preparing this report I was provided with a copy of the Federal Court *Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia* dated 5 May 2008. I have reviewed those guidelines and this report has been prepared consistently with the form of expert evidence required by those guidelines. In preparing this report, I have made all the inquiries that I believe are desirable and appropriate and no matters of significance that I regard as relevant have, to my knowledge, been withheld.

3. SFG has previously been engaged by DBNGP (WA) Transmission Pty Ltd (**DBP**) to provide a report in relation to the estimation of the gamma parameter (**previous report**). That report was dated 13 May 2011 and was titled *A regulatory estimate of gamma under the National Gas Rules: response to Draft Decision*.

4. For the current report, we have been asked to address the issue of how, if at all, the recent findings of the Australian Competition Tribunal (the **Tribunal**) affect our conclusions in relation to what represents an appropriate range for the estimate of gamma under the National Gas Rules.

Conclusions on key issues

5. Our main conclusions in this report are that:

   a. The Tribunal has recently determined that:

      i. The best available estimate of the distribution rate is 70% and there is no evidence to support a higher value;

      ii. The best available dividend drop-off estimate of theta is 0.35; and

      iii. These two parameters produce an estimate of gamma of 0.25;

   b. Given the Tribunal's findings, there is no support for the adoption of a gamma estimate above 0.25;

   c. In determining the best available dividend drop-off estimate, leading to its gamma estimate of 0.25, the Tribunal did not have reason to specifically consider the issues of internal consistency and market practice set out below in this report. Both of these issues provide reasons for using a gamma value of zero:

      i. The standard market practice is to make no adjustment in relation to franking credits when estimating WACC; and

      ii. If the dividend drop-off analysis was performed on the basis that cash dividends were fully valued (to be consistent with the fact that the CAPM estimates the required return on equity on the basis that cash dividends are fully valued) the resulting estimate of theta (and consequently of gamma) is zero.

6. For the reasons set out above, and in our earlier report, our conclusion is that an appropriate range for the point estimate of gamma is 0 to 0.25. We note that a value at the lower end of this range is:

   a. consistent with market practice;

   b. consistent with the ERA's approach in estimating the required return on equity; and

   c. consistent with the estimate presented in Cannavan, Finn and Gray (2004), which is the only estimate published in a journal that is rated A* by the Australian Research Council.

If a value toward the top end of the range is to be used, the corresponding 0.85 value of cash dividends must be used throughout the WACC estimation process.

1. The framework for estimating gamma

7. In its recent Draft Decision, the ERA concluded that gamma should be estimated as the product of two components: the distribution rate or franking credit "payout ratio" (F) and the value of distributed credits (θ). That is, gamma is to be estimated as $\gamma = F \times \theta$:

> It is widely accepted that the approach adopted by regulators across Australia to define the value of imputation credits, known as "gamma" (γ), is in accordance with the Monkhouse definition. There are two components of gamma:
> • the payout ratio (F); and
> • theta (θ).[1]

8. We agree with the ERA that this is the standard and appropriate way to estimate gamma. Consequently, estimates are required for the distribution rate or payout ratio (F) and the value of distributed credits (θ).

9. As set out in the following section of this report, it is now commonly agreed that an appropriate estimate of the payout ratio (F) is 0.7. This leaves the task of estimating the value of distributed credits (θ). Three methods have been proposed in the empirical literature for the purpose of estimating theta:

   a. Distribution rates from aggregate tax statistics;

   b. Inferences drawn from the simultaneous prices of related securities, one of which entitles the holder to receive a dividend (and the associated franking credit) and one of which does not; and

   c. Dividend drop-off analysis.

10. Our earlier report, notes that aggregate tax statistics cannot be used to produce an estimate of theta. They can only be used to produce an upper bound that can be used as a cross-check of the reasonableness of an estimate produced by some other means. In particular, the Australian Competition Tribunal has recently addressed the use of tax statistics studies, holding that the result of such a study would be relevant, but that:

> its relevance could only be related to the fact that it was an upper bound. No estimate that exceeded a genuine upper bound could be correct. Thus the appropriate way to use the tax statistics figure was as a check.[2]

11. The Tribunal has further held that:

> the tax statistics figure did no more than confirm that the [dividend drop-off] figure was not to be ruled out as being too high, ie higher than the correct figure could possibly be,[3]

[1] Draft Decision, Paragraph 661.
[2] Australian Competition Tribunal, [2010] ACompT 7, Paragraph 91.
[3] Australian Competition Tribunal, [2010] ACompT 7, Paragraph 92.

and that the Australian Energy Regulator (**AER**) had made "an error of logic"[4] in using the tax statistics figure as an *estimate* of theta.

12. Consequently, consistent with the findings of the Tribunal, tax statistics should only be used as an upper bound check on estimates of theta that are based on market data. That is, the correct approach is to estimate theta using market data and then to check that the resulting estimate is not higher than the theoretical upper bound based on tax statistics.

13. This leaves the simultaneous security price method and the dividend drop-off method for estimating theta. In the recent proceedings before the Tribunal, neither the AER nor the Applicants (ENERGEX, ETSA Utilities and Ergon Energy) sought to rely on estimates using the simultaneous security price method. This is likely due to the fact that the studies that employ this approach have used at least some data from the period before the July 2000 tax law change that resulted in unused franking credits being rebatable. This left the Tribunal to consider only dividend drop-off analysis and, as set out in the following section, to order that a "state-of-the-art" dividend drop-off analysis be performed for its use.

14. Dividend drop-off analysis seeks to infer the value of cash dividends and franking credits by examining stock price changes on ex-dividend days.[5] The amount by which stock prices change (on average) is assumed to reflect the value of the dividend and franking credit that has separated from the shares.

15. This is implemented via regression analysis whereby the stock price changes are compared with dividends and franking credits as follows:

$$\Delta P = aD + \theta FC + \varepsilon$$

where ΔP represents the change in stock price, D represents the amount of the cash dividend, FC represents the amount of franking credits, and ε is a residual term that represents the extent to which the stock price might change for reasons other than the payment of the dividend and franking credit.

16. In this analysis, a is the estimated value of a \$1 dividend and θ is the estimated value of a \$1 franking credit. At the present 30% corporate tax rate, a \$1 fully-franked dividend will have \$0.43 of franking credits attached to it. If both are fully valued by investors, a and θ would both equal one and on average the stock price would fall by \$1.43 on the ex-date, where:

$$\begin{aligned}\Delta P &= aD + \theta FC \\ &= 1\times 1 + 1\times 0.43 \\ &= 1.43.\end{aligned}$$

17. Different researchers will estimate a and θ using slight variations of the equation above,[6] but the essence of what is being estimated is described by the equation above – on average the stock price is expected to change by the market's assessment of the combined value of the dividend and franking credit. The estimate of θ is expected to be less than 1 since franking credits are of no value to a material number of investors (non-residents) and even those investors who can

[4] Australian Competition Tribunal, [2010] ACompT 7, Paragraph 93.

[5] These are days on which the dividend and associated franking credit separate from the shares. An investor who buys the shares prior to the ex-date is entitled to receive the dividend and franking credit, but an investor who buys the shares after the ex-date is not.

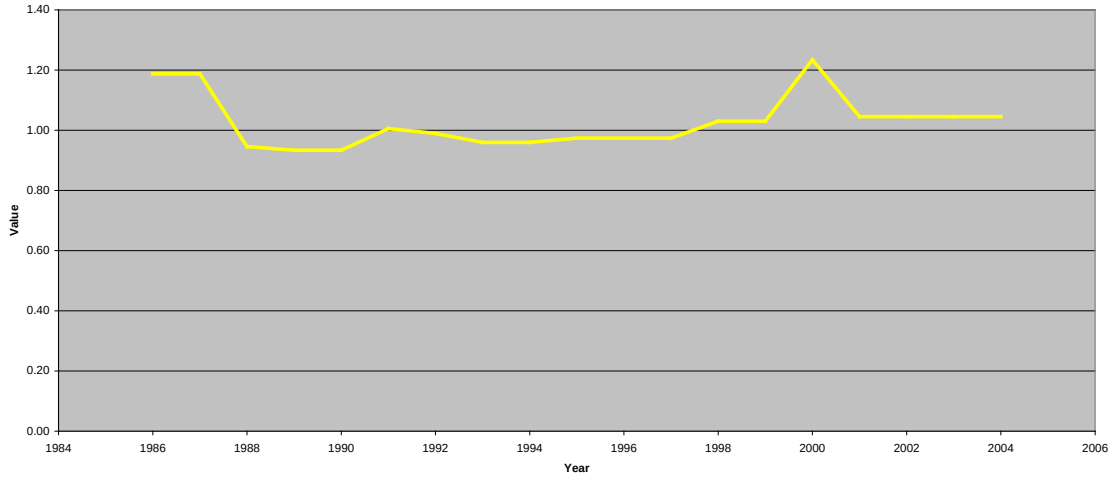
[6] For example, Hathaway and Officer divide both sides of the equation by *D* to scale by the amount of dividends.

redeem them must wait until after the end of the tax year. Predictions about the estimate of a are less clear. Some investors are taxed at a higher rate on dividends than on capital gains (in which case dividends would be relatively less valuable) but other investors are taxed equally on dividends and capital gains. Ultimately, of course, the selection of appropriate values for a and θ is an empirical question that must be answered with reference to market data.

18. The first point to note when interpreting the empirical evidence from dividend drop-off analyses is that there is essentially uniform agreement among the various studies that for a fully-franked dividend the $1.00 dividend and the $0.43 franking credit that is attached to it have a combined value of about $1.00.

19. For example, Beggs and Skeels (2006) compute this combined value over various different time periods, producing the results in the figure below.

Combined Value of Dividend Plus Franking Credit – Beggs and Skeels



Source: Beggs and Skeels, Table 5, p. 247. Computed as estimated value of cash dividend × 1.00 + estimated value of franking credit × amount of franking credit.

20. This figure shows that the estimate of the combined value of a $1.00 dividend and the associated franking credit is very close to $1.00 for almost all of the period examined. The only exceptions to this are the first year of the sample and the year prior to 30 June 2000. These unusual spikes imply economically unreasonable results (e.g., cash dividends being valued at substantially more than their face value) are highly likely to be due to estimation error. For this reason, we disregard those two points at this stage and conclude that the combined value of a $1.00 cash dividend plus the associated franking credit is consistently close to $1.00 over time.

21. Hathaway and Officer (2002) perform separate estimates for different kinds of companies, based on size and sector. For all of the subsets of companies that they examine, the estimated combined value of cash dividend plus franking credit is close to one. This is summarised in the table below.

Combined Value of Dividend Plus Franking Credit – Hathaway and Officer (2002)

Sector	Small Companies	Large Companies	All Companies
Industrials	0.97	1.11	1.02
Resources	1.00	1.00	1.00
All	0.97	1.08	1.02

Source: Hathaway and Officer (2002), Table 1, p. 17. Computed as estimated value of cash dividend × 1.00 + estimated value of franking credit × amount of franking credit.

22. The table above shows clearly that for all types of companies examined, the combined value of a $1.00 cash dividend plus the associated franking credit is close to $1.00.

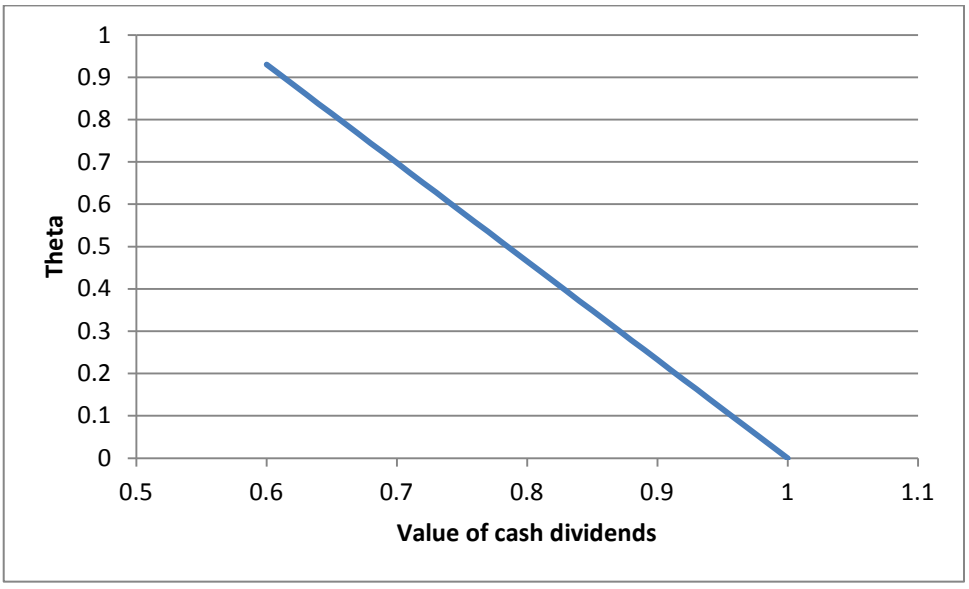
23. The "state-of-the-art" dividend drop-off study performed by SFG (2011) at the direction of the Australian Competition Tribunal also estimates the combined value of a $1.00 dividend and the associated 43 cent franking credit to be $1.00.

24. Having determined that the combined value of a $1.00 cash dividend plus the associated 43 cent franking credit is approximately $1.00, the next task is to determine how much of that $1.00 value is attributable to the $1.00 dividend and how much is attributable to the 43 cent franking credit. For example, if the $1.00 cash dividend is considered to contribute 85 cents of value, the remaining 15 cents of value must be due to the franking credit. Consequently, the 43 cent franking credit would have contributed 15 cents of value, which implies that franking credits are valued at 35% (15/43) of their face value and theta would be estimated to be 0.35.

25. If the $1.00 cash dividend is considered to contribute 90 cents of value, the remaining 10 cents of value must be due to the franking credit, which implies a theta estimate of 0.23 (10/43).

26. That is, the estimate of theta is conditional on the value that is ascribed to cash dividends. A higher valuation of cash dividends leads to a lower value of theta. There are many different pairs of estimates of the value of cash dividends and the value of theta that produce a combined value that is approximately $1.00, consistent with all of the empirical evidence. These pairs of estimates are set out in the figure below. When cash dividends are valued at close to their face value, the corresponding estimate of theta is close to zero.

Corresponding values of cash dividends and theta



27. In summary, the combined value of a $1.00 cash dividend plus the associated franking credit is approximately $1.00. For a particular value of cash dividends, the corresponding estimate of theta can be derived as in the figure above. This, of course, requires an estimate of the value of cash dividends.

28. One approach for estimating the value of cash dividends is to examine unfranked dividends. These are dividends that have been paid out of foreign-sourced profits and which have no franking credits attached to them. Since these dividends involve the payment of cash only, they can be used to estimate the value of cash dividends. It is this approach for tying down the value of cash dividends that is implicitly used in dividend drop-off analysis.

29. However, the number of unfranked dividends is very small relative to the number of franked dividends and the great majority of unfranked dividends are paid by property trusts. This has led to the examination of other approaches for estimating the value of cash dividends including:

    a. Setting the value of cash dividends to be 100 cents in the dollar, which is what is done whenever the standard CAPM is used to estimate the required return on equity; and

    b. Estimating the value of cash dividends using US data where *all* firms pay unfranked (cash only) dividends.

30. Whatever approach is used to estimate the value of cash dividends, the value of theta is such as to make the combined value of a $1.00 cash dividend plus the associated franking credit equal to $1.00. Consequently, every estimate of theta is conditional on the estimate of the value of cash dividends on which it is based.

2. Recent findings of the Australian Competition Tribunal

31. The Tribunal has recently made certain findings in relation to the estimation of the gamma parameter. This section of the report reviews those findings.

Distribution rate

32. The distribution rate is the ratio of (a) the total amount of franking credits distributed to shareholders in a given year, to (b) the total amount of franking credits created in a given year.

33. In proceedings before the Tribunal, the AER has recently revised its position on an appropriate estimate of the distribution rate. In those proceedings, the AER acknowledged that an estimate above 0.7 was unsupportable and therefore that the distribution rate should be set to 0.7. In summarising the AER's position on this issue, the Tribunal stated that:

> The AER accepts that on the material presently before the Tribunal, there is no empirical data that is capable of supporting an estimated distribution ratio higher than 0.7. The AER therefore accepts that it is open to the Tribunal to adopt a substitute distribution ratio of 0.7.[7]

34. The Tribunal then concluded and ordered that:

> In light of these submissions and the material before the Tribunal, the tribunal concludes that the distribution ratio is 0.7 for the calculation of gamma.[8]

Dividend drop-off estimate of theta

35. The theta parameter estimates the value, to the relevant shareholder, of a dollar of franking credits that has been distributed to them. Different shareholders will place a different value on the franking credits that are distributed to them. Resident shareholders can use franking credits to reduce their personal tax obligations, whereas non-resident shareholders obtain no benefit from franking credits. Theta represents the extent to which trading among all market participants results in some value in relation to franking credits being impounded into the stock price.

36. A number of techniques have been proposed for empirically estimating theta. In the recent proceedings before the Tribunal, only one technique was considered – the dividend drop-off technique. That technique estimates the value of theta by comparing the changes in stock prices over the ex-dividend day to the amount of the dividend and the amount of the associated franking credit.

37. There are a number of variations of the dividend drop-off methodology and the recent proceedings before the Tribunal centred around the specific question of the determination of the best available dividend drop-off methodology. The Tribunal directed that SFG should conduct a "state-of-the-art" dividend drop-off study to assist the Tribunal.[9] The Tribunal also directed that the dividend drop-off study to be performed by SFG "should employ the approach that is agreed

[7] Australian Competition Tribunal [2010] ACompT 9, Paragraph 2.
[8] Australian Competition Tribunal [2010] ACompT 9, Paragraph 4.
[9] Australian Competition Tribunal [2010] ACompT 7, Paragraph 146.

upon by SFG and the AER as best in the circumstances."[10] A set of Terms of Reference were agreed upon and the study was performed by SFG.

38. A key feature of dividend drop-off studies is that they produce joint estimates of two parameters:

a. The estimated value of cash dividends; and

b. The estimated value of distributed franking credits, theta.

39. The SFG report that sets out the results of the state-of-the-art study is explicit about this point – the estimate of theta from the dividend drop-off analysis (0.35) is paired with an estimate of the value of cash dividends:

> Finally, it is important to note that dividend drop-off analysis produces estimates of two parameters: theta and the value of cash dividends. That is, the estimates from drop-off analysis come in pairs. The point estimate of 0.35 for theta is not independent of the estimated value of cash dividends. Rather the estimate of 0.35 for theta corresponds with an estimate in the range of 0.85 to 0.90 for the value of cash dividends.[11]

40. The Tribunal also explicitly recognises that the estimate of theta is one part of a pair of estimates:

> SFG's March 2011 report proposes an estimate of 0.35 for theta. This estimate is paired with an estimate, produced in the same statistical procedure, of the value of cash dividends in the range of 0.85 to 0.90.[12]

41. The Tribunal then accepted the estimates from the SFG state-of-the-art study:

> In respect of the model specification and estimation procedure, the Tribunal is persuaded by SFG's reasoning in reaching its conclusions. Indeed, the careful scrutiny to which SFG's report has been subjected, and SFG's comprehensive response, gives the Tribunal confidence in those conclusions.[13]

Scope of Tribunal decision

42. It is important to note that the Tribunal has ruled on only the specific matters before it. The matter in dispute in the Tribunal's final Reasons for Decision concerned the dividend drop-off estimate of theta. The Tribunal's Reasons set out its findings on that specific matter:

> The Tribunal is satisfied that SFG's March 2011 report is the best dividend drop-off study currently available for the purpose of estimating gamma in terms of the Rules.[14]

and

[10] Australian Competition Tribunal [2010] ACompT 7, Paragraph 147.
[11] SFG Final Report (2011), Paragraph 102.
[12] Australian Competition Tribunal [2011] ACompT 9, Paragraph 14.
[13] Australian Competition Tribunal [2011] ACompT 9, Paragraph 22.
[14] Australian Competition Tribunal [2011] ACompT 9, Paragraph 29.

> The Tribunal finds itself in a position where it has one estimate of theta before it (the SFG's March 2011 report value of 0.35) in which it has confidence, given the dividend drop-off methodology. No other dividend drop-off study estimate has any claims to be given weight vis-à-vis the SFG report value.[15]

43. Having determined that the appropriate distribution rate is 70% and that the best dividend drop-off estimate of theta is 0.35, the Tribunal had no more work to do other than to multiply these two estimates together to obtain a gamma estimate of 0.25:

> Taking the values of the distribution ratio and of theta that the tribunal has concluded should be used, viz 0.7 and 0.35, respectively, the Tribunal determines that the value of gamma is 0.25.[16]

[15] Australian Competition Tribunal [2011] ACompT 9, Paragraph 38.
[16] Australian Competition Tribunal [2011] ACompT 9, Paragraph 42.

3. Consistency

Summary of issue

44. In our previous report, we noted that in previous AER Decisions, inconsistent estimates of the value of cash dividends are used in two places in the AER's reasoning:

    a. The AER's empirical estimates of theta (and consequently gamma) are conditional on an estimated value of cash dividends of 75-80 cents per dollar (i.e., dividend drop-off analysis estimates a pair of estimates, theta *and* the value of cash dividends – the estimate of theta is conditional on the particular estimate of the value of cash dividends); whereas

    b. The AER's estimate of the required return on equity using the CAPM is conditional on cash dividends being valued at 100 cents per dollar.

45. It is clear that both Handley (2008) and the AER have accepted that there is such an inconsistency:

> Handley agrees with SFG that the empirical evidence from dividend drop-off studies – that cash dividends are less than fully valued – presents an apparent inconsistency with the standard CAPM.[17]

46. Moreover, Handley (2009, p.29) notes that the AER has:

    a. Relied upon US dividend yield studies to conclude that dividends are valued at 100 cents per dollar in supporting its use of the standard CAPM in one step of the WACC estimation exercise; and

    b. Relied upon drop-off studies to conclude that dividends are less than fully valued (75-80 cents per dollar) when estimating gamma.

47. Handley (2009, p.29) also notes that this "at first appears to be an inconsistency." He then notes that the AER is "not concerned with" this inconsistency because it is using different estimates of the value of dividends in the two different steps of its WACC estimation exercise:

> i.e. US dividend yield studies in relation to the CAPM and drop-off studies in relation to gamma.[18]

48. On this point, the Draft Decision summarises the Handley and AER views and concludes that:

> Based on the above considerations, the Authority is of the view that there is no inconsistency when the estimates of the value of cash dividends are used differently: (i) 75-80 cents per dollar when theta (then gamma) is estimated and (ii) 100 cents per dollar when return on equity is estimated.[19]

49. It is difficult to interpret what the ERA means when it states that there is "no inconsistency" when, in the same sentence, it also states that a different value has been used for the same

[17] AER Review of WACC Parameters, Explanatory Statement, p. 335.
[18] Handley (2009, p. 29).
[19] Draft Decision, Paragraph 657.

parameter in two places in the WACC estimation. We interpret this conclusion in light of the Handley and AER views on the matter – that inconsistent estimates of the value of cash dividends have been used in two places in the WACC estimation, but that the ERA concludes that such an inconsistency is permissible or even appropriate.

Consistent use of parameter estimates

50. Our view is that it is neither permissible nor appropriate to use different values for the same parameter in two places in the same WACC estimation, for the reasons set out by the Australian Competition Tribunal in the *GasNet* case.[20] Consequently, the same estimate of the value of cash dividends should be used consistently throughout the WACC estimation process.

51. The Tribunal is clear that its preferred dividend drop-off estimate of theta, 0.35, is conditional on cash dividends being valued at 85 to 90 cents in the dollar:

> SFG's March 2011 report proposes an estimate of 0.35 for theta. This estimate is paired with an estimate, produced in the same statistical procedure, of the value of cash dividend in the range of 0.85 to 0.90.[21]

52. Consequently, if the Tribunal's estimate is to be adopted, internal consistency requires that the value of cash dividends must be set to 0.85-0.90 throughout the WACC estimation process. That is, the allowed revenues should be set on the basis that every dollar of dividends that is paid by the benchmark regulated firm is valued by investors at 85 to 90 cents.

53. It would be inconsistent to adopt the Tribunal estimate of gamma (which is conditional on cash dividends being valued at 85-90 cents in the dollar) but then to assume (in the same WACC calculation) that dividends paid by the benchmark regulated firm are valued by investors at full face value.

Restoring consistency

54. An inconsistency arises if a different estimate of the value of cash dividends is used in two places in the same WACC estimation exercise. Clearly, consistency is restored by using the same estimate in both steps. Logically, there are two possibilities:

    a. Use an estimate of the value of cash dividends of 100 cents in both steps of the WACC estimation; or

    b. Use an estimate of the value of cash dividends of 85-90 cents in both steps of the WACC estimation.

55. If consistency is to be restored, one of these courses of action must be taken.

56. If the value of cash dividends is to be set to 100 cents in both steps of the WACC equation:

    a. The required return on equity would be estimated using the standard CAPM, which imposes that dividends are valued at 100 cents in the dollar; and

[20] Re GasNet Australia (Operations) Pty Ltd [2003] ACompT 6 (23 December 2003), Paragraphs 46-47.
[21] Australian Competition Tribunal [2011] ACompT 9, Paragraph 14.

b. The dividend drop-off estimate of theta would also have to be estimated in a way that imposes that cash dividends are valued at 100 cents in the dollar.

57. The state-of-the-art SFG dividend drop-off study reports an estimate of the value of cash dividends of 85-90 cents in the dollar and an estimate of theta of 0.35. Since there are 43 cents of franking credits attached to every dollar of fully-franked dividends, the combined value of the cash dividend and the associated franking credit is:

$$0.85 + 0.35 \times 0.43 = 1.00 .$$

58. That is, the combined value of a one dollar cash dividend and the associated 43 cent franking credit is one dollar. If theta is to be estimated in a way that is consistent with cash dividends being fully valued, the estimate of theta is zero – the entire one dollar of combined value is attributed to the cash dividend in that case.

59. Consequently, if consistency is to be restored by using an estimate of the value of cash dividends of 100 cents in both steps of the WACC estimation, the appropriate (consistent) estimate of theta is zero. This, in turn, implies an estimate of zero for gamma.

60. Alternatively, if consistency is to be restored by using an estimate of the value of cash dividends of 85-90 cents in both steps of the WACC estimation, the allowed revenues must be increased to reflect the assumption that dividends are only valued by investors at 85-90 cents in the dollar.

61. In summary, restoration of consistency requires that the same estimate of the value of cash dividends should be used in both steps of the WACC estimation exercise. The remaining question is whether that estimate should be 100 cents in the dollar or 85-90 cents in the dollar. In a previous report for the Energy Networks Association,[22] we set out a number of reasons to support the use of an estimate of 100 cents in the dollar. Those reasons are set out in Appendix 1. If that estimate of the value of cash dividends is adopted throughout the WACC estimation process, the corresponding estimate of theta is zero. If that estimate of the value of cash dividends is rejected in favour of an estimate of 85-90 cents in the dollar, that same lower estimate must be used consistently in both steps of the WACC estimation process.

[22] SFG (2009), *The consistency of estimates of the value of cash dividends*, 1 February 2009.

4. Market practice

Market practice is to make no adjustment in relation to franking credits

62. In our earlier report, we summarised the relevant evidence about market practice as follows:

a. The great majority of independent expert valuation reports make no adjustment at all to either cash flows or discount rates to reflect any assumed value of franking credits (Lonergan, 2001; KPMG, 2005);

b. The great majority of CFOs of major Australian companies (who between them account for more than 85% of the equity capital of listed Australian firms) make no adjustment at all to either cash flows or discount rates to reflect any assumed value of franking credits (Truong, Partington and Peat, 2008); and

c. Published Queensland Government Treasury valuation principles require government entities to make no adjustment at all to either cash flows or discount rates to reflect any assumed value of franking credits (OGOC, 2006).

63. We also noted that credit rating agencies such as Moody's and Standard and Poor's also make no adjustments in relation to franking credits to any quantitative metric that they compute when developing credit ratings for Australian firms.

64. It is generally accepted that market practitioners make no adjustment in relation to franking credits when estimating WACC or firm values. For example, Handley explicitly states that:

> there is no disagreement concerning what experts do.[23]

65. Our earlier report also addresses the interpretation of survey evidence on this issue and the contention that practitioners may use an approach that does not require the explicit estimation of gamma. In particular, our earlier report concluded that:

> It is generally accepted that market practitioners make no adjustment in relation to franking credits. This is consistent with theta, and consequently gamma, being set to zero. The Draft Decision argues that an alternative reason for practitioners making no adjustment is that they use an approach that does not require an estimate of gamma. If that is the case:
>
> (a) The regulator should look at the estimates from that alternative approach, at least as a cross-check for the estimates that it obtains using the regulatory approach; and
>
> (b) In using the two-step regulatory approach, the regulator should ensure that the inclusion of the assumed value of franking credits in the first step, and the removal of the same assumed value of franking credits in the second step are consistent with each other.[24]

[23] Handley (2009), p. 3.
[24] SFG Final Report (2011), Paragraph 7e.

Relevance to current report

66. For the purposes of the current report, we note that:

a. Market practice is to make no adjustment in relation to franking credits when estimating WACC; and

b. Market practice was not an issue that concerned the Tribunal in determining the best dividend drop-off estimate of theta.

5. Conclusions

67. Our main conclusions are:

a. The Tribunal has recently determined that:

i. The best available estimate of the distribution rate is 70% and there is no evidence to support a higher value;

ii. The best available dividend drop-off estimate of theta is 0.35; and

iii. These two parameters produce an estimate of gamma of 0.25;

b. Given the Tribunal's findings, there is no support for the adoption of a gamma estimate above 0.25;

c. In determining the best available dividend drop-off estimate, leading to its gamma estimate of 0.25, the Tribunal did not have reason to specifically consider the issues of internal consistency and market practice set out above in this report. Both of these issues provide reasons for using a gamma value of zero:

i. The standard market practice is to make no adjustment in relation to franking credits when estimating WACC; and

ii. If the dividend drop-off analysis was performed on the basis that cash dividends were fully valued (to be consistent with the fact that the CAPM estimates the required return on equity on the basis that cash dividends are fully valued) the resulting estimate of theta (and consequently of gamma) is zero.

68. For the reasons set out above, and in our earlier report, our conclusion is that an appropriate range for the point estimate of gamma is 0 to 0.25. We note that a value at the lower end of this range is:

a. consistent with market practice;

b. consistent with the ERA's approach in estimating the required return on equity; and

c. consistent with the estimate presented in Cannavan, Finn and Gray (2004), which is the only estimate published in a journal that is rated A* by the Australian Research Council.

If a value toward the top end of the range is to be used, the corresponding 0.85 value of cash dividends must be used throughout the WACC estimation process.

Declaration

69. In preparing this report, I have made all the enquiries that I believe are desirable and appropriate and no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court.

Professor Stephen Gray
20 July, 2011.

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Appendix 1: Empirical estimates of the value of cash dividends

Dividend Yield Studies

70. The dividend yield studies considered by Handley (2008) compare the average returns of high- and low-yield companies. The basis of these studies is that if dividends really are valued at less than their face value, companies with high dividend yields would have to offer higher returns, other things equal, to attract equity capital. That is, because dividends are disfavoured by investors, high-yield companies would have to offer higher returns on average.[25]

71. It is generally accepted that these studies find that there is no difference at all between the average returns of high- and low-yield companies. This suggests that investors do not differentiate between firms that provide them with returns via dividends and firms that provide returns via capital gains. Other things equal, firms require exactly the same return whether it is provided as a dividend or as a capital gain. In other words, dividends are valued at 100 cents per dollar. Handley (2008) cites a recent paper by Graham, Michaely and Roberts (2003) which concludes that:

> a growing body of evidence shows that within static, single period equilibrium models, there is no convincing evidence of a significant cross-sectional relation between stocks' returns and their dividend yields.[26]

72. The implication of this evidence is that cash dividends are valued at 100 cents per dollar. This is consistent with the CAPM, which estimates the required return on equity conditional on cash dividends being valued at 100 cents in the dollar.

73. We note that this is consistent with the dominant market practice, which is to not use a more complex model that allows for investors to value dividends at less than their face value. The evidence from this line of research indicates that the more complex models are unnecessary.

74. In summary, the dividend yield studies support the view that cash dividends are valued at 100 cents per dollar, which is consistent with the use of the CAPM to estimate the required return on equity conditional on cash dividends being fully valued.

US dividend drop-off studies

Interpretation of Handley (2008)

75. US dividend drop-off studies apply dividend drop-off analysis to US stocks. Since the US operates a classical tax system, there are no franking credits to complicate the analysis. Consequently, the average change in the stock price around the ex-dividend is interpreted as an estimate of the market value of cash dividends.

76. The US dividend drop-off literature is large with many papers having been written in the area. Handley (2008) interprets this literature as providing evidence that in the US market cash

[25] Of course, controls must be put in place to take account of other systematic differences between high- and low-yield stocks and this is generally done quite carefully, especially by more recent studies.
[26] Handley (2008, p. 16).

dividends are valued at less than 100 cents per dollar. In particular, he cites Graham, Michaely and Roberts (2003) in concluding that:

> in most periods examined, the average price drop is less than the dividend paid.[27]

Boyd and Jagannathan (1994)

77. However, that Handley (2008) does not cite the leading paper in this literature Boyd and Jagannathan (1994) who conclude that:

> over the last several decades, one-for-one marginal price drop has been an excellent (average) rule of thumb.[28]

78. Boyd and Jagannathan (1994) use a more robust econometric methodology that allows for non-linearities and other statistical problems that may cause estimation errors. They also use a very large sample of more than 132,000 ex-dividend events. That is, they have been very careful to provide the most robust and reliable results possible. In this regard, they note that there is:

> a significant problem confronting researchers in this area – an extremely high noise-to-signal ratio. Dividend yields vary across stocks and across time, but their variability is miniscule compared to that of daily stock returns…To illustrate these issues we estimate price drop equations annually for each of the 25 years in our sample. Simply put, the results vary enormously from year to year. The implication is that inferences based on one or a few years' data will be extremely imprecise. One solution is to examine a very long time period as is done in this study.[29]

79. That is, Boyd and Jagannathan (1994) conclude that with dividend drop-off studies it is important to apply robust econometrics to a very large data set accumulated over a long period of time. We note that this advice was not heeded by Beggs and Skeels (2006) who report separate estimates for various small sub-sets of data. Not only does the Australian market have many fewer stocks than the US, but Beggs and Skeels use a series of short data periods in their analysis. Consequently, it is not surprising that Beggs and Skeels report coefficients that vary considerably from period to period and that some of their estimates are simply implausible.[30]

80. Boyd and Jagannathan (1994) finally conclude that:

> In reviewing all the empirical results, we note that marginal ex-dividend price drop is almost always one-for-one with dividends (in the cross-section). This result is obtained with a variety of different specifications and over a period of approximately 25 years.[31]

81. That is, the conclusion from the authors of this important paper in one of the leading journals is that drop-off analysis, when properly executed (in terms the econometric specification and the

[27] Handley (2008, p. 10).
[28] Boyd and Jagannathan (1994, p. 711).
[29] Boyd and Jagannathan (1994, p. 715-716).
[30] For example, for one of their sub-samples, Beggs and Skeels (2006) report that a one dollar cash dividend is valued at $1.18.
[31] Boyd and Jagannathan (1994, p. 716).

sample size) leads to the conclusion that cash dividends are fully valued. In a setting in which there are no franking credits, a one dollar cash dividend results in a drop-off of one dollar.

Graham, Michaely and Roberts (2003)

82. In concluding that US drop-off analyses support the conclusion that cash dividends are less than fully valued, Handley (2008) cites the work of Graham, Michaely and Roberts (2003) who examine dividend drop-offs over three sub-periods. US stocks traded in increments of an eighth of a dollar during the first period, sixteenths of a dollar during the second, and in increments of a cent during the third. The authors also examine drop-off ratios for companies grouped by dividend yield.

83. Table V of Graham, Michaely and Roberts (2003) reports the drop-off ratios for higher dividend yields stocks as follows:

Excerpt from Table V of Graham, Michaely and Roberts (2003)

Dividend Yield	Statistic	Sub-period 1 (eighths)	Sub-period 2 (sixteenths)	Sub-period 3 (decimal)
>2%	Mean	0.9984	1.0016	1.0218
>2%	Median	0.9868	0.9838	0.9565

Source: Graham, Michaely and Roberts (2003) Table V p. 2627.

84. This table indicates that for dividends that represent a yield of 2% or more the drop-off is essentially one-for-one. Indeed Graham, Michaely and Roberts (2003) demonstrate that all of the drop-offs in the table above are insignificantly different from 1.0. That is, Graham, Michaely and Roberts (2003) establish that dividends that represent a yield of 2% or more are valued by the market at 100 cents per dollar.

85. In our view, it is appropriate to focus on the higher-yield observations because the annual dividend yield on the firms in the ASX 200 index is in the order of 5%.[32] Since Australian firms pay dividends twice per year, the yield for each dividend event is, on average, 2.5%. Consequently, the "greater than 2% yield" category is the most appropriate for the average Australian company.

Conclusions in relation to US drop-off studies

86. In our view, the US drop-off literature supports the conclusion that the most appropriate estimate for the value of cash dividends is 100 cents per dollar. This conclusion is based on the analysis set out above:

a. Boyd and Jagannathan (1994) conclude that dividend drop-off analysis, when properly executed (in terms the econometric specification and the sample size) leads to the conclusion that cash dividends are fully valued. In a setting in which there are no franking credits, a one dollar cash dividend results in a drop-off of one dollar.

b. Graham, Michaely and Roberts (2003) also show that cash dividends are fully valued so that a one dollar cash dividend results in a drop-off of one dollar in cases where the dividend represents a yield of 2% or more. It is appropriate to focus on this result as the average actual dividend observation in Australia is greater than 2%.

[32] Of course, the exact value varies over time as stock prices change – but historically has averaged around 5%.